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Scientific, Technical and Economic Committee for Fisheries (STECF) REVIEW OF SCIENTIFIC ADVICE FOR 2014

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PART 3 (STECF-13-26)

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SCIENTIFIC, TECHNICAL AND ECONOMIC COMMITTEE FOR FISHERIES (STECF)

REVIEW OF SCIENTIFIC ADVICE FOR 2014 – part 3 (STECF-13-26)

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

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REVIEW OF SCIENTIFIC ADVICE FOR 2014 PART 3

Introduction to the STECF Review of Advice for 2014

Background

This report represents the STECF review of advice for 2014 for stocks of interest to the European Community in areas under the jurisdiction of CCAMLR, CECAF, WECAF, ICCAT, IOTC, IAATC, GFCM, NAFO, SEAFO, SPRFMO, and ICES advice on stocks in the North East Atlantic released since 28 June 2013.

The Report was drafted by the STECF Expert Working group (EWG) 13-14 during its meeting held in Barza de Ispra, Italy from 14-18 October 2013.

The STECF review of advice for 2014 Part 1 included the latest assessments and advice for stocks in the Baltic Sea and was published in June 2014. Part 2 contained the review of assessments and advice released by ICES up to the end of June 2013 and was published in July 2013. Parts 1, 2 and 3 will be combined and published in the STECF Consolidated review of advice for 2014, which will be available in mid-November 2013.

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. For some stocks the review remains unchanged from the Consolidated Review of advice for 2013 (STECF 12-22), since no new information on the status of or advice for such stocks was available at the time the present review took place.

STECF notes that the ICES approach for data limited stocks has remained largely unchanged from that used to provide advice for 2013; the exception being for some species classified as long-lived. While the principle of the approach has not changed, for some long-lived stocks assessed using trends only, the criterion for assessing whether the proportional change in the recent period (most recent 2 years) compared to an earlier period (preceding 3 years) has been modified to compare the average of the most recent 3 years with the average for the preceding 5 years. The reasons for this approach for only a sub-set of stocks that would classify as long-lived are not specified in the ICES advice sheets.

Format of the STECF Review of advice

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.

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. For stocks assessed by ICES, the stock status is summarised in a "traffic light" table utilising various symbols to indicate status in relation to different reference points. The key to the symbols is as follows:

⛔ **- indicates an undesirable situation e.g. F is above the relevant reference point or SSB is below the relevant reference point**

✅ **- indicates a desirable situation e.g. F is below the relevant reference point or SSB is above the relevant reference point**

- indicates that the status is unknown e.g the reference point is undefined or unknown, or F or SSB is unknown relative to a defined reference point

- indicates that status lies between the precautionary (pa) and limit (lim) reference points

- indicates that the absolute level is unknown but increasing

- indicates that the absolute level is unknown but unchanged

- indicates that the absolute level is unknown but decreasing

RECENT MANAGEMENT ADVICE: summary of most recent advice.

STECF COMMENTS: Any comments STECF thinks worthy of mention, including errors, omissions or disagreement with assessments or advice.

Terms of Reference

The STECF is requested to review and comment on the scientific advice released in 2013 which has not yet been reviewed at the meeting of the EWG stock advice in July 2013, in particular for the stocks specified below[1]. The text of previous STECF reviews of stocks for which no updated advice is available shall be retained in the report in order to facilitate easy reference and consultation of one single report containing all stock advice.

STECF is requested, in particular, to highlight any inconsistencies between the assessment results and the advice delivered by scientific advisory committees of ICES and RFMOs.

In addition, when reviewing the scientific advice from ICES, and any associated management recommendations, STECF is requested to take into account Harvest Control Rules adopted in any type of multi-annual management plan and rules and principles for the setting of TACs as specified in the Commission Communication to the Council concerning a consultation on Fishing Opportunities for 2014 (COM(2013) 319 final – see supporting documentation. STECF is requested to take into account additional information on stock advice that is contained in the relevant special requests, also published on the ICES website.

Finally, STECF is requested to give special attention to the ICES advice for species where ICES provides a complementary advice option considering there will be no more discards for the relevant fisheries, all catches being landed.

[1] The list of stocks provided by the Commission to the STECF was incomplete. STECF has therefore retained the list of stocks contained in the STECF Review of advice for 1013 Part 2.

Participants

This report was prepared in draft by the STECF Expert Working Group 13-14 at its meeting in Barza de Ispra, Italy held from 4-8 October 2013. STECF acknowledges the significant contribution from the following participants:

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Contact details of the participants in the Expert group 13-14 are given in Section 19 of this report.

1 Resources of the North Sea

1.1 Northern shrimp (*Pandalus borealis*) on Fladen Ground (Division IVa)

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: In the EU zone of the North Sea, *Pandalus* on the Fladen Ground (Div. IVa) is the main shrimp stock exploited, which has been exploited. This stock has been exploited mainly by Danish and UK trawlers with the majority of landings taken by the Danish fleet. Historically, large fluctuations in this fishery have been frequent, for instance between 1990 and 2000 annual landings ranged between 500 t and 6000 t. However since 2000 a continuous declining trend is evident, and in 2004 and 2005 recorded landings dropped to below 25 t. No catches were recorded in 2006-2012. Information from the fishing industry in 2004 gives the explanation that this decline is caused by low shrimp abundance, low prices on small shrimp characteristic for the Fladen Ground and high fuel prices.

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

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

STOCK STATUS:

	F (Fishing Mortality)	
	2009–2011	
Qualitative evaluation	?	Insufficient information
	SSB (Spawning-Stock Biomass)	
	2009–2011	

Qualitative evaluation	?	Insufficient information

The available information is inadequate to evaluate stock trends. The state of the stock is therefore unknown. The stock has not been exploited since 2005.

RECENT MANAGEMENT ADVICE: There is insufficient information to evaluate the status of the stock. ICES advises on the basis of the approach for data limited stocks that catches should not increase, unless there is evidence that this will be sustainable. This corresponds to zero catches. The advice for this fishery in 2014 and 2015 is the same as the advice for 2013

Other considerations

The available information is inadequate to evaluate stock trends. The state of the stock is therefore unknown and fishing possibilities cannot be projected.

ICES approach to data-limited stocks

For data-limited stocks without information on abundance or exploitation ICES considers that a precautionary reduction of catches should be implemented, unless there is ancillary information clearly indicating that the current level of exploitation is appropriate for the stock.

For this stock, since the current landings are around zero, ICES advises that catches should not increase, unless there is evidence that this will be sustainable. This corresponds to zero catches.

Additional considerations

No fishery has existed from 2006 onwards. No new data are available on the stock.

If the landings of this fishery return to substantial levels, a data collection programme should be implemented.

STECF COMMENTS: STECF agrees with the ICES advice that on the basis of the ICES approach to data-limited stocks, catches should not increase, unless there is evidence that this will be sustainable. This corresponds to zero catches for 2014 and 2015.

1.2 Northern shrimp (*Pandalus borealis*) in Division IIIa and Division IVa East (Skagerrak and Norwegian Deeps)

FISHERIES: *Pandalus borealis* is fished by bottom trawls at 150–400 m depth throughout the year by Danish, Norwegian and Swedish fleets. Northern shrimps are mainly caught by 35–45 mm single- and twin-trawl nets (minimum legal mesh size is 35 mm). A larger number of vessels use sorting grids on a voluntary basis. The number of Danish trawlers has declined over the last 20 years, whereas the Norwegian fleet of <11 m vessels has expanded. No significant changes took place in the Swedish fishery during the last decade except for an increase in the use of twin trawls in the last two years. Because of this development (and the accompanying increase in the size of the trawls), the efficiency of the fisheries has increased.

Total landings have varied between 10,000 and 15,000 t in the period 1985- 2009. Discarding of small shrimp takes place, mainly due to high grading. Discard estimates are available since 2009 and have been included in the assessments. Overall discard percentage is around 12 %. In 2010 total catches were around 8300 t, 9000 t in 2011 and 8800 t in 2012.

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

In recent years several assessment models, including both cohort based and stock production models, have been applied for this stock. This year's advice is based on a surplus production model fitted by Bayesian methods using commercial catch and effort data and trawl survey data.

REFERENCE POINTS:

	Type	Value	Technical basis
MSY approach	MSY $B_{trigger}$	0.5 of B_{MSY}*	Relative value. B_{MSY} is directly estimated from the assessment surplus production model and changes when the assessment is updated.
	F_{MSY}	*	Relative value. F_{MSY} is directly estimated from the assessment surplus production model and changes when the assessment is updated.
Precautionary	B_{lim}	0.3 of B_{MSY}	Relative value.

approach	B_{pa}	Not defined.	
	F_{lim}	1.7 of F_{MSY}	Relative value (the F that drives the stock to B_{lim}).
	F_{pa}	Not defined.	

STOCK STATUS:

F (Fishing Mortality)				
	2010	2011	**2012**	
MSY (F_{MSY})	✓	✗	✓	At target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Not defined

SSB (Spawning-Stock Biomass)				
	2011	2012	**2013**	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	✓	✓	✓	Above limit

The assessment using a Bayesian stock production model provides relative rather than absolute measures of stock status. The assessment shows that since the beginning of the 1990s stock biomass has been above MSY $B_{trigger}$ and fishing mortality below F_{MSY}, although in recent years stock biomass approached MSY $B_{trigger}$ and F has been very close to F_{MSY}. Recruitment indices have increased from a low value in 2010.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of MSY considerations that catches should be no more than 6000 t in 2014. If discard rates do not change from the average of the last three years, this implies landings of no more than 5426 t. Additional measures should be taken to address high grading.

SPECIAL COMMENTS: ICES notes that, according to the assessment model used and adhering to the 2013 TAC, stock biomass is expected to be above MSY Btrigger in 2014. Furthermore, catches of up to10 000 t in 2014 correspond to median F2014/FMSY <= 0.97. Therefore, catches of up to 10 000 t in 2014 are considered consistent with the MSY approach. With these catches in 2014, the stock biomass is forecast to remain above MSY $B_{trigger}$ in 2015, see table below.

Catch options (2014) produced by the Bayesian production model

Catch options 2014*	**6**	**8**	**10**	**12**	**14**
Stock size (B_{2015}/B_{MSY}), median	0.84	0.81	0.78	0.76	0.73
Fishing mortality (F_{2014}/F_{MSY}), median	0.54	0.74	0.97	1.19	1.45
Probability of B_{2015} falling below B_{lim}	6%	6%	6%	7%	7%
Probability of F_{2014} exceeding F_{lim}	5%	10%	19%	29%	39%

However, ICES also notes that according to this assessment model any catch value in the range 6000–10 000 t in 2014 corresponds to a 6% probability of B(2015) being less than B_{lim}. This indicates that the probability surface is very flat and, therefore, a formal 5% probability criterion (ICES criterion) would imply a very low catch in 2014, well below any catch value observed in the last three decades, which is considered overly restrictive. However, as the assessment shows a substantial decrease in stock biomass in recent years (in line with the decreases in the Norwegian survey and commercial lpue indices), a cautious approach to the advice is required this year, until historical stock development and current status in relation to reference points are further evaluated and confirmed by an alternative (length-based) assessment model expected to be used in next year's assessment.

STECF COMMENTS: STECF notes that assessment and forecast results are uninformative on the likely consequences for stock biomass of different catch options between 6,000 t and 14,000 t, as the risk of falling below B_{lim} is essentially the same within this range of catches. However for the same range of catch options the probability of exceeding F_{lim} increases from 5% for catches of 6,000 t to almost 40%, for 14,000 t.

STECF therefore advises that in order to keep the probability of exceeding F_{lim} to 5%, STECF agrees with the ICES advice that catches in 2014 should not exceed 6,000 t.

STECF agrees with ICES that the management of this stock should address the discarding of small shrimps and high grading.

1.3 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 Faroe Islands. Cod are taken mainly by mixed fisheries using otter trawls, seine nets, gill nets, long-lines and beam trawl. The stock is managed by TAC through joint negotiation between the EU and Norway, technical and supporting effort regulations in units of days at sea per vessel since 2003. Historically, landings peaked at about 350,000 t in the early 1970s, subsequently declining to around 200,000 t by 1988. From 1989 until 1998, landings remained between about 100 000 t and 140,000 t. Reported landings decreased sharply in 1999 to 96,000 t, and then declined steadily to 24,400 t in 2007. Reported landings for 2010, 2011 and 2012 were about 37 200t, 32 900t and 32 000t respectively. 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 used the age-based model (SAM) incorporating landings and discards, and calibrated with one survey index (from IBTS quarter 1). For ICES Subarea IV and Divisions VIId, discards were estimated from the Scottish discards sampling program up until 2005, raised to the total international fleet. The coverage of national discard data has subsequently improved.

REFERENCE POINTS:

	Type	***Value***	***Technical basis***
Management Plan	SSB_{MP}	150 000 t	$= B_{pa}$
	F_{MP}	0.4	Mortality rate when $SSB > SSB_{MP.}$
MSY Approach	MSY $B_{trigger}$	150 000 t	The default option of B_{pa}.
	F_{MSY}	0.19	F_{max} 2010, within the range of fishing mortalities consistent with F_{MSY} (0.16–0.42).
Precautionary approach	B_{lim}	70 000 t	Bloss **(**~1995**).**
	B_{pa}	150 000 t	Bpa = Previous MBAL and signs of impaired recruitment below 150 000 t.
	F_{lim}	0.86	Flim = Floss (~1995).
	F_{pa}	0.65	Fpa = Approx. 5th percentile of Floss, implying an equilibrium biomass > Bpa.

(unchanged since: 2011)

MANAGEMENT AGREEMENT: In 2005 the EU and Norway revised their initial agreement from 1999 and agreed to implement a long-term management plan for the cod stock. This plan was again updated in December 2008 and entered into force on 1 January 2009. The plan aims to be consistent with the precautionary approach and is intended to provide for sustainable fisheries and high yield leading to a target fishing mortality to 0.4. The main changes between the 2008 and 2004 plans is a phasing (transitional and long-term phase) and the inclusion of an F reduction fraction. The 18th of January 2013, the Parties agree to restrict their fishing on the basis of TACs consistent with a fishing mortality rate that maximises long-term yield and maintains spawning stock biomass above Bpa. The transitional arrangement and long-term management are as follows:

Transitional arrangement:

F will be reduced as follows: 75 % of F_{2008} for the TACs in 2009, 65 % of F_{2008} for the TACs in 2010, and applying successive decrements of 10 % for the following years.

The transitional phase ends as from the first year in which the long-term management arrangement leads to a higher TAC than the transitional arrangement.

Long-term management:

If the size of the stock on 1 January of the year prior to the year of application of the TACs is:

- Above the precautionary spawning biomass level, the TACs shall correspond to a fishing mortality rate of 0.4 on appropriate age groups;
- Between the minimum spawning biomass level and the precautionary spawning biomass level, the TACs shall not exceed a level corresponding to a fishing mortality rate on appropriate age groups equal to the following formula:
- 0.4 - (0.2 * (Precautionary spawning biomass level - spawning biomass) / (Precautionary spawning biomass level - minimum spawning biomass level))
- At or below the limit spawning biomass level, the TAC shall not exceed a level corresponding to a fishing mortality rate of 0.2 on appropriate age groups.

This plan entered into force on 1 January 2013.

The EU has adopted a long-term plan for this stock with the same aims as the EU-Norway plan (Council Regulation (EC) 1342/2008).

ICES evaluated the EC management plan (EC 1342/2008) and the EU–Norway long-term management plan in March 2009 (Annex 6.4.3) and concluded that these management plans are in accordance with the precautionary approach only if implemented and enforced (ICES, 2011a). A joint ICES–STECF group met during 2011 to conduct a historical evaluation of the effectiveness of these plans (ICES, 2011c; Kraak et al., 2012). The group concluded at that time that although there has been a gradual reduction in F and discards in recent years, the plans for North Sea cod had not controlled F as envisaged. Reductions in F observed since 2011 seem to be more pronounced than predicted in this evaluation.

STOCK STATUS:

F (Fishing Mortality)				
	2010	2011	**2012**	
MSY (F_{MSY})	✗	✗	✗	Above target
Precautionary approach (F_{pa},F_{lim})	✓	✓	✓	Harvested sustainably
Management plan (F_{MP})	✗	✗	✓	Below target

SSB (Spawning-Stock Biomass)				
	2011	2012	**2013**	
MSY ($B_{trigger}$)	✗	✗	✗	Below trigger
Precautionary approach (B_{pa},B_{lim})	✗	✗	o	Increased risk
Management plan (SSB_{MP})	✗	✗	✗	Below trigger

There has been a gradual improvement in the status of the stock over the last few years. SSB has increased from the historical low in 2006, and is now in the vicinity of Blim. Fishing mortality declined from 2000 and is now estimated to be around 0.4, between Fpa and the FMSY proxy. Recruitment since 2000 has been poor.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the EU–Norway management plan that landings in 2014 should be no more than 28 809 t. If discards rates do not change from those in 2012, this implies catches of no more than 37 496 t.

Other considerations

Management plan

The EU–Norway management plan as updated in December 2008 aims to be consistent with the precautionary approach and is intended to provide for sustainable fisheries and high yield, leading to a target fishing mortality of 0.4 (for details see Annex 6.4.3).

The EU has adopted a long-term plan for this stock with the same aims (Council Regulation (EC) 1342/2008; Annex 6.4.3). In addition to the EU–Norway agreement, the EU plan also includes effort restrictions, reducing kW-days available to community vessels in the main metiers catching cod in direct proportion to reductions in fishing mortality until the long-term phase of the plan is reached, for which the target F is 0.4 if SSB is above Bpa. In 2013, there has been no reduction in effort ceilings compared to the preceding year.

In the recovery phase of both plans, fishing mortality should be reduced to levels corresponding to 75% of F2008 in 2009 and 65% of F2008 in 2010. Until the long-term phase of the management plans has been reached, further annual reductions of 10% must be applied to achieve an F in 2014 equal to 25% of F2008 (F2014 = 0.16). This would lead to a TAC reduction of more than 20%, necessitating the application of the interannual TAC constraint (leading to F2014 = 0.18).

The long-term phase of the management is reached when the TAC derived from the long-term phase exceeds the TAC derived from the recovery phase. Application of the long-term phase calculates the target F as 0.4−(0.2 × (Bpa−SSB2013) / (Bpa−Blim)) which implies F2014 = 0.21, and hence leads to a TAC greater than that derived from the recovery phase, implying the management plan now switches to the long-term phase.

Following the management plan long-term phase, landings should be no more than 28 809 t in total for Subarea IV and Divisions IIIa West and VIId in 2014. If discard rates do not change from those in 2012, this implies catches in 2014 of no more than 37 496 t. Because of annual changes in fishing pattern the assumption on discard ratio is based on the most recent estimate.

MSY approach

Following the ICES MSY approach requires fishing mortality to be reduced to 0.11 (lower than FMSY because SSB2014< MSY Btrigger), resulting in catches of less than 21 014 t in 2014. This is expected to lead to an SSB of 141 150 t in 2015.

To follow the transition scheme towards the ICES MSY framework the fishing mortality must be reduced to (0.2 × 0.56) + (0.8 × 0.11) = 0.20, which is lower than Fpa. This implies catches of less than 36 507 t in 2014, which is expected to lead to an SSB of 128 251 t in 2015. If discards rates do not change from those in 2012, this implies landings in 2014 of no more than 28 057 t.

PA approach

A 87% reduction in F is needed to increase SSB to around Bpa in 2015. This corresponds to catches of no more than 10 063 t in 2014. If discard rates do not change from those in 2012, this implies landings in 2014 of no more than 7781 t.

Mixed fisheries

In contrast to single-species advice there is no single recommendation for mixed fisheries (ICES, 2013b), but rather a range of example scenarios, assuming fishing patterns and catchability in 2013 and 2014 are unchanged from those in 2012. Major differences between the outcomes of the various scenarios indicate potential undershoot or overshoot of the advised landings corresponding to the single-species advice. As a result, fleet dynamics may change, but cannot be determined.

Cod is the limiting species for the North Sea demersal fisheries in 2014. The “minimum” and “cod” scenarios of the mixed-fisheries analyses are both consistent with the single-species advice for cod. It is noted that in the “max” scenario, the implied F would exceed Fpa which is not considered precautionary.

Rationale	**Catch (2014)**	**Landings (2014)**	**Discards (2014)**	**Basis**	**F_{total} (2014)**	**F_{land} (2014)**	**F_{disc} (2014)**	**SSB (2015)**	**%SSB[1] Change**	**%TAC[2] Change**
Management plan	37.496	28.809	8.687	Long-term phase	0.21	0.15	0.06	127.392	+45%	−9%
Mixed fisheries options – minor differences with calculation above can occur due to different methodology used										
Maximum	96.751	78.729	18.022	A	0.75	-	-	65.054	−26%	+247%
Minimum	33.126	27.332	5.794	B	0.20	-	-	116.680	+33%	−14%

Cod MP	33.413	27.567	5.846	C	0.20	-	-	116.438	+33%	−13%
SQ effort	60.828	49.924	10.903	D	0.41	-	-	93.639	+7%	+57%
Effort_Mgt	29.314	29.314	6.229	E	0.22	-	-	114.641	+31%	−8%

Weights in thousand tonnes.

[1)] SSB 2015 relative to SSB 2014.

[2)] Landings 2014 relative to TACs 2013 (North Sea 26 475 + Skagerrak 3783 + Eastern English Channel 1543 = 31 801 t).

Mixed fisheries assumptions:

A. Maximum scenario: Fleets stop fishing when last quota exhausted.

B. Minimum scenario: Fleets stop fishing when first quota exhausted.

C. Cod management plan scenario: Fleets stop fishing when cod quota exhausted.

D. *Status quo (*SQ) effort scenario: Effort in 2012 and 2013 as in 2011.

E. Effort management scenario: Effort reductions according to cod and flatfish management plans.

It is assumed that there is no change in fishing mortality in 2013 relative to 2012. This is based on the fact that there is no reduction in effort ceilings for 2013 compared to 2012, leading to an assumed overshoot of the TACs in 2013, higher than the additional 12% added to the North Sea TAC for Fully Documented Fisheries purposes.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice for 2014.

STECF notes that the management plan on which the advice is based on, switched from the recovery phase to the long-term phase.

STECF notes that the provision in the long-term management plan for cod (Council Regulation (EC) 1342/2008; Annex 6.4.3) which prescribes a target fishing mortality rate of F=0.4 when the stock is above Bpa (= BMSY= 150,000 t) is not consistent with the objective of achieving F_{MSY} (F_{MSY}=0.19).

With regards to the introduction of a landing obligation in Skagerrak, STECF has estimated the following:

TAC in Skagerrak represents a fixed share of 12% of the total TAC, and assuming that the TAC is set in accordance with ICES advice on landings, the TAC in Skagerrak for 2014 would be 3 457 t. Meanwhile, according to data provided to ICES and used in the assessment, the discard rate in the Skagerrak (32%) is higher than the discard rate in the North Sea (22%) and discards in the Skagerrak represented 21% of total discards. This is attributable to the lower mesh size (90 mm) used in Skagerrak for the main demersal fisheries. 21% of the 8 687 t total discards estimated for cod in IIIa, IV and VIId for 2014 equates to 1 824 t. Assuming the proportion of total cod discarded in the Skagerrak remains the same as in 2012, the estimated total catch of cod in Skagerrak in 2014 is 5 281 t.

STECF notes that many vessels previously belonging to the TR 2 gear group will switch to using TR1 gears as a result of the adoption of proposed technical measures for the Skagerrak. Such a switch is likely to result in a lower proportion of the catch of cod being discarded but STECF has no objective means to estimate the magnitude of such an effect.

Request to ICES on TAC setting options for cod in the North Sea and Skagerrak.

STECF notes the ICES response to the Joint EU–Norway request for TAC setting options for cod in the North Sea and Skagerrak (ICES Advice 2013, Book 6, section 6.3.5.5).

STECF agrees with logical explanations given in the ICES response and with the ICES advice that the current management plan is considered precautionary, assuming perfect implementation. The current plan implies further reductions in fishing mortality and catch advice in 2014, which will pose difficulties in a mixed fisheries context. Achieving such a reduction may require that additional effort reductions or equivalent cod avoidance measures are considered. In contrast, the new proposed harvest control rules (HCRs) would result in increased catch advice in 2014, but in lower medium-term catches than the current HCR. ICES considers the new proposed HCRs not to be precautionary. Specifically, compared to the long-term phase of the current management plan they would delay the recovery of the SSB.

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

The most recent advice for this stock was provided by ICES in October 2012.

FISHERIES: The fishery is mainly by Danish and Norwegian vessels using small mesh trawls in the northern North Sea.

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 The fishery was closed in 2005, reopened in 2006 and closed again in 2007. Landings in 2008 and 2009 were 36,100 t and 54,500 t respectively. Due to the very high 2009 recruitment catches in 2010 amounted to 125,955 t. The fishery was closed in the first half of 2011 and 2012. Catches in 2011 and 2012 were 6500 t and 27000 t. Total catch in the first half of 2013 has been 11 000 t. Historically, the fisheries have resulted in by-catches of other species, particularly whiting, haddock, saithe, and herring. By-catches of these species have been low in the recent decade. Norway pout itself has been a by-catch in the fisheries for shrimp on the North Sea.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The analytical seasonal XSA assessment model fitted for this stock is based on time-series of catch-at-age, four quarterly commercial cpue series, and four research survey series.

Norway pout is a short-lived species and most likely a one-time spawner. The population dynamics of Norway pout are very dependent on changes caused by recruitment variation and variation in predation (or other natural) mortality, and less by the fishery. Recruitment is highly variable and influences SSB and TSB rapidly because of the short life span of the species. The stock is assessed twice a year. The spring assessment provides stock status up to 1st of April of the current year. The autumn assessment provides stock status for the current year and a forecast of fishing possibilities in the following year.

MANAGEMENT OBJECTIVES: No specific management objectives are known to ICES for this stock. Due to the short-lived nature of this species a preliminary TAC is set every year, which is updated on the basis of advice in the first half of the year (using the escapement management strategy approach)..

REFERENCE POINTS:

	Type	Value	Technical basis
MSY Approach	MSY $B_{escapement}$	150 000 t	= B_{pa}
	F_{msy}	Undefined	None advised
Precautionary approach	B_{lim}	90 000 t	B_{lim} = B_{loss}, the lowest observed biomass in the 1980s
	B_{pa}	150 000 t	= B_{lim} $e^{0.3*1.65}$
	F_{lim}	Undefined	None advised
	F_{pa}	Undefined	None advised

STOCK STATUS:

F (Fishing Mortality)				
	2010	2011	**2012**	
MSY (F_{MSY})	?	?	?	Undefined
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined
Qualitative evaluation	↗	↘	↗	Below average

SSB (Spawning-Stock Biomass)				
	2011	2012	**2013**	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	✓	✓	✓	Full reproductive capacity

The stock dynamic is highly variable from year to year, due to recruitment variability and a short life span. Recruitment has been very high in 2012 and about average in 2013. This is expected to maintain SSB above MSY in 2014. Fishing mortality has been lower than the natural mortality for this stock and has decreased in recent years to below the long-term average F (0.6).

RECENT MANAGEMENT ADVICE: ICES advises on the basis of the MSY approach (see below) according to the escapement strategy that catches in 2014 should not exceed 216 000 t, All catches are assumed to be landed.

Other considerations

Management plans

Based on a new joint EU–Norway and a later EU request, new management strategies were evaluated in September 2012 and June 2013 and considered to be consistent with the precautionary approach under certain constraints.

MSY approach

Assuming a catch of 150000 t in 2013 and to maintain the spawning-stock biomass above MSY B(escapement) by 1 January 2015, catches in 2014 should not exceed 216 000 t. All catches are assumed to be landed.

The advice for 2014 is sensitive to the actual catches taken in quarters 3 and 4 of 2013. The forecast assumes that the total catch in 2013 is 150 000 t (well below the TAC for EU and Norway, which is 344 500 t). The 2013 catch assumption is based on the low quota uptake by Denmark and Norway (11 000 t taken during the first half of 2013, while preliminary information indicates that the uptake by the third week of September is of the order of 35 000 t) and the fact that the TAC has not been reached in recent years. In the last decade, catches in the 4th quarter have not exceeded 35 000 t. Therefore, 150 000 t is considered as a realistic upper-end estimate of the actual catch that may take place in 2013. If, however, catches in 2013 were substantially above 150 000 t, a catch lower than 216 000 t would be required in 2014 to maintain the stock above MSY B(escapement) by January 1 2015.

Precautionary approach

The precautionary approach corresponds to maintaining SSB above Bpa = MSY Bescapement on 1 January 2015. Therefore, it is similar to the MSY approach for this species.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice that to comply with the MSY $B_{escapenment}$ strategy, catches in 2014 should not exceed 216,000 t.

1.5 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. Catches by the Danish industrial fleet for reduction into fishmeal and fish oil formed the majority of North Sea horse mackerel catches throughout the 1970s and 1980s. Catches were taken in the fourth quarter, mainly in Divisions IVb and VIId. The 1990s saw a drop in the value of industrial resources, limited fishing opportunities, and steep increases in fuel costs. In 2001, an individual quota scheme was introduced in Denmark, which resulted in a rapid restructuring of the fleet. Since then the fleet size has been radically reduced and now numbers less than 20% that in the 1980s; additionally, Danish North Sea horse mackerel catches have diminished. Since the 1990s, a larger portion of catches has been taken in a directed horse mackerel fishery for human consumption by the Dutch and German freezer-trawler fleet. Denmark has traded a limited part of its quota with other EU member states for fishing opportunities for other species. However, since only a limited amount of quota is made available to other countries the TAC has been consistently underutilized in recent years (approximately 50% in 2010–2012). The total catch taken from this stock in 2012 was 21,375 tonnes, which represents a 27% decrease compared to 2011.

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

REFERENCE POINTS: No reference points are set for this stock, as there is insufficient information to estimate reference points.

STOCK STATUS:

F (Fishing Mortality)		
	2010–2012	
Qualitative evaluation	?	**Insufficient information**

SSB (Spawning-stock Biomass)		
	2011–2013	
Qualitative evaluation	?	**Insufficient information**

The available information, while broadly informative, is insufficient to evaluate recent stock trends and exploitation status. Therefore, the state of the horse mackerel in the North Sea is unknown. Landings in recent years (2010–2012) have been around 25 kt.

MANAGEMENT AGREEMENTS: Since 2010, the EU TAC for the North Sea area has included Divisions IVb,c and VIId. In the past, Division VIId was not considered in the North Sea TAC regulation area. The assessment area of North Sea horse mackerel also includes catches from Division IVa during the first two quarters of the year. The TAC for Division IVa is included in a different management area together with Divisions IIa, VIIa–c, VIIe–k, VIIIa, VIIIb, VIIId, VIIIe, Subarea VI, EU and international waters of Division Vb, and international waters of Subareas XII and XIV. There is no TAC for Division IIIa.

In June 2009, an agreement was concluded between contracting parties to the Coastal States on mackerel banning high grading, discarding, and slipping from pelagic fisheries targeting mackerel, horse mackerel, and herring beginning in January 2010.

RECENT MANAGEMENT ADVICE:

New data on survey indices available for this stock do not change the perception of the stock; therefore, the advice for this fishery in 2014 is the same as the advice for 2013: Based on the ICES approach to data-limited stocks, ICES advises that landings should be no more than 25,500 t. Discards are known to take place but cannot be quantified; therefore total catches cannot be calculated.

Other considerations

No quantitative assessment can be presented for this stock. Therefore, fishing possibilities cannot be projected.

ICES approach to data limited stocks

The survey index, which provides information on the development of the stock and its response to the fishery, was available for the first time this year. The survey index has not been used as the basis for advice under DLS category 3, because the lack of measures of uncertainty limits interpretation of annual changes of this index. This implies that the information available does not significantly alter the perception of the stock from last year, and therefore the advice from 2012 which was to be applied for three years is still relevant.

Advice relates to landings. Discards are known to take place but cannot be quantified, therefore total catches cannot be calculated.

STECF COMMENTS:

STECF agrees with the ICES advice for 2014 that on the basis of the ICES approach to data limited stocks, landings should be no greater than 25,500 t.

1.6 Mackerel (*Scomber scombrus*) - North Sea spawning component

The stock summary and advice for mackerel in in the North Sea is given in Section 6.5 (Combined Southern, Western and North Sea spawning components).

2 Resources of the Celtic Sea and West of Scotland

2.1 Norway lobster (*Nephrops norvegicus*) in ICES Div. Vb and Sub-area VI, (West of Scotland) and waters west of Ireland

There are no exploited *Nephrops* stocks in Div. Vb. In Sub-area VI and Divs. VIIb & VIIc (waters west of Ireland) the following functional units are considered by ICES:

FU no.	Name	ICES Divisions	Statistical rectangles
11	North Minch	VIa	44–46 E3-E4
12	South Minch	VIa	41–43 E2-E4
13	Clyde + Sound of Jura	VIa	39–40 E4-E5
16	Porcupine Bank	VIIc	31–36 D5–D6; 32–35 D7–D8
17	Aran Grounds	VIIb	34–35 D9–E0

Nephrops also occur in other areas not contained within the Functional Units. TV surveys in deep water suggest widespread distribution at low density, and surveys at Stanton Bank indicate a population there. Three *Nephrops* stocks (FUs) in Sub-area VI and one in Div. VIIb (FU 17) are currently assessed using UWTV surveys. On the basis of these, current stock abundance and harvest ratios are estimated.

MSY approach for stocks with UWTV surveys

There are no precautionary reference points defined for *Nephrops*. Under the ICES MSY framework, exploitation rates which are likely to generate high long-term yield (and low probability of stock overfishing) have been explored and proposed for each functional unit. Owing to the way *Nephrops* are assessed, it is not possible to estimate F_{msy} directly and hence proxies for F_{msy} are determined. Three stock-specific candidates for F_{msy} ($F_{0.1}$, $F_{35\%SpR}$ and F_{max}) were derived using a length-based per recruit analysis. There can be substantial differences in relative exploitation rates between the sexes in many stocks. To account for this, values for each of the candidates have been determined for males, females and the two sexes combined. The appropriate F_{msy} candidate has been selected for each Functional Unit independently according to the perception of stock resilience, factors affecting recruitment, population density, knowledge of biological parameters and the nature of the fishery (relative exploitation of the sexes and historical Harvest Rate vs. stock status).

The table below illustrates the framework against which stocks were evaluated and appropriate F_{MSY} proxies chosen. In general, $F_{35\%SPR}$ was used unless there were stock-specific justifications for either higher or lower harvest ratios.

The combined sex F_{msy} proxy should be considered appropriate provided that the resulting percentage of virgin spawner per-recruit for males or females does not fall below 20%. In such a case a more conservative sex specific F_{msy} proxy should be picked instead of the combined proxy.

		Burrow Density (average numbers/m2)		
		Low	Med	High
		<0.3	0.3-0.8	>0.8
Observed harvest rate or landings compared to stock status	>Fmax	F35%	Fmax	Fmax
	Fmax-F0.1	F0.1	F35%	Fmax

	<F0.1	F0.1	F0.1	F35%
	Unknown	F0.1	F35	F35%
Stock Size Estimates	Variable	F0.1	F0.1	F35%
	Stable	F0.1	F35%	Fmax
Knowledge of biological parameters	Poor	F0.1	F0.1	F35%
	Good	F35%	F35%	Fmax
History Fishery	Stable spatially and temporally	F35%	F35%	Fmax
	Sporadic	F0.1	F0.1	F35%
	Developing	F0.1	F35%	F35%

There may be great differences in the relative exploitation rates between the sexes for many stocks. To account for this, values for each of the candidates have been determined individually for males, females, and the two sexes combined. The combined sex F_{MSY} proxy should be considered appropriate, provided that the resulting percentage of virgin spawner-per-recruit for males or females does not fall below 20%. If this happens a more conservative sex-specific F_{MSY} proxy should be chosen instead of the combined proxy.

Where possible, a preliminary MSY $B_{trigger}$ was proposed based on the lowest observed UWTV burrow abundance, unless the stock has shown signs of stress at higher abundance (in which case a higher value is used).

Additional considerations

Management considerations

The overriding management consideration for these stocks is that management should be at the functional unit rather than the ICES subarea/division level. Management at the functional unit level should provide the controls to ensure that catch opportunities and effort are compatible and in line with the scale of the resources in each of the stocks defined by the functional units. Current management of *Nephrops* in Subarea VI (both in terms of TACs and effort) does not provide adequate safeguards to ensure that local effort is sufficiently limited to avoid depletion of resources in functional units. In the current situation vessels are free to move between grounds, allowing effort to develop on some grounds in a largely uncontrolled way; this has historically resulted in inappropriate harvest rates from some parts.

There are also *Nephrops* catches in "other rectangles" in Division VIa, e.g. from offshore areas adjacent to Stanton Bank where Irish fishers frequently operate from the shelf edge.
There are no functional units in ICES Division VIb, but occasional small *Nephrops* landings occur.

STECF COMMENTS: STECF notes that to the West of Scotland (which comprises three *Nephrops* Functional Units (FUs)) the present aggregated management approach (overall TAC for all FUs) 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 (Vb & VI) is recommended. Furthermore, STECF notes that the current aggregated management of all *Nephrops* FUs in this area as a single unit is a major obstacle for a management complying with the Commissions Communication on Fishing opportunities for 2014 (COM(2013)319 final) as the rules require a TAC for each stock (in this case FU).

STECF notes that there also are *Nephrops* catches in "other rectangles" in Division VIa, e.g. from offshore areas adjacent to Stanton Bank where Irish fishers frequently operate from the shelf edge. To provide some guidance on appropriate future landings for these areas, the use of an average landings figure of around 326 tonnes could be considered (On the basis of ICES advice that catches from 'other areas' should not increase)

2.1.1 Norway lobster (*Nephrops norvegicus*) in North Minch (FU 11)

FISHERY: The *Nephrops* fishery in this area is prosecuted entirely by UK (Scottish) vessels. Total effort by Scottish *Nephrops* trawlers has shown a gradual decreasing trend since 2002. Total *Nephrops* landings increased

from about 3,000 t in 2005 to around 3800 t in 2008 but then fell in 2009 to 3497 t, to 2263 t in 2010 and 2696 t in 2011. In 2012 landings were 3388 t.

Available information indicates that landings from the late 1990s up to 2005 are most likely to be an underestimate of actual landings, but the reliability of landings figures has improved since 2006 with the introduction of buyers and sellers legislation. The *Nephrops* trawl fishery in this area takes by-catches of other species and has been observed to have extremely high discard rates of haddock and whiting in recent years. The fishery has been fairly stable over the time-series. Landings have increased in the last two years and the drop observed in 2010 seems to be mainly related to market conditions. Reported effort by all Scottish *Nephrops* trawlers has shown an increase in 2012 particularly during the first semester. It is an all-year-round fishery and creel fishing takes place mainly in the sea-loch areas, but has recently extended also to further offshore. Overall effort in terms of creel numbers is not known and there are no limits on the number of creels.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment in 2013 is based on trends in population indicators and catch options derived from UWTV surveys. For this FU, the absolute density observed in the UWTV survey is medium (~0.59 burrows m^{-2}). Historical harvest ratios in this FU have been around those equivalent to fishing at $F_{35\%SpR}$ and landings have been relatively stable in the past thirty years. $F_{35\%SpR}$ (combined between sexes) is expected to deliver high long-term yield with a low probability of recruitment overfishing and is therefore chosen as a proxy for F_{MSY}. New size-at-maturity parameters were available at the 2013 benchmark, leading to revisions in the harvest rate reference points.

REFERENCE POINTS:

	Type	***Value***	***Technical basis***
MSY	MSY $B_{trigger}$	541 million individuals	Bias-adjusted lowest observed UWTV survey estimate of abundance
Approach	F_{msy}	10.9% harvest rate	Equivalent to $F_{35\%SpR}$ combined sex. F_{MSY} proxy based on length-based yield-per-recruit analysis.
Precautionary Approach	Not agreed		

Harvest ratio reference points (2013):

	Male	Female	**Combined**
F_{max}	11.1	23.0	13.2
$F_{0.1}$	6.9	12.8	7.7
$F_{35\%SpR}$	8.2	19.6	**10.9**

STOCK STATUS:

F (Fishing Mortality)			
	2010 2011	**2012**	
MSY (F_{MSY})	✓ ✓	✗	Above target
Precautionary approach (F_{pa},F_{lim})	? ?	?	Not defined
SSB (Spawning-Stock Biomass)			
	2011 2012	**2013**	
MSY ($B_{trigger}$)	✓ ✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	? ?	?	Not defined

The stock has been above MSY $B_{trigger}$ for more than 15 years. The results from the UWTV survey indicate that the abundance has decreased in 2012 and recovered in 2013 to an abundance similar to those observed in 2010–2011. The historical harvest ratios (removals/UWTV abundance) have fluctuated around the F_{MSY} proxy. The harvest ratio in 2012 increased to 17.9% and is above the F_{MSY} proxy.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the MSY approach that landings in 2014 should be no more than 3485 tonnes. If total discard rates do not change from the average of the last three years (2010–2012), this implies total catches of no more than 3702 tonnes. Note that this figure includes discards expected to survive the discarding process – assumed to be 25% of the total number discarded for this stock.

In order to ensure the stock in this FU is exploited sustainably, management should be implemented at the functional unit level.

Other considerations

MSY approach:

Following the ICES MSY approach implies the harvest ratio for the North Minch functional unit should be reduced to less than 10.9%, resulting in landings of no more than 3485 tonnes in 2014. If discard rates do not change from the average of the last three years (2010–2012, assuming 25% discard survival), this implies total catches of no more than 3702 tonnes.

Additional considerations

The advice takes into account the 2013 UWTV survey results.

Recent work using VMS has refined the estimate of the area. Results from a recent study on mapping the spatial extent of *Nephrops* habitat in the North Minch sea lochs indicate that the muddy habitat in the lochs is only a very small proportion of the total *Nephrops* grounds in this FU.

The minimum landing size for *Nephrops* in Division VIa is 20 mm carapace length. Discarding of both undersize and poor quality *Nephrops* sometimes takes place in this FU. Discard rates have been variable but generally lower than 20%. The mean sizes in the length compositions of larger individuals (>35 mm CL) are relatively stable, but the mean weight in landings has increased markedly in 2010 and decreased again in the last two years. To dampen this variability, the time-series average (1999–2012) was used as input for the mean weight in landings for the catch forecasts.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice for 2014 that to comply with MSY objectives landings should be no greater than 3485 tonnes and catches of no more than 3702 tonnes.

STECF considers that management of fishing mortality on Nephrops stocks would best be achieved if measures, including catch restrictions, were implemented at the level of the functional unit.

STECF notes that the landings corresponding to ICES advice for 2014 imply a 39% decrease on the status quo harvest ratio (and 39% less in landings) from this functional unit.

STECF notes that the TR2 fleet in this area has been observed to have extremely high discard rates of haddock and whiting in recent years and suggests that selectivity should be improved.

2.1.2 Norway lobster (*Nephrops norvegicus*) in South Minch (FU 12)

FISHERY: The *Nephrops* fishery in this area is prosecuted largely by UK vessels with a small proportion of the landings by Irish vessels. Reported effort by all Scottish *Nephrops* trawlers has shown a gradual decreasing trend since 2001. Reported effort by all Scottish *Nephrops* trawlers has shown an increase in 2012, particularly during the first semester. Inshore trawlers are mainly small, but in the offshore areas of this FU larger boats operate. Creel fishing takes place mainly in inshore areas (including the sea-lochs), but has extended further offshore in recent years. Overall effort in terms of creel numbers is not known and there are no limits on the number of creels.

Total *Nephrops* landings from this FU were above 5000 t in 2007 and 2008 but decreased to around 4300 t in 2009 and further declined to around 3700 t in 2010 and 2011.The 2012 landings amount to about 3900 t. The decline from 2007 to 2011 is apparently largely due to market conditions. Available information indicates that landings from the late 1990s up to 2005 are most likely to be underestimates of actual landings. The reliability of landings figures improved from 2006 with the introduction of buyers and sellers legislation. The *Nephrops* trawl fishery in this area takes by-catches of other species and has been observed to have extremely high discard rates of haddock and whiting in recent years. Larger vessels operating on the western limits of the ground generally take higher by-catches of fish.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment in 2013 is based on trends in population indicators and catch options derived from UWTV surveys.

For this FU, the absolute density observed in the UWTV survey is medium (~ 0.44 burrows m^{-2}). The fishery in this area has been in existence since the 1960s. Historical harvest ratios in this FU have been variable, but generally around $F_{35\%SPR}$. $F_{35\%SPR}$ (combined between sexes) is expected to deliver high long-term yield with a low probability of recruitment overfishing and is therefore chosen as a proxy for F_{MSY}.

REFERENCE POINTS:

	Type	***Value***	***Technical basis***
MSY Approach	MSY $B_{trigger}$	1016 million individuals	Bias-adjusted lowest observed UWTV survey estimate of abundance
	F_{msy}	12.3% harvest rate	Equivalent to $F_{35\%SPR}$ combined sex. F_{MSY} proxy based on length-based yield-per-recruit analysis.
Precautionary Approach	Not agreed		

Harvest ratio reference points (2011):

	Male	Female	Combined
F_{max}	13.3	26.8	16.1
$F_{0.1}$	7.8	13.8	8.7
$F_{35\%}$	9.6	18.3	12.3

STOCK STATUS:

F (Fishing Mortality)				
	2010	2011	**2012**	
MSY (F_{MSY})	✓	✓	✗	Above target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Not defined
SSB (Spawning-Stock Biomass)				
	2011	2012	**2013**	
MSY ($B_{trigger}$)	✓	✗	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	?	?	?	Not defined

The stock fell below MSY $B_{trigger}$ in 2012 but increased in 2013 and is now above MSY $B_{trigger}$. The results from the TV survey indicate that the abundance has decreased in 2012 and recovered in 2013 to levels similar to those observed in 2011. The harvest ratio (removals/UWTV abundance) has increased to 15.8% in 2012 and is now above F_{MSY} proxy.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the MSY approach that landings in 2014 should be no more than 5211 tonnes. If total discard rates do not change from the average of the last three years (2010–2012), this implies total catches of no more than 5394 tonnes. Note that this figure includes discards expected to survive the discarding process – assumed to be 25% of the total number discarded for this stock.

In order to ensure the stock in this FU is exploited sustainably, management should be implemented at the functional unit level.

Other considerations

MSY approach:

Following the ICES MSY approach implies that the harvest ratio for the South Minch functional unit is reduced to less than 12.3%, resulting in landings of no more than 5211 tonnes in 2014. If discard rates do not change from the average of the last three years (2010–2012, assuming a 25% discard survival), this implies total catches of no more than 5394 tonnes.

Additional considerations

The advice takes into account the 2013 UWTV survey results.

Work comparing the area based on available VMS and sediment data on which the UWTV survey is based showed no major differences between the two; the original area of ground was therefore retained for the UWTV survey. However, the survey should still be considered as a minimum estimate since areas of suitable sediment in the sea lochs are not included.
The minimum landing size for *Nephrops* in Division VIa is 20 mm carapace length. Discarding of both undersize and poor quality *Nephrops* sometimes takes place in this FU. Discard rates have been variable but generally lower than 20%. The mean sizes in the length compositions of smaller individuals (< 35 mm CL) has increased consistently, suggesting low recruitment in the last four years. The mean weight in landings has increased markedly in recent years and the time-series average (1999–2012) was used as input for the mean weight in landings for the catch forecasts.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice for 2014 that to comply with MSY objectives landings should be no greater than 5211 tonnes and catches of no more than 5394 tonnes.

STECF considers that management of fishing mortality on Nephrops stocks would best be achieved if measures, including catch restrictions, were implemented at the level of the functional unit.

STECF notes that the landings corresponding to ICES advice for 2014 imply a 22% decrease on the status quo harvest ratio (and 22% less in landings) from this functional unit.

STECF notes that the TR2 fleet in this area has been observed to have extremely high discard rates of haddock and whiting in recent years and suggests that selectivity should be improved.

2.1.3 Norway lobster (*Nephrops norvegicus*) in Firth of Clyde (FU 13), including Sound of Jura.

FISHERY: Trawling is the predominant fishing method and fishing takes place all year round. An increasing number of creel boats operate in the Clyde due to temporal and area bans on trawling. *Nephrops* discard rates from trawl fleets in this functional unit are higher than in other FUs in Division VIa. *Nephrops* landings from FU 13 are taken entirely by UK vessels. Total *Nephrops* landings increased in the recent years, from around 3,400 t in 2005 to around 6500 t in 2007, but decreased in the two following years. However, landings increased again to 6584 t in 2012. Available information indicates that landings from the late 1990s up to 2005 most likely are underestimates of actual landings, but the reliability of landings figures has improved from 2006 with the introduction of buyers and sellers legislation. The *Nephrops* trawl fishery in this area takes by-catches of other species, mainly haddock, whiting and some cod.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment in 2013 is based on trends in population indicators and catch options derived from UWTV surveys. Underwater TV surveys have been conducted for the Firth of Clyde subarea every year since 1995. Confidence intervals around the abundance estimates are stable throughout the series and relatively low compared with other FUs in Division VIa. Underwater TV surveys for the Sound of Jura subarea have been more fragmented and sampling is at a relatively low level; confidence intervals are larger.

REFERENCE POINTS:

Reference points – Firth of Clyde

	Type	***Value***	***Technical basis***
MSY Approach	MSY $B_{trigger}$	579 millions	Lowest observed abundance estimate
	F_{msy}	16.4% harvest rate	Equivalent to F_{max} combined sex. F_{MSY} proxy based on length-based yield-per-recruit analysis.

Precautionary Approach	Not agreed	Not defined	

Reference points – Sound of Jura

	Type	*Value*	*Technical basis*
MSY Approach	MSY $B_{trigger}$	Not defined	
	F_{msy}	14.5% harvest rate	Equivalent to $F_{35\%SpR}$ combined sex
Precautionary Approach	Not agreed	Not defined	

Harvest ratio reference points (2011):

	Male	Female	Combined
F_{max}	13.6	34.0	16.4
$F_{0.1}$	8.7	21.1	9.7
$F_{35\%}$	10.7	25.7	14.5

STOCK STATUS:

Firth of Clyde

F (Fishing Mortality)				
	2010	2011	**2012**	
MSY (F_{MSY})	✗	✗	✗	Above target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Not defined

SSB (Spawning-Stock Biomass)				
	2011	2012	**2013**	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	?	?	?	Not defined

Sound of Jura

F (Fishing Mortality)				
	2010	2011	**2012**	
MSY (F_{MSY})	✓	✓	✓	Below target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Not defined

SSB (Spawning-Stock Biomass)		
	2011 -2013	
MSY ($B_{trigger}$)	?	Not defined
Precautionary approach (B_{pa},B_{lim})	?	Not defined
Qualitative evaluation	↘	Decreasing

UWTV abundance remains above the MSY $B_{trigger}$. Harvest rates (removals/UWTV abundance) for *Nephrops* in the Firth of Clyde have increased in 2012 to 26.0% and remain above the proposed F_{MSY} proxy.

Harvest rates (removals/UWTV abundance) for *Nephrops* in the Sound of Jura have been well below the proposed F_{MSY} proxy in recent years. UWTV abundance remains higher than observed at the start of the series, but the series is too short and patchy to propose a MSY $B_{trigger}$.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the MSY approach that landings in 2014 should be no more than 6265 tonnes (5744 tonnes for Firth of Clyde and 521 tonnes for Sound of Jura). If total discard rates do not change from the average of the last three years (2010–2012), this implies total catches of no more than 6959 tonnes (6382 tonnes for Firth of Clyde and 577 tonnes for Sound of Jura). Note that this figure includes discards expected to survive the discarding process – assumed to be 25% of the total number discarded for this functional unit.

In order to ensure the stock is exploited sustainably, management of *Nephrops* should be implemented at the functional unit level. In this FU the two subareas imply that additional controls maybe required to ensure that the landings taken in each subarea are in line with the advice.

Other considerations

MSY approach:

Following the ICES MSY approach implies the harvest ratio for the Firth of Clyde subarea should be reduced to less than 16.4%, resulting in landings of no more than 5744 tonnes in 2014. If discard rates do not change from the average of the last three years (2010–2012, assuming 25% discard survival), this implies total catches of no more than 6382 tonnes.

Following the ICES MSY approach implies the harvest ratio for the Sound of Jura subarea should be reduced to be less than 14.5%, resulting in landings of no more than 521 tonnes in 2014. If discard rates do not change from the average of the last three years (2010–2012, assuming 25% discard survival), this implies total catches of no more than 577 tonnes.

Additional considerations

The advice takes into account the 2013 UWTV survey results.

An increasing number of creel boats operate in the Clyde. Creeling activity often takes place during the weekend when the trawlers are not allowed to fish. One third of the creelers operate throughout the year, the rest prosecute a summer fishery.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stocks and the advice for 2014 that to comply with MSY objectives landings should be no greater than 5744 tonnes and catches of no more than 6382 tonnes in Firth of Clyde. Landings and catches in Sound of Jura should be no more than 521 t and 577 t respectively.

STECF considers that management of fishing mortality on Nephrops stocks would best be achieved if measures, including catch restrictions, were implemented at the level of the functional unit.

STECF notes that the landings corresponding to ICES advice for 2014 imply a 37% decrease on the status quo harvest ratio (and 37% less in landings) from this functional unit (Firth of Clyde).

STECF notes that the landings corresponding to ICES advice for 2014 imply a 1800% increase on the status quo harvest ratio (and 1800% more in landings) from this functional unit (Sound of Jura).

2.1.4 Norway lobster (*Nephrops norvegicus*) in FU 16, Porcupine Bank, Divisions VIIb,c,j,k

FISHERIES: The fishery takes place throughout the year with a peak between April and July. A seasonal closure covering much of the stock distribution area has been in place between 1 May and 31 July each year from 2010 to 2012. In 2013 the closure was only in place in the month of May. Most vessels are relatively large (between 20 and 35 m in total length) multi-purpose otter trawlers using single or twin rigs. Freezing of catches at sea has become increasingly prevalent since 2006. The majority of landings are taken by Irish, Spanish and to a lesser extent, UK vessels. There are concerns about the accuracy of the landings statistics for some fleets. Fishing effort directed at *Nephrops* will also have bycatches of hake, megrim, and anglerfish in mixed fisheries. Reported total landings for this FU have decreased significantly in recent years from 2186 t in 2007 to only 825 t in 2009. Thereafter landings steadily increase again to 1260 t in 2012 t (including estimated unallocated landings).

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based on indicators and an UWTV survey as last year. The advice for 2014 was delayed until autumn to take account of the most up-to-date survey information.

This year´s advice is based on the MSY approach, as last year

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

STOCK STATUS:

	F (Fishing Mortality)			
	2010	2011	2012	
MSY (F_{MSY})	?	?	✓	Appropriate
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined

	SSB (Spawning-Stock Biomass)	
	2012–2013	
MSY ($B_{trigger}$)	?	Undefined
Precautionary approach (B_{pa},B_{lim})	?	Undefined
Qualitative evaluation	→	Stable (based on UWTV abundance)

UWTV surveys for FU 16 were carried out in 2012 and 2013; these provide abundance estimates for this stock. The 2012 harvest ratio (removals/UWTV abundance) is estimated to be 3.2%, which is below the F_{MSY} proxy (5%). Other indicators show that the exploitation rates increased during the 2000s but declined significantly in 2011 and remain low. Bottom trawl survey cpue increased significantly in 2010 and this has been linked to a stronger recruitment first observed in the survey in 2009.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of the MSY approach that catches from FU 16 in 2014 should be no more than 1848 tonnes. All catches are assumed to be landed.

To protect the stock in this functional unit, management should be implemented at the functional unit level.

Other considerations:

MSY approach

No MSY $B_{trigger}$ has been identified for this FU. Following the ICES MSY approach implies a harvest ratio for the FU 16 that is less than 5%, resulting in catches of no more than 1848 t in 2014. All catches are assumed to be landed.

Additional considerations

The advice takes into account the 2013 UWTV survey results**.**

Since 2011 a maximum limit on landings from FU 16 is included in the TAC regulation (the “of which limit”). This has increased the risk of highgrading and area-misreporting in this fishery. Area misreporting and highgrading in the fishery should be discouraged through management measures.

A seasonal closed area (1 May–31 July) was in place between 2010 and 2012. The duration of the closure was reduced to one month (May) in 2013. The closure has been respected by the fleet and has therefore afforded some protection to the majority of the stock area (~75%). For this part of the stock area fishing effort and mortality has been reduced at a time of peak female emergence and typically high lpue and landings. The closure will also have inadvertently concentrated effort and fishing mortality in the ~25% of the stock area that is not currently covered by the closure. Survey information indicates that abundance was 2.5 times higher inside the closed area than outside in 2011.

Productivity of deep-water *Nephrops* stocks is generally lower than in shelf waters, though individual *Nephrops* grow to relatively large sizes and attain high market prices. Other deep-water *Nephrops* stocks off the Spanish and Portuguese coast have collapsed and have been subject to recovery measures for several years, e.g. in FUs 25, 26, 27, and 31. Recruitment in *Nephrops* populations in deep water may be more sporadic than for shelf stocks with strong larval retention mechanisms. This makes these stocks more vulnerable to overexploitation and potential recruitment failure as has been observed on the Porcupine Bank over the last decade.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice for 2014 that to comply with MSY objectives landings should be no greater than 1848 tonnes (All catches are assumed to be landed).

STECF notes that the catches and landings are uncertain. The unallocated catches include an estimate of Spanish landings.

STECF notes that the landings corresponding to ICES advice for 2014 imply a 56% increase on the status quo harvest ratio (and 56% more in landings) from this functional unit.

STECF considers that management of fishing mortality on Nephrops stocks would best be achieved if measures, including catch restrictions, were implemented at the level of the functional unit.

2.1.5 Norway lobster (*Nephrops norvegicus*) in FU 17, Aran Grounds (Division VIIb)

FISHERIES: Reported landings (almost entirely by Irish vessels) from this FU were around 1000 t in 2010, but decreased to 600 t in 2011. The preliminary 2012 landings amount again to 1135 t. In the Aran Grounds landings and effort by twin rig vessels have increased to constitute more than 90 % of the fishery. Effort decreased in 2009 due to decommissioning of several vessels that actively participated in the fishery but effort in 2010 increased again. In recent years several newer vessels specialising in *Nephrops* fishing have participated in this fishery. These vessels target *Nephrops* on several other grounds within the TAC area and move around to optimise catch rates. Since the introduction of effort management associated with the cod long term plan (EC 1342/2008) there have been concerns that effort could be displaced towards the Aran and other *Nephrops* grounds where effort control has not been put in place.

In the last few years the fishery has exploited more of the male component of the stock as a higher proportion of catches have been taken in the autumn.

The *Nephrops* trawl fishery takes bycatches of other species, especially plaice, but also, whiting, cod, hake, megrim and monkfish.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based on indicators and an UWTV survey as last year. The advice for 2014 was delayed until autumn to take account of the most up-to-date survey information.

This year´s advice is based on the MSY approach as was done last year.

REFERENCE POINTS:

	Type	***Value***	***Technical basis***
MSY Approach	MSY $B_{trigger}$	Not defined	
	F_{msy}	HR 10.5%	Equivalent to $F_{35\%\ SPR}$ for combined sex in 2010
Precautionary Approach			No reference points are defined

Harvest ratio reference points (2010):

	Male	Female	Combined
F_{max}	9.8%	13.0%	11.1 %
$F_{0.1}$	6.4%	9.1%	7.2 %
$F_{35\%SpR}$	8.4%	12.8%	10.5 %

STOCK STATUS:

	F (Fishing Mortality)			
	2010	2011	**2012**	
MSY (F_{MSY})	✓	✓	✗	Above target
Precautionary	?	?	?	Undefined

approach (F_{pa},F_{lim})		

SSB (Spawning-Stock Biomass)		
	2011–2013	
MSY ($B_{trigger}$)	?	Undefined
Precautionary approach (B_{pa},B_{lim})	?	Undefined
Qualitative evaluation	↘	Decreasing

The abundance decreased significantly in 2012 and the 2013 survey estimate is not significantly different (although it is the lowest in the time-series). The harvest rate (removals/UWTV abundance) has increased significantly to 19.2% in 2012 and is now above the F_{MSY} proxy.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of the MSY approach that landings in 2014 should be no more than 591 tonnes. If total discard rates do not change from the average of the last three years (2010–2012), this implies total catches of no more than 669 tonnes. Note that this figure includes discards expected to survive the discarding process – assumed to be 10% of the total number discarded for this stock.

In order to ensure the stock in this FU is exploited sustainably, management should be implemented at the functional unit level.

Other considerations:

MSY approach

No MSY $B_{trigger}$ has been identified for this FU. Following the ICES MSY approach for the Aran Grounds FU 17 implies a harvest ratio of less than 10.5%, resulting in landings of no more than 591 t in 2014. If discard rates do not change from the average of the last three years (2010–2012, assuming 10% discard survival), this implies total catches of no more than 669 t.

Additional considerations:

The advice takes into account the 2013 UWTV survey results.

The low abundance in 2012 and 2013 cannot be linked to causative factors as yet. Discard rates were a little lower in 2012, but the mean size data on the survey or in the fishery does not suggest weak recruitment or other problems in the stock.

Total discards of *Nephrops* and other organisms by the *Nephrops* trawl fleet is around 47% of the total catch by weight. The main discards are small *Nephrops*. The main fish species discarded are dogfish, haddock, whiting, and megrim.

The proportion of discarded *Nephrops* is substantial. On average over the last three years, around 19% (in numbers) or 12% (in weight) of the *Nephrops* caught are estimated to have been discarded.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice for 2014 that to comply with MSY objectives landings should be no greater than 591 tonnes and catches of no more than 669 tonnes.

STECF notes that the landings corresponding to ICES advice for 2014 imply a 45% decrease on the status quo harvest ratio (and 45% less in landings) from this functional unit.

STECF considers that management of fishing mortality on Nephrops stocks would best be achieved if measures, including catch restrictions, were implemented at the level of the functional unit.

STECF notes that in recent years several newer vessels specialising in Nephrops fishing have participated in this fishery. These vessels target Nephrops on several other grounds within the TAC area and move around to optimise catch rates. Since the introduction of effort management associated with the cod long term plan (EC 1342/2008) there have been concerns that effort could be displaced towards the Aran and other Nephrops grounds where effort control has not been put in place.

2.2 Norway lobster (*Nephrops norvegicus*) in Celtic and Irish Seas

Norway lobster in this region contains 5 Functional Units:

FU no.	Name	ICES Divisions	Statistical rectangles
14	Irish Sea East	VIIa	35–38E6; 38E5
15	Irish Sea West	VIIa	36E3; 35–37 E4–E5; 38E4
19	Ireland SW and SE coast	VII,g,j	31–33 D9–E0; 31E1; 32E1–E2; 33E2–E3
20–21	Labadie,Baltimore, Jones and Cockburn	VIIg,h	28–30 E1; 28–31 E2; 30E3
22	Smalls	VIIg,f	31–32E2, 31–32E4

Of these, FU 14 (Irish Sea E.), FU 15 (Irish Sea W.), FU19 (Ireland SW and SE coast) and FU 22 (Smalls) are currently assessed on basis of UWTV surveys. On basis on the UWTV surveys current stock abundance and harvest ratios are estimated.

MSY approach

Most functional units are monitored by underwater TV (UWTV) surveys, in which burrows are counted by means of video analysis. For these FUs, MSY reference points for fishing mortality have been evaluated. No precautionary reference points have been defined for *Nephrops*.

Under the ICES MSY approach, exploitation rates likely to generate high long-term yield (and low probability of stock overfishing) have been explored and proposed for each functional unit. Owing to the way *Nephrops* are assessed, it is not possible to estimate F_{MSY} directly and hence proxies for F_{MSY} are determined. Three candidates for F_{MSY} proxies are $F_{0.1}$, $F_{35\%SpR}$, and F_{max}. There may be strong differences in relative exploitation rates between the sexes for many stocks. To account for this, values for each of the candidates have been determined for males and females separately, and for the two sexes combined. The appropriate F_{MSY} candidate has been selected for each functional unit independently according to the perception of stock resilience, factors affecting recruitment, population density, knowledge of biological parameters, and the nature of the fishery (relative exploitation of the sexes and historical harvest rate versus stock status).

A decision-making framework based on the table below was used in the selection of preliminary stock-specific F_{MSY} proxies. These may be modified following further data exploration and analysis. The combined sex F_{MSY} proxy should be considered appropriate provided that the resulting percentage of virgin spawner-per-recruit for males or females does not fall below 20%. In such a case a more conservative sex-specific F_{MSY} proxy should be chosen over the combined proxy.

		Burrow Density (average numbers/m2)		
		Low	Med	High
		<0.3	0.3-0.8	>0.8
Observed larvest rate or landings compared to stock status	>Fmax	F35%	Fmax	Fmax
	Fmax-F0.1	F0.1	F35%	Fmax
	<F0.1	F0.1	F0.1	F35%
	Unknown	F0.1	F35	F35%
Stock Size Estimates	Variable	F0.1	F0.1	F35%
	Stable	F0.1	F35%	Fmax
Knowledge of biological parameters	Poor	F0.1	F0.1	F35%
	Good	F35%	F35%	Fmax

History Fishery	Stable spatially and temporally	F35%	F35%	Fmax
	Sporadic	F0.1	F0.1	F35%
	Developing	F0.1	F35%	F35%

Preliminary MSY $B_{trigger}$ reference points were proposed at the lowest abundance observed in the UWTV burrow abundance, unless the stock has shown signs of stress at higher abundance (in which case a higher value is used). However, the time-series of surveys in Subarea VII are too short for that. For FU 15, where a longer series of survey trawl cpue was available; this was used to estimate a preliminary MSY $B_{trigger}$.

Data limited stocks

The assessments and advice for *Nephrops* stocks in FUs 14 and 15 (Irish Sea), 16 (Porcupine Bank), 17 (Aran Grounds), 19 (southeast and southwest coast of Ireland), and 22 (the Smalls) are primarily based on abundance estimates from underwater TV (UWTV) surveys together with fishery landings data and estimates of quantities of discards (from which dead discards are calculated). Additional indicators of changes in stocks are derived from trends in length compositions and sex ratio in the catches, fishery lpue, and (for FUs 15 and 16) trawl survey catch rates.

The advice for FUs 20–21 (Celtic Sea) is the same as last year's advice and is based on a range of indicators of stock trends, including fishery lpue, trawl survey catch rates, size compositions, and sex ratio. This advice applies ICES approach to data-limited stocks (stock category 4.1.4).

The advice for FU 18 and 'other rectangles' also follows ICES approach to data-limited stocks, and is based on a 20% reduction (precautionary buffer) compared to the average landings of the last three years (2010–2012), according to category 6.2 (ICES, 2012). No information on discards is available for FU 18 and 'other rectangles'. Landings from 'other rectangles' are estimated because no Spanish landings have been reported to ICES in 2011 and 2012 for this area. Prior to 2011 the Spanish landings represented around one third of the total landings from 'other rectangles'.

For FUs 14, 15, 16, 17, 19, and 22, the following procedure is adopted for providing assessment and advice based on UWTV survey estimates:

- Total population numbers are estimated from the UWTV surveys, including adjustments for a range of biases associated with the method. At the benchmark meetings (ICES, 2009, 2013a) it was proposed that the UWTV surveys provide abundance estimates for *Nephrops* of 17 mm carapace length and over.
- Historical harvest ratios are calculated as the ratio of total dead catch numbers (landings and dead discards) to population numbers from the UWTV survey in each year.
- Recent fishery length compositions (landings and dead discards) are analysed using a length-based assessment model to estimate population numbers and fishing mortality-at-length for *Nephrops* of 17 mm carapace length and over. This method assumes that the length compositions are representative of a population at equilibrium. The analysis is done separately for males and females using stock-specific growth and maturity parameters.
- Yield-per-recruit and spawning biomass-per-recruit curves are derived for male and female *Nephrops*, based on fishery selectivity parameters from the length-based assessment model. The harvest ratios associated with potential F_{MSY} proxies (e.g. $F_{0.1}$, F_{max}, $F_{35\%SPR}$) for males, females, and for both sexes combined are computed. These are conditional on a fishery selectivity pattern that includes fishing mortality due to landings and dead discards of *Nephrops* in the years covered by the assessment model.

Catch options tables for 2014 are derived for F_{MSY} proxy and other options by applying the appropriate harvest ratios to the population numbers estimate from the most recent UWTV survey. This assumes that population numbers remain stable in the interim year. Landings are derived from the resultant total catch numbers after multiplying by the recent average value for proportion retained and mean weight in the landings.

STECF COMMENTS: The management approach with an aggregated TAC is a major obstacle for the application of the rules in the Commissions Communication on Fishing opportunities for 2014 (COM(2013) 319-FINAL) which requires a TAC for each stock (in this case FU). It furthermore runs the risk of unbalanced effort distribution. This is known to have been a particular problem in the Porcupine bank (FU 16) in the past,

where large increases in effort were followed by a substantial decline in the stock (and subsequently quotas were introduced for the FU 16 component of Sub-area VII for 2011).

STECF notes that there are also *Nephrops* catches in "other rectangles" in Sub-area VII (including the north-west coast of Ireland which has previously been treated as a separate FU (18)). To provide some guidance on appropriate future landings for these areas, the use of an average landings figure (2010-2012) of around 235 tonnes could be considered (On the basis of ICES advice that catches from 'other areas' should not increase).

2.2.1 Norway lobster (*Nephrops norvegicus*) in FU 14, Irish Sea East (Division VIIa)

FISHERIES: Prior to 2007 landings from this FU were believed to be underreported. However, new legislation in 2007 increased the reliability of the landings data. The landings have fallen from a peak of 960 t in 2007 to 530 t in 2012. The fleet of vessels targeting *Nephrops* in 2012, with mesh sizes of 70–99 mm and where the weight of *Nephrops* landed is more than 25% of the total landing, consisted of around 25 English vessels almost entirely single-otter trawling and around 48 generally larger Northern Irish vessels, over 56% of which fish multi-rig trawls. The multi-riggers take around one third of the landings. 80 mm codends are commonly used for both types of trawl. The fishery takes place mainly in spring and early summer, when male *Nephrops* predominate. The UK *Nephrops*-directed effort in FU 14 has declined since 2007 and is estimated in 2012 to be at its lowest value since 1974. The *Nephrops* trawl fisheries take by-catches of other species especially plaice, but also whiting and cod.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment in 2013 is based UWTV surveys of absolute abundance. The advice for 2014 was delayed until autumn to take account of the most up-to-date survey information. The basis for the assessment and advice is the same as last year, i.e. based on the MSY approach.

REFERENCE POINTS:

	Type	***Value***	***Technical basis***
MSY Approach	MSY $B_{trigger}$	Not defined	No available reference. UWTV time series too short.
	F_{msy}	Harvest ratio 9.8 %	Equivalent to $F_{0.1}$ for combined sexes.
Precautionary Approach	Not defined		

Harvest ratio reference points (2010):

	Male	Female	Combined
F_{max}	15.8%	17.4%	16.4%
$F_{0.1}$	9.6%	10.2%	9.8%
$F_{35\%SpR}$	12.5%	13.5%	13.0%

STOCK STATUS:

F (Fishing Mortality)				
	2010	2011	**2012**	
MSY (F_{MSY})	✓	✓	✓	Below target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined

SSB (Spawning-Stock Biomass)		
	2011–2013	
MSY ($B_{trigger}$)	?	Undefined
Precautionary approach (B_{pa},B_{lim})	?	Undefined
Qualitative evaluations	→	Stable

The abundance of *Nephrops* in FU 14 is stable with the exception of 2012, where there has been an increase. There is not a long enough time-series to determine a candidate for MSY $B_{trigger}$. The current harvest rate (removals/UWTV abundance) is below the F_{MSY} proxy.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of the MSY approach that landings from FU 14 in 2014 should be no more than 951 tonnes. If total discard rates do not change from the average of 2006–2008, this implies total catches of no more than 1131 tonnes. For this FU, no discards are expected to survive the discarding process.

In order to ensure the stock in this FU is exploited sustainably, management should be implemented at the functional unit level.

Other considerations:

MSY approach

No MSY $B_{trigger}$ has been identified for this FU. Following the ICES MSY approach implies that the harvest ratio for FU 14 should be less than 9.8%, resulting in landings of no more than 951 t in 2014. If discard rates do not change from the average of 2006–2008 (assuming 0% discard survival), this implies total catches of no more than 1131 t in 2014.

Additional considerations

The advice takes into account the 2013 UWTV survey results.

The *Nephrops* trawl fishery takes bycatches of other species, especially plaice, but also whiting and cod. Selectivity of this fishery needs to be improved to reduce bycatches of cod, whiting, and undersized plaice.

Although up-to-date discard rate estimates are not available due to insufficient sampling, information from 2006-2008 (on which catch options for FU 14 are based), indicate that the proportion of discarded Nephrops is substantial. On average during 2006-2008, around 28% (in numbers) or 16% (in weight) of the *Nephrops* caught are estimated to have been discarded.

The fishery peaks in spring/summer. Some UK vessels temporarily relocate, targeting the Farn Deeps *Nephrops* fishery on the east coast of England in the winter months.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice for 2014 that to comply with MSY objectives landings should be no greater than 951 tonnes and catches of no more than 1131 tonnes.

STECF notes that the landings corresponding to ICES advice for 2014 imply a 152% increase on the status quo harvest ratio (and 152% more in landings) from this functional unit.

STECF considers that management of fishing mortality on Nephrops stocks would best be achieved if measures, including catch restrictions, were implemented at the level of the functional unit.

STECF notes that by-catches of cod, whiting and undersized plaice occur in this fishery and suggests that selectivity of this fishery should be improved.

2.2.2 Norway lobster (*Nephrops norvegicus*) in FU 15, Irish Sea West (Division VIIa)

FISHERIES: Prior to 2007, landings from this FU are believed to be underreported. However, new legislation in 2007 increased the reliability of the landings data. Estimated landings in 2008 were more than 10500 t from the Irish Sea West. Landings in 2009 and 2010 decreased to around 9000 t but increased again to more than 10100 t in 2011 and to 10527 t in 2012. Most of the landings are taken by the UK and the Republic of Ireland. The gears used are a mixture of single- and twin-rig otter trawls. The use of specified species-selective gears has been mandatory for all Irish vessels since March 2012 and similar conditions were introduced in October 2012 for the UK (Northern Ireland) vessels. Some Irish vessels started using multi (quad) rig trawls in 2012. Provisional data suggest a ~30% increase in *Nephrops* catch rates and a reduction in fish bycatch of ~30% due to the lower headline height.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment in 2013 is based on trends in population indicators and catch options derived from UWTV surveys as last year. The advice for 2014 was delayed until autumn to take account of the most up-to-date survey information. The basis for the assessment and advice is the same as last year, the MSY approach.

REFERENCE POINTS:

	Type	*Value*	*Technical basis*
MSY Approach	MSY $B_{trigger}$	3 billion individuals	Minimum abundance observed based in a scaled trawl survey
	F_{msy}	HR 17.1%	Equivalent to F_{max} for combined sexes in 2010.
Precautionary Approach	Not defined		

Harvest ratio reference points (2010):

	Male	Female	Combined
F_{max}	17.1%	17.1%	17.1%
$F_{0.1}$	11.0%	10.2%	10.6%
$F_{35\%SpR}$	14.1%	12.7%	13.4%

STOCK STATUS:

F (Fishing Mortality)				
	2010	2011	**2012**	
MSY (F_{MSY})	✓	✗	✗	Above target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined
SSB (Spawning-Stock Biomass)				
	2011	2012	**2013**	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	?	?	?	Undefined

Since 2003 stock abundance has been above MSY $B_{trigger}$. Recent harvest rates (removals/UWTV abundance) have fluctuated around the F_{MSY} proxy and are now above it.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of the MSY approach that landings in 2014 should be no more than 8244 tonnes. If total discard rates do not change from the average of the last three years (2010–2012), this implies total catches of no more than 9914 tonnes. Note that this figure includes discards expected to survive the discarding process – assumed to be 10% of the total number discarded for this stock.

In order to ensure the stock in this functional unit is exploited sustainably, management should be implemented at the functional unit level.

Other considerations:

MSY approach

Following the ICES MSY approach implies that the harvest ratio for the western Irish Sea FU 15 is reduced to less than 17.1%, resulting in landings of no more than 8244 t in 2014. If discard rates do not change from the average of the last three years (2010–2012, assuming 10% discard survival), this implies total catches of no more than 9914 t.

Additional considerations

The advice takes into account the 2013 UWTV survey results.

The Nephrops trawl fishery takes bycatches of other species, especially plaice, but also whiting and cod. In response to the long-term management plan for cod (EC 1342/2008), Northern Ireland and Ireland have introduced more species-selective gears primarily to reduce bycatch of cod, but the devices thus far introduced

are also know to reduce discards of other species. Despite this, selectivity of this fishery needs to be further improved to reduce bycatches of juvenile whiting in particular.

The proportion of discarded Nephrops is substantial. On average over the last three years, around 28% in numbers (or 17% in weight) of the Nephrops caught are estimated to have been discarded.

The FU 15 Nephrops fishery first developed in the late 1950s. The environment in the Western Irish Sea is very suitable for Nephrops, with a large mud patch and a gyre that retains the larvae over the mud patch, thus ensuring good recruitment. The ground can be characterized as an area of very high densities of small Nephrops. All available information indicates that size structure of catches appears to have changed little since the fishery first began.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice for 2014 that to comply with MSY objectives landings should be no greater than 8244 tonnes and catches of no more than 9914 tonnes.

STECF notes that the landings corresponding to ICES advice for 2014 imply a 14% decrease on the status quo harvest ratio (and 14% less in landings) from this functional unit.

STECF considers that management of fishing mortality on Nephrops stocks would best be achieved if measures, including catch restrictions, were implemented at the level of the functional unit.

STECF notes that the Nephrops trawl fishery takes bycatches of other species, especially plaice, but also, whiting and cod. Selectivity of this fishery needs to be improved to reduce bycatches of cod, whiting and undersized plaice.

2.2.3 Norway lobster (*Nephrops norvegicus*) in FU19, SW and SE Ireland (Divisions VII g, j)

FISHERIES: Reported landings for this FU were 833 t in 2009, but decreased to 608 t in 2011. The reported landings for 2012 amount to 770t. The *Nephrops* fishery in this functional unit is mainly an otter trawl fishery using single- and twin-rigs and a codend mesh size of 80–99 mm. Similar to the situation in Aran Grounds the most recent change in the fishery is the proportion of twin-rig vessels, which has increased to over 90 % of the fleet in the past eight years. This implies a large increase in effective effort, even if such an increase is not observed in the nominal effort figures.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The 2013 assessment is based on data from UWTV survey begun in 2011. The assessment is based on indicators and an UWTV survey as last year. The advice for 2014 was delayed until autumn to take account of the most up-to-date survey information.

Last year's advice was based on the MSY approach. This year's advice is on the same basis

REFERENCE POINTS:

	Type	Value	Technical basis
MSY	MSY Btrigger	Not defined	
Approach	FMSY	HR 7.5%	Equivalent to F0.1 for combined sex in 2012
Precautionary Approach	Not defined		

Harvest ratio reference points (2012):

	Male	Female	Combined
F_{max}	10.4%	21.9%	12.7 %
$F_{0.1}$	6.5%	14.2%	7.5 %
$F_{35\%SpR}$	8.3%	21.8%	12.1 %

STOCK STATUS:

	F (Fishing Mortality)		
	2010	2011	**2012**

MSY (F_{MSY})	?	✓	✗	Above target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined

SSB (Spawning-Stock Biomass)		
	2011–2013	
MSY ($B_{trigger}$)	?	Undefined
Precautionary approach (B_{pa},B_{lim})	?	Undefined
Qualitative evaluation	↘	Decreasing

Recent harvest rates (removals/UWTV abundance) are around the F_{MSY} proxy. The time-series of reliable abundance estimates is too short to detect a significant trend within the uncertainty bounds, but appears to be decreasing.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the MSY approach that landings in 2014 should be no more than 521 tonnes. If total discard rates do not change from the average of the last three years (2010–2012), this implies total catches of no more than 618 tonnes. Note that this figure includes discards expected to survive the discarding process – assumed to be 10% of the total number discarded for this stock.

In order to ensure the stock in this FU is exploited sustainably, management should be implemented at the functional unit level.

Other considerations

MSY approach

No MSY $B_{trigger}$ has been identified for this FU. Following the ICES MSY approach implies the harvest ratio for FU 19 should be reduced to less than 7.5%, resulting in landings of no more than 521 t in 2014. If discard rates do not change from the average of the last three years (2010–2012, assuming 10% discard survival), this implies total catches of no more than 618 t.

Additional considerations

The advice takes into account the 2013 UWTV survey results.

Management considerations

The abundance estimates and the F_{MSY} harvest rate are considered conservative; the time-series of UWTV observations is short, and scientific knowledge about *Nephrops* populations and fisheries in this area is limited but improving.

Nephrops fisheries in this area are fairly mixed, landing also megrim, anglerfish, haddock, and other demersal species. Around 44% of the total catch by weight is discarded. The main discarded fish species are haddock and boarfish (Anon., 2011).

The proportion of discarded *Nephrops* is substantial. On average over the last three years, around 29% (in numbers) or 16% (in weight) of the *Nephrops* caught are estimated to have been discarded.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice for 2014 that to comply with MSY objectives landings should be no greater than 521 tonnes and catches of no more than 618 tonnes.

STECF notes that the landings corresponding to ICES advice for 2014 imply a 20% decrease on the status quo harvest ratio (and 20% less in landings) from this functional unit.

STECF considers that management of fishing mortality on Nephrops stocks would best be achieved if measures, including catch restrictions, were implemented at the level of the functional unit.

STECF notes that the *Nephrops* fisheries in this area are fairly mixed also landing megrim, anglerfish, haddock and other demersal species. The main discarded species are haddock, whiting and dogfish.

2.2.4 Norway lobster (*Nephrops norvegicus*) in FU 20, Celtic Sea (Labadie, Baltimore, and Galley) and in FU 21, Celtic Sea (Jones and Cocburn)

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: There are three Functional Units in the Celtic Sea area but FU 20 and 21 are treated together. Landings from these Functional Units are reported by France, the Republic of Ireland and the UK, the main contributors being France and Ireland. In 2009 total reported landings from all 2 FUs amounted to more than 3000 t, but have since decreased to 1189 t in 2012. There has been a considerable decrease in French landings and effort (due to decommissioning) whilst Irish landings have increased. There has also been increasing effort by Irish vessels targeting *Nephrops* in the Celtic Sea in recent years. Discarding and high-grading takes place, but varies between fleets and areas

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. For FUs 20 and 21, The advice is based on a calculation of potential landing options and harvest rates given the known surface area of Nephrops habitat and assumed potential densities of the functional unit.

REFERENCE POINTS:

	Type	***Value***	***Technical basis***
MSY Approach	MSY $B_{trigger}$	Not defined	
	F_{MSY} (whole FU20-21) harvest rate	Not defined	
Precautionary Approach		Not defined	

STOCK STATUS:

F (Fishing Mortality)		
	2009–2011	
Qualitative evaluation		Decreasing

SSB (Spawning Stock Biomass)		
	2009–2011	
Qualitative evaluation		Unknown

For the FU 20-21 stock component, for a long period, the stock was considered to be stable based on long term indicators (lpue, mean size, discard rates). There have been indications of strong recruitment in recent years (e.g. 2006) resulting in an increase in commercial lpue for Irish and for French trawlers in 2008 and 2009. Lpue decreased in the last two years suggesting a decline in abundance since the peak in 2008–2009. Landings in 2010 and 2011 have declined substantially (potentially explained by a decreased targeting of Nephrops by the French fleet).

RECENT MANAGEMENT ADVICE:

Based on the ICES approach for data limited stocks, ICES advises that landings should be no more than 2500 tonnes. This is the first year that ICES is providing quantitative advice for data limited stocks.

To protect the stock in this functional unit, management should be implemented at the functional unit level.

Other considerations

ICES approach to data limited stocks

For this stock, the last 10 years average landings correspond to a Harvest Rate below the range of MSY harvest rates calculated for other Nephrops FUs (between 7.5–17%) provided that the Nephrops density is at least 0.35.

The most recent density estimate (from 2006) is 0.4 Nephrops per m2. Even though this density estimate is six years old, the stock development since then (as indicated by commercial effort and lpue trends) does not give reason for concern that the burrow density may have declined significantly. Therefore, ICES advises that landings should not increase in relation to the ten year average landings, which corresponds to landings of no more than 2500 tonnes.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the FU 20-21 stock and the advice basis for 2013 and 2014 that on the basis of the ICES approach to data limited stocks, catches should be no greater than 2500 t.

STECF considers that management of fishing mortality on Nephrops stocks would best be achieved if measures, including catch restrictions, were implemented at the level of the functional unit.

2.2.5 Norway lobster (*Nephrops norvegicus*) in FU 22, Celtic Sea (the Smalls)

FISHERIES: Landings from this Functional Unit are reported by France, the Republic of Ireland and the UK, the main contributors being Ireland (95%). These vessels mainly use twin otter trawls. The fishery occurs throughout the year with a seasonal peak in activity in May. In 2009 total reported landings amounted to more than 3000 t, but have decreased to 1617 t in 2011. The preliminary landings for 2012 are 2633 t. There has been a considerable decrease in French landings and effort (due to decommissioning) whilst Irish landings have increased. There has also been increasing effort by Irish vessels targeting *Nephrops* in the Celtic Sea in recent years. Discarding and high-grading takes place, but varies between fleets and areas. *Nephrops* fishery in the Celtic Sea has bycatches of whiting and cod, and to a lesser extent of haddock and hake.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based on indicators and an UWTV survey as last year. The advice for 2014 was delayed until autumn to take account of the most up-to-date survey information.

This year's advice is based on the MSY approach, as last year.

REFERENCE POINTS:

	Type	***Value***	***Technical basis***
MSY approach	MSY $B_{trigger}$	Not defined.	
	F_{MSY} (FU 22) harvest rate.	10.9%	*Equivalent to $F_{35\%SPR}$ for combined sexes in 2011.*
Precautionary approach	Not defined.		

(unchanged since 2011)

Harvest ratio reference points (2011):

	Male	Female	Combined
F_{max}	10.9%	17.7%	12.3 %
$F_{0.1}$	6.5%	10.9%	7.5 %
$F_{35\%SPR}$	8.4%	15.3%	10.9%

STOCK STATUS:

F (Fishing Mortality)				
	2010	2011	**2012**	
MSY (F_{MSY})	✗	✓	✓	Appropriate
Precautionary approach (F_{pa},F_{lim})	?	?	?	Unknown

SSB (Spawning-Stock Biomass)		
	2011–2013	
MSY ($B_{trigger}$)	?	Undefined

Precautionary approach (B_{pa},B_{lim})	?	Undefined
Qualitative evaluation	→	Stable

The FU 22 stock component is considered to be stable. Harvest rates (removals/UWTV abundance) have decreased since 2007 and are below the F_{MSY} proxy.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the MSY approach that landings from FU 22 in 2014 should be no more than 2674 tonnes. If total discard rates do not change from the average of the last three years (2010–2012), this implies total catches of no more than 2937 tonnes. Note that this figure includes discards expected to survive the discarding process – assumed to be 25% of the total number discarded for this stock.

In order to ensure the stock in this FU is exploited sustainably, management should be implemented at the functional unit level.

Other considerations

MSY approach

No MSY $B_{trigger}$ has been identified for this FU. Following the ICES MSY approach implies that the harvest ratio for the Smalls FU 22 should be reduced to less than 10.9%, resulting in landings of no more than 2674 tonnes in 2014. If discard rates do not change from the average of the last three years (2010–2012, assuming 25% discard survival), this implies total catches of no more than 2937 tonnes.

Additional considerations

The advice takes into account the 2013 UWTV survey results.

Cod, whiting, and to a lesser extent haddock are landed together with *Nephrops*. The *Nephrops* trawl fleet operating in Divisions VIIgfh discards around 38% of its total catch by weight. Small *Nephrops* are the main species in the discards and the main fish species discarded are whiting, haddock, and dogfish.

The proportion of discarded *Nephrops* is substantial. On average over the last three years, around 15% in numbers (or 9% in weight) of the *Nephrops* caught are estimated to have been discarded.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice for 2014 that to comply with MSY objectives landings should be no greater than 2674 tonnes and catches of no more than 2937 tonnes.

STECF notes that the landings corresponding to ICES advice for 2014 imply a 15% increase on the status quo harvest ratio (and 15% more in landings) from this functional unit.

STECF considers that management of fishing mortality on Nephrops stocks would best be achieved if measures, including catch restrictions, were implemented at the level of the functional unit.

STECF notes that the *Nephrops* fisheries in this area are fairly mixed also landing Cod, whiting, and to a lesser extent haddock. The main discarded species are whiting, haddock, and dogfish.

2.3 Haddock (*Melanogrammus aeglefinus*) in Division VIb (Rockall)

FISHERIES: The haddock stock at Rockall is an entirely separate stock from that on the continental shelf of the British Isles. Rockall haddock have lower growth rates and reach a lower maximum size than other haddock populations in the Atlantic.

Until recently the Rockall haddock fishery largely occurred in summer months, when conditions are easier and particularly when fishing at Rockall was more profitable compared with the North Sea or West of Scotland. A number of Irish vessels did however exploit this stock on a more regular basis.

Haddock are caught in a mixed fishery together with blue whiting and a number of non-assessed species such as grey gurnard. Traditionally Scottish and Irish trawlers target 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.

Since 1987 reported landings have varied between 2,300 t and 8,000 tonnes. For 2009 total landings were 3,400t. As part of this stock area now falls outside the EU EEZ there was an increase in activity by non-EU fleets, notably Russian Federation vessels, from 1999 onwards, although this has declined in recent years. Landings by non-EU fleets reached a peak in 2004, when reported landings by the Russian Federation amounted to 5,844 t or some 90% of the total. For 2010, the officially reported landings from the Russian Federation and Norway were 198 t and 65 t respectively compared with 55 t and 71 t in 2009. Landings information for 2012 are preliminary and may not cover all landings.

Effort by the Scottish and Irish fleets increased in recent years following a period of reduced effort 2004 – 2006, and anecdotal information suggests this is partly as consequence of effort restrictions introduced as part of the 2009 long-term plan for cod.

Following the NEAFC agreement in March 2001, an area of the NEAFC zone around Rockall was closed to fishing. In spring 2002, part of the shallow water in the EU component was also closed to trawling. The main goal of the ban was to protect young haddock distributed in shallow water. At the request of NEAFC, ICES has this year provided advice on the Rockall closure area and additional measures for the protection of juveniles. ICES concluded that the overall impact of the current closure area is difficult to assess, and advised that a number of technical and operational measures could be examined to improve the selection pattern of the entire fishery.

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

The assessment is based on catch numbers-at-age and one survey index (Rock-WIBTS-Q3). In 2011 the survey was resumed with a new gear but an analysis showed that there was no detectable difference between it and the older gear. The 2012 and 2013 assessments are thus more robust than the 2011 one.

REFERENCE POINTS:

	Type	***Value***	***Technical basis***
MSY Approach	MSY $B_{trigger}$	9000 t	B_{pa}
	F_{MSY}	0.3	Provisional proxy by analogy with North Sea haddock. Fishing mortalities close to F_{sq} in 2010.
Precautionary Approach	B_{lim}	6000 t	B_{lim} = $B_{loss,}$ the lowest observed spawning stock estimated in previous assessments.
	B_{pa}	9000 t	B_{pa} = B_{lim} * 1.4. This is considered to be the minimum SSB required to obtain a high probability of maintaining SSB above B_{lim}, taking into account the uncertainty of assessments.
	F_{lim}	Not defined.	Not defined due to uninformative stock recruitment data.
	F_{pa}	0.4	This F is adopted by analogy with other haddock stocks as the F that provides a small probability that SSB will fall below B_{pa} in the long term.

STOCK STATUS:

F (Fishing Mortality)				
	2010	2011	**2012**	
MSY (F_{MSY})	✓	✓	✓	Below target
Precautionary approach (F_{pa},F_{lim})	✓	✓	✓	Harvest sustainably
SSB (Spawning-Stock Biomass)				

	2011	2012	2013	
MSY ($B_{trigger}$)	✗	✓	✗	Below trigger
Precautionary approach (B_{pa},B_{lim})	o	✓	o	Reduced reproductive capacity

The spawning-stock biomass increased up to 2008 as a result of the 2001 and 2005 year classes but has decreased constantly since then. SSB in 2013 is below B_{pa}. Fishing mortality has declined over time and is now below the F_{MSY} proxy. Recruitment during 2007–2012 is estimated to be extremely weak. The 2013 survey data indicate that the 2012 year class (corresponding to the 2013 recruitment) is above the most recent estimates of recruitment.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the MSY approach that catches should be no more than 1620 t in 2014. If discard rates (at age) do not change from the average of the last seven years (2006–2012), this implies landings of no more than 980 t.

Further management measures should be introduced to reduce catches of small haddock and to protect the incoming recruitment in 2013.

Other Considerations

MSY approach

Following the ICES MSY approach implies a fishing mortality at $F_{MSY\text{-}HCR} = F_{MSY} \times SSB_{2014}/MSY\ B_{trigger} = 0.14$, resulting in catches of no more than 1620 t in 2014. If discard rates (at age) do not change from the average of the period 2006–2012, this implies landings of no more than 980 t. This is expected to lead to an SSB of 21 700 t in 2015, which is above MSY $B_{trigger}$.

Further management measures should be introduced to reduce catches of small haddock and to protect the incoming recruitment in 2013.

PA approach

Under the precautionary approach catches in 2014 should be no more than 4100 t. If discard rates (at age) do not change from the average of the period 2006–2012, this implies landings of no more than 2430 t. This is expected to lead to an SSB of 18 700 t in 2015, which is above B_{pa}.

Further management measures should be introduced to reduce catches of small haddock and to protect the incoming recruitment in 2013.

Management plans

ICES evaluated a new HCR proposal for the Rockall haddock stock in August 2013and found that a maximum F of 0.2 was required in the HCR to ensure consistency with the precautionary approach, under the low recruitment conditions observed since 2004. If F = 0.2 in 2014, then SSB is forecast to be above B_{pa} at the end of 2014. In these circumstances, the proposed HCR initially calculates catches according to a fishing mortality of 0.2 in 2014, followed by the application of a TAC constraint adjustment. This results in F = 0.18 in 2014, corresponding to catches of no more than 2010 t in 2014. If discard rates (at age) do not change from the average of the period 2006–2012, this implies landings of no more than 1210 t.

The TAC in the proposed management plan refers to total catch, not just landings. The management plan additionally indicates that measures should be put in place to ensure that total catch does not exceed the established TAC, including measures to record and minimize discards. After the introduction of these measures, the human consumption TAC method currently used by ICES should not be applied.

Additional considerations

ICES evaluation of a proposed HCR in August 2013 and noted that if the low recruitment generally observed since 2004 were to prevail in the future, it is unlikely that the ICES HCR for the MSY approach with the existing reference points would be considered precautionary. This year the ICES MSY approach option

corresponds to higher SSB in 2015 than the proposed management plan HCR (which has been evaluated and found to be precautionary). ICES is providing advice this year that follows the MSY approach with an F_{MSY} proxy of 0.3, but this may need to be reconsidered in the future.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice for 2014 that to comply with MSY objectives, catches should be no greater than 1620 t. STECF notes that if poor recruitment as experienced since 2004 persists, the F_{MSY} proxy of F=0.3, as used as the basis of the advice, may need to be reconsidered.

STECF notes that the newly proposed management plan advises more cautious exploitation at F=0.2, but because of the greater short-term risk of lower SSBs, the MSY advice predicts a more rapid increase in SSB.

STECF also notes that the management plan proposed by ICES prescribes that catches in 2014 should be no greater than 2010 t.

2.4 Megrim (*Lepidorhombus whiffiagonis*) in IVa, Vb (EU zone), VI, XII & XIV

FISHERIES: The main fishery is in Sub-Area VI where megrim is taken as a by-catch in trawl fisheries targeting anglerfish, roundfish species and *Nephrops*. There is however increasing targeting of megrim in response to more restrictive fishing opportunities for other species. Since 2009, ICES also provides advice on megrim in Subarea IV (North Sea). This is because the spatial distribution of landings data and survey catches provide good evidence to suggest that megrim population is contiguous between Divisions IVa and VIa.

The main exploiters are the UK (≥ 80% of catch in the past 4 years), Ireland, France and Spain.

Between 1990 and 2012 nominal catches of Megrim in Division VIa, VIb and subarea IV as officially reported to ICES have ranged from 1,920 t in 2005 to 6,150 in 1996. Combined landings have been fluctuating around 3,000t since 2008 with a combined (Divisions IVa, VIa and VIb) nominal catch of 2,815 t for 2012.

It is unclear if the trends in landings reflects trends in abundance or are a consequence of the changes in trawl effort observed over the period.

Area misreporting had been prevalent as megrim catches were misreported from Subarea VI into Subarea IV due to restrictive quotas for anglerfish (i.e. vessels targeting anglerfish misreported all landings including megrim from Subarea VI into Subarea IV). However, in the most recent years there is evidence to suggest that this has reversed as the subarea IV TAC has become more restrictive and increasing targeting of megrim in response to more restrictive fishing opportunities for other species e.g. cod. The extent of this problem is unknown and should be quantified through integrated logbook and VMS analysis. As a consequence, the management of anglers and megrim which in the past has been thought to be strongly coupled is now likely to significantly less so.

SOURCE OF MANAGEMENT ADVICE:

The management advisory body is ICES.

ICES consider that there is little evidence to suggest that the megrim in Subarea IV and Division VIa are separate stocks and concluded that megrim in Divisions VIa and IVa should be treated as a single stock and megrim in Division VIb (Rockall) should be treated as a separate stock. Consequently it provides advice, separately, for each. In both cases these assessments are landings and survey trends based rather than analytical.

REFERENCE POINTS:

Divisions IVa and VIa:

	Type	***Value***	***Technical basis***
MSY Approach	MSY $B_{trigger}$	9740 t	50% B_{MSY}
	F_{MSY}	0.33	Estimated directly from the model. Fishing mortality values expressed relative to F_{MSY}.
Precautionary Approach	B_{lim}	5844 t	30% B_{MSY}
	B_{pa}	Not defined.	
	F_{lim}	Not defined.	
	F_{pa}	Not defined.	

STOCK STATUS:

Divisions IVa and VIa:

F (Fishing Mortality)				
	2010	2011	**2012**	
MSY (F_{MSY})	✓	✓	✓	Appropriate
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined

Biomass				
	2011	2012	**2013**	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	✓	✓	✓	Full reproductive capacity

Fishing mortality has been below F_{MSY} for almost the full time-series and the biomass well above MSY $B_{trigger}$.

Division VIb (Rockall)

F (Fishing Mortality)		
	2010–2012	
Qualitative evaluation	✓	Below poss. reference points

SSB (Spawning-Stock Biomass)		
	2008–2012	
Qualitative evaluation	↗	Increasing

There is no analytical assessment for this stock. Survey indices for Division VIb show an increase in biomass over the time-series from 2005 to 2010, followed by a decline in 2011. The 2012 survey data shows a substantive increase in biomass. The average of the stock size indicator, biomass from the survey, in the last two years (2011–2012) is 52% higher than the average of the three previous years (2008–2010). The harvest ratio has been on a low and stable level since 2007.

RECENT MANAGEMENT ADVICE:

Divisions IVa and VIa: ICES advises on the basis of the MSY approach that catches should be no more than 7000 t in 2014 and 2015. If discard rates do not change from the average of the last three years, this implies landings of no more than 5,950 t.
Division VIb (Rockall): Based on ICES approach to data-limited stocks, ICES advises that landings should be no more than 207 t in 2014. Discards are known to take place but cannot be quantified; therefore total catches cannot be calculated. ICES advises that the management area should be the same as the assessment area.

STECF COMMENTS:

STECF agrees with the ICES assessment of the state of the stock and the advice that catches should be no more than 7,207t in 2014. Given that the stock is distributed over 2 separate TAC management areas ((i) *EU waters of IIa and IV* and (ii) *EU and international waters of Vb; VI; international waters of XII and XIV*), STECF notes that advised catch should equate to the fishing opportunities for both TAC management areas combined. STECF notes that ICES (2013) the management and assessment units should be appropriately aligned and they should encompass the full spatial structure of the stock. ICES recommends that the management unit should match the assessment unit. Currently, there is a process to resolve how such fishing opportunities would best be allocated, but this process has not been finalised.

STECF considers that from a scientific perspective, if there is desire to maintain the current TAC area arrangements, it would be appropriate to allocate fishing opportunities according to the relative distribution of megrim biomass in the separate management areas. According to the SAMISS/IAMISS survey data, the average biomass distribution of megrim for the period 2010-2012 indicates that 56% is distributed in subarea IV and 44% is distributed in Division VIa. Using these relative survey biomass estimates as a means of allocating the

advised fishing opportunities, implies that in 2014 landings no greater than 3,332 t in *EU waters of IIa and IV* and no greater than 2825 t in *EU and international waters of Vb; VI; international waters of XII and XIV*.

STECF notes that if fishing opportunities for megrim in 2014 were to be allocated according to the procedure outlined above, compared to the agreed TACs for 2013, they would represent a 72% increase in fishing opportunities in *EU waters of IIa and IV* and an 17% decrease in *EU and international waters of Vb; VI; international waters of XII and XIV*.

Request to ICES on the distribution of the stock of megrim in Subarea IV and VIa.

STECF notes the ICES response to the Commission's request on the distribution of the stock of megrim in Subarea IV and VIa (ICES Advice 2013, Book 5, Section 5.3.3.1).

STECF agrees with logical explanations given in the ICES response and with the ICES advice that the management units should match the biological/assessment units.

2.5 Norway pout (*Trisopterus esmarki*) in Division VIa (West of Scotland)

The results from the most recent assessment and advice for this stock were released in 2012 and is valid for 2013 and 2014. The text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES A directed industrial fishery existed in the past but at present there are no directed fisheries for Norway Pout in Division VIa. Total landings for the years 1971 – 2009 varied considerably, from a high in 1987 of some 38,000 tonnes to less than 50 tonnes every year since 2005 and zero tonnes since 2007. Historically the majority of landings have been taken by Danish fleets with lesser catches by UK, Netherlands and Germany. If industrial fisheries resumes in this area they may take a bycatch of juvenile herring and other species.

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

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

STOCK STATUS: The available information is inadequate to evaluate stock trends relative to risk, so the state of the stock is unknown. The only data available are official landings statistics which have been very low and do not provide an adequate basis for scientific advice.

RECENT MANAGEMENT ADVICE: There is insufficient information to evaluate the status of this stock. Therefore, based on the ICES approach to data limited stocks, and taking into account the absence of landings in recent years, ICES advises for 2013 and 2014 that no increase of the catches should take place unless there is evidence that this will be sustainable.

STECF COMMENTS: STECF agrees with the ICES advice that as there is insufficient information to evaluate the status of stock, based on precautionary considerations, no increase of the catches should take place unless there is evidence that this will be sustainable.

3 Resources of the Bay of Biscay and Iberian Waters

3.1 Sole (*Solea solea*) in Divisions VIIIa, b (Bay of Biscay)

FISHERIES: The French fleet, which consists mainly of trawlers and fixed-nets, is the major participant in the Bay of Biscay sole fishery with landings comprising about 90% of the total official international landings over the historical series. The remaining part is landed by the Belgian beam trawler fleet. The landings of the French fixed-net fishery have increased from less than 5% of total landings prior to 1985 to around 65% in recent years. This shift between fleets has resulted in a change in the selection pattern towards older fish. Discards are estimated to have been limited in this fishery in the past, but there are some recent reports of high-grading practices due to the landing limits adopted by the industry.

Total landings in 2012 were 4,300t (inshore trawlers 7%, offshore otter trawlers 17%, offshore beam-trawlers 9%, and fixed nets 66%).

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

The advice is based on an age-based analytical assessment based on landings and CPUE data series from surveys and commercial fleets. Discards are not included in the assessment.

In addition to the two commercial tuning fleets, fisheries-independent data (ORHAGO survey) were incorporated in the assessment this year, following an Inter-Benchmark Procedure. This is considered to be an improvement in the quality of the assessment. The catch and SSB in the forecast are dominated by year classes for which geometric mean recruitment is assumed. The ORHAGO survey provides information on age 1, which could in the future also be used in predicting the incoming year-class strength. The update of the maturity ogive may improve the assessment quality.

REFERENCE POINTS:

	Type	***Value***	***Technical basis***
MSY Approach	MSY $B_{trigger}$	13 000 t	B_{pa} (provisional estimate.)
	F_{MSY}	0.26	F_{max} (ICES, 2010) because stock–recruitment relationship, limited variations of recruitment, and fishing mortality pattern are known with low uncertainty.
Precautionary Approach	B_{lim}	Not defined.	
	B_{pa}	13 000 t	The probability of reduced recruitment increases when SSB is below 13 000 t, based on the historical development of the stock.
	F_{lim}	0.58	Based on the historical response of the stock.
	F_{pa}	0.42	F_{lim} * 0.72

MANAGEMENT AGREEMENT: A multiannual plan has been agreed by EU in 2006 (EC Reg. No. 388/2006, Annex 7.4.21). The aim of the plan was first to bring the spawning-stock biomass above 13 000 tonnes in 2008 and thereafter to ensure the sustainable exploitation of the stock. ICES has not evaluated the plan.

STECF has evaluated a new management plan proposal and concluded that exploiting the Bay of Biscay sole stock at Fmsy (0.26) can be considered precautionary. An F target of 0.26 does not produce significantly higher long term yields relative to Fs in the range of 0.15-0.35. Two possible Fmsy transition options were considered: 1) A strategy of gradual annual reductions in F towards achieving Fmsy in 2015 may be combined with the current 15% constraint in interannual variation in TAC. 2) With a constant TAC strategy of 4100t from 2012 onwards, Fmsy could be reached with a 50% probability by 2015. Both strategies assume that F is maintained at Fmsy (0.26) once F has declined to that level.

STOCK STATUS:

F (Fishing Mortality)				
	2010	2011	**2012**	
MSY (F_{MSY})	✗	✗	✗	Above target
Precautionary approach (F_{pa},F_{lim})	✓	✓	○	Increased risk

SSB (Spawning-Stock Biomass)				
	2011	2012	**2013**	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	✓	✓	✓	Full reproductive capacity

The most recent estimates of SSB are above the MSY $B_{trigger}$. Fishing mortality has been above the F_{MSY} proxy, and since 2003 it has been around F_{pa}. SSB in 2012 was revised upwards by 4%. F in 2011 was revised downwards by 23%. Recruitment values since 2004 are among the lowest in the time-series, with the exception of the 2009 recruitment which is the highest observed.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the transition to the MSY approach that catches in 2014 should be no more than 3270 tonnes. All catches are assumed to be landed.

Other considerations

Management plan

The multiannual plan for the Bay of Biscay sole (EC Reg. No. 388/2006) does not provide any basis for a TAC advice for 2014. The aim of the plan was first to bring the spawning-stock biomass above 13 000 tonnes. This target is estimated to have been achieved. According to the plan, the Council must decide on (a) a long-term target fishing mortality rate; and (b) the rate of reduction in the fishing mortality rate that should apply until the target fishing mortality rate decided under (a) has been reached. The EC has not yet defined the values for items (a) and (b). ICES has not evaluated this plan.

MSY approach

To follow the ICES MSY approach implies fishing mortality at the F_{MSY} proxy = 0.26, resulting in catches of no more than 3051 t in 2014. This is expected to lead to an SSB of 19 105 t in 2015, corresponding to a 14% increase compared with the 2014 SSB. All catches are assumed to be landed.

To follow the transition scheme towards the ICES MSY approach implies fishing mortality at 0.28, resulting in catches of 3270 t in 2014. This is expected to lead to an SSB of 18 847 t in 2015, corresponding to a 12% increase compared with the 2014 SSB. All catches are assumed to be landed.

PA approach

The fishing mortality in 2013 should be no more than Fpa, corresponding to landings of less than 4606 t in 2014. This is expected to keep SSB above Bpa in 2015 (17,278 t).

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock but notes that the ICES advice is not consistent with a 15% constraint in interannual variation in TAC. A total catch of 3270 in 2014 on the basis of the MSY transition approach as advised by ICES will lead to a 20% change in TAC. Taking into account a 15% constraint in interannual variation in TAC, would imply that total catches in 2014 should be no more than 3490 t.

STECF further notes that although the spawning stock biomass is evaluated by ICES to be equal or above the precautionary level of 13,000 t, the Council has not decided on (a) a long-term target fishing mortality rate, or (b) a rate of reduction in the fishing mortality rate for application until the target fishing mortality rate decided under (a) has been reached as specified in Article 3.1 of Annex 7.4.21 of the muliannual plan for Bay of Biscay sole in Divisions VIIIa and VIIIb, Council Regulation (EC) No. 388/2006.

Request to ICES for a harvest control rule evaluation on fixed TAC regimes.

STECF notes the ICES response to the Commission's request for a harvest control rule evaluation on a fixed TAC and safeguard mechanisms for sole in the Bay of Biscay (ICES Advice 2013, Book 7, section 7.3.5.2).

STECF agrees with logical explanations given in the ICES response and with the ICES advice that the evaluated harvest control rule is considered to be precautionary when the fixed TAC is set at less than or equal to 4500 tonnes. STECF notes that none of the fixed TAC regimes (3500 to 4500 tonnes) have >50% probability of reaching F_{MSY} in 2015 but all fixed TAC targets ≤4300 tonnes have >50% probability of reaching F_{MSY} by 2020. Only fixed TACs less than ≤3900 tonnes are shown to have a greater than 75% probability of reaching F_{MSY} by 2020. Only fixed TACs less than ≤3900 tonnes are shown to have a greater than 75% probability of reaching F_{MSY} by 2020. STECF further notes that it takes longer to reach F_{MSY} for higher fixed TAC options. As a consequence, with higher fixed TAC's there is, for a few years beyond 2020, some probability of failing to reduce F sufficiently to move from the fixed TAC target to the F_{MSY} target (see table below).

Table The probability (in %) of changing from the initial fixed TAC (Clauses 2 and 5) to the F_{MSY} target (Clauses 3 and 4), for initial fixed TAC values between 3500 and 4500 tonnes. Shaded values have >50% probability of making the change to Clauses 3 and 4 (i.e. F estimated to have reached F_{MSY}). The simulations include the implementation of all clauses of the HCR.

Fixed TAC	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
3500	0	0	24	54	81	93	98	100	100	100	100	100	100	100
3600	0	0	20	49	75	89	96	99	100	100	100	100	100	100
3700	0	0	16	42	67	84	93	98	99	99	100	100	100	100

3800	0	0	13	36	60	79	90	96	99	99	100	100	100	100
3900	0	0	11	31	53	72	86	93	97	99	100	100	100	100
4000	0	0	9	26	46	64	80	90	95	98	99	100	100	100
4100	0	0	7	20	38	56	73	84	91	94	97	98	100	100
4200	0	0	6	16	33	49	66	78	86	92	95	97	98	99
4300	0	0	5	12	27	42	58	72	81	88	93	96	97	99
4400	0	0	3	9	22	33	49	62	72	81	88	93	96	98
4500	0	0	2	8	18	29	41	53	64	74	81	87	91	95

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

FISHERIES: Anchovy is targeted by trawlers and purse-seiners. The Spanish and French fleets fishing for anchovy in Subarea VIII are spatially and temporally well separated. The Spanish fleet operates mainly in Divisions VIIIc and VIIIb in spring, while the French fleets operate in Division VIIIa in summer and autumn and in Division VIIIb in winter and summer. Since 2003 the fleets of both countries have decreased.

After 5 years of closure, the anchovy fishery was re-opened in 2010. Catches in 2011and 2012 were 14 530 t and 14 402 t respectively.

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

REFERENCE POINTS:

	Type	Value	Technical basis
MSY Approach	MSY $B_{escapement}$	33 000 t	Provisional value based on B_{pa}.
	F_{MSY}	Not defined.	
Precautionary approach	B_{lim}	21 000 t	B_{lim}: B_{loss} = 21 000 t (1989 SSB).
	B_{pa}	33 000 t	$B_{pa} = B_{loss} \times \exp(1.645\sigma)$.
	F_{lim}		Not defined.
	F_{pa}	1.0–1.2	F_{pa}: = F for 50% spawning potential ratio, i.e. the F at which the SSB/R is half of what it would have been in the absence of fishing.

(unchanged since 2010)

STOCK STATUS:

F (Fishing Mortality)				
	2010	2011	**2012**	
MSY (F_{MSY})	?	?	?	Undefined

SSB (Spawning-Stock Biomass)				
	2011	2012	**2013**	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	✓	✓	✓	Full reproductive capacity

The spawning-stock biomass has been above the limit reference point since 2006 and above the MSY $B_{escapement}$ since 2010. Recruitment in 2013 is around the 30th percentile of the historical series. The harvest rate in 2012 was below the average of the historical series since 1987 (the years 2005–2009 were excluded due to fishery closures).

RECENT MANAGEMENT ADVICE: ICES advises on the basis of the precautionary approach that catches from 1 July 2013 to 30 June 2014 should be no more than 18 000 tonnes.

Other considerations

Management plan

Following the management plan proposed by the European Commission in 2009 (COM/2009/399 final), the TAC for the fishing season running from 1 July 2013 to 30 June 2014 should be established at 17 100 tonnes (as stated in Annex 1 of the proposal for an SSB in the range 56 001–57 000 t).

MSY approach

If the objective is to maintain the spawning-stock biomass above the provisional MSY Bescapement in 2014, a catch of less than 51 000 t can be taken in the period 1 July 2013 to 30 June 2014. However, such a catch is not considered precautionary as it leads to a 31% probability of SSB being less than B_{lim} by 2014.

PA approach

To reduce the risk to less than 5% of the SSB in 2014 falling below Blim, catches in the period 1 July 2013–30 June 2014 should be less than 18 000 t.

Additional considerations

In the past, a TAC was set independently of the state of the stock in the range of 30 000–33 000 t, and the TAC had limited impact on regulating catches in the fishery.

Recent developments in management have been moving towards an in-year monitoring regime, as previously recommended by ICES. The assessment of anchovy is based on the survey results in the spring and catch data. Hence, the most up-to-date assessment can be obtained in June as done in this assessment. TACs may be set for the whole period July–June.

Harvest control rules (HCR) for anchovy have been tested outside ICES, for the EC proposal of a long-term management plan for this fishery. A draft management plan has been proposed by the EC in cooperation between STECF and the South Western Waters RAC. This plan has not yet been formally adopted by the EU. The plan is based on a constant harvest rate (30%), and sets a TAC as a percentage of the point estimate of the SSB as assessed at the start of the TAC period which runs from 1st July to 30th June, but with an upper bound on the TAC (of 33 000 t), and with a minimum TAC level (of 7000 t) applicable at SSB estimates between 24 000 t and 33 000 t. ICES notes that the criterion for accepting the HCR as precautionary would include rules that imply a low risk of reducing the SSB to a level which may imply further reduction in recruitment. Supplementary measures (area closures, minimum landing size) may be considered in addition to TACs.

Catch options for the next year depend heavily on the coming recruitment for which there is no information yet. The autumn JUVENA survey started in 2003. ICES considers that the JUVENA acoustic index of juveniles is a valid indicator of the strength of the incoming recruitment and hence useful for improving the forecast of the population and potentially its assessment. The use of this index as a tool to forecast next year's population , could serve to either review the TAC that currently runs from July to June, or to generate preliminary advice for a TAC going from January to December, based on the autumn acoustic survey.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock but notes that the ICES advice is not consistent with the provisions of the proposed management plan. In June 2008 STECF endorsed the approach and findings of the evaluation of the management plan presented in the report of the SGBRE-08-01 Working Group.

STECF notes that the proposed management plan has been applied to derive annual TACs for the past 3 years (2010-2011, 2011-12 and 2012-13). The provision of the proposed management plan prescribe a TAC of 17 100 tonnes for the period 1 July 2013 to 30 June 2014 and would give rise to a SSB in 2014 in the range 68,001–69,000 t as specified in Annex 1 of the proposed plan.

Review of harvest control rules for anchovy in the Bay of Biscay

Following its review of harvest control rules (HCRs) to propose the TAC for anchovy in the Bay of Biscay (EWG 13-20, and PLEN 13-03), STECF advises that the HCR currently used and the alternative HCR proposed by the SWWRAC are both consistent with the objectives of the plan.

3.3 Horse mackerel (*Trachurus spp*) in CECAF areas (Madeira Island)

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

STECF did not have access to any recent stock assessment information on *Trachurus spp* in this area. ICES has reported that catches of horse mackerel have been around 1500 tonnes from 1986 to 1990. Since then catches have declined to less than 700 t. A TAC in area ICES X for 2010 was set to 1229 t and was taken exclusively by Portugal. No TAC has been set since 2010.

STECF COMMENTS: No comments

3.4 Horse mackerel (*Trachurus spp*) in CECAF areas (Canary Islands)

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

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

A TAC in area ICES X for 2010 was set at 1229 t and was taken exclusively by Spain. No TAC has been set since 2010.

STECF COMMENTS: No comments

3.5 Blue jack mackerel (*Trachurus picturatus*) in Subdivision Xa2 (Azores)

FISHERY: The blue jack mackerel (*Trachurus picturatus*) is the only *Trachurus* species around the Azores Islands. It has traditionally been one of the favourite species for human consumption in the Azores and is targeted by an artisanal fleet using seine nets close to the coast of the Azorean islands. The blue jack mackerel is also the main species used as live bait by the local bait boat fleet, which targets tuna species. The demersal fleet also catches blue jack mackerel, usually large specimens, in the multispecies fishery for deep-water species, where several types of hooks and lines gears are used. Those gears vary from handlines, using one to several hundred hooks, to the bottom longlines**.**

ICES has reported that landings of *T. picturatus* have been around 3000 t between 1986 and 1990. From 1991 onwards, they followed a general decreasing trend to minimum values around 650 t in 1999-2000. A new increasing trend was registered in the last decade, with an average landing value for the last five years (2007-2011) of 2026 t. A reduction in catches similar to recent periods also occurred in 2012 (1131 t). However, landings may not represent the actual catches because discards or fish used for bait are not accounted for. A TAC of 3 072 t, which is taken exclusively by Portugal has been set each year since 2010

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

REFERENCE POINTS: No reference points have been defined.

STOCK STATUS: No assessment can be presented for this species in the waters of the Azores.

F (Fishing Mortality)	
	2008–2010
Qualitative evaluation	 Insufficient information

SSB (Spawning-Stock Biomass)	
	2008–2010
Qualitative evaluation	 Increase

The advice is based on commercial abundance indices from the main fleets, used as an indicator of stock trends. The methods applied to derive quantitative advice for data-limited stocks are expected to evolve as they are further developed and validated. Signals from different fleets give contradictory signals on stock dynamics. A reduction in catches similar to recent periods also occurred in 2012, which may be the result of recruitment fluctuations. The advice was therefore not revised this year.

RECENT MANAGEMENT ADVICE: The 2012 advice for this stock is biennial and valid for 2013 and 2014 (see ICES, 2012): *ICES advises on the basis of the approach for data limited stocks that catches should be no more than 1800 tonnes.*

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice that on the basis of the ICES approach to data-limited stocks, catches in 2014 should be no more than 1,800 t.

3.6 Sardine in Divisions VIIIa,b,d and Subarea VII

FISHERIES: Most catches are taken by purse-seiners and pelagic trawlers. 90% of the French catches are made from purse-seiners. Sardine catches are highest in the second semester of the year. In Spain, vessels target anchovy, mackerel, sardine, and horse mackerel; in summer, part of the fleet switches to tuna fishing during quarter 3. Discards are unknown but the available information suggest their magnitude is low and variable depending on the vessel type. Fleets and catches in subarea VII are very variable and present a mainly opportunistic nature although there are also locally some long well established small sardine fishery (e.g. Cornwall in UK, Brittany in France). In 2012, total catch was 37 kt, 100% being landed (80% purse seiners, 4% pelagic trawl, 16% diverse fleets in VII). Discards are considered negligible.

SOURCE OF MANAGEMENT ADVICE:

The main management advisory body is ICES.

REFERENCE POINTS:

No reference points are defined for this stock. Cohort curve analysis from the acoustic survey and catches in Division VIIIabd suggests F is around or below natural mortality (M), and is likely to be close to maximum sustainable yield.

STOCK STATUS:

F (Fishing Mortality)		
	2000–2012	
Qualitative evaluation		Below possible reference points
SSB (Spawning Stock Biomass)		
	2009–2013	
Qualitative evaluation		Decreasing to just below long term average

Catches have been relatively stable since 2000 with an increasing trend in divisions VIIIa,b,d and decreasing in subarea VII. The average of the combined biomass indices in the last two years (2011-2012) are around 27% lower than the average of the three previous years (2008-2010) in the divisions VIIIa,b,d. Recruitment in 2012 is the highest in the time series. An analysis shows that F is just below natural mortality and is likely to be close to maximum sustainable yield. There is no biomass or recruitment information for Subarea VII.

RECENT MANAGEMENT ADVICE:

This is the first time ICES gives advice for sardine in Divisions VIIIa,b,d and subarea VII. ICES advises on the basis of precautionary considerations catches of no more than 27 554 t. Discards are assumed to be negligible, therefore all catches are assumed to be landed. This advice is applicable for 2014 and 2015

Other considerations

No analytic assessment can be presented. The main cause of this is lack of data, and times series of age structure are too short for divisions VIIIa,b,d while they are non-existent in subarea VII for major countries involved in that fishery. Therefore, fishing possibilities cannot be projected.

ICES approach to data-limited stocks

For data-limited stocks for which biomass indices are available, ICES uses as harvest control rule an index-adjusted status-quo catch. The advice is based on a comparison of the two most recent index values with the three preceding values, combined with recent catch data. Knowledge about the exploitation status also influences the advised catch.

For this stock the biomass is estimated to have decreased by more than 20 % between 2009- 2011 (average of the three years) and 2012-2013 (average of the two years). Indices are only available for VIIIabd (where major catches come from) but considered representative for the whole stock.

This implies a decrease of catches of at most 20% in relation to the average of the last 3 year catch, corresponding to catches of no more than 27 554 t.

Considering that exploitation is likely to be close to maximum sustainable yield, no additional precautionary reduction is needed.

Discards are known to take place but considered negligible, therefore all catches are assumed to be landed.

Additional considerations

Sardine is distributed in the Iberian region, to the north in Subareas VII and VIII and in the North Sea, and to the south on the Moroccan shelf. The information presented here assumes that sardine in Divisions VIIIabd and subarea VII is a unit stock, based on biological characteristics. However, some movement of fish between Divisions VIIIb and VIIIc is known to occur. The effect of this movement is uncertain but is presently considered to have little influence on the estimation of the stock in the assessed area (Divisions VIIIabd and VII).

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice for 2014 and 2015 that on the basis of the ICES approach to data limited stocks, catches should be no greater than 27,554 t.

4 Eco-region 4: Resources in Icelandic and East Greenland waters

4.1 Beaked pelagic redfish (*Sebastes mentella*), management unit in the northeast Irminger Sea: ICES Division Va and Subareas XII and XIV *(formally beaked redfish (Sebastes mentella) in Subareas V, XII, XIV and NAFO Subareas 1+2, deep pelagic stock > 500 m)*

FISHERIES: The fishery started around 1991–1992 when the commercial fleet of the shallow pelagic redfish moved into deeper waters. Since 1997, the main fishing season occurred from late April to August in the so-called northwest fishing area near the Greenland and Icelandic EEZ and within the Icelandic EEZ, i.e. in the area east of 32°W and north of 61°N. The trawlers participating in this fishery use large pelagic trawls (*Gloria*-type) with vertical openings of 80–150 m. The vessels have operated at a depth range of 600 to 950 m in 1998–2008. Discarding is at present not considered to be significant in this fishery. The deep pelagic fishery in the Irminger Sea only exploits the mature part of the stock. Nursery areas for the stock are found at the continental slope off East Greenland. Technical conservation measures such as mandatory sorting grids in the shrimp fishery that have been in place for several years should be continued in order to protect the juvenile redfish.

Landings of the deep pelagic *S. mentella* stock have declined from 139,000t in 1996 to 30,000 t in 2008. In 2009, this fishery was subject to a NEAFC TAC of 46,000 t, which was given for both shallow and deep stocks. Total catches of 2012 were 32,800 t, all landings (100% pelagic trawl). No discards, industrial bycatch, or unaccounted removals.

SOURCE OF MANAGEMENT ADVICE: Scientific advice is provided by ICES. The main management organisation concerned with pelagic redfish in the Irminger Sea is NEAFC. Survey indices, catches, CPUE and biological data are available for the stock, but the assessment is mainly based on surveys. The quality of the trawl biomass estimate from the international trawl-acoustic surveys since 1999 cannot be verified as the data series is relatively short and the survey is only conducted every second year. Therefore, the abundance estimates by the trawl-method must only be considered as a rough attempt to measure the abundance of the deep pelagic stock. It is not known to what extent CPUE reflect changes in the stock status of deep pelagic *S. mentella* stock. The fishery targets pelagic aggregating fish. Therefore, stable or increasing CPUEs are not considered to reflect the stock status reliably, but decreasing CPUEs likely indicate a decreasing stock.

MANAGEMENT AGREEMENT: There are no explicit management objectives for this stock.

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

STOCK STATUS:

F (Fishing Mortality)		
		2010–2012
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	Unknown

SSB (Spawning-Stock Biomass)		
		2011–2013
MSY ($B_{trigger}$)	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	Unknown
Qualitative evaluation	→	Stable

Trawl survey estimates in 2009–2013 are lower than the average for 1999–2003, with the 2013 estimates being the lowest observed. These indices in combination with a marked decrease in landings since 2004 suggest that the stock has been reduced in the past decade. The exploitation rate for this stock is unknown.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of precautionary considerations that catches in 2014 should be reduced to no more than 20 000 t and that a management plan should be developed and implemented.

Other considerations

No assessment can be presented for this stock due to the insufficient commercial dataset and short time-series of suitable survey data. Therefore, fishing possibilities cannot be projected.

Precautionary approach

ICES advises on the basis of the precautionary considerations that catches should be reduced to no more than 20 000 t and a management plan should be developed and implemented. The stock is considered to have decreased over the last decade and the exploitation status is unknown. The stock is considered to be vulnerable to overexploitation because of its biological characteristics (slow-growing, late-maturing, and schooling behaviour).

ICES approach to data-limited stocks

For data-limited stocks (DLS) for which a biomass/abundance index is available, ICES uses as harvest control rule an index-adjusted status quo catch. The advice is based on a comparison of the three most recent index values (2009–2013 as the survey is conducted biennially) with the three preceding values (1999–2003, no surveys conducted in 2005 and 2007), combined with recent catch or landings data. Knowledge about the exploitation status also influences the advised catch.

For this stock the biomass is estimated to have decreased by 40% between the years 1999–2003 (average of three indices) and 2009–2013 (average of three indices). This implies a decrease in catches of at most 40% in relation to the average catch of the last three years, corresponding to a catch of no more than 27 776 t. Additionally, considering that exploitation is unknown, the DLS approach implies that catch should decrease by a further 20% as a precautionary buffer. This results in catch/landings of no more than 22 221 t in 2014. All catches are assumed to be landed. Given the data available and the history of the ICES advice for this stock, there is no basis for ICES to change its previous advice.

Additional considerations

ICES has previously advised that most deep-water and long-living species like redfish can only sustain low rates of exploitation, since slow-growing and long-lived species that are depleted have a long recovery period. Fisheries should only be allowed to expand when indicators have been identified and a management strategy that includes appropriate monitoring requirements has been decided and implemented.

ICES is concerned about the lack of formally agreed management and TAC allocation schemes. Although most nations conducting fisheries have agreed on management measures to reduce catches stepwise over the next three years, the total quotas that have been set are insufficient to constrain catches. This increases the risk of overexploitation. The autonomous quotas that have been set are insufficient to constrain catches, even though ICES acknowledges that some parties have agreed on a step-wise reduction of catches. Therefore, ICES has for the past two years advised that an adaptive management plan be implemented. ICES has provided a list of potential elements that could be contained in such a management plan.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice for 2014 that there is no reason to change the previous advice given since 2008 and that catches should be reduced to no more than 20,000 t and a management plan should be developed and implemented.

4.2 Beaked pelagic redfish (*Sebastes mentella*) management unit in the southwest Irminger Sea: NAFO Areas 1 and 2, ICES Division Vb and Subareas XII and XIV (*formally beaked redfish (Sebastes mentella) in Subareas V, XII, XIV and NAFO Subareas 1+2, shallow pelagic stock < 500 m*)

FISHERIES: Russian trawlers started fishing on the shallow pelagic *S. mentella* stock in 1982 and covered wide areas of the Irminger Sea. Vessels from other nations soon joined this fishery. The main fishing area in the last decade has been south and southeast of Cape Farwell, Greenland, the so-called south-western area (south of 60°N and west of about 32°W), and the area is almost entirely shallower than 500 m. Since 2000, the south-western fishing ground extended also into the NAFO Convention Area, but in later years the fishing area has been limited to the border area between NAFO and ICES south of Greenland. Catches have in parallel with this shrinkage declined substantially. In the period 1982–1992, the fishery was carried out mainly from April to August but since then the fishery has been conducted from July-October. The trawlers participating in this fishery use large pelagic trawls (*Gloria*-type) with vertical openings of 80–150 m.

The shallow pelagic stock fishery in the Irminger Sea only exploits the mature part of the stock. Nursery areas for the stock are found at the continental slope off East Greenland. Technical conservation measures such as mandatory sorting grids in the shrimp fishery that have been in place for several years should be continued in order to protect the juvenile redfish.

Landings of the shallow pelagic *S. mentella* stock has declined from 100,000t in 1993 to 2,000 t in 2008. In 2009, this fishery was subject to a NEAFC TAC of 46,000 t, which was given for both shallow and deep stocks. Total catches in 2011 and 2012 were 234 t and 3,200 t respectively. All assumed as landings (100% pelagic trawl). No discards, industrial bycatch, or unaccounted removals.

SOURCE OF MANAGEMENT ADVICE: Scientific advice is provided by ICES. The main management organisation concerned with pelagic redfish in the Irminger Sea is NEAFC.

Survey indices, catches, CPUE and biological data are available for the stock, but the assessment is mainly based on surveys. ICES again had difficulties in obtaining landings data from some ICES' member countries. In spite of best efforts, there is a need for a special action through NEAFC and NAFO to provide ICES in time with all information that might lead to more reliable catch statistics. *Furthermore, ICES recommends that all nations should report depth information in accordance with the NEAFC logbook format*.

MANAGEMENT AGREEMENT: There are no explicit management objectives for this stock.

REFERENCE POINTS: Precautionary reference points are not defined for this stock.

STOCK STATUS:

F (Fishing Mortality)		
		2010–2012
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	Unknown
SSB (Spawning-Stock Biomass)		

		2011–2013
MSY ($B_{trigger}$)	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	Unknown
Qualitative evaluation	✗	Stable at very low

The biomass index from the acoustic surveys in 2009–2013 indicates that the stock has declined to less than 5% of the estimates at the beginning of the survey time-series in the early 1990s. The exploitation rate for this stock is unknown.

The lack of accurate fisheries and survey data (especially for depths within the deep-scattering layer) and recruitment indices prevents precise determination of stock status. ICES is concerned about the lack of agreed management and TAC allocation schemes. This increases the risk of over-exploitation. The autonomous quotas that have been set are insufficient to constrain catches.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the precautionary approach that no directed fishery should be conducted in 2014 and bycatch of this stock in non-directed fisheries should be kept as low as possible.

Other considerations

No reliable assessment can be presented for this stock due to the insufficient commercial dataset and short time-series of suitable survey data. Therefore, fishing possibilities cannot be projected.

Precautionary approach

ICES advises on the basis of precautionary considerations that no directed fishery should be conducted and bycatch of this stock in non-directed fisheries should be kept as low as possible. A recovery plan should be developed.

The acoustic survey biomass index shows that the stock has declined to less than 5% of that observed in the early 1990s and the exploitation status is unknown. The stock is considered to be vulnerable to overexploitation because of its biological characteristics (slow-growing, late-maturing, and schooling behaviour).

Additional considerations

Management considerations

ICES is concerned about the lack of agreed management and TAC allocation schemes. This increases the risk of over-exploitation. The autonomous quotas that have been set are insufficient to constrain catches.

ICES has advised that an adaptive management plan be implemented and ICES provided with a list of potential elements of such a management plan. The main management organization concerned with pelagic redfish in the Irminger Sea – NEAFC – has further requested ICES to specify these elements and also to estimate possible candidates for reference points. However, ICES has not yet been able to address this issue.

ICES has previously advised that most deep-water species like redfish can only sustain low rates of exploitation, since slow-growing, long-lived species that are depleted have a long recovery period. Fisheries should only be allowed to expand when indicators have been identified and a management strategy that includes appropriate monitoring requirements has been decided and is implemented. ICES therefore stresses the need to develop and implement a recovery plan which takes into account the uncertainties in science and the properties of the fisheries.

The relationship of the shallow pelagic component with *S. mentella* from the Greenlandic shelf remains unclear.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice that on the basis of the precautionary approach, no directed fishery should be conducted in 2014 and bycatch of this stock in non-directed fisheries should be kept as low as possible.

STECF notes that ICES has had difficulty in obtaining landings data from some ICES' member countries and that there is a need for a special action through NEAFC and NAFO to provide ICES with timely information

that might lead to more reliable catch statistics. STECF also agrees with the ICES recommendation that all nations should report depth information in accordance with the NEAFC logbook format.

5 Resources in the Barents and Norwegian Seas

5.1 Northern Shrimp (*Pandalus borealis*) in Sub-areas I (Barents Sea) and & IIb (Svalbard Waters)

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The fisheries for Northern shrimp in Sub-areas I & II (Barents Sea & Svalbard are**a**) are among the largest shrimp fisheries in the North east Atlantic. Norwegian and Russian vessels exploit the stock over the entire resource area, while vessels from other nations are restricted to the Svalbard fishery zone. No overall TAC has been established for this stock, and the fishery is partly regulated by effort control, licensing, and a partial TAC (Russian zone only). Bycatch is constrained by mandatory sorting grids and by temporary closures of areas where high bycatch occurs of juvenile cod, haddock, Greenland halibut, redfish, or small shrimp (<15 mm). The minimum mesh size is 35 mm. Norway and Russia have taken the majority of the landings in the past. 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: 60,000 t in 2002, around 40 000 t in 2003-2005, around 30 000 t in 2011 and 26,000 t in 2012. There are no reported Russian landings in 2006 and since 2009.

SOURCE OF MANAGEMENT ADVICE: This stock is currently managed jointly by Norway and Russia. ICES is providing biological advice for management of this stock.

REFERENCE POINTS:

	Type	Value	Technical basis
MSY Approach	MSY $B_{trigger}$	0.5 of B_{MSY*}	50% of B_{MSY} (10^{th} percentile of the B_{MSY} estimate); relative value
	F_{MSY}	*	Resulting from the production model.
Precautionary approach	B_{lim}	0.3 of B_{MSY*}	30% of B_{MSY} (production reduced to 50% MSY); relative value
	B_{pa}	Not defined	Not needed: Risk of transgressing limits are directly estimated
	F_{lim}	1.7 of F_{MSY*}	$1.7F_{MSY}$ (the F that drives the stock to B_{lim}); relative value
	F_{pa}	Not defined	Not needed: Risk of transgressing limits are directly estimated

* Fishing mortality is estimated in relation to F_{MSY} and total stock biomass is estimated in relation to B_{MSY}.

STOCK STATUS:

F (Fishing Mortality)				
	2009	2010	**2011**	
MSY (F_{MSY})	✓	✓	✓	Below target
Precautionary approach (F_{lim})	✓	✓	✓	Harvested sustainably

SSB (Spawning-Stock Biomass)				
	2010	2011	**2012**	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{lim})	✓	✓	✓	Full reproductive capacity

The assessment is considered indicative of stock trends, and provides relative measures of stock status rather than absolute. Throughout the history of the fishery, estimates of stock biomass have been above $B_{trigger}$ and fishing mortality below FMSY. The estimated risk of falling below Btrigger and Blim or of exceeding FMSY by the end of 2012 is less than 1%. Recruitment indices showed no major changes in the period 2004–2012.

RECENT MANAGEMENT ADVICE: ICES advises that catches of 60 000 tonnes in 2013 will maintain the stock at the current high biomass.

Other considerations

MSY approach

The stock is well above MSY Btrigger and F is well below F_{MSY}. Catches of 60 000 t in 2013 will maintain the stock at current high biomass.

PA approach

There is a low risk in 2013 of the stock falling below Blim or of the fishing mortality rate exceeding F_{lim} at catch options up to 90 000 t.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice that catches of 60 000 tonnes in 2013 will maintain the stock at the current high biomass.

STECF notes that there is no TAC set for *Pandalus borealis* in this area.

5.2 Herring (*Clupea harengus*) in ICES subareas I & II (Norwegian Spring spawners)

FISHERIES: The total catches in 2012 were 826000 t., mainly taken by Norway (491 000 t), Russia (119 000 t), Iceland (121 000 t), EU (57 000 t), and Faroe Islands (36 000 t). The fishery in general follows the migration of the stock closely as it moves from the wintering and spawning grounds along the Norwegian coast to the summer feeding grounds in the Faroese, Icelandic, Jan Mayen, Svalbard, and international areas. Due to limitations for some countries to enter the EEZs of other countries in 2008, the fisheries do not necessarily depict the distribution of herring in the Norwegian Sea. A special feature of the summer fishery in 2005 and 2006 was the prolonged fishery in the Faroese and Icelandic zone. In 2007 and 2008 a clean herring fishery was hampered by mixture of mackerel schools in the area. This was especially the case for the Faroese fleet, which usually targets mackerel later in the year (October–November).

Management regulations have restricted landings in recent years.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an analytical assessment, which takes into consideration catch data, and eight surveys, three of which have not been continued in recent years, (acoustic surveys of adults and juveniles, larval survey, and 0-group survey). The present assessment is an updated assessment, using the models, configurations and procedures agreed at the benchmark assessment in 2008. From 2010 onwards, new maturity-at-age information was used

for the whole time-series. This revision contributes to the change in perception of estimated SSB in the 2010 assessment.

REFERENCE POINTS:

	Type	*Value*	*Technical basis*
Management plan	SSB_{MP}	5.0 million t	Medium-term simulations conducted in 2001.
	F_{MP}	0.125	Medium-term simulations conducted in 2001.
MSY Approach	MSY $B_{trigger}$	5.0 million t	B_{pa}
	F_{MSY}	0.15	Stochastic equilibrium analysis using a Beverton–Holt stock–recruitment relationship with data from 1950 to 2009.
Precautionary Approach	B_{lim}	2.5 million t	MBAL (accepted in 1998).
	B_{pa}	5.0 million t	$B_{lim} \times \exp(0.4 \times 1.645)$.
	F_{lim}	Not defined.	-
	F_{pa}	0.15	Based on medium-term simulations.

(unchanged since: 2010)

STOCK STATUS:

F (Fishing Mortality)				
	2010	**2011**	**2012**	
MSY (F_{MSY})	✗	✓	✓	Appropriate
Precautionary approach (F_{pa})	✗	✓	✓	Harvested sustainably
Management plan (F_{MP})	✗	✗	✗	Above limit
SSB (Spawning-Stock Biomass)				
	2011	**2012**	**2013**	
MSY ($B_{trigger}$)	✓	✓	✓	At trigger
Precautionary approach (B_{pa},B_{lim})	✓	✓	✓	Full reproductive capacity
Management plan (SSB_{MP})	✓	✓	✓	At trigger

The stock is declining and estimated at B_{pa} in 2013. In the last 15 years, five large year classes have been produced (1998, 1999, 2002, 2003, and 2004). However, the available information indicates that year classes born after 2004 have been small. Fishing mortality in 2011 and 2012 is slightly below F_{pa} and F_{MSY}, but above the management plan target F.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of the management plan of EU, Faroe Islands, Iceland, Norway, and Russia that landings in 2014 should be no more than 418 487 t. Minor discards are known to take place, but cannot be quantified accurately; the proportion of discards in the total catches are considered negligible.

Other considerations

Management plan

Following the long-term management plan agreed by the EU, Faroe Islands, Iceland, Norway, and Russia implies a TAC of 418 487 tonnes in 2014. This is expected to lead to an SSB of 3.5 million tonnes in 2015.

The short-term prognoses indicate a decline in SSB from 5 million tonnes in 2013 to 4.1 and 3.5 million tonnes in 2014 and 2015, respectively, assuming that declared catches are taken in 2013 and exploitation in 2014 is in accordance with the management plan. The observed decline in the stock is consistent with previous assessments and forecasts; last year it was expected that the SSB in 2013 would decline to 5.1 million tonnes compared to this year's estimate of 5 million tonnes. Because the SSB in 2014 is assumed to be below B_{pa}, the advice is based on article 3 of the management plan, which will be applied for the first time. As a result, the fishing mortalities will be lower than the target F_{MP} of 0.125. Given the low recruitment in recent years, it is expected that SSB will remain below B_{pa} in the short term. This situation will continue until large year classes appear and recruit into the spawning stock, and because of the maturation taking place between the ages of 4 and 6 it will take at least four years until a strong year class contributes to an increase in the SSB. Surveys carried out in recent years in the Norwegian Sea and Barents Sea show no signs of new strong year classes after 2004.

MSY approach

Following the ICES MSY framework implies a fishing mortality of 0.124 (MSY $B_{trigger}$/SSB(2014)*F_{msy}) because SSB(2014) is below MSY $B_{trigger}$, resulting in landings of 512 000 tonnes in 2014. This is expected to lead to a decline in SSB in 2015 to 3.5 million tonnes.

Fishing mortality in 2012 is below F_{MSY}, therefore the transition scheme towards the ICES MSY framework does not apply.

PA approach

The precautionary approach states that should the SSB fall below B_{pa} the fishing mortality should be reduced to ensure a safe and rapid recovery of the B_{pa}. Even zero catches in 2014 is expected to lead to a reduction in SSB in 2015 to 3.9 million tonnes.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice that the provisions of the management plan, agreed by EU, Faroe Islands, Iceland, Norway and Russia, prescribes that landings in 2014 should be no greater than 418,487t.

5.3 Capelin (*Mallotus villosus*) in ICES subareas I and II, excluding Division IIa-west of 5°W (Barents Sea capelin)

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. Since 1979 the fishery has been regulated by a bilateral agreement between Norway and Russia (formerly USSR) and since 1987, catches have been very close to the advice, varying between 100,000 t and 650,000 t. The fishery was closed from 2004-2008. In 2009, 2010 and 2011 landings amounted to 307 000 t, 315 000 t and 360 000 t respectively. The landing over the winter period at the start of 2012 are 296 000 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 (Report from the 2009 joint Russian-Norwegian meeting to assess the Barents Sea capelin stock, Kirkenes, October 3-4 2009. Report of the Arctic Fisheries Working Group, 21-27 April 2009. ICES CM 2009/ACOM: 02.).

REFERENCE POINTS:

	Type	***Value***	***Technical basis***
MSY Approach	MSY $B_{trigger}$	Undefined.	
	F_{MSY}	n/a	
Precautionary Approach	B_{lim}	200 000 t	Above SSB_{1989}, the lowest SSB that has produced a good year class.
	B_{pa}	n/a	
	F_{lim}	n/a	
	F_{pa}	n/a	

(unchanged since: 2010)

STOCK STATUS:

F (Fishing Mortality)				
	2011	2012	2013	
MSY (F_{MSY})	-	-	-	Not relevant
Precautionary approach (F_{pa},F_{lim})	-	-	-	Not relevant

SSB (Spawning-Stock Biomass)				
	2012	2013	2014	
MSY ($B_{trigger}$)	?	?	?	Undefined
Precautionary approach (B_{lim})	✓	✓	✓	95% probability of being above limit reference point

The maturing component of the stock in autumn 2013 was estimated to be 1.3 million tonnes. The spawning stock in 2014 will consist of fish from the 2010 and 2011 year classes. The joint Russian–Norwegian ecosystem survey estimate of the 2012 year class at age 1 is above the long-term average. The 0-group observations during the same survey in August–September 2013 indicated that the 2013 year class is around the long-term average.

The immature (< 14 cm) part of the stock is the largest since 1992.

MANAGEMENT OBJECTIVES: In 2002, the Joint Norwegian–Russian Fisheries Commission (JNRFC) adopted a management plan, in which the fishery is managed according to a target escapement strategy that includes the predation by cod by accounting for removals based on the size of the cod stock. A basis for the management plan is that all catches are taken on pre-spawning capelin. The harvest control rule is designed to ensure that when the fishery is closed, the SSB remains above the proposed B_{lim} of 200 000 tonnes (with 95% probability). ICES considers the management plan to be consistent with the precautionary approach.

In 2010, the JNRFC decided that the management strategy should not be changed for the following 5 years.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of the management plan agreed by the Joint Norwegian–Russian Fisheries Commission (JNRFC) that catches in 2014 should be no more than 15 000 tonnes. All catches are assumed to be landed.

The basis of the assessment and the advice remains the same as last year. Although the total stock size is about the same as last year, the maturing stock is considerably lower (1.3 vs. 2.0 million tonnes). The mean length- and mean weight-at-age decreased for all age groups This affects the maturing stock in two ways: first, reduced growth in length led to a considerable lower number of individuals reaching the length at which the capelin matures (109 billions in 2012 vs. 74 billions in 2013), and second, the reduced growth led to lower mean length and mean weight in the maturing stock. Since the predation pressure from cod remains at a high level, this has led to a considerable reduction in the advised TAC for 2014 compared to 2013.

Other considerations

Management plan

Following the management plan agreed by the Joint Norwegian–Russian Fisheries Commission, catches in 2014 should be no more than 15 000 t. The harvest control rule in the management plan states that the quota set should ensure that the SSB remains above the proposed B_{lim} of 200 000 t with 95% probability.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice that the provisions of the management plan agreed by Norway and Russia prescribes that catches in 2014 should be no greater than 15,000t.

6 Widely distributed and migratory stocks

6.1 European eel (*Anguilla anguilla*)

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 level of 20,000 tonnes in the late 1990s, but throughout the decades, landing statistics cover only about half the true catches. Recent years show a rapid decline in reported catches, to below 10,000 tonnes. Recruitment remained high until 1980, but declined afterwards, to a level of only 2 % of former levels in 2001, and has remained low since. 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. In 2007, eel was included in CITES Appendix II that deals with species not necessarily threatened

with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival. The listing was due to be become effective in March 2009.

SOURCE OF MANAGEMENT ADVICE: Management advice has been provided by ICES and FAO/EIFAC. The joint ICES/EIFAC working group is the main assessment body.

STOCK STATUS:
Indications are that the eel stock remained in a critical state in 2012. Abundance of all stages of eel (glass eel, yellow eel, and silver eel) is at an historical minimum. The recruitment index (five year average) is currently at its lowest historical level for the North Sea (at less than 1% of the maximum observed value) and around 5% in the rest of its European distribution ('Elsewhere Europe') area with respect to 1960-1979. In 2012, recruitment for the series outside the North Sea ('Elsewhere Europe') has increased and returned to the level observed in 2007-2008. Recruitment of yellow eel has been declining continuously since the 1950s.

Stock indicators in the national eel management plans submitted in 2008 indicated that anthropogenic mortality was above the limit implied by EC Regulation No. 1100/2007 (EC, 2007). According to the information provided in the Eel Management Plans progress reports reviewed by ICES in 2012, in most Eel Management Units (EMUs), depending on EMU conditions, progress has been made in implementing eel-specific management measures for commercial and recreational fisheries, hydropower, pumping stations and obstacles, restocking, management measures on habitat, and in a few cases predator control. Management measures related to fisheries have most often been fully implemented while other management measures have often been postponed or only partially implemented. Most increases in silver eel escapement since the implementation of management plans have been achieved by management measures addressing the commercial and recreational fisheries on silver eel. ICES also consider that extending actions that have proven successful, rather than pursuing untried actions or those difficult to implement, will reduce the risk of continued underachievement.

In 2007, eel was included in CITES Appendix II that deals with species not necessarily threatened with extinction, but in which trade must be controlled to avoid utilization incompatible with the survival of the species (see http://www.cites.org/eng/disc/how.shtml). The listing was implemented in March 2009. Eel was listed in September 2008 as critically endangered in the IUCN Red List.

REFERENCE POINTS: Exploitation that leaves 30% of the virgin spawning-stock biomass is generally considered to be a reasonable target for escapement. Due to the uncertainties in eel management and biology, ICES proposed a limit reference point of 50% for the escapement of silver eels from the continent in comparison to pristine conditions (ICES, 2003). This is higher than the escapement of at least 40% "pristine" set by the EC Regulation for the escapement of silver eels. ICES has evaluated the conformity of country management plans with EC Regulation 1100/2007 (ICES Advice Reports 2009 and 2010, Technical Services), but it has not evaluated the consistency of the regulation itself with the precautionary approach. ICES will undertake such an evaluation based on country reports under EC Regulation 1100/2007.

MANAGEMENT OBJECTIVES: A management framework for eel was established in 2007 through an EC Regulation (EC No. 1100/2007; EC, 2007). The objective of this regulation is the protection, recovery, and sustainable use of the stock. To achieve the objective, Member States have developed eel management plans for their river basin districts, designed to reduce anthropogenic mortalities and increase silver eel biomass.

The objective of the national eel management plans is to provide, with high probability, a long-term 40% escapement to the sea of the biomass of silver eel, relative to the best estimate of the theoretical escapement in pristine conditions (i.e. if the stock had been completely free of anthropogenic influences). ICES has evaluated the conformity of the national management plans with EC Regulation No. 1100/2007 (ICES Advice Reports 2009 and 2010, Technical Services), but it has not evaluated the consistency of the regulation itself with the precautionary approach. ICES will undertake such an evaluation based on the national reports in accordance with EC Regulation No. 1100/2007 (EC, 2007).

A coordinated approach to planning, data workshops, and stock assessment is needed to take full advantage of the 2012 reporting by Member States on monitoring, effectiveness, and outcome of the national eel management plans. The subsequent statistical and scientific assessment will include an opinion by STECF as envisaged by the EU. Independent access to the raw data, biomass, and mortality estimates (see supporting information) provided by the Member States will be required to undertake the statistical and scientific assessments of the reliability and accuracy of the estimates.

RECENT MANAGEMENT ADVICE: The status of eel remains critical and urgent action is needed. ICES reiterates its previous advice that all anthropogenic mortality (e.g. recreational and commercial fishing,

hydropower, pollution) affecting production and escapement of eels should be reduced to as close to zero as possible until there is clear evidence that both recruitment and the adult stock are increasing.

Given the current record-low abundance of glass eels, ICES reiterates its concern that glass eel stocking programmes are unlikely to contribute to the recovery of the European eel stock in a substantial manner. The overall burden of proof should be that stocking will generate net benefits, in terms of contributions to silver eel escapement and spawning potential. Prior to stocking, or for continuing existing stocking, a risk assessment should be conducted, taking into account fishing, holding, transport, post-stocking mortalities, and other factors such as disease and parasite transfers. To facilitate stock recovery all catches of glass eel should be used for stocking. Stocking should take place only where survival to the silver eel stage is expected to be high and escapement conditions are good. This means that stocking should not be used to continue fishing and stocking should only take place where all anthropogenic mortalities are low.

STECF COMMENTS: STECF agrees with ICES assessment of the status of the stock and the ICES advice.

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

FISHERIES: Hake is caught in mixed fisheries together with megrim, anglerfish, and *Nephrops*. Discards of juvenile hake can be substantial in some areas and fleets. An important increase in landings has occurred in the northern part of the distribution area (Division IIIa, and Subareas IV and VI) in recent years. Several changes in fishing technology have occured in the fishery in recent years : increased mesh sizes in several gears, introduction of the high vertical opening trawls in the mid-1990s, and introduction of selective gears in the *Nephrops* trawl fishery of the Bay of Biscay (square mesh panel). Total landings in 2012 = 75.2 kt (20% trawl, 21% gillnet, 18% longline, and 41% unspecified gears). Discards of 14.6 kt (16% of catches). Discard data are only available for some of the fleets and not all data are included in the assessment.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on a length-based assessment using commercial catch data and 4 survey series. This stock was benchmarked in 2010 and a further benchmark is scheduled for 2014.

REFERENCE POINTS:

	Type	***Value***	***Technical basis***
MSY Approach	MSY $B_{trigger}$	Not defined.	
	F_{MSY}	0.24	$F_{30\%SPR}$ (Section 9.3.2.1 in ICES, 2010).
Precautionary Approach	B_{lim}	Not defined.	
	B_{pa}	Not defined.	
	F_{lim}	Not defined.	
	F_{pa}	Not defined.	

(unchanged since: 2010)

MANAGEMENT AGREEMENT: A recovery plan was agreed by EU in 2004 (EC Reg. No. 811/2004). The aim of the plan is to increase the SSB to above 140 000 t with a fishing mortality (F_{MP}) of 0.25, constrained by a year-to-year change in TAC of 15% when SSB is above 100 000 t. This plan has not been evaluated by ICES. At present (2011) the SSB is estimated to be above 140,000 t, but the reference points used as basis for that recovery plan are not considered valid anymore. The application of a new assessment method has, however, resulted in a change in the perception of the historical stock and the previous defined precautionary reference points, on which the recovery plan is based, are no longer appropriate.

A proposal for a long-term plan has been put forward by the EU in 2009 (COM(2009) 122 final). The aim of the proposal is to reach maximum sustainable yield.

STOCK STATUS:

F (Fishing Mortality)				
	2010	2011	**2012**	
MSY (F_{MSY})	✗	✓	✓	Appropriate
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined
SSB (Spawning-Stock Biomass)				

	2011	2012	2013	
MSY ($B_{trigger}$)	?	?	?	Undefined
Precautionary approach (B_{pa},B_{lim})	?	?	?	Undefined
Qualitative evaluation	↗	↗	✓	Above poss. reference points

The spawning biomass has been increasing since 2008 and is estimated to be record high in 2013. Fishing mortality has decreased sharply in recent years and was equal to the F_{MSY} proxy in 2011 and 2012. Recruitment fluctuations appear to be without substantial trend over the whole series. After low recruitments in 2009, 2010, and 2011, the last recruitment (2012) is estimated to be the highest in the time-series.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the MSY approach that landings should be no more than 81,846 t in 2014. Even though some discards are included in the assessment, the total amount of discards cannot be quantified. Therefore total catches cannot be calculated.

Other considerations

MSY approach

Because MSY $B_{trigger}$ has not been identified for this stock, the ICES MSY approach has been applied without considering SSB in relation to MSY $B_{trigger}$.

Following the ICES MSY approach implies fishing mortality at F_{MSY} = 0.24, resulting in catches of no more than 84,111 t in 2014. This is expected to lead to an SSB of 333 kt in 2015. If discard rates do not change, this implies landings of no more than 81,846 t in 2014.

Not all discards are accounted for in the model and in the forecast, and therefore cannot be quantified even though they are substantial (in 2012 other observed, but also partial, discards accounted for 10% by weight of the total catch).

Management plan(s)

The current recovery plan (EC Reg. No. 811/2004) uses target values based on precautionary reference points that are no longer appropriate.

Additional considerations

Discards of juvenile hake can be substantial in some areas and fleets. The spawning-stock biomass and the long-term yield can be substantially improved by reducing mortality of small fish. This could be achieved by measures that reduce unwanted bycatch through shifting the selection pattern towards larger fish. TACs have been ineffective in regulating the fishery in recent years as landings greatly exceeded the TACs.

Hake in the ICES area is managed and assessed as two separate stocks. There is no biological basis for the current ICES stock definition of northern and southern hake. These stocks have similar biology with an unknown degree of mixing.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advised landings for 2014 of 81,846 t. Given that total discards are not accounted for in the assessment model and catch forecast, the predicted catch of 84,811 t is an underestimate.

STECF also agrees with ICES that effective measures to reduce discarding are also needed, given the substantial discards of juvenile hake in some areas and fleets.

Request to ICES for an in-year revision of the 2013 TAC.

STECF notes the ICES response to the Commission's request for an opinion on the outcome of an in year revision for northern hake (ICES Advice 2013, Book 11, section 11.2.1.2).

STECF agrees with logical explanations given in the ICES response and with the ICES recommendation that the 2013 TAC should not be increased.

6.3 Blue whiting (*Micromesistius poutassou*) in ICES subareas I-IX, XII & XIV

FISHERIES: Blue whiting is exploited mainly by fleets from Norway, Russia, the Faroe Islands, and Iceland but the Netherlands, Scotland, Denmark, Ireland, Sweden, Germany and Spain also take substantial catches. The fishery for blue whiting was fully established in 1977. The Northern blue whiting stock is fished in Subareas II, V, VI, and VII and 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 the directed and mixed fishery in Subarea IV and Division IIIa, and in the pelagic trawl fishery in the Subareas I and II, in Divisions Va, and XIVa,b. The fisheries in the northern areas have taken 330 000 t to 640,000 t per year in the first half of the nineties, after which landings increased to close to 1 000 000 t in the latter part of the decade. Landings have been above one million tonnes for most years between 1998 and 2008, with 2003 and 2004 having recorded the highest catches (>2,300,000 t). Since 2009 landings have been dropping with 2012 being the second lowest in the time series. In the southern areas (Subarea VIII, IX, Divisions VIId,e and g-k) catches have been stable around 30 000 t between 1987 and 2011 with the exception of 2004 when 85,000 t were recorded and in 2007 when landings were less than 18 000 t. In Division IXa blue whiting is mainly taken as bycatch in mixed trawl fisheries.

Total landings over all areas decreased drastically from 1.25 million t in 2008 to 104 thousand t in 2011.

SOURCE OF MANAGEMENT ADVICE: The main body for management advice is ICES. The assessment is based on catch-at-age data from commercial catches in 1981–2011 and one international blue whiting spawning stock survey (IBWSS) 2004–2013. The IBWSS survey is the only survey that covers almost the entire distributional area of the spawning stock.

Due to the large uncertainties in the 2010 survey data the IBWSS index has been excluded from the assessment since 2011, because the survey in 2010 is believed to have missed significant concentrations, making it not comparable with the remainder of the time-series.

Limited information was available on discarding and discards were therefore not included in the assessment. However, discarding is considered to be minor.

REFERENCE POINTS:

	Type	*Value*	*Technical basis*
Management plan	SSB_{MP}	2.25 million t	B_{pa}
	F_{MP}	0.18	Management strategy evaluation conducted in 2008
MSY approach	MSY $B_{trigger}$	2.25 million t	B_{pa}
	$F_{0.1}$	0.22	Yield per recruit
	F_{MSY}	0.30	Simulations in 2013
Precautionary approach	B_{lim}	1.50 million t	Approximately B_{loss}
	B_{pa}	2.25 million t	$B_{lim} \exp(1.645 \times \sigma)$, with $\sigma = 0.25$.
	F_{lim}	0.48	Equilibrium stochastic simulations
	F_{pa}	0.32	Based on F_{lim} and assessment uncertainties

(unchanged since: 2013)

F_{MSY} = 0.30 gives a high yield and a low risk of SSB< B_{lim}.

MANAGEMENT AGREEMENT: A management plan was agreed by Norway, the EU, the Faroe Islands, and Iceland, and subsequently endorsed by NEAFC in 2008. The plan uses i) a target fishing mortality (F = 0.18) if SSB is above B_{pa}, ii) a linear reduction to F = 0.05 if SSB is between B_{pa} and B_{lim}, and iii) F = 0.05 if SSB is below B_{lim}. ICES has evaluated the plan in 2008 and concluded that it is in accordance with the precautionary approach. Work is underway to evaluate a NEAFC request concerning an alternative management plan. ICES will issue advice in advance of WGWIDE 2013.

For assessment purposes ICES considers blue whiting in ICES Subareas I–IX, XII, and XIV as a single stock.

STOCK STATUS:

F (Fishing Mortality)				
	2010	2011	**2012**	
MSY (F_{MSY})	✓	✓	✓	Appropriate
Precautionary approach (F_{pa},F_{lim})	✓	✓	✓	Harvested sustainably

Management plan (F_{MP})	✗	✓	✓	Below target
SSB (Spawning-Stock Biomass)				
	2011	2012	**2013**	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	✓	✓	✓	Full reproductive capacity
Management plan (SSB_{MP})	✓	✓	✓	Above trigger

SSB has almost doubled from 2010 (2.9 million tonnes) to 2013 (5.5 million tonnes) and is well above B_{pa} (2.25 million tonnes). This increase is due to the lowest Fs in the time-series in 2011 and 2012, in combination with increased recruitment since 2010.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of the management plan agreed by Norway, the EU, the Faroe Islands, and Iceland that landings in 2014 should be no more than 948 950 tonnes. All catches are assumed to be landed.

Other considerations

Management plan

The management plan agreed by Norway, EU, the Faroe Islands, and Iceland in November 2008 implies a TAC of 949 000 tonnes in 2014, compared to 643 000 tonnes in 2013. This is expected to lead to an increase in SSB in 2015 to 6.96 million tonnes, which is above SSB_{MP}.

MSY approach

Following the ICES MSY framework implies a TAC of 1 502 000 t in 2014 based on a fishing mortality at F_{MSY} = 0.30. This is expected to lead to a decrease in SSB in 2015 to 6.42 million tonnes, which is above MSY $B_{trigger}$ (2.25 million tonnes).

PA approach

Following the ICES precautionary approach implies a TAC of 1 588 000 tonnes in 2014 based on a fishing mortality at F_{pa} = 0.32. This is expected to lead to a decrease in SSB in 2015 to 6.33 million tonnes, which is above B_{PA} (2.25 million tonnes).

Additional considerations

Recruitment (age 1) is estimated significantly higher in 2011 - 2013 than in the years 2007–2009 with the historically low recruitments. Information from surveys and the fishery indicates a steep increase in recruitment in the two most recent years. Also, indices suggest that recruitment (age 1) in 2012 is at a similar or higher level.

There are uncertainties about the stock structure even though ICES evaluated available evidence on sub-stock structure and came to the conclusion that there is no scientific evidence in support of multiple stocks with distinct spawning locations or timings. The emerging picture is one of a single stock whose large-scale spatial spread varies as a function of hydrographic conditions and total abundance; this is commonly described as an abundance–occupancy relationship. Further, there seem to be a number of core nursery and feeding areas with marginal areas being occupied at times of high stock abundance. As a result, ICES considers blue whiting in ICES Subareas I–IX, XII, and XIV as a single stock for assessment purposes.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice that the provisions of the management plan agreed by the EU, Norway, Faroe Islands and Iceland prescribe that landings for 2014 should be no greater than 948,950 tonnes

6.3.1 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 6.3.

6.3.2 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 6.13.

6.3.3 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 6.13.

6.3.4 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 6.1.

6.3.5 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 6.13.

6.4 Horse mackerel (*Trachurus trachurus*) in ICES Divisions IIa, IVa, Vb, VIa, VIIa-c,e-k and VIIIa-e (western stock)

FISHERIES: Catches of 'Western' horse mackerel 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. Following the changes in migration, a target fishery on horse mackerel developed in Division IVa by the Norwegian purse seiners. Most catches by other countries were taken in Sub-areas VI, VII and Divisions VIIIa-e.

The catches in Division IVa have dropped considerably since 1996 and Western horse mackerel has in recent years been taken in a variety of fisheries exploiting juvenile fish for the human consumption market (with mid-aged fish mostly for the Japanese market), and older fish either for human consumption purposes (mostly for the African market) or for industrial purposes. Since 2003, the fishery has been more directed toward younger fish (ages 1–3) than fish of ages 4 to 8. In 2012, fishing mortality on younger ages reached a record-high level.

The proportion of catches (in weight) in the areas where juveniles are distributed increased gradually from about 40% in 1997 to about 65% in 2003, but declined to 40% in 2005. Since 2005, there have been no obvious changes in fishing patterns. Overall catch levels increased from 123 000 t in 2007 to 218 000 t in 2010. The estimated catches for 2012 amount to 173 000 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. There is large uncertainty in the absolute estimates of SSB. The only fishery-independent information for this stock is a measure of egg production from surveys conducted every three years. The assessment assumes that fecundity at size varies with no trend over time. If this assumption is incorrect then the assessment results may be biased.

REFERENCE POINTS:

	Type	***Value***	***Technical basis***
MSY Approach	MSY $B_{trigger}$	Not defined.	
	F_{MSY}	0.13	$F_{0.1}$ from the yield-per-recruit
Precautionary Approach	B_{lim}	Not defined.[1)]	
	B_{pa}	Not defined.[1)]	
	F_{lim}	Not defined.	
	F_{pa}	Not defined.	

(unchanged since: 2013)

[1)] Previous PA biomass reference points were considered not consistent with the perceived state of the stock, the exploitation rate, and the evaluation of MSY reference points.

MANAGEMENT AGREEMENT:

In 2007, a management plan based on the triennial egg survey was proposed by the Pelagic RAC and has been used by the EU since 2008 to set the EU TAC. The management plan was initially appraised by ICES in 2007 and was deemed to be precautionary in the short term only, because some relevant scenarios were not evaluated. Further evaluation in 2013 suggests that in its current configuration the HCR is not robust to more than 2 years of very low recruitment.

STOCK STATUS:

F (Fishing Mortality)		
2010	2011	**2012**

MSY (F_{MSY})	✓	✗	✗	Above target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined
SSB (Spawning-Stock Biomass)				
	2011	2012	**2013**	
MSY ($B_{trigger}$)	?	?	?	Undefined
Precautionary approach (B_{pa},B_{lim})	?	?	?	Undefined
Qualitative evaluation	↘	↘	↘	declining

The SSB, which has varied between 0.65 and 1.72 million tonnes during 1995–2012, is estimated to be at 0.84 million tonnes in 2013. Fishing mortality has been increasing since 2007 and is now above F_{MSY}. Recruitment has been low from 2004 onwards.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of the MSY approach that landings in 2014 should be no more than 110 546 t. Even though some discards are included in the assessment, the total amount of discards cannot be quantified. Therefore total catches cannot be calculated.

Other considerations

MSY approach

Following the ICES MSY approach requires fishing mortality to be reduced to 0.13 in 2014, resulting in catches of less than 110 546 tonnes in 2014. This is expected to lead to an SSB of 554 kt in 2015.

PA approach

There are no PA reference points defined for this stock.

Management plans

ICES does not advise according to the management plan because it has recently concluded that, in its current configuration, the HCR is not consistent with the PA. However, this work also showed that the plan could be made consistent with the PA through the introduction of a biomass trigger in the HCR. Thus, ICES advises that these modifications to the HCR would need to be made before the plan is used to give catch advice.

Additional considerations

Note that the TAC advice based on the MSY approach results in a lower SSB in 2015 than the lowest SSB in the time-series, and it is uncertain if this low SSB will lead to reduced recruitment.

The TAC should apply to all areas where Western horse mackerel is caught. The advice for horse mackerel assumes that all landings are counted against the TAC for each stock separately.

ICES advises that the management areas correspond to the distribution areas which include all EU, Norwegian, and Faroese waters where horse mackerel are caught. The management areas for the North Sea and Western horse mackerel were changed in 2010 to more appropriately reflect the stock distributions.

Western horse mackerel are taken in a variety of fisheries for human consumption with juvenile fish directed mostly at the Japanese market, and large fish at the African market. Since 2003, the fishery has been more directed toward younger fish (ages 1–3) than fish of ages 4 to 8. In 2012, fishing mortality on younger ages reached a record-high level

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice for 2014 that to comply with MSY objectives, landings should be no greater than 110,546 tonnes.

STECF notes that the provisions of the management plan proposed by the Pelagic RAC and used by the EU since 2008 to set the EU TAC, prescribe that landings in 2014 should be 137,524 t.

6.5 Northeast Atlantic Mackerel (*Scomber scombrus*) - combined Southern, Western and North Sea spawning components)

FISHERIES AND STOCK: ICES currently uses the term "Mackerel in Northeast Atlantic" 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. Catches cannot be allocated specifically to spawning area components on biological grounds but by convention, catches from the Southern and Western components are separated according to the areas in which these are taken.

To keep track of the development of spawning biomass in the different spawning areas, mackerel in the Northeast Atlantic stock are divided into three area components: the Western Spawning Component, the North Sea Spawning Component**,** and the Southern Spawning Component. The Western Component is defined as mackerel spawning in the western area (ICES Divisions and Subareas VI, VII, and VIII a, b, d, e). This component currently accounts for ~75% the entire Northeast Atlantic stock. Similarly, the Southern Component (~22%) is defined as mackerel spawning in the southern area (ICES Divisions VIIIc and IXa). Although the North Sea component has been at an extremely low level since the early 1970s, ICES considers that the North Sea Component (~3%) still exists as a discrete unit. This component spawns in the North Sea and Skagerrak (ICES Subarea IV and Division IIIa). Current knowledge of the state of the spawning components is summarised below.

Traditionally, the fishing areas with higher catches of mackerel have been in the northern North Sea (along the border of Divisions IVa and IIa), around the Shetland Isles, and off the west coast of Scotland and Ireland. The southern fishery off Spain's northern coast has also accounted for significant catches. In recent years significant catches have also been taken in Icelandic and Faroese waters, areas where almost no catches were reported prior to 2008. In 2012, catches in this area constituted approximately half of the total reported landings. Catches from Greenland were reported for the first time in 2011, and have increased in 2012. In the Icelandic and Faroese fisheries, in the north-western part of the distribution area, mackerel have been partly taken together with herring. In the southern part of the distribution area, Atlantic mackerel (*Scomber scombrus*) can be caught together with Spanish mackerel (*Scomber colias*). Catches of both species are reported separately.

Western Component: The catches of this component were low in the 1960s, but increased since. The main catches are taken in directed fisheries by purse-seiners and mid-water trawlers. Large catches of the western component are taken in the northern North Sea, west of Scotland and in the Nordic Seas. A separate assessment for this stock component has not been conducted in recent years as a recent extension of the time-series of NEA mackerel data now allows the estimation of the mean recruitment from 1972 onwards. Preliminary estimates of the SSB of the Western component derived from egg surveys indicate an increase from 3.43 million t in 2010 to 4.30 million t in 2013.

North Sea Component: Very large catches were taken in 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 than 100,000 t in the late 1970s. Catches during the last ten years have been assumed to be about 10,000 t. Estimates of the SSB of the North Sea component derived from the North Sea egg survey indicate a decrease from 0.22 million t in 2005 to 0.17 million t in 2011.

Southern Component: Mackerel in this component are taken in a mixture of purse-seine, demersal trawl, line, and gillnet fisheries. The highest catches (87%) from the Southern component are taken in the first half of the year, mainly from Division VIIIc, and consist of adult fish. In the second half of the year, the catches are mainly taken in Division IXa and contain a high proportion of juveniles. Catches from the Southern component increased from about 20 000 t in the early 1990s to about 40 000 tonnes in the early 2000s, reaching a peak at 108 000 tonnes in 2009 and decreasing to 19 000 tonnes in 2011. The 2011 decline was due to pay-back of 18 000 tonnes and tighter regulations.
Preliminary estimates of the SSB of the Southern component derived from egg surveys indicate an increase from 0.85 million tonnes in 2010 to 1.27 million tonnes in 2013.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICES.

REFERENCE POINTS:

Previous reference points are not cited here because the model basis for the assessment has been rejected.

MANAGEMENT AGREEMENT: A management plan was agreed by Norway, Faroe Islands and the EU in October 2008. ICES has evaluated the plan and concluded that the plan is precautionary under the assumption that the TAC equals the total removals from the stock. However, since 2009, the management plan has not been followed and there was no international agreement on TACs for 2010, 2011 and 2012.

1. *For the purpose of this long-term management plan, "SSB" means the estimate according to ICES of the spawning stock biomass at spawning time in the year in which the TAC applies, taking account of the expected catch.*
2. *When the SSB is above 2,200,000 tonnes, the TAC shall be fixed according to the expected landings, as advised by ICES, on fishing the stock consistent with a fishing mortality rate in the range of 0.20 to 0.22 for appropriate age groups as defined by ICES.*
3. *When the SSB is lower than 2,200,000 tonnes, the TAC shall be fixed according to the expected landings as advised by ICES, on fishing the stock at a fishing mortality rate determined by the following:*

   Fishing mortality F = 0.22 SSB/ 2,200,000*
4. *Notwithstanding paragraph 2, the TAC shall not be changed by more than 20% from one year to the next, including from 2009 to 2010.*
5. *In the event that the ICES estimate of SSB is less than 1,670,000 tonnes, the Parties shall decide on a TAC which is less than that arising from the application of paragraphs 2 to 4.*
6. *The Parties may decide on a TAC that is lower than that determined by paragraphs 2 to 4.*
7. *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:

F (Fishing Mortality)		
	2010–2012	
Qualitative evaluation		Insufficient information
SSB (Spawning-Stock Biomass)		
	2004–2013	
Qualitative evaluation		Steady increase

Catches of mackerel have been increasing since 2005 and have been around 900 kt since 2010. The mackerel egg survey index show a doubling of the SSB since 2004, and a 30% increase from 2010 to 2013 (a preliminary value).

RECENT MANAGEMENT ADVICE: ICES advises on the basis of the recent three years' landings that landings should be no more than 889 886 t in 2014. Discards are known to take place, but cannot be quantified accurately; therefore total catches cannot be calculated.

ICES advise that the existing measures to protect the North Sea spawning component should remain in place.

Other considerations

No analytical assessment can be presented. The main cause is a change in the perception of the accuracy of the catch data prior to 2005. Sensitivity runs with alternative catch series demonstrated that the assessment model configuration was dependent on the accuracy of the historical catch data series. A benchmark assessment is scheduled for February 2014 which will consider alternative models as well as a suite of possible survey indices not currently used in the assessment. In the interim, considering that recent landings have been stable and that the stock appears to have increased, ICES considers that the current exploitation is appropriate in the short term.

For data-limited stocks for which a biomass index is available, ICES would normally use *status quo* landings adjusted by the survey index as a harvest control rule. This approach has not been used as the basis for the advice here because the survey is only conducted every third year and results from the most recent year (2013) are preliminary. Given that the survey results are preliminary and that mortality signals are equivocal, ICES is unable to determine if a precautionary buffer according to the data-limited approach should be applied (giving landings = 854 291 t); however, ICES notes that advising an even larger increase in catch, as would be the case otherwise (giving landings = 1 067 863 t), would not be precautionary. ICES is therefore unable to give advice

based on the DLS approach and as an interim measure advises not to increase recent landings compared to the last three years. This results in advised landings of no more than 889 886 tonnes.

Additional considerations

The changes in mackerel distribution and migration have been investigated in an *Ad hoc* Group on the Distribution and Migration of Northeast Atlantic Mackerel. The accepted consensus of the AGDMM was that there has been an expansion of the distribution of spawning over time in the western component. This expansion has been geographically large, but is thought to contain a marginal proportion of total spawning. There has also been an expansion in the temporal distribution of spawning in the western and southern components to earlier in the year. The distribution of juvenile mackerel is very patchy, and abundance is highly variable between years. A northern expansion of the western component is indicated by the recent summer surveys in the Nordic Seas (IESSNS). Likewise a westward expansion in the summer distribution of adult mackerel has been observed in the Nordic Seas since 2007, as far west as southeast Greenlandic waters. The distribution of fish tends to be less patchy and more spread out during the summer feeding phase. There have also been physical changes in the environment with record high sea temperatures in recent years facilitating a large potential habitat for mackerel. Furthermore, the expansion could in part be due to a reduction in available food, requiring fish to spread out further to find adequate resources. Overwintering in Icelandic waters, never previously observed, occurred in 2010 and 2011 but not 2012, and in recent years (winter 2006/2007 and since 2009) the Faroe Plateau has been used as a nursery area for 0- and 1-group mackerel.

STECF COMMENTS: STECF agrees with the ICES assessment and the advice that based on the most recent three years' landings, landings for 2014 should be no greater than 889 886 tonnes.

STECF suggests that managers reassess whether the advised landings for 2014 are still appropriate once the results of the benchmark assessment scheduled for February 2014 are available.

6.6 Boarfish (*Capros aper*) in the Northeast Atlantic

FISHERIES: The fishery for boarfish is conducted with pelagic trawls. The catches are currently used for reduction to fish meal and oil, but development of a human consumption market is underway. The majority of landings to date have come from ICES Divisions VIIj (75%) and VIIh (18%) The recent expansion of the fishery was enabled by developments in the pumping technology for boarfish catches. These changes made it easier to pump boarfish ashore. The number of vessels in the fishery has been increasing, although the recent introduction of a TAC is expected to limit further effort expansion

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

REFERENCE POINTS:

	Type	***Value***	***Technical basis***
MSY approach	MSY $B_{trigger}$	Not defined.	
	F_{MSY}	0.23	r/2 from Schaefer surplus production model.
Precautionary reference points		Not defined.	

(Unchanged since 2013)

MANAGEMENT AGREEMENT: There are no current management agreements.

STOCK STATUS:

F (Fishing Mortality)	
	2010–2012
MSY (F_{MSY})	Appropriate
TSB (Total Stock Biomass)	
	2010–2012
Quality evaluation	Above possible reference point

F is below F_{MSY} and biomass is likely to be above any candidate for MSY $B_{trigger}$.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of the MSY approach that catches in 2014 should be no more than 133 957 t. If discard rates do not change from the average of the last ten years this implies landings of no more than 127 509 t.

Other considerations

MSY approach

Following the MSY approach implies a fishing mortality at F_{MSY} = 0.23. On this basis, ICES advises that catches in 2014 should not be more than 133 957 t. If discard rates do not change from the average of the last 10 years 2003 to 2012 (6448 t) should be subtracted from this, resulting in landings in 2014 of no more than 127 509 t.

Additional considerations:

Management considerations

The stock appears to be large, widely distributed, and not over-exploited. The FAO gives guidelines on how new and developing fisheries should be dealt with. It is recommended that expansion should only take place in a cautious manner. The overall objective in managing such a new fishery should be to prevent the development of the fleet's capacity outpacing the ability of management to understand the effect of existing fishing effort. In view of the rapid development of the fishery in recent years, a cautious approach is warranted in exploiting boarfish.

In 2010 an interim management plan, proposed by Ireland, included a number of measures to mitigate potential bycatch of other TAC species in the boarfish fishery A closed season from 15 March to 31 August was proposed, as anecdotal evidence suggested that mackerel and boarfish are caught in mixed aggregations during this period. This proposed closed season has been followed by participating vessels on a voluntary basis in 2011 and 2012. A closed season was also proposed in Division VIIg to prevent catches of Celtic Sea herring, known to form feeding aggregations in this region at these times. If catches of a single species other than boarfish totals more than 5% of the total catch in the boarfish fishery, by day and by ICES statistical rectangle, and this species is covered by a TAC, then boarfish fishery must cease in that rectangle. In 2012, a management plan has been proposed by the Pelagic RAC. This includes a nested set of harvest control rules that are designed to deal with whatever level of information is available to assess stock status. This plan has yet to be evaluated.

Bottom trawl survey data suggest a continuity of distribution spanning ICES Subareas V, VI, VII, and VIII. Isolated small occurrences appear in the North Sea (ICES Subarea IV) in some years. An examination of Portuguese groundfish survey data indicated that boarfish are mostly distributed in the southwest of Portugal, with only rare occurrences in the northern parts. This suggests a potential discontinuity of the distribution of the species between ICES Division VIIIc and the southern part of Division IXa (Cardador and Chaves, 2010). Based on these results, a single stock is considered to exist in ICES Subareas IV, V, VI, VII, and VIII, a broader area than that covered by the current EU TAC.

Regulations and their effects

In 2010, the European Commission notified member states that the mesh sizes of less than 100 mm were illegal and that fisheries for boarfish should not be prosecuted with mesh sizes of less than 100 mm. However, in 2011, the European Parliament voted to change Regulation 850/1998 to allow fishing for boarfish using mesh sizes ranging from 32 to 54 mm.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and the advice that to comply with MSY objectives catches for 2014 should be no greater than 133,957t.

STECF agrees that if discard rates do not change from the average of the last ten years this implies landings of no more than 127 509 t.

Request to ICES to evaluate the proposed long-term management plan for boarfish and possible in-year revision of the TAC for 2013.

STECF notes the ICES response to the Commission's request to evaluate the proposed long-term management plan for boarfish and possible in-year revision of the TAC for 2013 (ICES Advice 2013, Book 9, section 9.3.3.6).

STECF agrees with logical explanations given in the ICES response and with the ICES recommendation that Tier 1.1 of the management plan be considered consistent with the PA and MSY approaches for as long as a Category 1 assessment is available.

STECF agrees with the ICES statement that the remaining harvest control rule terms of the proposed management plan cannot be evaluated at the moment. STECF notes that ICES policy, in the absence of a Category 1 assessment, is to use the data-limited stocks (DLS) approach. STECF notes however that the subsequent Tiers of the proposed management plan might be followed, if they resulted in more precautionary management (lower TACs) than those provided for in the DLS approach.

STECF also agrees with the ICES recommendation that an in-year TAC revision is not possible at the moment because the 2013 assessment is the first that is of sufficient quality to be used for advice.

7 Resources in the Mediterranean Sea (GFCM).

The Management advisory body is the Scientific Advisory Committee (SAC) of the General Fisheries Commission for the Mediterranean (GFCM). The SAC is organized into Sub-Committees. The Sub-Committee on Stock Assessment (SCSA) gives advice on stock status.

One of the objectives of the GFCM SCSA is to enhance joint practical stock assessment involving the participation of scientists from all the Mediterranean countries of the different Geographical Sub-Areas (GSAs) who provide their data and share them with their colleagues, using standard methodologies and analysing together the results and options for fisheries management. The process, based on undertaking joint practical working group meetings and review sessions was launched in 2008, during the SCSA Working Group on Demersal species (Turkey, September 2008).

The outcome of the assessments already undertaken by national experts within national programmes, FAO Regional projects and/or other international initiatives are presented at the relevant working group meetings and subsequently at the SCSA meeting for review.

With the aim of establishing the scientific evidence required to support development of long-term management plans for selected fisheries in the Mediterranean, consistent with the objectives of the Common Fisheries Policy, and to strengthen the Community's scientific input to the work of GFCM, the Commission made a number of requests to STECF. In order to meet these requests, a series of STECF Working Groups on the Mediterranean were initiated in 2008 (STECF-SGMED Working Group). In 2009 STECF-SGMED-09-02 Working Group on the Mediterranean Part I took place at Villasimius, Sardinia, (Italy) in June 2009. The STECF-SGMED-09-03 Assessment of Mediterranean stocks – Part II was held in December 2009 at Barza d'Ispra (Italy). The latter meeting produced short and medium term projections regarding the assessments discussed in the previous meeting. The strategy of two assessment working groups, the first focused on the assessment of historic stock parameters and the second on projections of stock parameters into the short and medium term future was also applied in 2010 with the STECF-SGMED-10-02 meeting in Heraklion (Greece) in early June and STECF-SGMED-10-03 meeting held in Sicily (Italy) in December.

Such an approach continued in 2012, with the STECF-EWG-11-20 held in Madrid in January, STECF-EWG-12-11 held in Sete (France) in July, and STECF-EWG-12-19 held in Ancona (Italy) in December 2012. At the most recent STECF EWG assessing Mediterranean stocks, STECF 13-09 held in Barza d'Ispra (Italy), both assessments and forecast projections were carried out. The reports of STECF-EWG 12-19 and STECF-EWG 13-09 were considered when updating this report based on scientific advice released by STECF in 2013 for Mediterranean stocks.

The most recent GFCM Working Groups on the Demersal Stocks and on the Small Pelagic Stocks were held in Split, Croatia in November 2012 (from the 5th to the 9th), and reviewed during the 14th session of Sub-Committee on Stock Assessment held in Rome in February 2013 (from the 18th to the 20th) and endorsed during the 15th session of the Scientific Advisory Committee (SAC) held in Rome in April 2013 (from the 8th to the 11th) –The relevant meeting reports were considered when updating this report based on the scientific advice released by GFCM in 2013 for Mediterranean stocks.

STECF recognises the efforts made by GFCM and STECF-SGMED/STECF-EWG in the recent years to harmonize the assessment of the most important stocks among the different Mediterranean countries but notes that, in spite of this, most of the Mediterranean stocks are not yet assessed on a regular basis in all GSAs.

STECF advises that the cooperation between EU Member States, GFCM and STECF-SGMED Working Groups should be further improved in order to provide annual assessment of all stocks listed in the Council Regulations 1542/2000, 1343/2007, 199/2008 and Commission Decision 2010/93/EU, based on the national programs for data collection. Annual assessments are considered informative to monitor the effects of the various multi-annual management plans.

In summary, STECF and GFCM SAC reviewed 121 stock assessments of 38 species. 42 updated stock reviews considered analytically assessed exploitation rates which were evaluated with regard to proposed management reference points (F_{MSY}). Advice on the most up to date available analytical stock assessments is provided for:

- 2 small pelagic species (anchovy, sardine) in 2 Geographical Sub-areas;
- 11 demersal species (giant red shrimp, blue and red shrimp, monkfish, European hake, blue whitihing, red mullet, Norway lobster, pink shrimp, greater forkbeard, spottail mantis shrimp and common sole) in 17 Geographical Sub-Areas;

Advice if also provided for additional species for which either only a preliminary assessment has been done, or for which no updated assessment was available:

- 3 small pelagic species (Spanish mackerel, sprat, horse mackerel)
- 9 demersal species (bogue, common dentex, striped mullet, octopus, black spot seabream, common pandora, picarel, barracuda, poor cod)
- 13 elasmobranch species (thresher shark, carcharhinidae, basking shark, tope shark, blackmouth catshark, blackchin guitarfish, sixgill shark, pelagic stingray, starry skate, thornback ray, small-spotted catshark, smoth hammerhead, spurdog)

STECF notes that none of the reviewed up to date assessments provided precautionary management reference points of stock size due to data deficiencies or shortage of data series, wit the exception of sardine and anchovy in GSA 17.

Overall, 40 (93%) out of the 42 analytically assessed and reviewed stocks in the Mediterranean are classified as being subject to overfishing. Tables 7.1 and 7.2 summarize the findings in detail for the various stocks (species by Geographical Sub-Areas).

Table 7.1. Stock status according to the exploitation rate.

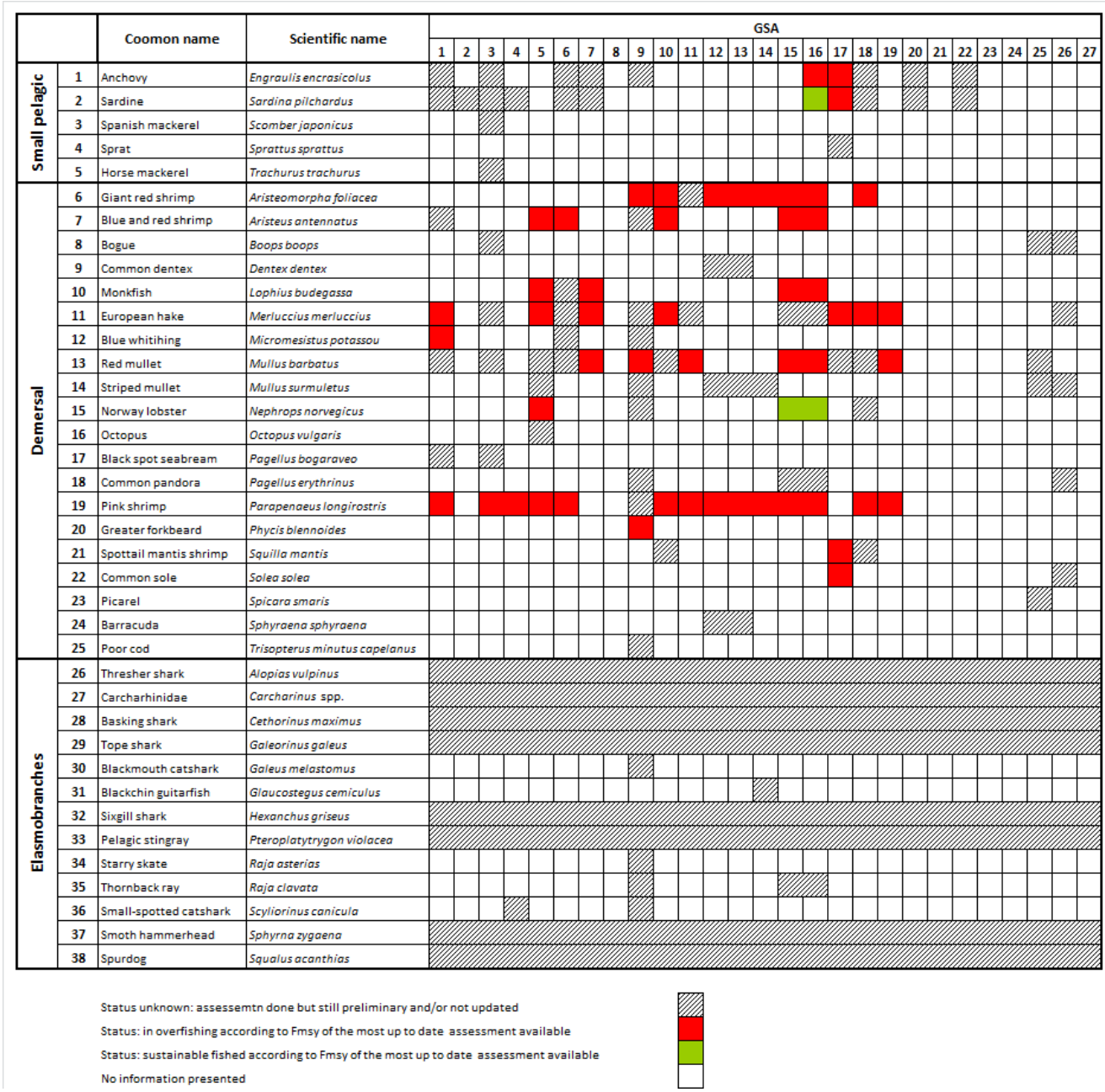

Table 7.2. Summary overview

Scientific advice about the state of the stock exploitation	no	%
Stocks classified according to criteria	42	35
Other stocks not included for very poor data or not updated	79	65
Stocks taken into account	121	100
Classified stocks:		
The stock is overfished (above Fmsy)	40	95
The stock is fished at or below the Fmsy	2	5
Total classified stocks (13 species)	42	100

STECF approach to advice for Mediterranean fisheries

The management advice for fisheries exploiting the assessed demersal fish, crustacean and mollusc stocks focuses on the need for a consistent approach to establishing multi-annual management plans (COUNCIL REGULATION (EC) No 1967/2006) to reduce fishing mortality towards the proposed reference points

consistent with high long term yields and low risk of through fishing effort reductions. This advice reflects the fact that Mediterranean demersal fisheries are characterized by a pronounced multi-species/stocks catch profile, while each of the species/stocks has different management and conservation requirements. It is further noted that most of the demersal fisheries exploit mainly early life stages and/or small growing species.

The management advice for fisheries exploiting the assessed stocks of small pelagics focuses on the need for a consistent approach to establishing multi-annual management plans to keep fishing mortality at or below the proposed management reference points consistent with high long term yields or to reduce fishing mortality towards such limits. STECF notes that management of fisheries targeting stocks of small pelagics through effort management alone runs the risk of not achieving the desired management objectives. The reason for this is as follows:

Fleets exploiting small pelagic species in the Mediterranean have the ability to target more than one stock and a restriction on overall fleet effort does not ensure a reduction in effort on the stock of concern. For example a fleet currently exploiting stock A which is more valuable than stock B, could choose to direct all of it's effort to stock A if it's effort is restricted since the revenue gained would be greater.

STECF considers that if fully enforced and implemented, a restriction on landings is likely to be a more appropriate and effective management tool to control the exploitation rate on small pelagics in the Mediterranean. Hence STECF advises that consideration be given to introduce landing restrictions for small pelagic species. The species of concern are primarily anchovy and sardine.

STECF emphasizes that to assess the effectiveness of multi-annual management plans implies that evaluations are undertaken at appropriately-prescribed intervals and that the plans are adapted in the light of the results of the evaluations. The plans need to be supported by effective control and enforcement measures together with collection of fisheries-related data. STECF notes that not all Member States have fully implemented the Data Collection Regulation and notes that full implementation of the provisions of the data collection regulation is a prerequisite to effective scientific monitoring and management of the stocks and fisheries.

7.1 European anchovy (*Engraulis encrasicolus*) in Geographical Sub Area 1. Northern Alboran Sea

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The current fleet in GSA 01 the Northern Alborán Sea is composed by 131 units, characterised by small vessels. 21% of them are smaller than 12 m and 79% between 12 and 24 m. The purse seine fleet has been continuously decreasing in the last two decades, from more than 230 vessels in 1980 to 131 in 2009. Sardine (*Sardina pilchardus*) and anchovy (*Engraulis encrasicolus*) are the main target species of the purse seine fleet in Northern Alboran GSA 01, but other species with lower economical mackerel (*Trachurus spp.*), mackerel (*Scomber spp.)* and gilt sardine (*Sardinella aurita*). The annual landings of anchovy in the Northern Alborán Sea show annual fluctuations and ranged between 3,268 and 178 tons. Landings increased in 2009 reaching up 292 t. Anchovy discards in GSA 01 are considered to be negligible.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Biomass estimation comes from acoustic surveys and from commercial landings and CPUEs. The stock is assessed by means of an XSA. Since 2008 advice is also provided by STECF-SGMED. GFCM-SAC WG in 2010 performed an assessment but considered the XSA analysis as provisional and found it unacceptable as basis for advice. The main shortcoming of the analysis is the lack of reliable tuning data.

REFERENCE POINTS: STECF proposes the following reference points as a basis for management advice:

E_{msy} (F/Z, F age range 0-3) $\leqslant$ 0.4.

GFCM SAC has not proposed any management reference points.

STOCK STATUS: Based on the report of the STECF-SGMED 10-02, STECF concludes that overfishing (E_{2009} = 0.64-1.17 > 0.4) is currently occurring.

RECENT MANAGEMENT ADVICE: GFCM-SAC recommended not to increase fishing effort and to consider the multispecies effect of this fishery. STECF advised to reduce the exploitation rate below or at the proposed reference point (E_{MSY}=0.4), in order to avoid future loss in stock productivity and landings. STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not

lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool for small pelagic in the Mediterranean. STECF also proposes that a multi-annual management plan for small pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with sardine fisheries.

STECF COMMENTS: STECF considers that in order to avoid future loss in stock productivity and landings the exploitation rate should be reduced to E = 0.4 or below. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

7.2 European anchovy (*Engraulis encrasicolus*) in Geographical Sub Area 3. Southern Alboran Sea

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The purse seine fleet operating in GSA 03 Southern Alboran Sea is composed of about 150 boats distributed in seven Mediterranean ports.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Data sources were acoustic surveys and landings.

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

STOCK STATUS: No assessment has been presented to SAC-GFCMSCSA since 2008. The biomass estimate obtained by the acoustic survey performed in May 2006 is 3,700 tons.

RECENT MANAGEMENT ADVICE: No specific advice is given by the GFCM-SAC- SCSA.

STECF COMMENTS: STECF notes that the information presented on this stock and fishery is poor and in the absence of any reliable stock assessment and related biological reference points, STECF is unable to assess the status of the stock. Consequently, STECF is also unable to advise on an appropriate exploitation rate for this stock.

7.3 European anchovy (*Engraulis encrasicolus*) in Geographical Sub area 6. Northern Spain

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The most updated fleet information corresponds to GFCM-SCSA WG 2011, containing data up to 2010. Anchovy in GSA06 is exploited by purse seiners. Three fleet segments, distinguished by vessel size are recorded. The catch (landings) is not split by fleet segments. It comprises 8399 tonnes in 2010 for the three operational units. The exploitation is based on the first age classes 0, 1 and 2. Purse seine fleet mainly target on anchovy and sardine but other species with lower commercial value as horse mackerel, mackerel and gilt sardine are also caught. The number of vessels in the fleet has declined slightly over time, but has been stable at 132 vessels since 2007. Discards are negligible and no effort data were reported to STECF-SGMED-10-02 through the DCF data call for Spain. In the commercial landings, length distribution and biological sampling are available from 2003 to 2010 from IEO sampling network and Spanish National Data Collection.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Since 2008 advice is provide also by STECF-SGMED. The XSA assessment by the STECF-SGMED-10-02 WG and GFCM-SAC WG are based on acoustic surveys (ECOMED and MEDIAS), commercial landings and CPUEs. In 2010 GFCM-SAC performed an assessment but considered the XSA analysis as provisional and found it unacceptable as basis for advice. The main shortcoming of the analysis is the lack of reliable tuning data. In 2011 GFCM-WG on small pelagic performed an assessment using XSA and tuning data coming from Echo-surveys, that was endorsed by SAC.

REFERENCE POINTS: STECF proposes the following reference points as a basis for management advice:

E_{msy} (F/Z, F age range 0-2) $\leqslant$ 0.4.

GFCM SAC has not proposed any management reference points.

STOCK STATUS: Based on the stock assessment summary of the GFCM-WG on small pelagics, STECF concludes that overfishing (E_{2010} = 0.6 > 0.4) is currently occurring. According to the GFCM-small pelagic WG stock status evaluation the abundance is low while the exploitation rate is uncertain.

RECENT MANAGEMENT ADVICE: Based on the report of the GFCM-SAC, STECF advises that the exploitation rate should be reduced to E = 0.4 or below, in order to avoid future loss in stock productivity and landings. STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagic in the Mediterranean. STECF also proposes that a multi-annual management plan for small pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with sardine fisheries.

STECF COMMENTS: STECF considers that in order to avoid future loss in stock productivity and landings the exploitation rate should be reduced to E = 0.4 or below. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

7.4 European anchovy (*Engraulis encrasicolus*) in Geographical Sub Area 7. Gulf of Lions

FISHERIES: In the Gulf of Lions, pelagic fisheries are targeting anchovy and sardine (*Sardina pilchardus*). An average of 50 trawlers has targeted these pelagic species in the past but they have declined to around 15 in 2011. There have been around 14 purse seiners operating in the south of the Gulf of Lions that catch pelagic species but they have declined to only 3 in 2011. Some purse seine boats from Spain come in the area to fish mainly sardine. Fishing effort depends largely on market fluctuations.

The catches declined from 8000 tonnes in 1998 to 2249 tonnes in 2005, and have fluctuated between about 2500 t and 4000 tonnes since then. The catch in 2011 was less than 1900 tonnes.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Since 2008 advice is also provided by STECF. In 2012 an assessment was undertaken by the GFCM-SAC. The data sources were time series of acoustic surveys, landings and CPUE (1998-2011).

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

STOCK STATUS: Evidence provided by the GFCM-SAC indicates that since 2009, the demographic structure of anchovy has been highly unbalanced with very low abundance of larger individuals (age 2+) in the landings. Age group 1 represents more than 60% of the estimated total biomass. Moreover, an analysis of different biological indicators showed a reduced mean length at age, a distortion of the sex-ratio and a decrease in condition index, reduced growth rate and reduced size-at first maturity. Although biomass is more or less stable in this stock since 2005, with a slight increasing trend, anchovy average size remains small in comparison with previous years, in particular before 2005 and that commercial-sized anchovy abundance is low. GFCM-SAC concluded that this stock should be considered as fully exploited and subject to a low exploitation rate**.**

RECENT MANAGEMENT ADVICE: GFCM-SAC recommends that fishing mortality should not increase. Gulf of Lion small pelagic fisheries are multispecies and effort on anchovy cannot be separated from effort on sardine, so that most of the management decisions have to be taken, considering both species. STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF proposes that a multi-annual management plan for small pelagic fisheries be devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with sardine fisheries.

STECF COMMENTS: STECF agrees with the GFCM SAC assessment of the stock status and notes that in the absence of reference points, no advice on the stock status can be provided. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

7.5 European anchovy (*Engraulis encrasicolus*) in Geographical Sub Area 9. Ligurian and North Tyrrhenian Sea

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: In the GSA 09, anchovy is mainly exploited by purse seiners attracting fish with light. Due to the high economic value, anchovy represents the target species for this fleet in the area; sardine (*Sardina pilchardus*) is the other important species exploited by this fishery. The fishing season starts in spring (March) and ends in autumn (October). Favourable weather conditions and abundance in the catches can extend the fishing activity to the end of November. However, the maximum activity of the fleet is normally observed in summer. Some vessels coming from the south of Italy (mainly from GSA 10) join the local fleet for the exploitation of this resource. Studies carried out in the framework of the DCF in 2005 demonstrated that discards of anchovy for the Italian fleet can be considered as negligible. Anchovy is also a by-catch in the bottom trawl fishery; however, the landing done by this metier is negligible in comparison to that of purse seine (less than 5%). Pelagic trawling is not present in the GSA 09. Annual landings decreased from about 7,000 t in 2002 to 1,400 t in 2004 and remained at such low level until 2008.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. The stock status was assessed by the STECF-SGMED-10-02 including data up to 2008. The assessment was performed using an LCA (VIT software, Lleonart and Salat 1997) on annual pseudo-cohorts from catch data in 2006-2008. STECF notes that an update assessment was conducted during the meeting of STECF-EWG-11-12 (26-30 September 2011).

REFERENCE POINTS: STECF proposes the following reference points as a basis for management advice:

Emsy (F/Z, F age range 0-3) $\leqslant$ 0.4.

GFCM SAC has not proposed any management reference points.

STOCK STATUS: Based on the report of the STECF-EWG-11-12, STECF concludes that overfishing (E_{2010} = 1.0 > 0.4) is currently occurring.

RECENT MANAGEMENT ADVICE: STECF considers that the exploitation rate should be reduced to E = 0.4 or below, in order to avoid future loss in stock productivity and landings. STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool for small pelagic in the Mediterranean. STECF also proposes that a multi-annual management plan for small pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with sardine fisheries.

STECF COMMENTS: STECF agrees with the assessment of the stock status and consider that in order to avoid future loss in stock productivity and landings the exploitation rate should be reduced to E = 0.4 or below. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

7.6 European anchovy (*Engraulis encrasicolus*) in Geographical Sub Area 16. Strait of Sicily

FISHERIES: In Sciacca port, the most important base port for the landings of small pelagic fish species along the southern Sicilian coast (GSA16), accounting for about 2/3 of total landings in GSA 16, two operational units (OU) are presently active, purse seiners and pelagic pair trawlers. The fleet in GSA16 is composed by about 50 units (17 purse seiners and 30 pelagic pair trawlers were counted up in a census carried out in December 2006).

In both OUs, anchovy represents the main target species due to the higher market price. Fishing effort has remained quite stable over the last decade.

Average anchovy landings in Sciacca port over the period 1998-2011 were about 2,700 metric tons, with large inter-annual fluctuations and a general increasing trend.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Since 2008 advice has also been provided by STECF. Census data for catch and effort data were obtained from census information (on deck interviews) in Sciacca port. Acoustic data were used for fish biomass evaluations. Biological sampling and the collection of catch and effort data were also carried out. The area surveyed extends over the continental shelf from the southern coast of Sicily to a depth of about 200 m. The time-series of acoustic biomass estimates cover the period 1998 – 2011.

REFERENCE POINTS: STECF and GFCM SAC propose the following reference points as a basis for management advice:

E_{msy} (F/Z, F age range 0-3) $\leqslant$ 0.4.

A tentative B_{lim} was discussed and adopted by the GFCM WG on small pelagics as the lowest value observed in the time series. Similarly, B_{pa} was established as B_{lim}*1.4. Using the above reported reference points, the current biomass estimate (5070 tons, 2011 value) is well below B_{MSY} (14152 tons), but it is above the adopted estimated B_{lim} (3130 tons) and also slightly, even not significantly, above B_{pa} (4382 tons).

STOCK STATUS: Biomass estimates of total population obtained by hydro-acoustic surveys for anchovy in GSA 16 show a decreasing trend over the period 1998-2011, despite the occurrence of quite large inter-annual fluctuations, from a maximum of about 22,900 t in 2001 to a minimum of 3,100 t in 2008. Biomass estimates over the period 2006-2009 surveys were the lowest of the series (their average representing less than one-quarter of the maximum recorded value). The stock appeared to partially recover in 2010, when estimated biomass was higher than the average value over the entire time series (about 16,000 t vs. 13,000 t), but current (2011) estimate is again close to the lower level of biomass of the series (about 5,000 t). Estimates of biomass were also obtained by fitting a production models with additional information on primary production. According to this model, the current level of biomass is below B_{MSY} and exploitation rate is above F_{MSY}. Thus, according to the report of the GFCM WG on small pelagics, the fishing mortality is stock abundance is low and the stock is considered to be overexploited.

According to STECF 12-13, the current exploitation rate (i.e. E=0.55) corresponds to F=0.79, with M=0.66 estimated with Pauly (1980) empirical equation, and E=0.59 if M=0.56 is estimated with Beverton & Holt's Invariants method (Jensen, 1996). Consequently, considering as reference point for the exploitation rate E= 0.4 value as suggested by Patterson (1992), STECF concludes that this stock is being exploited unsustainably.

RECENT MANAGEMENT ADVICE: The results from the GFCM-SAC assessment suggest that environmental factors can be very important in explaining the variability in yearly biomass levels (mostly based on recruitment success) and indicate that the stock biomass was below B_{MSY} during the period examined. Although stock biomass increased significantly in 2010 from the low biomass levels experienced during the period 2006-2009, the biomass declined again in 2011 and fishing mortality levels over the last years are higher than those required to achieve MSY. Given that the stock is currently overexploited, fishing mortality should be reduced by means of a multi-annual management plan until there is evidence for stock recovery. Catch reductions consistent with effort reductions should be determined. However, the mixed fisheries effects, mainly the interaction with sardine, need to be taken into account when managing the anchovy fishery. As the small pelagic fishery is generally multispecies, any management of fishing effort targeting the anchovy stock would also have effects on sardine.

STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool for small pelagics in the Mediterranean. STECF also proposes that a multi-annual management plan for small pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with sardine fisheries

STECF COMMENTS: STECF considers that in order to avoid future loss in stock productivity and landings the exploitation rate should be reduced to E = 0.4 or below. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

7.7 European anchovy (*Engraulis encrasicolus*) in Geographical Sub Area 17. Northern Adriatic and Central Adriatic

FISHERIES: Anchovy, together with sardine, is one of the most important commercial species of the Adriatic Sea. The stock of anchovy living in the northern and central Adriatic Sea (GFCM-GSA 17) is shared between Italy, Slovenia and Croatia. The stocks are exploited by mid-water trawlers and purse seiners. In 2007, the Italian fleet was composed of about 130 (65 pairs) pelagic trawlers (*volante*) mainly operating from Trieste to Ancona (average GRT 43, average engine power 290 kW) and about 45 purse seiners attracting fish with light (*lampara*), operating in the Gulf of Trieste (24 small *lampara*, average GRT 9, average engine power 110 kW) and in the Central Adriatic (21 big *lampara*, average GRT 97, average engine power 390 kW). In 2007, the Slovenian fleet was composed of 1 pelagic trawler pair and 7 purse seiners; Croatian purse seine fleet is composed by 134 units with LOA greater than 15 meters. No data are available for purse seine boats with LOA lower/equal than 15 m. In 2011, a total of 122 vessels from Italy, Croatia and Slovenia, including both pelagic trawlers and purse seiners, were operating in GSA 17.

The main fraction of the total catch has been usually taken by the Italian fleet but, in recent years, the fraction relative to the fleets of the eastern part of the GSA17 has increased. Fisheries by boat seines and small trawlers targeting the transparent goby (*Aphia minuta*) as well as fries of small pelagic species are authorised for 60 days in wintertime in Italy. Italian regulations prohibit fishing with trawls and mid-water pair trawls for about 25/30 days between July and September. This closed season does not apply to purse seiners. Fishing activity is suspended during the weekend.

Recent anchovy landings for the whole area are in excess of 40000 t but they have declined to 35000 t in 2011. The assessment is based on data time series up to 2011.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Since 2008 advice is also provided by STECF. The present assessment of this stock has been carried out by means of VPA (i.e. ICA), tuned with echo-survey data (2000-2011), during the GFCM-SAC WG on small pelagic in October 2012. Catch and fishing effort data were collected for the period 2000-2011 along with biological data. Length frequency and age length data were combined to obtain annual catch-at-age series from 2000 onwards, which represented the basic input of VPA.

STECF 12-19 also conducted an assessment of the stock in December 2012. The assessment was based on the same model but using the full time series (i.e. 1975-2011).

REFERENCE POINTS: The GFCM-SAC 2012 proposed the following reference point as a basis for management advice:

E_{msy} (F/Z, F age range 1-3) $\leqslant$ 0.4. B_{lim} (179000 tons based on B_{loss}) and B_{pa} (250600 tons based on $B_{pa}=B_{lim}*1.4$) reference points.

STECF 12-19 proposed the following reference point as a basis for management advice:

F_{msy} = 0.56 (i.e. F_{max} catch in the long term). (age range 1-3). B_{lim} (187000 tons based on 30% of SSB_{MAX}) and B_{pa} (262000 tons based on $B_{pa}=B_{lim}*1.4$) reference points.

STECF notes that a mistake occurred in the latest SGMED report, as B_{pa} and B_{lim} were erroneously reported in section 8.2.4.2 of the report. Also, two different values of F_{MSY} were reported by STECF 12-19, i.e. E=0.4 and $F_{max\ catch}$ =0.56. STECF has a preference on the latter as it is derived by simulations considering the stock and recruitment function of this stock.

STOCK STATUS: The GFCM-SAC 2012 concluded that after the collapse of the stock in 1987 a recovery took place, but fluctuations still occurred, in particular in recent years. The recent exploitation rate F/Z is around the Patterson's threshold 0.4 (Patterson, 1992). Also, the ratio between total catch and stock biomass is not particularly high: below 0.3. Thus, anchovy stock can be considered as sustainably exploited. The 2011 total biomass (333,400 tons) is above both the proposed B_{lim} and B_{pa} reference points.

STECF concluded that based on ICA results using the entire time series, F_{bar} (1-3) shows an increasing trend with the highest value in 2000 equal to 1.4. In 2011 the F_{bar} resulted 0.83. The exploitation rate since 1998 remained above the E reference point of 0.4 while in 2011 gets lower to a value of 0.47. Also, current F (0.83) is larger than the F which maximises the catches in the long run ($F_{max\ catch}$=0.56). Based on this assessment results the stock is considered to be exploited unsustainably. SSB in 2011 is estimated to be around B_{pa}.

RECENT MANAGEMENT ADVICE: The GFCM-SAC recommended that fishing mortality should not be allowed to increase, both in terms of fishing effort and catches. Technical interactions regarding the fisheries targeting the sardine stock in GSA 17 need to be taken into account when managing the anchovy fisheries, as well as the possibility to combine the data of GSA 17 with GSA 18 and to explore the relationships between recruitment and environment. The GFCM-SAC also recommends that biomass reference points should be revised.

Based on the latest assessment results, STECF concluded that the stock is currently considered to be exploited unsustainably. STECF consider that in order to avoid future loss in stock productivity and landings the exploitation rate should be reduced to F = 0.56 or below. STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions (i.e. TAC) as a more effective management tool for small pelagic in the Mediterranean. STECF also proposes that a multi-annual management plan for small pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with sardine fisheries.

STECF COMMENTS: STECF considers that in order to avoid future loss in stock productivity and landings the exploitation rate should be reduced to F = 0.56 or below. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

STECF also considers that the entire time series (from 1975 and onwards) should be used to derive exploitation and biomass reference points for this stock.

7.8 European anchovy (*Engraulis encrasicolus*) in Geographical Sub Area 18. Southern Adriatic

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: In Italy anchovy is exploited by pelagic trawl, purse seine and to a lower level by bottom trawl, which generate a certain amount of bycatch of small pelagics. Highest landings in weight are those of pelagic trawling followed by purse seine. Fishing is carried out five days a week. Exploitation is mainly based on age classes 1 and 2. Purse seiners during most of the fishing season operate in GSA 17. From official data, the pelagic trawl and purse seine fleet of the geographical sub-area 18 (South-Western Adriatic Sea) is made up by 41 boats, but not all of them are operating all over the year. In Montenegro, since 2004 there was no commercial catching of small pelagic fishes so it was not possible to estimate biomass or MSY from commercial landings data. At present time, there is only one active vessel (purse seine) that is exploiting these resources in Montenegro but the catches are poor, probably because of lack of experience of the crew and some technical problems. Even when catches are accomplished there is a big problem in its sale because of unorganized market. As for the case of sardine, anchovy is targeted mostly by small-scale fisheries. Fishing grounds are located along the coast, and also in the Boka Kotorska Bay. In small-scale fishery almost all types of nets are used (gillnet, purse seines, trammel net etc. and long lines). With this type of fishery, a lot of economically important fishes are caught but there are no precise data about their amounts. In Albania, at present there are 4 pelagic vessels, which are active for 3 - 5 months during the year. There are three main exploitation areas: Shengjin, Durres and Valona. The catch goes to market or is used by the local conservation industry. There are three conservation industries in Shengjin; most of the product for these industries is imported.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Stock biomass estimates are based on data concerning Italian official commercial landings come from ISTAT (1987-2003) and IREPA (2004-2010). Anchovy biomass was assessed by two direct methods, acoustics and DEPM, in the

frameworks of MEDIAS and AdriaMed project in both sides of GSA 18. Survey period was July. Reproductive parameters of adult population were processed directly on board (total length, weight with and without gonads, sex ratio and maturity stages), while relative batch fecundity (Frb) and spawning frequencies (f) were analysed in lab. Biomass estimate is derived from the elaboration of acoustic data logged at three frequencies (38, 120 and 200 kHz) to calculate raw density of small pelagic fish in the study area converted into biomass per species on the base of percentage in weight of the different species and their mean size from the outcome of pelagic trawls made during the survey.

REFERENCE POINTS: The GFCM-SAC 2011 proposed the following reference point as a basis for management advice:

E_{msy} (F/Z, F age range 0-3) $\leqslant$ 0.4.

STOCK STATUS: Anchovy stock in GSA 18 shows a decrease respect to 2009 in the western side and also respect to 2008 in the eastern side (no survey here in 2009). Due to the fact that the biomass in the western side is at an intermediate level looking at the historical series and that the fishing effort is not entirely directed in GSA 18 the stock could be considered moderately exploited. Moreover the exploitation rate estimated with western side data gave a value of 0.17, well below the Patterson's Reference Point of 0.4. For what concerns the eastern side even if anchovy biomass resulted at a low level the fishing effort is very low, so the stock could be considered moderately exploited.

RECENT MANAGEMENT ADVICE: GFCM-SAC SCSA evidenced the uncertainty of the evaluation and the poor knowledge of the status of the stock and considered the assessment as preliminary. Anyway on the base of the precautionary approach the advice should be not increase the fishing mortality. Moreover the need to merge GSA 17 and 18 was also stressed by the GFCM-SAC SCSA. STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool for small pelagic in the Mediterranean. STECF also proposes that a multi-annual management plan for small pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with sardine fisheries

STECF COMMENTS: STECF notes that the data and information provided to the GFCM on anchovy in GSA 18 are very poor and agrees with the GFCM-SAC SCSA that the assessment has to be considered as preliminary and should not be used as a basis for management advice.

STECF consider that in order to avoid future loss in stock productivity and landings the exploitation rate should be reduced to E = 0.40 or below. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

7.9 European anchovy (*Engraulis encrasicolus*) in Geographical Sub Area 20. Eastern Ionian Sea

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: In GSA 20 (Greek part) anchovy is almost exclusively exploited by the purse seine fleet. Pelagic trawls are banned and benthic trawls are allowed to fish small pelagics in percentages less than 5% of their total catch. Regarding the regulations enforced they concern a closed period from the mid December till the end of February and technical measures such as minimum distance from shore, gear and mesh size, engine, GT. There is a minimum landing size at 9 cm. Anchovy landings have been highly variable, showing maximum values in 2003 decreasing up to 2007 and then increasing to 1326 tons in 2008. Information regarding the age and length distribution of anchovy landings prior to 2003 is based on the Hellenic Centre of Marine Research data collection system. Data of the fishing effort (Days at Sea) and the landings per vessel class indicate that small vessels (12-24 m) are entirely responsible for anchovy catches. Discards values are less than 1%, reaching approximately 0.06% data for GSA 20. Annual landings taken by vessels varying in length from 12 to 24 m (Greek purse seine fleet) varied from about 110 t to 1,950 t without any clear trend. In 2008, this fleet landed 1,326 t.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. The stock was also assessed by the STECF-SGMED-10-02 WG. This assessment is based on fishery independent surveys information as well as on Extended Survivor Analysis (XSA) model. XSA assessment method uses virtual population analysis (VPA) with weighted tuning indices (CPUE estimates). The applied method of the estimation of the natural mortality is consistent with the methodology used in GSAs 5, 6 and 17 for small pelagics. Discards were also included within this assessment representing however only 0.3 % of total landings. Y/R analyses were performed but were not considered reliable due to its flat-topped shape.

REFERENCE POINTS:

The STECF proposed the following reference point as a basis for management advice:

E_{msy} (F/Z, F age range 1-3) $\leqslant$ 0.4.

STOCK STATUS: State of the adult abundance and biomass: Estimates of XSA stock assessment model for anchovy in GSA 20 indicated a decrease in SSB was observed since 2002 but with a slight increase since 2006 to 2008 reaching 1,200 t in 2008. In the absence of proposed or agreed precautionary reference points, STECF is unable to fully evaluate the state of the stock in respect to biomass reference points. It should be considered that this assessment is based on a short time series of data and not suitable to suggest reference points of B_{lim}. Moreover, anchovy is a short lived species characterized by high fluctuations in abundance and recruitment strongly depends on environmental conditions.

State of the juvenile (recruits): XSA model results for anchovy stock in GSA 20 indicated the highest values of recruitment in 2001 and 2006, decreasing however towards 2008.

Based on XSA results, the mean fishing mortality (averaged over ages 1 to 3) is highly variable fluctuating around 0.4. However, since XSA was tuned with unstandardised CPUE of the purse seine fleet, exploitation rates might be underestimated. The purse seine fleet showed a sharp increase concerning its capacity since 2005 that might bias the model estimates, resulting into underestimation of the exploitation rate. The mean F/Z concerning the anchovy stock in GSA 20 was on average above (mean value of the entire time series equals 0.41) the empirical level of sustainability (E<0.4, Patterson 1992) for small pelagics.

RECENT MANAGEMENT ADVICE:

STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions as a more effective management tool for small pelagic in the Mediterranean. STECF also proposes that a multi-annual management plan for small pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with sardine fisheries.

STECF COMMENTS: STECF considers that the assessment provided is considered unlikely to reflect the current stock status or exploitation rate and should not be used as a basis for management advice.

STECF considers that in order to avoid future loss in stock productivity and landings the exploitation rate should be reduced to E = 0.40 or below. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

7.10 European anchovy (*Engraulis encrasicolus*) in Geographical Sub Area 22. Aegean Sea

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: In GSA 22 (Greek part) anchovy is almost exclusively exploited by the purse seine fleet. Pelagic trawls are banned and benthic trawls are allowed to fish small pelagics in percentages less than 5% of their total catch. Regarding the regulations enforced they concern a closed period from the mid December till the end of February and technical measures such as minimum distance from shore, gear and mesh size, engine, GT. There is a minimum landing size at 9 cm. Discards values are less than 1%, reaching approximately 0.06% data for GSA 22.

Annual landings (t) in GSA 22 of the purse seiners above 12m length increased 14,000t in 2003 to 24,500 t in 2008. Since there was no Data Collection Program in Greece in 2007, data concerning this year are estimations of the Hellenic Centre for Marine Research based on data from other research projects that were held in GSA 22.

Discards are less than 1%. The size of the Greek fleet in the Aegean Sea (GSA 22) ranged between 149 and 160 fishing vessels from 2000 to 2006. The main fishing ground for anchovy in GSA 22 is northern Aegean Sea.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Since 2008 advice has also been provided also by the STECF. The most recent (2012) assessment carried out by the STECF-SGMED-11-20 WG, is based on fishery independent surveys information as well as on Integrated Catch at Age (ICA) analysis model. Specifically, acoustic surveys estimations were used for Total Biomass estimates and DEPM surveys for the estimation of SSB. The application of ICA was based on commercial catch data (2000-2008). Biomass estimates from acoustic surveys and the Daily Egg Production Method (DEPM) covering the period 2003-2008 were used as tuning indices.

REFERENCE POINTS: No reference points were proposed by GFCM-SAC for this stock.

The STECF proposed the following reference point as a basis for management advice:

E_{msy} (F/Z, F age range 1-3) $\leqslant$ 0.4.

STOCK STATUS: Given the short time series, the STECF is unable to precisely estimate the absolute levels of stock abundance and biomass. Survey indices and VPA analyses indicate that average total biomass and SSB increased since 2005 to 2008. Precautionary biomass reference points have not been estimated for this stock, and hence advice relative to these cannot be provided by STECF.

ICA model estimates suggest an increase in recruitment since 2004, with a pronounced increase in 2008. However the model predicts a decrease in the population abundance at age 0 for 2009 to the 2006 abundance level.

STECF proposes an exploitation rate E $\leqslant$ 0.4 as management target for stocks of anchovy and sardine in the Mediterranean Sea. This value might be revised in the future when more information becomes available. Based on ICA results, the mean E=F/Z (F averaged over ages 1 to 3) has fluctuated around 0.36 and since 2004 has been below the empirical level of sustainability suggested as target exploitation level for this stock. Thus, the stock is considered to be exploited sustainably until 2008.

GFCM-SAC has classified the stock status as being fully exploited.

RECENT MANAGEMENT ADVICE: GFCM advised not to increase fishing effort. STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool for small pelagic in the Mediterranean. STECF also proposes that a multi-annual management plan for small pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with sardine fisheries.

For precautionary reasons the possibility of changing the closed period should be examined. Since the purse seine fishery is a multispecies fishery targeting both anchovy and sardine, a shift of the closed period (present: mid-December to end of February) towards the recruitment period of anchovy (e.g. October to December) / or the recruitment period of sardine (e.g. February to April) could be suggested. This approach has the potential to improve the selectivity of the fishery, and thus provide higher potential catch in the long term.

STECF COMMENTS: STECF considers that the assessment provided is considered unlikely to reflect the current stock status or exploitation rate and should not be used as a basis for management advice.

STECF consider that in order to avoid future loss in stock productivity and landings the exploitation rate should be reduced to E = 0.40 or below. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

7.11 Sardine (*Sardina pilchardus*) in Geographical Sub Area 1. Northern Alboran Sea

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The current fleet in GSA 01 the Northern Alborán Sea is composed by 131 units, characterised by small vessels. 21% of them are smaller than 12 m and 79% between 12 and 24 m. The purse seine fleet has been continuously decreasing in the last two decades, from more than 230 vessels in 1980 to 131 in 2009.

Sardine (*Sardina pilchardus*) and anchovy (*Engraulis encrasicolus*) are the main target species of the purse seine fleet in Northern Alboran GSA 01, but other species with lower economical mackerel (*Trachurus spp.*), mackerel (*Scomber spp*.) and gilt sardine (*Sardinella aurita*) are also caught. The annual landings of sardine in the Northern Alborán Sea show annual fluctuations ranged between 3,960 and 10,000 tons. In 2009, landings amounted to about 6,000 t. Sardine discards in GSA 01 are negligible.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The assessment of this stock was carried out by means of VPA Extended Survivor Analysis (XSA) using catch data collected by the Spanish National Data Collection during GFCM SAC 2010 WG. The XSA tuning was performed using abundance index series derived from echo-surveys carried out in the GSA 01 but no tuning data was available for GSA 01 in 2009. The GFCM-SAC 2010 WG considers the XSA analysis as provisional and found it unacceptable as basis for advice. The main shortcoming of the analysis is the lack of reliable tuning data. The GFCM-SAC 2010 WG also would recommend that further consideration is given to the assumptions about natural mortality.

REFERENCE POINTS: STECF proposes the following reference points as a basis for management advice:

Emsy (F/Z, F age range 0-3) $\leqslant$ 0.4.

GFCM SAC has not proposed any management reference points.

STOCK STATUS: Based on the report of the STECF EWG 10-02, concludes that overfishing (E2009 = 0.3 < 0.4) is not currently occurring. The GFCM-SAC 2010 classifies this stock as fully-exploited and sustainable fishery.

RECENT MANAGEMENT ADVICE: Based on the report of the STECF SEGMED 10-02, STECF advises that in order to avoid future loss in stock productivity and landings the exploitation rate should be maintained at or below the proposed reference level of Emsy (F/Z, F age range 0-3) $\leqslant$ 0.4.

GFCM-SAC WG in 2010 advice is not to increase the fishing effort, but considers the analytical assessment as provisional.

STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool for small pelagic in the Mediterranean. STECF also proposes that a multi-annual management plan for small pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with anchovy fisheries.

STECF COMMENTS: STECF agrees with the assessment of the stock status and consider that in order to avoid future loss in stock productivity and landings the exploitation rate should be reduced to E = 0.4 or below. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

STECF notes that GFCM-SAC 2012 WG on small pelagics carried out an assessment combining the GSA 1, 2 and 3. However the 2012 assessment is considered preliminary, so no formal advice was provided.

7.12 Sardine (*Sardina pilchardus*) in Geographical Sub Area 3. Southern Alboran Sea

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The fisheries of small pelagic are an important component of inshore fishing on the Moroccan Mediterranean coast. For these fisheries, the activity of fishing is executed only by Moroccan seiners targeting mainly sardine, anchovy and horse mackerel. Bogue and sardinella are also caught. For several decades, the sardine constituted between 50 and 70% of the total landings of small pelagic of the Moroccan Mediterranean. However, the production of sardine declined during the last years, because of the increase in the fishing effort exerted by the sardine fleet on this resource. In the years 2007 to 2010, the annual landings of sardine fluctuated between 9,000 and 15,000 tons.

The fishing of small pelagic is by a fleet of approximately 140 units, that is to say 20% of the operational coastal fleet in the Moroccan Mediterranean. Fishing of sardine is practiced mainly by approximately 140 purse seiners in seven ports. It should be noted that these units can carry out displacements towards the ports of the Atlantic, in particular the port of Larache. The sardine and the anchovy constitute the target species towards which the fishing effort of the sardine boats is directed; the sardine for its remarkable abundance compared to the other species and anchovy for its high commercial value. The time series of the captures of sardine since the year 2000 has important fluctuations, but with a stable general tendency. The evolution of the captures shows a reduction of the captures between 2000 and 2003, followed by an increase between 2004 and 2006 and then a new reduction in 2007 and 2008, increase in 2009 and decrease in 2010.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is the GFCM-SAC. By means of the Software VIT , Length Cohort Analysis (LCA) was made on the average of the frequencies of sizes of sardine balanced at the whole zone of the Moroccan Mediterranean during the four last years (2007-2010).

REFERENCE POINTS: GFCM SAC proposes the following reference points as a basis for management advice:

$F_{0.1} = 0.99$

STOCK STATUS: The GFCM SAC 2011 report states that the exploitation rate is moderate in east and high in west part of the GSA and the biomass level is lower than previous year. Moreover the results showed that the fishing effort is exercised mainly on adult individuals (between 16.5 and 19.5 cm). The analysis of the yield per recruit indicates a state of full exploitation for stock sardine in the Moroccan Mediterranean sea. STECF notes that GFCM-SAC 2012 WG on small pelagics carried out an assessment combining the GSA 1, 2 and 3. However the assessment is considered preliminary, so no formal advice is provided.

RECENT MANAGEMENT ADVICE: Taking into account the likely state of the stock and in order to ensure a rational and durable exploitation of Moroccan Mediterranean sardine, the GFCM-SAC working group on small pelagic recommended the following:

- maintain the current fishing effort;
- reduce the mortality of fishing on the spawning fish
- introduce seasonal closure during January which coincides with the peak of the spawning.

The GFCM-SAC reported the comment of Morocco delegate that the management options should be given in a more general way, avoiding of being too specific on defining the management measure.

STECF COMMENTS: In contrast to the GFCM-SAC WG on small pelagic which proposes F0.1 as an appropriate reference point for fishing mortality, STECF proposes a target reference point of $E \leqslant 0.4$ for the small pelagic in the Mediterranean. However with the information available a value for E cannot be derived. STECF notes that in the summary sheet of sardine in GSA 3 finalized by GFCM SAC WG on small pelagic the value of the current F is unclear.

STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool for small pelagic in the Mediterranean. STECF also proposes that a multi-annual management plan for small

pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with anchovy fisheries

7.13 Sardine (*Sardina pilchardus*) in Geographical Sub Area 4. Algeria

SOURCE OF MANAGEMENT ADVICE: The management advisory body is the GFCM-SAC. Shaefer model and Length Cohort Analysis (LCA) were applied.

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

STOCK STATUS: The GFCM SAC 2012 WG report states that the stock is fully exploited.

RECENT MANAGEMENT ADVICE: GFCM-SAC does not provide any advice as the assessment is considered preliminary.

STECF COMMENTS: STECF notes that the information presented on this stock and fishery is insufficient to permit an assessment of the status of the resource or its exploitation rate. Consequently, STECF is unable to advise on an appropriate exploitation rate for this stock or an appropriate catch level.

STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

7.14 Sardine (*Sardina pilchardus*) in Geographical Sub Area 6. Northern Spain

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The purse seine fleet operate in GSA 06 Northern Spain is composed by 130 units: 4% are smaller than12 m in length, 87% between 12 and 24 m and 9% bigger than 24 m. The fleet continuously decreased in the last decade, from more than 222 vessels in 1995 to 130 in 2008. This strong reduction (59%) is possibly linked to a continuous decreasing in small pelagic catches. Sardine (*Sardina pilchardus*) and anchovy (*Engraulis encrasicolus*) are the main target species of the purse seine fleet in Northern Spain GSA 06, but other species with lower economic importance are also captured, sometimes representing a high percentage of the capture: horse mackerel (*Trachurus* spp.), mackerel (*Scomber* spp.), and gilt sardine (*Sardinella aurita*).

The annual landings of sardine (*Sardina pilchardus*) in the Northern Spain for the whole time series ranged between 52,440 and 7,900 t. Landings in 2009 were 7,900 t. This is the lowest values of the assessed time series, halving the catch from 2008 (14,120 t) which is the second lowest value of the time series. The highest value of the time series corresponds to the first year analysed (1994 with 52,440 t). Hence, the time series shows a continuous and very sharp decrease from the beginning of the times series. Discards are negliglible and no effort data were reported to STECF-SGMED-10-02 through the DCF data call for Spain.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. GFCM-SAC WG 2011 performed an assessment using eXtended Survivor Analysis (XSA), tuned with acoustic data.

REFERENCE POINTS: STECF proposes the following reference points as a basis for management advice:

E_{msy} (F/Z, F age range 0-2) $\leqslant$ 0.4.

GFCM SAC has not proposed any management reference points.

STOCK STATUS: Based on the report of the STECF EWG 10-02, STECF concludes that overfishing (E2009 = 0.78 > 0.4) is currently occurring.

Although no reference points were defined GFCM-SAC 2011 classifies this stock as overexploited at low abundance. The GFCM-SAC 2011 also evidenced the decreasing trend in landing, SSB and recruitment recognizing the risk of stock collapse.

RECENT MANAGEMENT ADVICE: GFCM-SAC advised a reduction of fishing mortality, in order to avoid future loss in stock productivity and decrease the risk of stock collapse.

STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore

be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool for small pelagic in the Mediterranean. STECF also proposes that a multi-annual management plan for small pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with anchovy fisheries.

STECF COMMENTS: STECF agrees with the assessment of the stock status and consider that in order to avoid future loss in stock productivity and landings the exploitation rate should be reduced to E = 0.4 or below. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

7.15 Sardine (*Sardina pilchardus*) in Geographical Sub Area 7. Gulf of Lions

FISHERIES: The fishery is mostly by trawlers, targeting anchovy and sardine. Some catches are also taken by a smaller purse seine fleet. Since 2002, the number of trawlers targeting sardine (and anchovy) has gone down from 56 to 20. The number of vessels in the whole trawler fleet remains stable at around 100 vessels. Since 1998, the catches have fluctuated around 6,000 to 11,000 tonnes. In 2009, the catches went down to 2,720 tonnes, in 2010 to only 600 tonnes and increased in 2011 to 750 tonnes.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Data sources were time series of acoustic surveys, landings and CPUE (1998-2011). The acoustic surveys are performed at daytime in July. The acoustic assessment results are completed by an analysis of catches and fishing effort to improve the fisheries diagnoses. The stock has been assessed in the framework of GFCM-SAC 2012.

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

STOCK STATUS: GFCM-SAC WG classifies this stock as low abundance and low fishing mortality.

RECENT MANAGEMENT ADVICE: GFCM Sub-Committee on Stock Assessment (SCSA) understands the difficulties in terminology for this stock (very low fishing pressure and abundance possible related to ecological reasons). However the SCSA recommends to use the word “Collapsed” to describe this stock. The advice should therefore be to reduce or close the fishery until recovery. A recommendation to test the feasibility to use analytical methods to facilitate the advice is made. GFCM-SAC highlights that the current state of the stock is believed to be related to ecological and/or environmental reasons. Therefore concludes that the word “Collapsed” does not fully apply. SAC advice is that the stock is under some environmental stress and that human exploitation should be kept to minimum to maximize potential for stock recovery. .

STECF COMMENTS: STECF notes that in the absence of reference points the stock status cannot be fully evaluated.

STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool for small pelagic in the Mediterranean. STECF also proposes that a multi-annual management plan for small pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with anchovy fisheries.

7.16 Sardine (*Sardina pilchardus*) in Geographical Sub Area 16. Strait of Sicily

FISHERIES: In the port of Sciacca, the most important base port for the landings of small pelagic fish species along the southern Sicilian coast (GSA16), accounting for about 2/3 of total landings in GSA 16, two operational units (OU) are presently active, purse seiners and pelagic pair trawlers. The fleet in GSA16 is composed by about 50 units (17 purse seiners and 30 pelagic pair trawlers were counted up in a census carried out in December 2006). In both OUs, anchovy represents the main target species due to the higher market price.

Average sardine landings over the last decade (2002-2011) were about 1,900 metric tons, with a general decreasing trend with a minimum in 2010 (565 tons) followd by a sharp increase in 2011 (2,665 tons). Fishing effort has remained quite stable over the last decade.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Since 2008 management advice is given by the STECF. Census data for catch and effort data were obtained from census information (on deck interviews) in Sciacca port. Acoustic data were used for fish biomass evaluations. Stock assessment analyses have been carried out both in the framework of GFCM-SAC 2012 WG on small pelagic and STECF EWG 12-19.

REFERENCE POINTS: GFCM-SAC 2012 WG proposes as reference points in 2011:

- $F_{MSY} = 0.16$
- $B_{MSY} = 32{,}527$ tons

calculated from surplus production model (BioDyn).

STECF EWG 12-19 recommends the application of the proposed exploitation rate $E \leqslant 0.4$ as management target for stocks of sardine in the Mediterranean Sea (Patterson, 1992).

STOCK STATUS: GFCM-SAC 2012 classifies the stock status as sustainable exploited with a low abundance, slightly increasing in the last years.

Based on the report of the STECF EWG 12-19 the exploitation rate corresponding to F=0.137 is E=0.15, if M=0.77, estimated with Pauly (1980) empirical equation, is assumed, and E=0.16 if M=0.72, estimated with Beverton & Holt's Invariants method (Jensen, 1996), is used instead. Thus, using the exploitation rate of 0.4 as a target reference point, the stock of sardine in GSA 16 would be considered as being sustainably exploited.

RECENT MANAGEMENT ADVICE: GFCM-SAC advised that fishing mortality should not be allowed to increase. Moreover GFCM-SAC informs that there are market constraints that control the main target of the pelagic species fishery, but also due to the multispecies characteristics of the fishery, a common management may be needed.

Based on available information and assuming status quo exploitation in 2011, STECF EWG 12-19 recommends that the relevant fleet effort and/or catches should not be allowed to increase. STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool for small pelagic in the Mediterranean. STECF also proposes that a multi-annual management plan for small pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with anchovy fisheries.

STECF COMMENTS: STECF agrees with the assessment of the stock status made by EWG 12-19 and consider that in order to avoid future loss in stock productivity and landings the fishing mortality rate should be reduced to E = 0.40 or below. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

7.17 Sardine (*Sardina pilchardus*) in Geographical Sub Area 17. Northern Adriatic and Central Adriatic

FISHERIES: Sardine, together with anchovy, is one of the most important commercial species of the Adriatic Sea. The stock of sardine living in the northern and central Adriatic Sea (GFCM-GSA 17) is shared between Italy, Slovenia and Croatia. The Adriatic small pelagic fleet is targeting both sardine and anchovy.

In 2007, the Italian fleet was composed of about 130 (65 pairs) pelagic trawlers (*volante*) mainly operating from Trieste to Ancona and about 45 purse seiners attracting fish with light (*lampara*), operating in the Gulf of Trieste and in the Central Adriatic. In 2007, the Slovenian fleet was composed of 1 pelagic trawler pair and 7 purse seiners. In 2008, the Croatian purse seine fleet was composed by 134 units with LOA greater than 15 meters. No data are available for purse seine boats with LOA lower/equal than 15 meters.

Fisheries by boat seines and small trawlers targeting the transparent goby (*Aphia minuta*) as well as fry of small pelagic species are authorised for 60 days in wintertime in Italy. Italian regulations prohibit fishing with trawls

and mid-water pair trawls for about 25/30 days between July and September. This closed season does not apply to purse seiners. Fishing activity is suspended during the weekend.

Sardine landings for the whole area were about 17,000 t per year (average of the last three years), with an increase in 2007. GFCM-SAC reports that landings in 2011 exceeded 50,000 t. Due to low market price for sardine in Italy, discards of sardine at sea may occur. Between 1987 and 1999, discard estimates averaged about 2,000 t per year. No information on discards was available in the recent years.

In 2011, a total of 122 vessels from Italy, Croatia and Slovenia, including both pelagic trawlers and purse seiners, were operating in GSA 17.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Since 2008 advice has been also provided by STECF.

The assessment of this stock was carried out by means of Integrated Catch Analysis (ICA) and Virtual Population Analysis (VPA) during the GFCM-SAC WG on small pelagic in 2012, using catch data collected for Italy, Slovenia and Croatia. Short time series (2000-2011) of fishery dependent and independent data have been employed as input data to the stock assessment models utilized.

STECF 12-19 also conducted an assessment of the stock in December 2012. The assessment was based on the same model but using the full time series (i.e. 1975-2011).

REFERENCE POINTS: The GFCM-SAC proposed the following reference point as a basis for management advice: Emsy (F/Z) $\leqslant$ 0.4.

The GFCM-SAC 2012 WG on small pelagic also estimated and proposed biomass reference points (Blim and Bpa) but GFCM-SAC 2012 recommends that they should be revised.

During STECF EWG 12-19 estimation of biomass reference points was done based on the methodology described in Simmonds et al., (2011) which originated as a working document to the 2010 WKFRAME meeting (Anon., 2010). The framework uses computer intensive methods to estimate MSY (Maximum Sustainable Yield) reference points and calculates for a given value of Blim corresponding Flim reference points. STECF EWG 12-19 suggest to adopt Blim = 408,032 tons (i.e. 30% of SSBmax), Bpa = 571,245 tons (i.e. Blim * 1.4) and Fmsy = 0.26 (i.e. Fmax Catch).

STECF 12-19 proposed the following reference point as a basis for management advice:

F_{msy} = 0.26 (i.e. F_{max} catch in the long term). (age range 1-3). B_{lim} (408,032 tons based on 30% of SSB_{MAX}) and B_{pa} (571,245 tons based on $B_{pa}=B_{lim}*1.4$) reference points. STECF notes that a mistake occurred in the EWG 12-19 report, two different values of F_{MSY} were reported, i.e. E=0.4 and $F_{max\ catch}$ = 0.26. STECF has preference on the latter as it is derived from simulations incorporating the stock and recruitment function of this stock.

STOCK STATUS: According to GFCM-SAC 2012 assessment, the recent exploitation rate F/Z (E = 0.52) is higher than the Patterson's reference point (E = 0.40). The stock is considered as fully exploited with no room for further expansion.

According to STECF EWG 12-19 the current F is above the reference point (FMSY). Based on this assessment results the stock is considered to be exploited unsustainably. Moreover the level of sardine SSB in 2011 is much lower than the estimated reference point for Blim.

RECENT MANAGEMENT ADVICE: The GFCM-SAC recommended that fishing mortality should not be allowed to increase. Technical interactions regarding the fisheries targeting the anchovy stock in GSA 17 need to be taken into account when managing the sardine fisheries. Moreover GFCM-SAC 2012 recognised that spatial distribution of shared stock of sardine is not limited to GSA17 area only, but it is extended in GSA18 area also. Therefore GFCM-SAC 2012 suggests that future assessments try to take into account combined data from these two GSAs.

STECF EWG 12-19, based on the assessment results of a longer data series, considered the stock to be exploited unsustainably. However, this has to be confirmed in following years and the sardine stock should be monitored on an annual basis. Mixed fisheries implications, i.e. the interaction with anchovy, need to be considered when managing this fishery.

STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore

be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool for small pelagic in the Mediterranean. STECF also proposes that a multi-annual management plan for small pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with anchovy fisheries.

In keeping with the GFCM-SAC, STECF also noted that spatial distribution of shared stock of sardine is not limited to GSA17 area only, but it is extended in GSA18 area also. Therefore, it is suggested that future assessments take into account combined data from these two GSAs. Moreover, an important nursery area of this stock is located in Gulf of Manfredonia (GSA18) where the sardine stock is exploited by fry fishery.

STECF COMMENTS: STECF agrees with the assessment of the stock status made by EWG 12-19 and consider that in order to avoid future loss in stock productivity and landings the fishing mortality rate should be reduced to F = 0.26 or below. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

STECF agrees with the reference points estimated by EWG 12-19. STECF also consider that the entire time series (from 1975 and onwards) should be used to derive exploitation and biomass reference points for this stock.

7.18 Sardine (*Sardina pilchardus*) in Geographical Sub Area 18. Southern Adriatic

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: In Italy sardine is exploited by pelagic trawl, purse seine and to a lower level by bottom trawl (bycatch of small pelagics). Highest landings in weight are those of pelagic trawling followed by purse seine. Fishing is carried out five days a week. Exploitation is mainly based on age classes 1 and 2. Purse seiners during most of the fishing season operate in GSA 17. Pelagic trawlers mainly fishing small individuals (bianchetto) are no more allowed to operate. From official data, the pelagic trawl and purse seine fleet of the geographical sub-area 18 (South-Western Adriatic Sea) is made up by 41 boats, but not all of them are operating all over the year. In Montenegro sardine is targeted mostly by small scale fisheries. Fishing grounds are located along the coast, and also in the Boka Kotorska Bay. In small scale fishery almost all types of nets are used (gillnet, purse seines, trammel net etc. and long lines). With this type of fishery, a lot of economically important fishes are caught but there are no precise data about their amounts. In Albania, at present there are 4 pelagic vessels which are active for 3 - 5 months during the year. There are three main exploitation areas: Shengjin, Durres and Valona. The catch goes to market or is used by the local conservation industry. There are three conservation industries in Shengjin; most of the product for these industries is imported.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC.

Data used for sardine biomass assessment are from the acoustic surveys made in the western side in the period 1987-2010 and in the eastern side in the period 2002-2010, in both areas some years are missing. For acoustic methodology the analysis was made through echograms interpretation and standard echointegration procedure. Multifrequency comparison and data thresholding were used in order to separate information of small pelagic fish from other unwanted echoes (i.e. plankton echoes). Information on the composition by species of the pelagic biomass and the relative size distributions were derived from pelagic trawls and used to subdivide total pelagic biomass per species. Conversion of raw density into biomass per species was made using specific Conversion Factors derived from ex situ and in situ experiments. IDW interpolator was used in GIS software for mapping.

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

STOCK STATUS: GFCM-SAC 2011 evidenced the uncertainty of the evaluation and the poor knowledge of the status of the stock and considered the assessment as preliminary.

RECENT MANAGEMENT ADVICE: GFCM-SAC 2011, on the base of the precautionary approach the advices to not increase the fishing mortality. Moreover GFCM-SAC 2011 evidenced the need to merge the GSA 17 and 18.

STECF COMMENTS: STECF notes that the data and information provided to the GFCM on sardine in GSA 18 are very poor and agrees with the GFCM-SAC SCSA that the assessment has to be considered as preliminary and it cannot provide management advice. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool for small pelagics in the Mediterranean Sea.

7.19 Sardine (*Sardina pilchardus*) in Geographical Sub Area 20. Eastern Ionian Sea

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: In GSA 20 sardine is almost exclusively exploited by the purse seine fleet. Pelagic trawls are banned and benthic trawls are allowed to fish small pelagics in percentages less than 5% of their total catch. Regarding the regulations enforced they concern a closed period from the mid December till the end of February and technical measures such as minimum distance from shore, gear and mesh size, engine, GT. There is a minimum landing size at 11 cm. Sardine landings showed high variability with highest values in 2005 (1,900 ton) and in 2008 (2,900 ton). Data of the fishing effort (days at sea) and the landings per vessel class indicate that small vessels (12-24 m) are entirely responsible for sardine catches. The purse seine fishery is considered a mixed fishery, where sardine, anchovy and other species are caught. Discards were also included within this assessment representing however only 0.3 % of total landings.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC, but this stock was not considered recently. Since 2009 advice has been also provided by STECF. This assessment is based on fishery independent surveys information as well as on Extended Survivor Analysis (XSA) model.

REFERENCE POINTS: No precautionary reference points were proposed by GFCM-SAC for this stock. The STECF-SGMED-10-02 WG proposes the exploitation rate $E \leq 0.4$ as limit management reference point consistent with high long term yield.

STOCK STATUS: The STECF-SGMED-10-02 WG concluded the following:

State of the adult abundance and biomass: Estimates of XSA stock assessment model for sardine in GSA 20 indicated an increase since 2004 reaching 5,600 t in 2008. In the absence of proposed or agreed references, the STECF is unable to fully evaluate the state of the stock and provide scientific advice with respect to precautionary biomass reference points.

State of the juvenile (recruits): XSA model estimates had showed an increase in the number of recruits towards 2007 but a decrease was estimated by the stock assessment model in 2008.

State of exploitation: Based on XSA results, the mean fishing mortality (averaged over ages 1 to 3) is highly variable, being below 1.0 in all years and decreasing since 2005 but approximating 0.68 in 2008. However, since XSA was tuned with unstandardised CPUE of the purse seine fleet, exploitation rates might be underestimated. The purse seine fleet showed a sharp increase concerning its capacity since 2005 that might bias the model estimates, resulting into underestimation of the exploitation rate. The exploitation rate below the empirical level for stock decline ($E<0.4$, Patterson 1992) was suggested by the STECF-SGMED-10-02 WG as reference point for small pelagics. Therefore, the mean F/Z concerning the sardine stock in GSA 20 was on average above (mean value of the entire time series equals 0.46) the empirical level of sustainability ($E<0.4$, Patterson 1992) for small pelagics. Taking into account that this value could be an underestimation of the actual situation, the STECF-SGMED-10-02 WG recommends a reduction in fishing mortality in order to reach the $F/Z= 0.4$, promote stock recovery and avoid future loss in stock productivity and landings. Therefore, taking the empirical level as a reference point for sustainable exploitation, the stock is considered to be overexploited. Fishing mortality should be reduced in order to allow future recruitment contributing to stock productivity. This requires also consideration of the mixed fisheries nature of the fleets.

RECENT MANAGEMENT ADVICE: Due to constraints in data availability the STECF is unable to estimate most recent (2009) stock parameters. Based on available information and assuming status quo exploitation in 2009, the STECF advises that exploitation should be reduced towards $F/Z= 0.4$ in order to promote stock recovery and avoid future loss in stock productivity and landings. Catches consistent with the reductions in exploitation rate should be estimated.

STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool for small pelagic in the Mediterranean. STECF also proposes that a multi-annual management plan for small pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with anchovy fisheries.

STECF COMMENTS: STECF agrees with the assessment of the stock status made by SGMED-10-02 and consider that in order to avoid future loss in stock productivity and landings the fishing mortality rate should be reduced to E = 0.40 or below.. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

7.20 Sardine (*Sardina pilchardus*) in Geographical Sub Area 22. Aegean Sea

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: In GSA 22 (Greek part) sardine is almost exclusively exploited by the purse seine fleet. Pelagic trawls are banned and benthic trawls are allowed to fish small pelagic in percentages less than 5% of their total catch. Enforced regulations include a closed period from mid-December till the end of February, and technical measures such as minimum distance from shore and gear restrictions. There is a minimum landing size of 11 cm.

Sardine landings showed high variability indicating a decreasing trend between 2005 and 2008, comprising approximately 9,700 tons in 2008. The purse seine fishery is considered a mixed fishery, where sardine, anchovy and other species are caught. Discards are <1% of the catches.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Since 2008 advice has been also provided by STECF-SGMED. The latest STECF-SGMED-11-20 assessment was based on fishery independent surveys information as well as on Integrated Catch at Age (ICA) analysis model. Acoustic surveys estimations were used for Total Biomass estimates. The application of ICA was based on commercial catch data (2000-2008). Biomass estimates from acoustic surveys over the period 2003-2008 were used as tuning indices. Sardine data were comprised of annual sardine landings, annual sardine catch at age data (2000-2008), mean weights at age, maturity at age at age and the results of acoustic surveys.

REFERENCE POINTS: No reference points were proposed by GFCM-SAC for this stock. STECF-SGMED 11-20 proposes the exploitation rate E_{lim} (F/Z, age range 1-3)<=0.4 as management point consistent with high long term yield.

STOCK STATUS: The GFCM-SAC 2009 classified this stock as fully exploited.

STECF concludes as follows:

State of the adult abundance and biomass: the results of the short time series of data do not allow concluding on reference points of B_{lim} or B_{pa}. In the absence of proposed or agreed references, the STECF is unable to fully evaluate the state of the stock and provide scientific advice. Results of the Integrated Catch at Age analysis indicated an increasing trend in total biomass and SSB showing a slight recovery of SSB to 20,000 t in 2008 from the low 2003-2004 estimates of 7,000 t.

State of the juvenile (recruits): ICA model estimates showed above average recruitment since 2007, with a very high peak in 2008.

State of exploitation: based on ICA results, the mean fishing mortality (averaged over ages 1 to 3) is highly variable but showed a clear decreasing trend since 2006, amounting approximating 0.64 in 2008. The mean F/Z has declined from 2003 reaching the value of 0.41 which approximates the exploitation reference points (E<0.4, Patterson 1992) suggested by STECF for small pelagics. Taking into account the uncertainty in the estimate, the STECF- considers the stock as being harvested sustainably.

RECENT MANAGEMENT ADVICE: GFCM-SAC advised not to increase the fishing effort.

The STECF advises that increased fishing is not expected to result in increased landings in the long term.

STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions as a more effective management tool for small pelagic in the Mediterranean. STECF also proposes that a multi-annual management plan for small pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with anchovy fisheries.

STECF COMMENTS: STECF agrees with the assessment of the stock status made by SGMED-11-20 and consider that in order to avoid future loss in stock productivity and landings the fishing mortality rate should be reduced to E = 0.40 or below.. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

7.21 Sprat (*Sprattus sprattus*) in Geographical Sub Area 17. Northern Adriatic and Central Adriatic

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Sprat is fished by the same fleet targeting anchovy and sardine (see Section 7.7 - Anchovy in Geographical Sub-Area 17 for fleet description). Italian fleet discard sprats at sea, while Slovenian and Croatian land them. The level of catches is unknown.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Biomass estimation is based on acoustic survey. No assessment has been presented to the GFCM-SAC-SCSA in 2008 and no other information was available to STECF for this stock.

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

STOCK STATUS: The biomass estimate obtained by the 2005 acoustic survey is 21,000 t.

RECENT MANAGEMENT ADVICE: No specific advice is given by the GFCM-SAC-SCSA.

STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool for small pelagic in the Mediterranean. STECF also proposes that a multi-annual management plan for small pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with anchovy fisheries.

STECF COMMENTS: STECF notes that the information presented on this stock and fishery is poor and in the absence of any reliable biological reference points, is unable to assess the status of the resource or its exploitation rate. Consequently, STECF is unable to advise on an appropriate exploitation rate for this stock. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

7.22 Mackerel (*Scomber japonicus*) in Geographical Sub Area 3. Southern Alboran Sea

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Fishing fleet is composed by 147 boats, distributed in seven Mediterranean ports, targeting small pelagics. The level of catches is unknown.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Data sources were acoustic surveys and landings. No assessment has been presented to GFCM-SAC Sub-Committee in 2008 and no other information was available to STECF for this stock.

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

STOCK STATUS: The biomass estimate obtained by the acoustic survey performed in May 2006 is 3,000 t.

RECENT MANAGEMENT ADVICE: No specific advice is given by the GFCM-SAC-SCSA.

STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions as a more effective management tool for small pelagic in the Mediterranean. STECF also proposes that a multi-annual management plan for small pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with anchovy fisheries.

STECF COMMENTS: STECF notes that the information presented on this stock and fishery is poor and in the absence of any reliable biological reference points, is unable to assess the status of the resource or its exploitation rate. Consequently, STECF is unable to advise on an appropriate exploitation rate for this stock. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

7.23 Horse mackerel (*Trachurus trachurus*) in Geographical Sub Area 3. Southern Alboran Sea

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Fishing fleet is composed by 147 boats, distributed in seven Mediterranean ports, targeting small pelagics. The level of catches is unknown.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Data sources were acoustic surveys and landings. No assessment has been presented to GFCM-SAC Sub-Committee in 2008 and no other information was available to STECF for this stock.

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

STOCK STATUS: The biomass estimate obtained by the acoustic survey performed in May 2006 is 71,000 t.

RECENT MANAGEMENT ADVICE: No specific advice is given by the GFCM-SAC-SCSA.

STECF considers that management of the fisheries targeting small pelagic stocks through effort control alone may not lead to control of the exploitation rate. Such fisheries have the ability to selectively target different stocks in response to a variety of factors such as availability and price. The majority of their effort may therefore be directed to one of the available stocks resulting in a higher than desirable exploitation rate. STECF suggests that consideration be given to introducing landing restrictions as a more effective management tool for small pelagic in the Mediterranean. STECF also proposes that a multi-annual management plan for small pelagic fisheries is devised and implemented. Such a management plan should take into account mixed-fisheries effects, in particular the technical relation with anchovy fisheries.

STECF COMMENTS: STECF notes that the information presented on this stock and fishery is poor and in the absence of any reliable biological reference points, is unable to assess the status of the resource or its exploitation rate. Consequently, STECF is unable to advise on an appropriate exploitation rate for this stock. STECF also suggests that consideration be given to introducing landing restrictions (e.g. TAC) as a more effective management tool to control the exploitation rate on small pelagics in the Mediterranean Sea.

7.24 Striped red mullet (*Mullus surmuletus*) in Geographical Sub Area 5. Balearic Islands

No additional information on this stock was available to the STECF since 2012, hence the text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Striped red mullet (*Mullus surmuletus*) is one of the most important target species in the trawl fishery developed by around 40 vessels off Mallorca (Balearic Islands, GSA 05). A fraction of the small-scale fleet (~100 boats) also directs to this species during the second semester of the year, using both trammel nets

and gillnets. During the last decade, the annual landings of this species have oscillated between 73-117 and 17-29 tons in the trawl and small-scale fishery, respectively.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most updated assessments of the stock of *Mullus surmuletus* in the GSA 05 were provided by STECF EWG 11-20 in January 2012 on the time data series 2000-2010, presented to the GFCM WG on Demersal Fish in November 2012 and endorsed by GFCM-SAC.

REFERENCE POINTS: STECF EWG 11-20 proposes the following reference point as a basis for management advice:

$F_{0.1}$=0.229.

STOCK STATUS: Based on the report of the GFCM WG on Demersal Fish and STECF EWG 11-20 the stock of striped red mullet in GSA 05 is assessed as in overfishing as current F (0.714) is above the proposed $F_{0.1}$ reference point (0.229). SSB and stock biomass consistently declined over the time series since 2000 to the lowest value of the time series in 2009, increased in 2010 and lowered in 2011.

RECENT MANAGEMENT ADVICE: Based on the report of the GFCM WG on Demersal Fish and STECF EWG 11-20, the GFCM-SAC recommended to reduce fishing mortalities by reducing the effort activity and improving the selection pattern of the fishery. The use of the information from the vessel monitoring system will also help to improve the knowledge about the spatial distribution of the fishing effort. The SC endorses the advice. The recommendation to use VMS for the assessment/management of the stock is not sustained in the assessment sheet presented to the GFCM WG on Demersal Fish. The GFCM SC recommends to incorporate all information and discussion that lead to the recommendation given in future reports. As striped red mullet is mainly caught by different gears and in mixed fisheries, the measures adopted to reduce fishing mortality require multi-annual management plans that take into account mixed-fishery considerations to be developed and fully implemented.

STECF COMMENTS: STECF agrees with the recommendations of the GFCM SAC and has no additional comments.

7.25 Striped red mullet (*Mullus surmuletus*) in Geographical Sub Area 9. Ligurian and North Tyrrhenian Sea

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The species is exploited by different types of gears. The annual landing for 2009 was due for 30% to bottom trawl (75 tons), for 31% to gillnet (76 tons) and for 39% to trammel net (96 tons). In 2010 the highest landing was due to trammel net (57%, 159 tons), while bottom trawl and gillnet contributed for 18% and 25% respectively. About 200 bottom trawlers exploit this resource all year round in the coastal area frequently using specific devices to exploit hard bottoms where the species is more abundant. Striped red mullet is caught as a part of a species mix that constitutes the target of the trawlers operating near shore. The main species caught in GSA09 are *Squilla mantis*, *Sepia officinalis*, *Trigla lucerna*, *Merluccius merluccius*, *Mullus barbatus*, *Zeus faber*. The length of first capture of the striped red mullet is of about 10 cm. Trawl catch is mainly composed by age 0+ and 1 individuals while the older age classes are poorly represented in the catch. As concerns artisanal fisheries, *M. surmuletus* represents the target species in some period of the year (end of spring-summer) and it is caught by is caught by gillnet and trammel net. Part of the fleet uses a small mesh size trammel net to catch this species on rocky bottoms near the shore. The catch is mainly composed by individuals at ages 0+ and 1. The landing showed a clear decreasing trend in the period 2005-2008 followed by an increase in 2009-2010, with maximum value in 2005 (404 tons) and minimum in 2008 (224 tons). A slightly increase is observed in the last two years. It is difficult to correlate this trend with the reduction in fishing effort as it is not possible to quantify the real effort exerted by the fleet on this resource. However, the LPUEs calculated on the entire fleet show considerable fluctuations with a decreasing trend for gillnet and bottom trawl; for trammel net a high peak is observed in the last year.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission.

REFERENCE POINTS: GFCM-SAC 2011proposes a reference point of

F_{msy}=0.48 ($F_{0.1}$).

STOCK STATUS: GFCM SAC 2011 evaluated the stock in overfishing; considering that the current F was estimated 0.71 and 0.56 respectively for 2009 and 2010 are higher than the reference value of F0.1=0.48.

RECENT MANAGEMENT ADVICE: GFCM-SAC 2011 advises a reduction of fishing mortality towards the proposed reference point.

STECF advises that the reduction can be achieved by reducing fishing effort of the relevant fisheries. As striped red mullet is mainly caught by different gears and in mixed fisheries, the measures adopted to reduce fishing mortality require multi-annual management plans that take into account mixed-fishery considerations to be developed and fully implemented.

STECF COMMENTS: STECF agrees with GFCM-SAC advice to reduce fishing mortality.

7.26 Striped red mullet (*Mullus surmuletus*) in Geographical Sub Areas 12, 13, 14. Northern Tunisia, Gulf of Hammamet, Gulf of Gabès

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Striped red mullet is one of the two principal species of Mullidae exploited in Tunisia. The mean catches are over 1950 tons, representing 45% of the landings of this family and 3.6% of the production of demersal fishery. Striped red mullet is fished all along the Tunisian coast, where many types of fleets (métiers) operate; the principal two are artisanal fishery and bottom trawl.

SOURCE OF MANAGEMENT ADVICE: Two independent stocks of red mullet in Tunisia were identified: one relative to the Northern and Eastern (GSAs 12 and 13) and the other to the Southern part (GSA 14). The two stocks were treated separately. Demographic analysis of *Mullus surmuletus* in Tunisia was made by means of length composition of capture applied to the inshore trawl fishing from 2003 to 2005. The analysis of pseudo-cohort method is used.

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

STOCK STATUS: The global fishing mortality rates of the northern and eastern stocks are low; while for the southern stocks, they are moderate. The exploitation profile of north and east trawler and coastal fleet is orientated to mature fish; however, the southern trawlers catch mainly an important fraction of juveniles.

RECENT MANAGEMENT ADVICE: No assessment has been presented to the GFCM-SAC Sub-Committee in 2009. The previous recommendation was not to increase the fishing effort.

STECF COMMENTS: STECF advises that the assessment provided is considered unlikely to reflect the current stock status or exploitation rate and should not be used as a basis for management advice.

7.27 Striped red mullet (*Mullus surmuletus*) in Geographical Sub Area 26. South Levant. Egypt

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The Egyptian Mediterranean coast is about 1100 km extending from El-Salloum in the West to Taba city in the East. The mean annual fish production from this area is about 50 thousand ton (GAFRD; 1991-2007). The main fishing gears operated in this region are trawling, purse-seining and lining, especially long and hand lining.

The fishing grounds along the Egyptian Mediterranean coast are divided into four regions, namely: Western region (Alexandria and El-Mex, Abu-Qir, Rashid, El-Maadya and Mersa Matrouh); Eastern region (Port Said and El-Arish); Demietta region; and Nile Delta region. Red mullets are among the most valuable and highly priced fish species in Egypt, though widely distributed along the entire coast of Mediterranean, their major fisheries are located on the area from Alexandria to Port Said. Red mullet are mainly exploited by the trawl fishery and contributed about 10% of the total trawl landings in the Egyptian Mediterranean (GAFRD annual reports). The catch of Red mullet is composed mainly of two species: *Mullus surmuletus* and *M. barbatus*, while

some species of Red Sea origin have been recorded in the eastern Mediterranean. The striped red mullet, *Mullus surmuletus* is the most common species in the catch and constituted about 65% of red mullet landings. The number of trawl vessels which operated in the Egyptian Mediterranean ranged between 1100 and 1500 during 1991-2007. The vessel length varies between 18 and 22 m and width from 4 to 6 m.

SOURCE OF MANAGEMENT ADVICE: Analyses were based upon monthly length frequency distributions from trawl catches for the year June 2007 - April 2008 sampled from the Egyptian ports Alexandria, Demietta and Port Said (except for May and the first half of June 2007, the period when all fishing operations are prohibited). These data (raised to the landings and combined to approximate equilibrium conditions for the pseudocohort analysis) formed the basis of the assessment.

Sagittal otoliths were used for age determination. Growth parameters were estimated using the von Bertalanffy equation (see Mehanna, 2009). The natural mortality coefficient (M) was estimated using the method of Djabali et al. (1993). The size at first capture (Lc) was estimated through the catch curve analysis. The length at first sexual maturity Lm50 was estimated by fitting the maturation curve between the observed points of mid-class interval and the percentage maturity of fish corresponding to each length interval. The analysis of pseudo-cohort method (VIT) was used.

REFERENCE POINTS: Proposed Reference points: $F_{0.1}$=0.37; F_{max}=0.53.

STOCK STATUS: The current F was 0.73. GFCM-SAC 2010 recognised that the stock was overexploited.

RECENT MANAGEMENT ADVICE: The GFCM-SAC recommended as a precautionary measure not to increase the fishing effort in the area and to reduce the fishing mortality by 63%. Due to the one year of data collection the assessment was considered as a preliminary.

STECF COMMENTS: STECF considers that, given the short data series, the stock status has to be considered as unknown.

7.28 Red mullet (*Mullus barbatus*) in Geographical Sub Area 1. Northern Alboran Sea

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Red mullets are of the most important target species for the trawl fisheries but are also caught with set gears, in particular trammel-nets and gillnets. From official data, the total trawl fleet of the geographical sub-area 01 (Northern Alborán Sea region) is composed by about 170 boats: on average, 42 TRB, 60 GT and 197 HP (in 2007). Smaller vessels operate almost exclusively on the continental shelf (targeted to red mullets, octopuses, hake and sea breams), bigger vessels operate almost exclusively on the continental slope (targeted to decapods crustaceans) and the rest can operate indistinctly on the continental shelf and slope fishing grounds. Red mullet is intensively exploited during its recruitment from August to November.

Landings data were reported to STECF EWG11-12 through the Data collection regulation (OTB and GTR). Otter trawl landings represent around the 87% of the catches. Total landings increased from 95 t in 2002 to 225 t in 2009 and decreased in 2010 to 200 t. Discards are considered negligible and range at or below one ton.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent assessment and advice are provided by STECF-EWG-11-12 (26-30 September 2011).

REFERENCE POINTS: STECF proposes the following reference points as a basis for management advice:

F_{msy}=0.3 (basis $F_{0.1}$)

STOCK STATUS: Based on the assessment results (Fcurr=1.79), STECF concludes that the stock of red mullet in GSA01 is currently subject to overfishing.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no further comments.

7.29 Red mullet (*Mullus barbatus*) in Geographical Sub Area 3. Southern Alboran Sea. Morocco.

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The trawler fleet targeting red mullet in GSA 3 consists of 120 trawlers. Trawlers' catches are mainly landed in three harbours: Nador (62.6%), Al Hoceima (23.2%) and M'diq (14.2%). Over the years 2000-2009 the landings of *M. barbatus* showed a tendency to stabilize around 350 tons with a pick in 2005 (795 tons). The average landing per year amounts at around 405 tons.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The assessment was performed in the GFCM WG on Demersal Fish which took place in October 2010. The length-frequency data were derived from the landings of trawl fleets of Nador and Al-Hoceima harbours over the years 2004-2009. VIT was used to perform VPA and yield per recruit (Y/R) analysis.

REFERENCE POINTS: The GFCM SAC 2011 proposed the following reference points as a basis for management advice:

$F_{0.1}$= 0.55

F_{max} = 0.56

STOCK STATUS: Based on the report of the GFCM WG on Demersal Fish, GFCM SAC 2011 assessed the stock to be subject to overfishing as fishing mortality (F=0.68) exceeds the proposed values of $F_{0.1}$ and F_{max}. The fishing mortality, mainly applied in the 4 last years, and the abundance index indicate that the stock is progressively decreasing.

RECENT MANAGEMENT ADVICE: GFCM-SAC 2011 recommended to reduce the fishing mortality and to control the trawling ban in coastal waters.

STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF agrees with the recommendations of the GCFM SAC.

7.30 Red mullet (*Mullus barbatus*) in Geographical Sub area 5. Balearic Island, Spain

No additional information on this stock was available to the STECF since 2012, hence the text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The two species of red mullet inhabiting the Mediterranean, *Mullus surmuletus* and *M. barbatus*, are present in the GSA 5. However, *M. surmuletus* predominates in this area where the species is targeted by both the artisanal and trawl fleet working along the continental shelf. On the contrary, *M. barbatus* is caught as a by-catch species by trawlers operating mainly on the deep shelf. In the Balearic Islands, *M. surmuletus* and *M. barbatus* represent about 80% and 20% of the total red mullet catches respectively. During the 2000-2009 period, the landings of *M. barbatus* from Mallorca have ranged between 10.5 and 27.8 tons.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most updated assessment of the stock of *Mullus barbatus* in GSA 5 was provided by GFCM WG on Demersal Fish in October 2010 using data from both the trawl and the small-scale fishery on a time series covering ten years (2000-2009), from all fishing ports of Mallorca Island. The assessment has been carried out applying tuned VPA (Extended Survivor Analysis, XSA). XSA tuning were performed using abundance indices from MEDITS surveys (N/km^2) during 2001–2009 around the Balearic Islands.

REFERENCE POINTS: GFCM SAC proposes the following reference points as a basis for management advice:

$F_{0.1}$=0.33

Fmax = 0.53

SB = 50.3 tons

SSB = 30.2 tons

STOCK STATUS: Both SB and SSB showed a clear decrease from 2000 to 2003; SB decreased from 75 to 45 tons and SSB from 45 to 25 tons. Subsequently, both parameters remained rather constant or even increased slightly until 2007. However, SB showed a marked decreasing trend between 2007 and 2009, which was also followed by SSB; in both cases the lowest historical values were obtained in the last assessed year (SB = 34 tons; SSB = 22 tons). Both values are lower that the respective reference points given by GFCM SAC. In spite of this, SSB remained constant between 55% and 65% of the SB throughout the entire time series.

With the exception of 2001, recruitment remained rather constant between 1.3 and $1.5 \cdot 10^6$ during 2002-2006. Since then, however, the number of recruits has decreased progressively to the point that the lowest historical values were reached during 2008-2009.

Fishing mortality ranged between 0.7 and 1.7 during the entire series and it is noticeable the abrupt decrease in 2003 coinciding with the lowest historical landings. Although fishing mortality has decreased progressively from 2004 to 2007, it has increased during the last two years. The vector of fishing mortality by age depictures a typical selection curve and shows that the highest fishing exploitation affects age groups 2 and 3 and while there is no exploitation of the recruits (age 0). The current F_{ref} given by the GFM SAC ($F_{ref\ 0\text{-}4}$ = 0.82) exceeds the proposed $F_{0.1}$ and Fmax reference points, indicating that red mullet in GSA 5 is subject to overfishing.

RECENT MANAGEMENT ADVICE: Based on the report of the GFCM WG on Demersal Fish, GFCM SAC advised to reduce the fishing effort by 40% to 60% through reducing the effort activity and improving the selection pattern of the fishery.

STECF COMMENTS: STECF agrees the advice of the GFCM SAC.

STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

7.31 Red mullet (*Mullus barbatus*) in Geographical Sub area 6. Northern Spain

No additional information on this stock was available to the STECF since 2012, hence the text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Red mullet is one of the main target species for the trawl fisheries carried out by around 723 vessels in GSA 06 with an average of 47 TRB, 58 GT and 297 HP. Some of these units (smaller vessels) operate almost exclusively on the continental shelf (targeting among other species red mullet), whilst others (bigger vessels) operate almost exclusively on the continental slope (targeting decapods) and the rest can operate indistinctly on the continental shelf and slope, depending on the season, the weather conditions and also the economic factors (e.g. landings price). The percentage of these trawl fleet segments has been estimated around 30, 40 and 30% of the boats, respectively. According to Spanish DCF, landings of red mullet increased considerably between the 70s and 1982, and from then a decreasing trend has been observed. According to the analysis carried out with data submitted in 2011, trawl accounts for the majority (98%) of the total landings of red mullet. The remaining 2% is taken by the gillnetters (small-scale or artisanal fisheries). The largest proportion of the total red mullet catch is taken by trawlers in the fourth quarter, coinciding with the recruitment of this species to the fishing grounds. The exploitation of small individuals (recruitment fishery) by trawlers in autumn occurs since decades (stated already by Demestre et al, 1997; Sánchez et al., 1995; Martín et al., 1999; Lloret and Lleonart, 2002). Since 2002 annual landings fluctuated around 1,000 t and were by individuals of age 1+ (adults). Spawning takes place in late spring and recruitment to the fishery occurs in early autumn, when juveniles are heavily exploited by trawlers.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. A recent assessment was undertaken at the GFCM WG on

Demersal Fish in October 2011. The assessment was performed over the period 1998-2010 using official landings and data from trawl surveys.

REFERENCE POINTS: GFCM SAC 2011 proposed the following reference points as a basis for management advice:

$F_{0.1}$ = 0.20.

STOCK STATUS: Based on the report of the GFCM WG on Demersal Fish, GFCM SAC assessed the stock in overfishing being the estimated current value of F (F = 0.72) higher that the $F_{0.1}$ reference point.

RECENT MANAGEMENT ADVICE: The GFCM-SAC 2011 advises to decrease the fishing mortality by 70%. GFCM-SAC also advises a more effective control in shelf areas above 50 m depth to reduce the catch of small individuals under the minimum legal size. GFCM-SAC also highlighted that the use of 40 mm square mesh in the cod-end should improve trawl exploitation pattern and Y/R by 24%.

STECF COMMENTS: STECF agrees with the advice from the GFCM-SAC.

STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

7.32 Red mullet (*Mullus barbatus*) in Geographical Sub Area 7. Gulf of Lion. France

FISHERIES: In the Gulf of Lions (GFCM-GSA07), red mullet (*Mullus barbatus*) is exploited by both French and Spanish trawlers. Around 120 boats are involved in this fishery. According to official statistics, total annual landings for the period 2004-2010 have oscillated around a mean value of 157 tons. Most boats and catches correspond to the French trawling fleet (80% and 85% respectively). In 2011 catches reached 170 tons for France and 28 tons for Spain. In French and Spanish landings, modal length is 14 cm. In GSA 7, the trawl fishery is a multi-specific fishery. Length at first capture is about 7 cm (6 cm for 2011). Catch is mainly composed by individuals of age 0 and 1, while the oldest age class (5+ group) is poorly represented. Catch rates showed oscillations, with an increase in the last year (2010).

French and Spanish trawl fisheries developed along the continental shelf of the Gulf of Lions are multi-specific fisheries. In addition to *M. barbatus*, the following species can be considered as important in landings: *Mullus surmuletus*, *Merluccius merluccius*, *Pagellus acarne*, *Pagellus erythrinus*, *Trachurus* spp, *Scyliorhinus canicula*, *Trachinus* spp, *Triglidae*, *Scorpaena* spp, *Octopus vulgaris*, *Eledone* spp, *Lophius* spp.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most updated assesement was provided by the GFCM WG on demersal fish in November 2012 using data coming from DCF (size distribution of catches for French and Spanish trawlers, landings) for the period 2004-2011. The Extended Survivor Analysis (XSA), method calibrated with MEDITS abundance indices for 2004-2011 was the methodological approach employed. No discards were included.

REFERENCE POINTS: The GFCM SAC proposes the following reference points as a basis for management advice:

$F_{0.1}$ = 0.5

STOCK STATUS: Based on the report of the GFCM WG on Demersal Fish, GFCM SAC assessed the stock to be subject to overfishing and at intermediate level of abundance (current F = 1.26).

RECENT MANAGEMENT ADVICE: The GFCM SAC 2012 advised to reduce fishing mortality by means of effort and catch limitations.

STECF COMMENTS: STECF agrees with the advice from the GFCM SAC.

STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock

should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

7.33 Red mullet (*Mullus barbatus*) in Geographical Sub Area 9. Ligurian and northern Tyrrhenian Sea

FISHERIES: *Mullus barbatus is* among the most commercially valuable species in GSA9. The species is mainly exploited by bottom trawlers, and the catches derived from artisanal fisheries are negligible. *Mullus barbatus* catch rates are much higher in late summer-autumn. About 200 trawlers and a relatively small but variable number of artisanal vessels exploit the species in the GSA9. Annual landings, mostly proceeding from trawling, ranged from 500 to 1100 tons in the last years. The landings in 2010 were reported to amount to 875 tons. The length of first capture is about 7 cm. The catch is mainly composed by age 0+ individuals while the older age classes are poorly represented.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008 the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. A recent assessment was undertaken by the Expert Working Group on Assessment of Mediterranean Sea stocks - part 2 (STECF EWG 12-19) and reviewed by the STECF during the plenary meeting held from 8 to 12 April, 2013 in Brussels, Belgium.

REFERENCE POINTS: STECF proposed the following reference points as a basis for management advice:

$F_{MSY} = F_{0.1} = 0.61$

STOCK STATUS: As the current fishing mortality F2011 of 0.68 exceeds the proposed reference point, STECF EWG 12-19 considers the stock as being subject to overfishing.

RECENT MANAGEMENT ADVICE: STECF advises that the fishing mortality should be reduced until or below the proposed $F_{MSY} = F_{0.1}$ (F= 0.61) reference point.

STECF COMMENTS: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

7.34 Red mullet (*Mullus barbatus*) in Geographical Sub Area 10. Southern and central Tyrrhenian

No additional information on this stock was available to the STECF since 2012, hence the text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Red mullet is an important species in the area, targeted by trawlers and small scale fisheries using mainly gillnet and trammel nets. Fishing grounds are located along the coasts of the whole GSA within the continental shelves. Available landing data collected under the DCF framework range from 513 tons of 2004 to 176 tons in 2010, the latter being the lowest value registered. Most part of the landings of red mullet were from trawlers up to 2006, while since 2007 the level of catches of trawlers is similar to that of the other métier grouped together, to which the maximum contribution is given by gillnet (GNS) and trammel net (GTR). Since 2008 the catches of both métier are decreasing.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most updated assessment was provided by the STECF-SGMED-11-20. The stock is assessed by a VPA (VIT-model) using the pseudocohort approach for each year (2006, 2007, 2008, 2009, 2010). A sex combined analysis was carried out. A constant natural mortality M (Alagaraja) = 0.61 was adopted, because this value was close to 0.70, an estimate reported for a very slightly exploited area in the Castellammare Gulf (northern Sicily coasts) within the GSA. The setting of the proportion of mature females was 0.16 at age 0, 0.92 at age 1 and 1 at age 2. Management reference points were estimated by an Yield per Recruit analysis.

REFERENCE POINTS: STECF proposes the following reference points as a basis for management advice:

$F_{0.1} \leq 0.41$ (F_{MSY} proxy)

STOCK STATUS: Based on the report of the STECF-SGMED-11-20 STECF assessed the stock to be overfished during 2006-2009 as the estimated F values (F 2006=1.3, F 2007=0.76, F 2008=1.38; F 2009=0.98, F 2010=1.01) are higher than the proposed $F_{0.1}$ (0.41). In the absence of proposed and agreed precautionary management reference points STECF-SGMED-11-20 was unable to fully evaluate the state of the SSB. However, survey indices indicate a variable pattern of biomass with the recent values amongst the lowest observed, except for 2007 and a decrease pattern of biomass indices. As regards the state of the juvenile (recruits), in 2007 and 2009 the MEDITS surveys indicated high indices of recruit abundance, while in 2010 the index was among the lowest observed in the time series..

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no further comments.

7.35 Red mullet (*Mullus barbatus*) in Geographical Sub Area 11. Sardinian Sea

FISHERIES: *Mullus barbatus,* red mullet, is exploited in all trawlable areas around Sardinia and is one of the most important target species showing the highest landings on shelf bottoms, together with the cephalopod *Octopus vulgaris*. Landings come both from bottom trawl vessels and small artisanal fishery. Small and adults catches come from a mixed fishery, as in the GSA11 there is not a specific fishery target on red mullet. At the end of 2006 the trawl fleet of GSA 11 accounted for 157 vessels (11.7% of the overall Sardinian fishery fleet). From 1994 to 2004 a general increase in the number of vessels. For the entire GSA a decrease of 20% for the smaller boats (<30 GRT), which principally exploit this species, was also observed. In the latest years the effort showed a peak in 2005, then continuously decreased and a dropped in 2008 and 2009. Since 2004 the total annual landings varied between 225 and 354 t, with a consistent drop (-22% of the 6 years mean) in 2009. During 2005-2011 annual catches have a mean of 268.7 t and ranged between 171 t in 2011 and 346 t in 2007. Over the period 2005-2011, SSB highest stock size was observed in 2009 (300 t), and it rapidly decreased to a minimum around 150 t (2011). The landings were mainly from demersal otter trawls (catches from other gears are less than 5% of the total).

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most updated assessment was provided by the STECF-EWG-12-19. The present assessment was derived by both indirect and surveys data (MEDITS, GRUND). By using XSA and SURBA the status stock was assessed considering the same set of parameters reported below. Vectors of natural mortality calculated from ProdBiom were used. Yield per Recruit (Y/R) Analysis was performed by means of the Yield software.

REFERENCE POINTS: STECF-EWG 12-19 proposes the following reference point as a basis for management advice $F_{0.1} = 0.291$ as proxy of F_{MSY}.

STOCK STATUS: In the three methods used (XSA, SURBA, YPR), the values of the most recent Fbar range from 0.8 to 1.5 and the values of $F_{0.1}$ as a proxy of F_{MSY} is 0.29. Taking into account the results obtained by the XSA analysis (current F is around 0.97), the stock should be considered as exploited unsustainably. Since any biomass reference proposed or agreed, EWG 12-19 is unable to fully evaluate the state of the stock size in respect to these. STECF EWG 12-19 could not estimate the absolute levels of stock abundance or of the recruitment. MEDITS abundance (n/km²) and biomass (kg/km²) indices do not indicate any significant trends.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no further comments.

7.36 Red mullet (*Mullus barbatus*) in Geographical Sub Area 17. Adriatic Sea

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The fishery for red mullet is one of the most important in the GSA 17. Fishing grounds correspond to the distribution of the stock particularly within 100 m depth. The allocation of fishing effort depends on the different life cycles of this species and the different concentration and distribution in GSA 17.

The Italian catch of red mulled in GSA 17 is obtained mostly by demersal otter trawl, but other gears are participating at the fishery for a very minor fraction of the catch. Demersal trawl landings ranged between 77% to 98.6% in the years 2002-2007.

Catches in recent years were reported at a level of 3,098 t in 2002; 3,111 t in 2003; 3,884 in 2004; 3,696 in 2005 and 3,226 in 2006. In 2007, red mullet catches accounted for 3,425 t.

Total landings remained above 3,500 tons between 2006-2008, than decreased to 2,000 tons in 2010 and then in 2011 increased again to 2,692 tons. Discard is high, about 20% of the total catches.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The STECF-EWG 12-10 carried out XSA analysis on DCF data of commercial landings (2006-2011), calibrated with fishery independent survey abundance indices (MEDITS). Landings and discard at age data were obtained from the Italian fleet within the DCF. The discard is high and it represents an important percentage on the overall catches. MEDITS abundance indices in number at length were transformed in number at age using age length keys (ALK) obtained from otolith reading of commercial samples. The most updated assessment was provided by GFCM WG on demersal fish in November 2012 but this was considered preliminary and not endorsed by GFCM-SAC.

REFERENCE POINTS: STECF proposed $F_{0.1} \leqslant 0.36$ (Fmsy proxy) as a limit management reference point consistent with high long term yields.

STOCK STATUS: Taking into account the results obtained by the XSA analysis (current F around 0.71), the STECF considers the stock to be exploited unsustainably.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF notes that the most recent assessment does not include catch data from the Croatian fleet and as such the absolute estimate of stock abundance and biomass is likely to be underestimated. Nevertheless the estimate for $F_{0.1}$ is likely to be relatively robust.

7.37 Red mullet (*Mullus barbatus*) in Geographical Sub Area 19. Western Ionian Sea

FISHERIES: *Mullus barbatus* is among the species with high commercial value. The highest trawl fishing pressure occurs along the Calabrian coast while the presence of rocky bottoms on the shelf along the Apulian coast prevents the fishing by trawling in this sector. During 2006-2011 annual catches ranged between 727 t in 2006 and 360 t in 2008. In 2011 total species' catches were 474 tons. The main components of the catches were age classes 0 and 1. Highest catches corresponded to age 0 in 2009 and 2011, and age 1 in 2010

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. An XSA (Extended Survivor analysis) assessment was performed using DCF catch data during STECF EWG 12-19. Over 2006-2011, SSB highest stock size was observed in 2006 (1125 t), and it sharply decreased to 715 t in 2007, a stock size similar to that observed in 2011. No baseline for comparison of the current values against historic SSB is available. In the absence of proposed or agreed reference points, STECF is unable to fully evaluate the state of the spawning stock in comparison to these.

REFERENCE POINTS: STECF proposes $F_{0.1(\text{mean } 2009\text{-}2011)} = 0.3$ as proxy of F_{MSY} and as exploitation reference point consistent with high long term yields.

STOCK STATUS: STECF concludes that the stock is exploited unsustainably.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no further comments.

7.38 Red mullet (*Mullus barbatus*) in Geographical Sub Area 25. Cyprus

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: *Mullus barbatus* Red mullet in GSA 25 is exploited with other demersal species by the bottom otter trawlers and the artisanal fleet using trammel nets. The main species caught with *M. barbatus* are: *Spicara* spp. (mostly *S. smaris*), *Boops boops*, *M. surmuletus*, *Pagellus erythrinus* and cephalopods (*Octopus vulgaris*, *Loligo vulgaris* and *Sepia officinalis*). The artisanal (inshore) fishery catches also relatively large quantities of *Diplodus* spp, *Sparisoma cretense* and *Siganus* spp. The average percentage of *M. barbatus* in the overall landings (2007 <40 T) of the bottom trawl (4 vessels) and artisanal fishery, for the period 2005-2008, was 7% and 2% respectively. For the assessment period (2005-2010) the average landings by each fleet was around 15-16 tons. The most exploited age classes by both fleets are the age classes 1 and 2.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most updated assessment was provided by the GFCM-SAC and WG on demersal in October 2011. Separable VPA for the period 2005–2010 and Y/R analysis were employed.

REFERENCE POINTS: GFCM SAC recommends $F_{0.1}$ of 0.33 as an approximation of F_{msy}.

STOCK STATUS: GFCM-SAC 2010 considers the stock in overfishing state, considering that the current fishing mortality should be reduced by 24% (based on 2010 Y/R analysis) or by 28% (based on 2009 Y/R analysis) for reaching the $F_{0.1}$ reference point. The stock abundance seems to be in low levels, on the basis of the available time series and considering the decrease in official landings and the LPUE of the stock throughout the years.

RECENT MANAGEMENT ADVICE: Fishing mortality from both fleets should be reduced. This could be achieved with the following measures that have been recently implemented/will be implemented in the near future in Cyprus:

- Reduction on the number of licensed trawlers: From November 2011 the licensed bottom trawlers fishing in territorial waters will be restricted to 2 (50% reduction). This measure has been included in the 2011 Cyprus Management Plan for Bottom Trawlers fishing in territorial waters.
- Reduction on the number of licensed small scale artisanal boats: DFMR is currently evaluating the possibility of reducing the number of licensed vessels in the artisanal fishery.
- Increase of the selectivity of gears targeting the stock: - From June 2010 the 40mm diamond shape trawl net was replaced by a diamond meshed net of 50mm at the cod end, while from November 2011 the diamond meshed net of 50mm will be enforced as minimum mesh size in any part of the net.- From March 2011 the minimum mesh size of all passive nets was increased from 32 mm to 38 mm.
- New measure included in the 2011 Management Plan for trawlers: From November 2011 a restriction of 2 areas from fishing with trawl nets will be applied, on a rotational basis (northwest part of Cyprus from 8 November – 15 February, southeastern part from 16 February – 31 May every year).

STECF COMMENTS: STECF agrees with the advice from the GFCM-SAC.

7.39 European hake (*Merluccius merluccius*) in Geographical Sub Area 1. Northern Alboran Sea

FISHERIES: European hake is one of most important demersal target species of the Mediterranean fishing fleets, exploited in GSA01 mainly by trawlers (95% landings) on the shelf and slope, and by small-scale fisheries using gillnets (3%) and long lines (2%) on the shelf (average 2009-2012). The trawling fleet in the GSA01 area comprised an average of 228 boats, averaging 34.9 GRT and 175.8 HP. The port of Almeria had the largest number of boats with an average of 40 units. In 2012 the annual landings of this species was 460.28 tons in the whole area.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessments available to STECF were carried out by the GFCM demersal working group (November 2012) and the STECF-EWG 13-09. The assessment was endorsed by the GFCM SAC and the STECF.

REFERENCE POINTS: GFCM SAC and STECF proposes the following reference points as a basis for management advice:

$F_{msy} \leq 0.28$ ($F_{0.1}$ basis)

$F_{max} = 0.39$

$F_{40\%SSB} = 0.27$

$F_{30\%SSB} = 0.36$

STOCK STATUS: The stock is considered to be overexploited since current F (1.5) exceeds the $F_{0.1}$ reference point (0.28); the fishery is being exploited at above a level which is believed to be sustainable in the long term, with no potential room for further expansion and a higher risk of stock depletion/collapse. STECF-EWG 13-09 advised that by comparing $F_{0.1}$ (ages 1-2 =0.22) and Fmax against Fbar1-2 over 2008-2012 (1.61) the stock was exploited unsustainably. The continued low abundance of adult fish in the surveyed population and landings indicate a very high exploitation rate far in excess of those achieving high yields and low risk of fisheries collapse.

RECENT MANAGEMENT ADVICE: GFCM SAC advises that taking into account the estimated reference points MSY proxies (F0.1, F40%SSB and F30%SSB), a reduction of the current fishing mortality is recommended by reducing the effort activity and improving the selection pattern of the fishery. STECF further considers that the relevant fleets' effort and/or catches to be reduced until fishing mortality is below or at the proposed level F01, in order to avoid future loss in stock productivity and landings.

STECF COMMENTS: STECF agrees with the advice given by GFCM SAC.

STECF notes that current F is estimated to be well above the proposed FMSY reference point and continued fishing at such a level poses a serious risk to the productivity of the stock and the future viability of the fishery.

STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

7.40 European hake (*Merluccius merluccius*) in Geographical Sub Area 3. Southern Alboran Sea

No additional information on this stock was available to the STECF since 2012, hence the text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: In GSA 03 hake is caught by trawlers which exploit a mixed-species fish assemblage. In 2009 the overall trawl fleet of Morocco consisted of 121 vessels. In the period 1999-2009 the hake catches ranged from 30 to 596 tons, with an increasing trend until 2005-2006 and a decrease in the subsequent years. In 2009 they amounted to 198 tons. Other important species in the catches are *Pagellus acarne*, *Mullus spp.*, *Boops boops*, *Gadus poutassou*, *Octopus vulgaris*, and *Sepia* spp.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The data used in this assessment is obtained by biological sampling for length frequencies of *Merluccius merluccius* landed during 2000-2009, in the GSA 03 corresponding to the Moroccan Mediterranean waters at the level of the ports of Nador and Al hoceima. The length cohort analysis approach within VIT was applied.

REFERENCE POINTS: GFCM SAC 2010 proposes estimated F parameters:

$F_{0.1} =$ 0.61

$F_{max} =$ 0.75

$F_{CURRENT}$ = 0.90

STOCK STATUS: Based on the report of the GFCM 2010 the stock was considered overexploited.

RECENT MANAGEMENT ADVICE: The GFCM SAC 2010 recommended reducing the fishing mortality and controlling the illegal trawl into the coastal waters and reducing and limiting the moving of trawlers from Atlantic to the Mediterranean.

STECF COMMENTS: STECF agrees with the advice from the GFCM SAC.

STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

7.41 European hake (*Merluccius merluccius*) in Geographical Sub Area 5. Balearic Islands

FISHERIES: In the Balearic Islands (GSA 5), commercial trawlers employ up to four different fishing tactics (Palmer et al. 2009), which are associated with the shallow and deep continental shelf, and the upper and middle continental slope (Guijarro & Massutí 2006; Ordines et al. 2006). Vessels mainly target striped red mullet (*Mullus sumuletus*) and European hake (*Merluccius merluccius*) on the shallow and deep shelf respectively. However, these two target species are caught along with a large variety of fish and cephalopod species. The European hake, it is also an important by-catch in the upper slope and, in a lower level, in the middle slope. Annual landings of hake in 2011 was about 89.7 tons (36 trawlers).

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessments available to STECF was carried out in 2012 at the GFCM demersal working group on stock assessment and endorsed by GFCM SAC.

REFERENCE POINTS: GFCM SAC proposes the following reference points as a basis for management advice:

$F_{msy} \leq 0.17$ ($F_{0.1}$ basis)

STOCK STATUS: GFCM SAC concluded that the stock is subject to overfishing since current F (1.57) exceeds the $F_{0.1}$ reference point (0.17).

RECENT MANAGEMENT ADVICE: GFCM SAC advises to reduce fishing mortality. The use of the information from the vessel monitoring system will help improve the knowledge about the spatial distribution of the fishing effort.

STECF COMMENTS: STECF agrees with the advice given by GFCM SAC.

STECF notes that current F is estimated to be well above the proposed FMSY reference point and continued fishing at such a level poses a serious risk to the productivity of the stock and the future viability of the fishery.

STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

7.42 European hake (*Merluccius merluccius*) in Geographical Sub area 6. Northern Spain

The most recent assessment of this stock was undertaken in 2012, hence the text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Exploitation is based on very young age classes, mainly 0 and 1 year old individuals, with immature fish dominating the landings. In 2011 the annual landings of this species were around 4,000 tons in the whole GSA 06 (3,278 tons in 2010).

Hake (*Merluccius merluccius*) is one of the most important target species for the trawl fisheries carried out by around 567 vessels in the Northern Spain (GSA 06) with an average of 47 TRB, 58 GT and 297 HP.

Some of these units (smaller vessels) operate almost exclusively on the continental shelf (targeted at red mullet, octopus, hake and sea breams), others (bigger vessels) operate almost exclusively on the continental slope (targeting decapod crustaceans) and the rest can operate indistinctly on the continental shelf and slope fishing grounds, depending on the season, the weather conditions and also economic factors (e.g. landings price). The percentage of these trawl fleet segments has been estimated around 30, 40 and 30% of the boats, respectively. In 2002-2010, the annual landings of this species, which are mainly composed by juveniles living on the continental shelf, were around 4,000 t (3,254 t in 2011) in the whole GSA.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. STECF notes that an updated assessment was conducted in 2012 at the GFCM demersal working group and endorsed by GFCM SAC.

REFERENCE POINTS: GFCM SAC 2012 proposes the following reference points as a basis for management advice:

$F_{0.1}$ = 0.20

$F_{CURRENT}$ = 2.0

GFCM SAC proposes F_{msy} = 0.20 (F0.1 basis) as management reference point.

STOCK STATUS: Based on the report of the GFCM working group on demersal species (SCSA) 2012 exploitation is based on very young age classes, mainly 0 and 1 year old individuals, with immature fraction dominating the landings. Recruitment shows a continuous decreasing trend, with a little recovery in 2008, decreasing again thereafter. Starting from a value of 550 million in 1999 slump to only 57 million in 2011, with an average of 350 million for the whole period. On the other hand, SSB shows a continuous increasing trend along the period, doubling from 800 tons in 1999 to 1.550 tons in 2011. The SSB represents only a 13 % of the total biomass in average. It shows however an increase since 2005 suggesting a gradual stock recovery. The reproductive fraction of the population is caught by longline and gillnet. The increase of the gillnet and long lining effort may create a trouble for the spawning stock biomass considering that a major part of spawners are caught by these passive fishing gears.
Landings and fishing mortality ($Fbar_{0-3}$) show a similar pattern to that for recruitment, decreasing slightly but continuously along the time series analysed, with an average of 4,122 t. for landings and an Fbar = 2.1 for the 0 to 3 age classes.
GFCM SAC 2012 concludes that fishery is being exploited at above a level which is believed to be sustainable in the long term (overfishing), with no potential room for further expansion and a higher risk of stock depletion/collapse.

RECENT MANAGEMENT ADVICE: GFCM SAC advises that a reduction in trawling fishing effort, along with a reduction of gillnet and long lining effort is recommended in the context of a multi-annual management plan taking into account the multi-species landings of the trawl fishery.

STECF COMMENTS: STECF agrees with the advice from the GFCM-SAC. STECF notes that current F is estimated to be well above the proposed FMSY reference point and continued fishing at such a level poses a serious risk to the productivity of the stock and the future viability of the fishery.

Furthermore, if the apparent decline in recruitment persists, continued catches at the recent level of the order of 4,000 t are likely to pose a serious risk of stock collapse.

7.43 European hake (*Merluccius merluccius*) in Geographical Sub area 7. Gulf of Lions.

FISHERIES: Hake (*Merluccius merluccius*) is one of the most important demersal target species for the commercial fisheries in the Gulf of Lions (GFCM-GSA07). In this area, hake is exploited by French trawlers, French gillnetters, Spanish trawlers and Spanish long-liners. Around 240 boats are involved in this fishery and, according to official statistics, the total annual landings for the period 1998-2012 have oscillated around an average value of 2030 tons (1123 tons in 2012). In 2009, because of the large decline of small pelagic fish species in the area, the trawlers fishing small pelagic have diverted their effort on demersal species. Since 2011, the fishing capacity of French trawlers in GSA 07 has decreased by nearly 30%.

The French trawler fleet is the largest in number of boats and catch (42 and 72%, respectively). The second largest fleet is the French gillnetters (~41 and 14% respectively, range 13-86 cm TL and average size 39 cm TL), followed by the Spanish trawlers (~11 and 8%, respectively, range 5-88 cm TL, and average size 24 cm TL), and the Spanish long-liners (~6 and 6%, respectively, range 22-96 cm TL and average size 52 cm TL).

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent STECF assessment was provided by its expert working group in 2013 (EWG 13-09).

REFERENCE POINTS: STECF proposes the following reference points as a basis for management advice:

$F_{MSY} = F_{0.1} =$ 0.11

$F_{CURRENT} =$ 1.83

STECF proposes F_{MSY}=0.11 ($F_{0.1}$ basis) as management reference point.

STOCK STATUS: STECF concluded that the stock is exploited unsustainably. The SSB shows a decreasing trend in 1998-2012. The highest recruitment values observed over the period are in 1998, 2002-2003 and 2007. Since 2007, the recruitment follows a decreasing trend and is currently at the lowest level observed.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF notes that if the apparent declines in SSB and recruitment persist, continued catches at the recent level of the order of 1,000 t -2,000 t are likely to pose a serious risk of stock collapse.

7.44 European hake (*Merluccius merluccius*) in Geographical Sub area 9. Northern Tyrrhenian

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Hake is the demersal species providing the highest landings and incomes in the GSA 09. About 60% of hake landings are due to bottom trawl vessels; the remaining fraction is caught by artisanal vessels using set nets, in particular gillnets. The trawl fleet of GSA 09 at the end of 2009 accounted for 339 vessels. The main trawl fleets of GSA 09 are present in the following continental harbours: Viareggio, Livorno, Porto Santo Stefano (Tuscany), Fiumicino, Terracina, Gaeta (Latium). The artisanal fleets, according to the 2009 data, accounted for 1,296 vessels that operate in several harbours along the continental and insular coasts. A fleet of about 50 vessels, exploits hake using gillnets. The fishing capacity of the GSA 09 has shown in these last 20 years a progressive decrease; from 1996 to 2010 the number of bottom trawlers of GSA9 decreased of about 30%. Consequently also fishing effort is presumably decreased in this period. In the last five years the total landings of hake of GSA 09 fluctuated between 1100 (2004) to about 2300 tons, with 1484 tons in 2010. Trawl landings are traditionally dominated by small sized specimens; they are basically composed by age groups 0 and 1. Gillnet fishery lands mostly age 2 -5 fish. High quantities of small size hake are routinely discarded, especially in summer and on fishing grounds located near the main nursery areas of the species. About 690 tons of hake discards were estimated in 2009, and 130 tons in 2010 for the trawl fishery in GSA 09 depending on the dimension of the annual recruitment. Due to the introduction of the EU Regulations on minimum sizes, a progressive increase of the size at which 50% of the specimens caught was discarded has been observed in the last ten years.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG 10-03 and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The STECF EWG 11-12 has provided the most recent advice, which was endorsed by GFCM SAC.

REFERENCE POINTS: STECF and GFCM SAC propose the following reference points as a basis for management advice:

F_{MSY} = 0.2 ($F_{0.1}$ basis) as a management reference point.

F_{max} = 0.35

STOCK STATUS: STECF and GFCM SAC classified the stock as being subject to overfishing since current F (1.5-2) exceeds F_{MSY}.

RECENT MANAGEMENT ADVICE: GFCM SAC and STECF advise the relevant fisheries' effort to be reduced until fishing mortality is below or at the proposed level F_{msy}. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF notes that current F is estimated to be well above the proposed FMSY reference point and continued fishing at such a level poses a serious risk to the productivity of the stock and the future viability of the fishery.

7.45 European hake (*Merluccius merluccius*) in Geographical Sub Area 10. Southern and Central Tyrrhenian Sea.

FISHERIES: *M. merluccius* is with red mullet and deep-water pink shrimp a key species of fishing assemblages in the central-southern Tyrrhenian Sea. Fishing grounds are located on the soft bottoms of continental shelves and the upper part of continental slope along the coasts of the whole GSA. Catches from trawlers are from a depth range between 50-60 and 500 m and hake occurs with other important commercial species as *Illex coindetii, M. barbatus, P. longirostris, Eledone spp., Todaropsis eblanae, Lophius spp., Pagellus spp., P. blennoides, N. norvegicus*. The landings fluctuates around 1,100 and 1,600 tons with the maximum in 2006 and the minimum in 2012 (1082 tons). Most part of the landings of hake is from trawlers and nets (GNS and GTR), however the catches of the demersal long-line fishery are also important.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent STECF assessment is provided by in 2013 by EWG 13-09.

REFERENCE POINTS: STECF proposes the following reference points as a basis for management advice:

F_{MSY} = F0.1 ≤ 0.14

F CURRENT = 0.96

STOCK STATUS: The stock appeared to be subject to overfishing in 2006-2012 and a considerable reduction in fishing mortality is necessary to approach the F_{MSY} reference point.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF notes that current F is estimated to be well above the proposed FMSY reference point and continued fishing at such a level poses a serious risk to the productivity of the stock and the future viability of the fishery.

7.46 European hake (*Merluccius merluccius*) in Geographical Sub Area 11. Sardinian Sea

An attempt to assess the stock was done during STECF-EWG 13-09, however due to data limitation, the assessment has not been accepted.

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Hake is exploited in all trawlable areas around Sardinia and is one of the most important target species showing the highest landings. GSA 11 hake landings come almost entirely from bottom trawl vessels, whereas catches from trammel nets or longlines are negligible and do not belong to a target fishery. Small hakes are commonly caught from shallow waters about 50 m to 300 m depth, whereas adults reach the maximum depths exploited by the fleet (800 m). Both juvenile and adult catches come from a mixed fishery, as in the GSA 11 there is not a specific fishery for hake. The most important by catch species are horned octopus (*Eledone*

cirrhosa), squids (*Illex coindetii*), poor cod (*Trisopterus minutus capelanus*) at depths less than 350 m and *Chlorophtalmus agassizii*, greater forkbeard (*Phycis blennoides*) and deep-water pink shrimp (*Parapenaeus longirostris*) caught at greater depth. At the end of 2006 the trawl fleet of GSA 11 was composed by 157 vessels (11.7% of the overall Sardinian fishing fleet). In the last three years effort was almost stable. The total landings of hake of GSA 11 in the last 7 years decreased from 866 t (2005) to 268 t in 2009 and slightly increased in 2011 (389 t).

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most update assessment was undertaken in 2012 by STECF EWG 12-10.

REFERENCE POINTS: STECF proposes the following reference points as a basis for management advice:

$F_{MSY} = F_{0.1} =$ 0.30

$F_{CURRENT} =$ 1.16

STOCK STATUS: STECF concluded that the stock is exploited unsustainably.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF notes that current F is estimated to be well above the proposed FMSY reference point and continued fishing at such a level poses a serious risk to the productivity of the stock and the future viability of the fishery.

7.47 European hake (*Merluccius merluccius*) in Geographical Sub Area 15 and 16. Malta Island and Strait of Sicily.

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Although hake is not a target of a specific fishery such as deep water pink shrimp and striped mullet, it is the third species in terms of biomass of Italian yield in GSA 16. The stock is exploited by a fleet of Italian, Maltese and Tunisian trawlers and gillnetters. In 2011 the Italian fleet landed about 65% of the total annual landing (1672 tons). Hake is caught by trawlers in a wide depth range (50-500 m) together with other important species such as *Nephrops norvegicus*, *Parapenaeus longirostris*, *Aristaeomorpha foliacea*, *Eledone* spp., *Illex coindetii, Lophius* spp., *Mullus* spp., *Pagellus* spp., *Zeus faber, Raja* spp among others.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most up to date stock assessment for hake in GSA 15-16 was done by STECF SGMED 10-03, however the assessment is based only on Sicilian and Maltese data.
In 2012 an assessment covering a wider area (GSA 12-13-14-15-16) was attempted by GFCM working group on demersal species. This assessment was however considered as preliminary and not endorsed by the GFCM SAC.

REFERENCE POINTS: STECF proposes the following reference points as a basis for management advice:

$F_{MSY} = F_{0.1} =$ 0.15

$F_{CURRENT} =$ 1.12

STECF proposes $F_{MSY} = 0.15$ ($F_{0.1}$ basis) as management reference point.

STOCK STATUS: STECF concludes that the stock is subject to overfishing.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF notes that current F is estimated to be well above the proposed FMSY reference point and continued fishing at such a level poses a serious risk to the productivity of the stock and the future viability of the fishery.

7.48 European hake (*Merluccius merluccius*) in Geographical Sub Area 17 Adriatic Sea.

FISHERIES: The hake fishery is one of the most important in GSA 17. In GSA 17 hake is a target species for the otter trawlers and Croatian long liners, but it is also caught in smaller quantity in the gill-net fisheries.The species is mainly fished with bottom trawl nets, but long-lines and trammel-net are also used. An overall decreasing trend in effort of the major bottom otter trawl fleets occurred in the recent years. Fishing grounds mostly correspond to the distribution of the stock (SEC (2002) 1374). On the basis of the Italian data collected through DCF from 2004 to 2008, landings of bottom otter trawlers account for over 95% of the total. The hake total catch peaked in 2006 (4,339 tons) and decreased in the subsequent years. In 2008 it amounted to 3,177 tons. No effort and catch data were provided in 2009 by the Italian authorities.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most updated assessment was undertaken in 2012 by STECF-EWG 12-19.

REFERENCE POINTS: STECF proposes the following reference point as a basis for management advice:
$F_{MSY} = F_{0.1} =$ 0.21 as proxy for F_{MSY} and as limit management reference point consistent with high long term yields.

STOCK STATUS: Based on the report of the STECF EWG 12-19 the SSB shows a clear decrease trend in GSA17. The recruitment shows a fluctuating pattern with a general decreasing trend. Taking into account that the current F is comprised in the range 1.48-2.1 and is higher than the $F_{0.1}$ (0.21), STECF concluded that the stock has to be considered exploited unsustainably.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF notes that current F is estimated to be well above the proposed FMSY reference point and continued fishing at such a level poses a serious risk to the productivity of the stock and the future viability of the fishery.

7.49 European hake (*Merluccius merluccius*) in Geographical Sub Area 18. Southern Adriatic Sea

FISHERIES: Hake is one of the most important species in the Geographical Sub Area 18 representing more than 20% of landings from trawlers. Trawling represents the most important fishery activity in the southern Adriatic Sea and a yearly catch of around 30,000 tonnes could be estimated for the last decades. The Mediterranean hake is also caught by off-shore bottom long-lines, but these gears are utilised by a low number of boats (less than 5% of the whole South-western Adriatic fleet).

In 2011 the total annual landing of hake in GSA 18 was 4258 tons. Most of this landing was due to the Italian trawlers (77.1%) and (12.5%). Albanian and Montegrin fleets contributed respectively for 9.44 and 0.86% of the total. Trawlers exploit hake in a large depth range, between 50-60 and 500 m, along with other commercial species (*Illex coindetii, M. barbatus, P. longirostris, Eledone spp., Todaropsis eblanae, Lophius spp., Pagellus spp., P. blennoides, N. norvegicus*).

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent assessment was performed within the FAO AdriaMed project, presented to and endorsed by the GFCM SAC in 2012 as well as STECF-EWG 13-09.

REFERENCE POINTS: STECF proposes the following reference points as a basis for management advice:

$F_{MSY} = F_{0.1} \leq 0.19$

$F_{CURRENT}$ = 1.09

STECF proposes F_{MSY} = 0.19 ($F_{0.1}$ basis) as management reference point.

STOCK STATUS: The stock appeared to be subject to overfishing in 2007-2012.. As observed in 2011, the fishing mortality from the Italian bottom trawlers represents 77% of the total F in the GSA and that of the Italian longlines is accounting for about 12%, with an overall percentage of about 90%. Montenegrin and Albanian trawlers account for 10% of the total F.

RECENT MANAGEMENT ADVICE: STECF and GFCM SAC consider the relevant fleets' effort and/or catches to be reduced until fishing mortality is below or at the proposed F_{MSY} level, in order to avoid future loss in stock productivity and landings. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF notes that current F is estimated to be well above the proposed FMSY reference point and continued fishing at such a level poses a serious risk to the productivity of the stock and the future viability of the fishery.

7.50 European hake (*Merluccius merluccius*) in Geographical Sub Area 19. Western Ionian Sea

FISHERIES: European hake is fished with bottom trawl (OTB) and different small-scale gears (long-line (LLS), gillnet (GNS) and trammel net (GTR)). The main fisheries operating in GSA 19 are from Gallipoli, Taranto, Schiavonea and Crotone. The fishing pressure varies between fisheries and fishing grounds. Over 2006-2012, annual landings ranged between 1565 t in 2006 and 657 t in 2012.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most updated assessment was undertaken in 2013 by STECF EWG-13-09.

REFERENCE POINTS: Precautionary reference points have not been proposed for this stock.

$F_{MSY} = F_{0.1} \leq 0.22$

$F_{CURRENT}$ = 1.21

STECF proposes F_{MSY} = 0.22 ($F_{0.1}$ basis) as management reference point.

STOCK STATUS: The stock is considered exploited unsustainably. A considerable reduction is necessary to approach the F_{MSY} reference point.

RECENT MANAGEMENT ADVICE: The catches of hake in GSA 19 is mainly due to otter trawler, with an important contribution from longlines. STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF notes that current F is estimated to be well above the proposed FMSY reference point and continued fishing at such a level poses a serious risk to the productivity of the stock and the future viability of the fishery.

7.51 European hake (*Merluccius merluccius*) in Geographical Sub Area 26. South Levant. Egypt.

The results from the most recent assessment and advice for this stock were released in 2011. The text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The Egyptian Mediterranean coast is about 1100 km extending from El-Salloum in the West to Taba city in the East. The mean annual fish production from this area is about 50000 tons (GAFRD; 1991-2007). The main fishing gears operated in this region are trawling, purse-seining and lining, especially long and hand lining.

The number of licensed trawl vessels ranged between 1100 and 1500 during the period from 1991 to 2007. The vessel length varies between 18 and 22 m and width from 4 to 6 m. This fleet targets many species such as red

mullet *Mullus surmuletus* and *M. barbatus*; the sparids *Sparus aurata*, *Pagellus* spp., *Boops boops*, *Lithognathus mormyrus*, *Diplodus* spp.; the soles *Solea* spp.; the European hake *Merluccius merluccius*; the picarels *Spicara* spp.; the lizardfishes *Synodus saurus*; the cephalopods *Sepia* spp., *Loligo* spp. and *Octopus* spp.; crabs *Portunus pelagicus* and shrimp (about 10 species).

European hake contributed about 3% of the total trawl landings in the Egyptian Mediterranean waters. The vessel length varied between 18 and 22 m and its width varied from 4 to 6 m. Each vessel is powered by main engine of 150 to 600 hp but the majority of 250 hp engines. The fishing trip is about 7 to 10 days and the number of crew is about 6 to 15 persons. The mean annual landing of trawl fishery is around 16000 tons accounting for approximately 33% of total catches in Egyptian Mediterranean area.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. The VIT model did not fit well to data from 2008. Therefore the analysis was re-done with data from 2006-2007; the results presented only reflect the status over that period.

REFERENCE POINTS: GFCM 2009: Position of reference points relative to current F (2006-2007): $F_{0.1}$=0.49; Fmax=0.78.

STOCK STATUS: Based on the report of the GFCM SAC 2010, the length converted catch curve analysis estimated F~0.66. GFCM-SAC 2010 identified the stock status as overexploited.

RECENT MANAGEMENT ADVICE: Based on the report of the GFCM 2010 The GFCM-SAC 2010 recommended to reduce the fishing mortality. To achieve $F_{0.1}$, a reduction of 51% would be required. It should be noted that this does not imply that the reduction be achieved in one year. A management plan to achieve this reduction over time would be recommended.

STECF COMMENTS: STECF advises that the assessment provided is considered unlikely to reflect the current stock status or exploitation rate and should not be used as a basis for management advice.

7.52 Common Sole (*Solea solea*) in Geographical Sub Area 17. Northern and Middle Adriatic

FISHERIES: The Italian fleets exploit this resource with *rapido* trawl and set nets (gill nets and trammel nets), while only trammel net is used in the countries of the eastern coast of GSA 17 in the Adriatic Sea. Sole is an accessory species for otter trawling. More than 90% of catches come from the Italian side. Landings fluctuated between 1,000 and 2,300 tons in the period 1996-2012 (data source: FAO-FishStat; ISMEA-SISTAN and DCR official data call). The fishing effort applied by the Italian *rapido* trawlers gradually increased from 1996 to 2005, and slightly decreased in the last years.

Exploitation is based on 1 and 2 year old individuals. In the last years, the annual landings of this species were around 2000 tons in the overall GSAs, and in 2012 was around 1900 tons. Otter and *rapido* trawlers carry out their activity all year round, with the only exception of the fishing ban (end of July – beginning of September), while set netters show a seasonal activity (spring-fall). The fishing grounds exploited by *rapido* trawlers extend from 5.5 km from the shoreline to 50-60 m depth, while otter trawlers carry out their activity in the overall area, except for the Croatian waters. Set netters operate in the shallower waters usually close to the fishing harbors.

SOURCE OF MANAGEMENT ADVICE: Advice on this stock is provided by both the GFCM SAC and the STECF, The latest advice relates to that provided by the STECF based on a stock assessment carried out in 2013 during STECF EWG 13-09.

REFERENCE POINTS: STECF proposes the following reference points as a basis for management advice: $F_{MSY} = F_{0.1} = \leq 0.31$.

STOCK STATUS: STECF classified the stock status as being subject to overfishing ($F_{2012} = 0.93$).

RECENT MANAGEMENT ADVICE: STECF advises reducing fishing mortality towards the proposed reference point F_{MSY}. Considering the overexploited situation and the low values of SSB of the sole stock in GSA 17 a reduction of fishing effort and an improvement in exploitation pattern is advisable, especially of Italian *rapido* trawlers and gillnetters, which mainly exploit juveniles.

STECF considers that the best option to reduce effort and improve the exploitation pattern for sole in GSA 17, would be to introduce a closure for rapido trawling within 17 km of the Italian coast during the summer-fall period (June- December).

STECF notes that in recent years, some Italian artisanal fleets fish with gill net in the main spawning area during periods when trawling is prohibited. Additional measures to restrict exploitation of sole in the spawning area are desirable, to afford further protection to the Adriatic sole stock.

STECF COMMENTS: STECF has no additional comments.

7.53 Anglerfish (*Lophius budegassa*) in Geographical Sub Area 6. Northern Spain

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Black-bellied anglerfish are by catch of commercial importance of bottom trawl fisheries. They are also caught by a variety of static fishing gear (trammel nets, gillnets and baited traps). In GSA 06 the bulk of catches (90% in weight) are from otter trawl, while trammel nets amounts less than 10% of the catches. The largest individuals are caught by trammel nets, but these are not sampled. In all fisheries, discards of anglerfish are negligible. The landings of black-bellied anglerfish have increased over the 2002-2012 period, although there is some uncertainty as to whether the reported landings in the data call represent only *Lophius budegassa* or a mix of the two species of Lophius. In 2002 353 tonnes were landed, in 2009, 2010 and 2011 a total of 563, 747 and 1212 tonnes were landed respectively.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent STECF assessment is provided in 2012 by STECF EWG 12-10.

REFERENCE POINTS: No STECF proposes the following reference points as a basis for management advice:

$F_{MSY} = F_{0.1} =$ 0.15

$F_{CURRENT} =$ 0.72

STOCK STATUS: The stock is considered exploited unsustainably.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.54 Common Dentex (*Dentex dentex*) in Geographical Sub Areas 12, 13. Northern Tunisia and Gulf of Hammamet.

The results from the most recent assessment and advice for this stock were released in 2007. The text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: *Dentex dentex* is exploited in the Tunisian coasts by artisanal gears, especially the long-lines and the trammel-nets. Two separate stocks are assessed according to regions: the Northern and the Eastern coasts.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission.

The latest assessment was conducted by GFCM SCSA in 2007 on data collected in 2004.

REFERENCE POINTS: No reference points have been defined for this stock.

STOCK STATUS: In the North (GSA 12), the yield by recruit value is below the optimal level; the stock seems to be underexploited. The exploitation profile in the eastern region (GSA 13) is in optimal conditions.

RECENT MANAGEMENT ADVICE: The GFCM-SAC recommended as a precautionary measure not to increase the fishing effort in both areas. In the future, a more detailed description of the fishery should be provided to facilitate the management advice.

STECF COMMENTS: STECF notes that in the absence of reference points the exploitation status of the stock cannot be fully evaluated and no advice can be provided. STECF considers that the assessment provided is considered unlikely to reflect the current stock status or exploitation rate and should not be used as a basis for management advice. STECF points out that no new assessment has been presented to the GFCM-SAC since 2007.

7.55 Blackspot seabream (*Pagellus bogaraveo*) in Geographical Sub Area 1 and 3. North and South Alboran Sea

FISHERIES: The stock is exploited by Spanish and Moroccan long-liners on the continental slope of the Alboran Sea. The long liners fishery along the Moroccan coast is the major activity in the Strait of Gibraltar. This fleet is mainly based in Tangier port where 200 boats are based. They represent 85% of the total long liners in the whole Mediterranean. The vessels belonging to this fishery have an average GRT of about 20 tons, a power average about 160 CW and an average age of 7 years. The Spanish fleet is made up by 94 longliners. Long liners target primarily swordfish, small tunas, red seabream, the grouper *Helecolenus dactylopterus*, and *Lepidopus caudatus*. The catches of *Pagellus boragaveo* increased from around 20 tons in 2001 up to around 80 tons in 2007 for the Moroccan fleet, and from 330 in 2005 to 362 tons in 2007 for the Spanish fleet. In 2009-2011 the Spanish catch declined from 592 to 258 tons whereas the Moroccan catch increased slightly from 98 to 154 tons in the same period.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent available assessment was provided by GFCM-SCSA in 2012. A length cohort analysis was carried out on landings and length frequency data for the years 2009-2011.

REFERENCE POINTS: GFCM SAC proposes the following reference points as a basis for management advice: $F_{MSY} = F_{0.1} = \leq 0.11$; $F_{40\%SSBvirgin} = 0.12$.

STOCK STATUS: Based on the report of the GFCM SAC, overfishing was occurring in 2009-2011 ($Fbar_{2-6} = 0.194 > 0.11$).

RECENT MANAGEMENT ADVICE: The joint assessment of blackspot seabream in GSAs 1 and 3 showed a stock which is being exploited at above a level which is believed to be sustainable in the long term, with no potential room for further expansion and a higher risk of stock depletion/collapse. GFCM-SAC advices to reduce the effort level to set the fishing mortality level to a more sustainable value. Rationalize the management of this fishery by establishing similar management measures in both countries (Morocco and Spain).

STECF COMMENTS: STECF agrees with the advice from the GFCM SAC. STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

7.56 Common pandora (*Pagellus erythrinus*) in Geographical Sub Area 9. Northern Tyrrhenian

The results from the most recent assessment and advice for this stock were released in 2011. The text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The species is mainly caught as a part of a species mix that constitutes the target of the trawlers operating near shore. A small fraction of the catches proceed from artisanal fisheries. The main commercial species in this bottom multi-species trawl fishery in GSA 09 are *Squilla mantis, Sepia officinalis, Trigla lucerna, Merluccius merluccius, Mullus barbatus, Gobius niger*. Fishing effort have shown a moderate decling in the analyzed period 1994-2010.

Since 2006 annual landings varied below 300 tons. 171 tons of landings are reported for 2010.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission.

The most recent available assessment was performed during the STECF-EWG-11-12.

REFERENCE POINTS: STECF proposed the following reference point as a basis for management advice: F_{MSY} = 0.48. ($F_{0.1}$ basis)

STOCK STATUS: The current fishing mortality was estimated as F=0.63 and exceeds this reference level. The STECF classifies the stock status as being subject to overfishing.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.57 Bogue (*Boops boops*) in Geographical Sub Area 3. Southern Alboran Sea

The results from the most recent assessment and advice for this stock were released in 2010. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES Exploitation of the stocks of *Boops boops* is carried out by trawlers from Moroccan Mediterranean ports. Fishing is focussed between the coastal region of Tangier from the port of Saidia in the east. 70% of landings occur within the ports of Nador and Al hoceima. Catches increased from 2959 tons in 2000 to 4086 in 2009.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. The most recent available assessment was performed by the GFCM-SCSA 2010. The data used in this assessment is obtined by biological sampling for length frequencies of *Boops boops* landed during 2000-2009, in the GSA 03 corresponding to the morrocan Mediterranean waters at the level of the ports of Nador and Al hoceima .Length frequencies for the years 2000-2009 were thus used as the basis of this analysis; the length cohort analysis approach within VIT was used.

REFERENCE POINTS: GFCM SAC proposes the following reference points as a basis for management advice: $F_{MSY} = F_{0.1} = \leq 0.61$ and $F_{max} = 0.75$

STOCK STATUS: Based on the report of the GFCM SAC, overfishing was occurring in 2000-2009 ($F_{2000-2009} = 0.9 > 0.61$).

RECENT MANAGEMENT ADVICE: The GFCM-SAC recommended a reduction in the current fishing mortality, to limit the movement of trawlers from the Atlantic to the Mediterranean, and to control the existing trawling ban in coastal waters.

STECF COMMENTS: STECF notes that the proposed reference points differ markedly from those assessed by the preliminary GFCM SCSA in 2009 ($F_{0.1}$=0.13, F_{max}=0.22). STECF agrees that overfishing is taking place and advises that a management plan being implemented taking account of mixed fisheries effects with the aim of reducing fishing mortality towards the proposed F_{MSY} reference point.

7.58 Norway Lobster (*Nephrops norvegicus*) in Geographical Sub Area 05 - Balearic Island

FISHERIES: Norway lobster catches from the Balearic fleet are generated exclusively by the bottom trawlers. The species is mostly caught in the upper slope (350-600 m). The mean annual number of days in which the fleet works in this fishing tactic (alone or in combination with other fishing tactics) is around 1050 days. Other species caught on the upper slope are *Merluccius merluccius*, *Lepidorhombus* spp., *Lophius* spp. and *Micromesistius poutassou* (Guijarro and Massutí, 2006). Discards on the upper slope have been estimated to be up to 18% (autumn) and 45% (spring) of captured biomass and they are composed by a large number of elasmobranchs, teleosts, crustaceans and cephalopods, among others. In the last 8 years the total landings of *N. norvegicus* in GSA 05 oscillated around 20 tons.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent assessment for Norway lobster in GSA 5 was performed in 2012 by GFCM-SAC WG on demersal.

REFERENCE POINTS: GFCM-SAC proposes the following reference points as a basis for management advice:

$F_{MSY} = F_{0.1} =$ 0.134

STOCK STATUS: GFCM-SAC considered the stock as subjected to overfishing, $F_{current}$ (0.447) is higher than F_{MSY}.

RECENT MANAGEMENT ADVICE: GFCM-SAC advised to reduce fishing mortality.

STECF COMMENTS: STECF agrees with GFCM-SAC. STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

7.59 Norway lobster (*Nephrops norvegicus*) in Geographical Sub Area 9. Ligurian and northern Tyrrhenian

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Norway lobster is one of the most important commercial species in the GSA as total annual landing value. All the landing is due to bottom trawl vessels exploiting slope muddy bottoms mainly between 300 and 500 m depth. Catch of vessels targeting Norway lobster is composed of a mix of both commercial (hake, deep-sea pink shrimp, horned octopus (*Eledone cirrhosa*), squids (*Todaropsis eblanae*)), and non-commercial species. The trawl fleet of GSA 09 at the end of 2007 accounted for 360 trawlers. To date about 80-100 trawlers are involved in this fishery. During 2005-2009 the total landings of Norway lobster of GSA 09 fluctuated between 2890 tons (2005) and 228 tons (2008). In 2010, the landings decreased to 162 tons. The catch is mainly composed by adult individuals over the size-at-maturity while discarding of specimens under MLS (20 mm CL) is negligible.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent available assessment for Norway lobster in GSA 9 was performed by STECF EWG 11-12. The assessment was endorsed by GFCM SAC.

REFERENCE POINTS: STECF and GFCM SAC propose the following reference points as a basis for management advice: $F_{MSY} = 0.21$ ($F_{0.1}$ basis).

STOCK STATUS: STECF classified the stock status as being subject to overfishing as current F in 2010 equals 0.35.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.60 Blue and red shrimp (*Aristeus antennatus*) in Geographical Sub Area 5. Balearic Islands

FISHERIES: The blue red shrimp is one of the most important resources for bottom trawling in the Balearic Islands. It is fished on the slope between 400 and 800 m depth. 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. In 1999-2010 landings fluctuated between 90 and 170 tonnes; in 2010 Spanish trawlers landed 164 tonnes. Females dominate in the landings, nearly 70-80% of the total. The number of red shrimp vessels for the whole GSA 5 has been decreased steadily from the early 1990s, and in 2011 the fleet was made up of 17 vessels, which landed a total of 120 tonnes of blue and red shrimp.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. The most recent available assessment was done by GFCM demersal working group in 2012 and endorsed by GFCM SCSA / SAC in 2013.

REFERENCE POINTS: GFCM-SAC proposed the reference points $F_{MSY} = F_{0.1} = 0.26$.

STOCK STATUS: Based on the report of the GFCM-SAC, overfishing was occurring in 2011 ($F_{2011} = 1.01$).

RECENT MANAGEMENT ADVICE: GFCM-SAC recommends decreasing fishing mortality. This could be achieved through management measures like temporal fishing time reduction for periods such as the beginning of the recruitment period at the beginning of autumn.

STECF COMMENTS: STECF agrees with the advice from the GFCM-SAC.

STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

7.61 Blue and red Shrimp (*Aristeus antennatus*) in Geographical Sub Area 6. Northern Spain

FISHERIES: Blue and red shrimp (*Aristeus antennatus*) is one of the most important crustacean species for the trawl fisheries in GSA 6 (Northern Spain). This resource is an important component of the commercial landings in some ports of GSA 6, and it is the target species of a specific trawl fleet. The blue and red shrimp has a wide bathymetric distribution, between 80 and 3300 m depth, and some areas may constitute a refuge for the resource, located distantly from the main fishing ports and below 1000 m depth. Females dominate in the landings, representing nearly 80% of the total. Discards of the blue and red shrimp are very low. The number of harbors with vessels targeting blue and red shrimp is 14 for the whole GSA 6. Exploitation is based on very young age classes, mainly 1 and 0 year old individuals. Landings in GSA 6 over 2002-2011 fluctuated between 308 t in 2005 and 743 t in 2009, with an average of about 600 tonnes.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The stock assessment using the most updated data was done in 2012 by STECF EWG 12-10. An Extended Survivor Analysis (XSA) was performed using as input data bottom trawl landings and age distributions from 2002-2011; standardized indices from MEDITS bottom trawl survey were used as tuning fleets. STECF notes that GFCM-SAC 2012 WG on demersal species carried out assessments for blue and red shrimp in GSA 6, but agrees with GFCM SCSA that all data for this stock in GSA 6 should be combined in a single assessment. The STECF EWG 12-10 is thus retained as the basis for advice.

REFERENCE POINTS: STECF proposes $F \leq 0.30$ as management reference point (basis $F_{0.1}$ as a proxy of F_{MSY}) consistent with high long term yields.

STOCK STATUS: STECF considers the stock to be exploited unsustainably based on the results of the analysis ($F_{curr} = 1.05$).

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.62 Giant red shrimp (*Aristaeomorpha foliacea*) in Geographical Sub Area 11. Sardinian Sea

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The giant red shrimp is a relevant target species in Sardinian waters. Fishing grounds are typical muddy bottoms from 150 to 570 m depth, but the occurrence of the species is mainly between 200 and 450 meter of depth. It is caught exclusively by otter trawl on the slope ground during all year round, with peaks in

landings observed in summer. Giant red shrimps are frequently caught together with Norway lobster (*Nephrops norvegicus*), blue and red shrimp (*Aristeus antennatus*), catshark (*Galeus melastomus*), *Phycis blennoides*, *Etmopterus spinax*, Macrouridae as well as large hake (*Merluccius merluccius*).

Landings in GSA 11 showed a decrease in the period 2005-2008, falling from about 170 to 67 tons. Annual landings increased in 2009 and 2010 to the level of about 110 tons. No discards were observed.

Nominal effort (kw·days) in GSA 11 has gradually decreased from 2004 to 2008; since then it remained rather constant.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent assessment was provided by STECF EWG 11-12.

REFERENCE POINTS: STECF proposes $F_{MSY} \leq 0.49$ as management reference point ($F_{0.1}$ basis).

STOCK STATUS: Based on the assessment results, the estimated F (average F_{1-4} = 0.98) exceeded the proposed reference value. STECF classifies the stock being subject to overfishing.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.63 Giant red shrimp (*Aristaeomorpha foliacea*) in Geographical Sub Areas 12-16. Strait of Sicily

FISHERIES: Giant red shrimp are a key target species for the Sicilian and Maltese bottom otter trawl fleets operating on the slope of the continental shelf in the Strait of the Sicily throughout the year. Based on the available information and the distribution of fishing ground targeted by the Sicilian long distance trawl fleet, giant red shrimp found in the Central Mediterranean GSAs 12-16 were considered to form a single stock for the purpose of this assessment. *A.foliacea* is fished exclusively by otter trawl, mainly in the central – eastern side of the Strait of Sicily, whereas in the western side it is substituted by the violet shrimp, *Aristeus antennatus.* Other commercial species frequently caught together with giant red shrimp are the deep water rose shrimp (*Parapenaeus longirostris*), Norway lobster (*Nephrops norvegicus*), blue and red shrimp (*Aristeus antennatus*), greater forkbeard (*Phycis blennoides*) and hake (*Merluccius merluccius*). Yield for Italian and Maltese trawlers combined in the period 2005-2011 peaked in 2010, at 1684 tonnes. The lowest landings were reported in 2008, at 1287 tonnes. The average of giant red shrimp landings was 1474 tonnes from Sicilian trawlers and 31 tonnes from Maltese trawlers in 2005-2011; the average annual contribution of Maltese catches to the total catch in this period was 2.1%. No information is available on giant red shrimp catches by the Tunisian trawl fleet.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessment was done in 2012 by STECF EWG 12-19. An Extended Survivor Analysis (XSA) was performed using as input data bottom trawl landings and age distributions from 2006-2011; standardized indices from MEDITS bottom trawl survey were used as tuning fleets.

REFERENCE POINTS: STECF proposes $F \leq 0.30$ as management reference point (basis F_{01} as a proxy of F_{MSY}) consistent with high long term yields.

STOCK STATUS: STECF considers the stock to be exploited unsustainably based on the results of the analysis (F_{curr} = 1.67).

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.64 Blue and red shrimp (*Aristeus antennatus*) in Geographical Sub Areas 15-16. Malta Island and South of Sicily

FISHERIES: The key target species for the Sicilian and Maltese bottom otter trawl fleets operating on the slope of the continental shelf in the Strait of the Sicily is the giant red shrimp, *Aristaeomorpha foliacea*. However whilst *A. foliacea* is fished mainly in the central – eastern side of the Strait of Sicily, it is substituted by the blue and red shrimp *A. antennatus* on the western side of the channel. Other commercial species frequently caught together with blue and red shrimp are the deep water rose shrimp (*Parapenaeus longirostris*), Norway lobster (*Nephrops norvegicus*), greater forkbeard (*Phycis blennoides*) and hake (*Merluccius merluccius*). Yield for Italian and Maltese trawlers combined in the period 2009-2012 peaked in 2012, at 94 tonnes. The lowest landings were reported in 2009, at 42.18 tonnes. The average of blue and red shrimp landings was 61 tonnes from Sicilian trawlers and 2 tonnes from Maltese trawlers in 2009-2012; the average annual contribution of Maltese catches to the total catch in this period was 3.6%.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessment was done in 2013 by STECF EWG 13-09. A length cohort analysis was carried out based on 2009-2012 data using VIT software.

REFERENCE POINTS: STECF proposes $F \leq 0.26$ as management reference point (basis F_{01} as a proxy of F_{MSY}) consistent with high long term yields.

STOCK STATUS: STECF considers the stock to be exploited unsustainably based on the results of the analysis ($F_{curr} = 0.81$).

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.65 Pink shrimp (*Parapenaeus longirostris*) in Geographical Sub Area 1. Northern Alboran Sea

FISHERIES: In GSA 1, deepwater pink shrimp is a target species for around 170 trawling vessels (in 2011) operating on the upper slope and it is one of the most important crustacean species for the trawl fisheries. The species is caught almost exclusively as a by-catch by trawlers working in the deep continental shelf and the upper slope (100–400 m). No artisanal boats target this species. During the last 10 years the total landings showed important oscillations, ranging between a minimum of 66 tonnes in 2006 and a maximum of 250 tonnes in 2009; in 2012 239 tonnes of deepwater pink shrimp were landed in GSA 1.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most updated assessment was done in 2013 by STECF EGW 13-09. An Extended Survivor Analysis (XSA) was performed using as input data bottom trawl landings and age distributions from 2001-2012; standardized indices from MEDITS bottom trawl survey were used as tuning fleets.

REFERENCE POINTS: STECF proposes the following reference points as a basis for management advice: F0.1 = 0.26.

STOCK STATUS: STECF considers the stock to be exploited unsustainably based on the results of the analysis ($F_{curr} = 0.43$).

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF notes that the assessment for pink shrimp in GSA 1 is unlikely to relate to the geographical range of the stock. An assessment summary for GSAs 1, 3 and 4 (Alboran sea) is given in Section 7.66.

7.66 Pink shrimp (*Parapenaeus longirostris*) in Geographical Sub Area 1, 3 and 4. Alboran Sea. Algeria, Morocco and Spain.

FISHERIES: In GSAs 1, 3 and 4 Algerian, Moroccan and Spanish trawlers are targeting deepwater pink shrimp. The number of the trawlers catching *Parapenaeus longirostris* in 2011 was 502 in Algeria, 115 in Morocco and 121 in Spain. Total catches showed a decreasing trend from 2 257 tonnes in 2003 to 1220 tonnes in 2008, before increasing to 2 049tonnes in 2009 and decreasing again in 2010-2011 (average of 1380 tonnes).

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. The assessment was provided by the GFCM-SCSA in 2013. Catch per unit effort information for the coastal fishery was used as the basis of a Schaefer production model run. A length cohort analysis analysis was run using the VIT software using trawl catch length frequency data for 2009-2011 from GSA 1 and GSA 3 (Morocco and Spain). A yield per recruit analysis was run to estimate reference points.

REFERENCE POINTS: GFCM SAC proposes the following reference points as a basis for management advice: $F_{0.1} = 0.48$, $F_{max} = 0.64$

STOCK STATUS: GFCM SAC considers the stock to be in a status of overfishing based on the results of the analysis ($F_{curr} = 1.135$).

RECENT MANAGEMENT ADVICE: GFCM-SAC recommends a reduction of 50% of the current fishing mortality in the trawl fisheries targeting *P. longirostris*. GFCM-SAC further notes that the effort level in the trawl fisheries should be reduced to adjust the current fishing mortality to levels more in agreement with the sustainability values, with F0.1 as reference point.

STECF COMMENTS: STECF agrees with the assessment and advice from the GFCM-SAC.

STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

7.67 Pink shrimp (*Parapenaeus longirostris*) in Geographical Sub Area 6. Northern Spain

FISHERIES: Deepwater pink shrimp (*Parapenaeus longirostris*) is one of the most important crustacean species for the trawl fisheries developed along the GFCM geographical sub-area Northern Spain (GSA 06). The trawl feet operating in GSA 6 in 2012 consisted of 540 trawlers. During de period 2001-2012 landings decreased from 331 tonnes in 2001 to 76 tonnes in 2004, averaging 113 tonnes per year in 2005-2012. In 2012 120 tonnes of deepwater pink shrimp were landed.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most updated assessment was done in 2013 by STECF EGW 13-09. An Extended Survivor Analysis (XSA) was performed using as input data bottom trawl landings and age distributions from 2001-2012; standardized indices from MEDITS bottom trawl survey were used as tuning fleets.

REFERENCE POINTS: STECF proposes $F \leq 0.27$ as a management reference point (basis $F_{0.1}$ as a proxy of F_{MSY}) consistent with high long term yields.

STOCK STATUS: STECF considers the stock to be exploited unsustainably based on the results of the analysis ($F_{curr} = 1.49$).

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

7.68 Pink shrimp (*Parapenaeus longirostris*) in Geographical Sub Area 9. Ligurian and northern Tyrrhenian

No additional information on this stock was available to the STECF since 2012, hence the text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The deep sea pink shrimp is one of the most important species exploited commercially by the trawl fleet (361 vessels) in the GSA9. The fishing grounds are distributed from 150 to 400 m depth, where the main target species are hake, *Merluccius merluccius*, horned octopus, *Eledone cirrhosa* and Norway lobster, *Nephrops norvegicus*, at greater depths. The stock is more abundant in the southern part (central northern Tyrrhenian Sea) than in the northern part (Ligurian Sea). The species is exploited by trawl fleet mostly on muddy bottoms from 150 to 500 m depth. Annual trawl landings increased from 161 tons in 2002 to 462 tons in 2006, decreasing to 217 tons in 2007; the peak was reached at 463 tons in 2010.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessments available to STECF were carried out in 2011 at STECF EWG 11-12. The assessment was endorsed by GFCM SAC.

REFERENCE POINTS: GFCM SAC and STECF propose $F_{MSY} = 0.78$ ($F_{0.1}$ basis) as a management reference point.

STOCK STATUS: GFCM SAC and STECF consider the stock to be harvested in a sustainable manner since the 2010 current F (2010 current F = 0.4) was well below the estimated F_{MSY} reference point.

RECENT MANAGEMENT ADVICE: GFCM SAC and STECF consider that the stock in 2010 was being exploited sustainably. STECF considers that a multi-annual management plan should be established with the aim of maintaining fishing mortality below the proposed F_{MSY}.

STECF COMMENTS: STECF has no additional comments.

7.69 Pink shrimp (*Parapenaeus longirostris*) in Geographical Sub Area 10. Southern and Central Tyrrhenian.

FISHERIES: The pink shrimp stock is only targeted by trawlers and fishing grounds are located on the soft bottoms of continental shelves and the continental slope along the coasts of the whole GSA. The pink shrimp occurs mainly with *M. merluccius*, *M. barbatus*, *Eledone cirrhosa*, *Illex coindetii* and *Todaropsis eblanae*, *N. norvegicus*, *P. blennoides*, depending on depth and area. The catches of the species in 2006 were 1088 tonnes, then declined to 370 tonnes in 2010, before increasing again until 2012, when 459 tonnes were landed.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most updated assessment was done in 2013 by STECF EGW 13-09. An Extended Survivor Analysis (XSA) was performed using as input data bottom trawl landings and age distributions from 2006-2012; standardized indices from MEDITS bottom trawl survey were used as tuning fleets.

REFERENCE POINTS: STECF proposes $F \leq 0.93$ as a management reference point (basis $F_{0.1}$ as proxy of F_{MSY}) of exploitation consistent with high long term yield

STOCK STATUS: STECF considers the stock to be exploited unsustainably based on the results of the analysis ($F_{curr} = 1.24$).

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.70 Pink shrimp (*Parapenaeus longirostris*) in Geographical Sub Area 12-16. Strait of Sicily

FISHERIES: Trawling for pink shrimp *Parapenaeus longirostris* is carried out on the continental shelf of the Central Mediterranean throughout the year, and catches often include Norway lobster (*Nephrops norvegicus*), giant red shrimp (*Aristaeomorpha foliacea*), hake (*Merluccius merluccius*), violet shrimp (*Aristeus antennatus*), scorpionfish (*Helicolenus dactylopterus*), grater forkbeard (*Phycis blennoides*), red Pandora (*Pagellus bogaraveo),* common Pandora (*Pagellus erythrinus*) and monkfish (*Lophius piscatorius*). Scientific data available indicates that exploitation by the fishing fleets of Tunisia, Malta, Libya and Italy is targeting a single shared stock of pink shrimp. In 2011 22 Maltese, 390 Sicilian and 70 Tunisian trawlers were fishing for pink shrimp in GSAs 12-16, landing a total of 8234 tonnes of pink shrimp.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most up to date pink shrimp assessment was carried out as part of the FAO project MedSudMed in 2012 and endorsed by GFCM-SAC in 2013. The assessment was carried based on 2007-2011 data, using length cohort analysis implemented in VIT software, and a preliminary XSA assessment tuned with survey data from GSAs 15-16.

REFERENCE POINTS: GFCM-SAC proposed the following reference points as a basis for management advice: F_{MSY} = 1.22 ($F_{0.1}$ basis).

STOCK STATUS: GFCM SAC concluded that overfishing is occurring since F_{ref} (2010-2011) = 1.6.

RECENT MANAGEMENT ADVICE: GFCM SAC recommends that a reduction in fishing mortality of about 20-28% as well as an improvement of the exploitation pattern of the small Italian trawlers (12-24 m in length) targeting juvenile shrimp is considered necessary in order to fish the stock at F_{MSY}. In addition the protection of nursery areas in the Strait of Sicily from towed gears was recommended.

STECF COMMENTS: STECF agrees with the assessment and advice from the GFCM-SAC.

STECF agrees with the GFCM SAC recommendation to investigate the effect of the method applied on the $F_{0.1}$ calculation since the $F_{0.1}$ value seems higher than in other GSAs.

STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

7.71 Pink shrimp (*Parapenaeus longirostris*) in Geographical Sub Area 18. Southern Adriatic Sea

FISHERIES: Deep-water rose shrimp is an important species in demersal trawl fishery of the whole Geographical Sub Area 18. The species is only targeted by trawlers and fishing grounds are located along the coasts of the whole GSA. Catches from trawlers are from a depth range between 50-60 and 500 m and the species may co-occurs with other important commercial species as *M. merluccius*, *Illex coindetii*, *Eledone cirrhosa*, *Lophius* spp., *Lepidorhombus boscii*, *N. norvegicus*. Landings are rather stable in the observed years with a slight increase in 2009 (933t) and a small decrease in 2011 (862 tonnes), while fishing effort of trawlers is decreasing. The Italian fleet contributes 71% of the total fishing mortality exerted on pink shrimp in GSA 18, while Albanian and Montenegrin trawlers account for about 27.1% and 1.7% respectively.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. STECF carried out an assessment in 2012 at the EWG 12-10, which was presented at the GFCM SCSA and subsequently endorsed by the GFCM SAC in 2013. The analysis was carried using length cohort analysis implemented in VIT software based on 2008-2011 data.

REFERENCE POINTS: STECF proposes $F \leq 0.7$ as a management reference point (basis F_{01} as a proxy of F_{MSY}) consistent with high long term yields.

STOCK STATUS: The stock is considered exploited unsustainably. STECF considers the stock to be exploited unsustainably based on the results of the analysis (F_{curr} = 1.45).

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments

7.72 Pink shrimp (*Parapenaeus longirostris*) in Geographical Sub Area 19. North-western Ionian Sea.

FISHERIES: In the north-western Ionian Sea, fishing occurs from coastal waters to 700–750 m. The most important demersal resources are targeted by trawlers are red mullet (*Mullus barbatus*) on the continental shelf, hake (*Merluccius merluccius*), deepwater pink shrimp (*Parapenaeus longirostris*) and Norway lobster (*Nephrops norvegicus*) over a wide bathymetric range and the deep-water red shrimps (*Aristeus antennatus* and *Aristaeomorpha foliacea*) on the slope. Annual landings decreased sharply from 2002 (1126 tonnes) to 2012 (488 tonnes).

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most updated assessment was done in 2013 by STECF EGW 13-09. An Extended Survivor Analysis (XSA) was performed using as input data bottom trawl landings and age distributions from 2006-2012; standardized indices from MEDITS bottom trawl survey were used as tuning fleets.

REFERENCE POINTS: STECF proposes $F_{0.1} \leq 0.67$ as a management reference point (basis $F_{0.1}$ as proxy of F_{MSY}) of exploitation consistent with high long term yield.

STOCK STATUS: STECF considers the stock to be exploited unsustainably based on the results of the assessment ($F_{curr} = 1.31$).

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.73 Blue and red shrimp (*Aristeus antennatus*) in Geographical Sub Area 9. Ligurian and North Tyrrhenian Sea

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The blue and red shrimp is one of the most valuable demersal resources for the trawling fleet operating on the muddy bottoms of the upper and middle slope up to 750-800m depth. More than 95% of GSA09 annual landings were observed in the northern part of the area and there were no discards. Annual landings depict a clear growing trend from 2007 to 2010. Nominal effort (kW*days) decreased from 2005 until 2009, reflecting an increasing in LPUE in the last 2 years. Annual landings increased from 93 tons in 2006 to 186 tons in 2010.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent available assessment is provided by STECF EWG 11-12.

REFERENCE POINTS: STECF proposed the reference point $F_{MSY} = 0.32$ ($F_{0.1}$ basis).

STOCK STATUS: STECF considers the stock to be subject to overfishing as the F in 2010 was assessed to amount to F=0.62.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort

and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.74 Giant red shrimp (*Aristaeomorpha foliacea*) in Geographical Sub Area 9. Ligurian and North Tyrrhenian Sea

FISHERIES: In GSA 9 the giant red shrimp, *Aristaeomorpha foliacea*, is one of the most important target species of the otter bottom trawl fishery carried out on the muddy bottoms of the upper and middle slope. The main fishing grounds are located in the central and southern part of the GSA 09 (eastern Ligurian Sea, northern and central Tyrrhenian Sea). The species is mainly exploited by the trawl fleets of Porto S. Stefano and Porto Ercole, in Tuscany, and Fiumicino, Anzio, and Terracina, in Latium. Total landings of giant red shrimp decreased from about 60 tonnes in 2006 to 24 tonnes in 2007, in 2008 and 2009 landings remain quite stable (around 30-40 tonnes) before increasing up to about 70 tonnes in 2011. In 2012 52 tonnes of *A. foliacea* were landed in GSA 9.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessment was done in 2013 by STECF EWG 13-09. An Extended Survivor Analysis (XSA) was performed using as input data bottom trawl landings and age distributions from 2006-2012; standardized indices from MEDITS bottom trawl survey were used as tuning fleets.

REFERENCE POINTS: STECF proposes $F \leq 0.36$ as a management reference point (basis F_{01} as a proxy of F_{MSY}) consistent with high long term yields.

STOCK STATUS: STECF considers the stock to be exploited unsustainably based on the results of the analysis ($F_{curr} = 0.62$).

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.75 Giant red shrimp (*Aristaeomorpha foliacea*) in Geographical Sub Area 10. Southern and Central Tyrrhenian Sea.

FISHERIES: In GSA 10 the giant red shrimp, *Aristaeomorpha foliacea* is targeted by trawlers and fishing grounds are located offshore, beyond depths of 200 m, mainly southward Salerno Gulf. Landings decreased from 2006 (412 tonnes) to 2008 (113 tonnes) before increasing in 2009 (207 tonnes) and 2010 (189 tonnes). In 2011 observed landings of giant red shrimp in GSA 10 were 141 tonnes.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessment was done in 2012 by STECF EWG 12-19. An Extended Survivor Analysis (XSA) was performed using as input data bottom trawl landings and age distributions from 2006-2011; standardized indices from MEDITS bottom trawl survey were used as tuning fleets.

REFERENCE POINTS: STECF proposes $F \leq 0.4$ as a management reference point (basis F_{01} as a proxy of F_{MSY}) consistent with high long term yields.

STOCK STATUS: STECF considers the stock to be exploited unsustainably based on the results of the analysis ($F_{curr} = 0.48$).

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.76 Blue and red shrimp (*Aristeus antennatus*) in Geographical Sub Area 10. Southern and Central Tyrrhenian Sea.

FISHERIES: In GSA 10 the giant red shrimp, *Aristeus antennatus* is targeted by trawlers and fishing grounds are located offshore, beyond 200 m of depth, mainly at a depth range between 400 and 700 m depth. Blue and red shrimp are caught together with *A. foliacea*, *P. longirostris* and *N. norvegicus*, *P. blennoides*, and *M. merluccius*, depending on operative depth and area. Landings decreased from 2006 (51.6 tonnes) to 2008 (23 tonnes) and then increased slightly in 2009 (27 tonnes). Thereafter, a new slight decrease is observed in 2010 (20 tonnes) followed by a remarkable increase in 2011 (49 tonnes).

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessment was done in 2012 by STECF EWG 12-19. An Extended Survivor Analysis (XSA) was performed using as input data bottom trawl landings and age distributions from 2006-2011; standardized indices from MEDITS bottom trawl survey were used as tuning fleets.

REFERENCE POINTS: STECF proposes $F \leq 0.31$ as a management reference point (basis $F_{0.1}$ as a proxy of F_{MSY}) consistent with high long term yields.

STOCK STATUS: STECF considers the stock to be exploited unsustainably based on the results of the analysis ($F_{curr} = 0.51$).

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.77 Giant red shrimp (*Aristaeomorpha foliacea*) in Geographical Sub Area 18. Southern Adriatic Sea.

FISHERIES: In GSA 18 the giant red shrimp, *Aristaeomorpha foliacea* is targeted by trawlers and fishing grounds are located offshore, beyond depths of 200 m, mainly in the northernmost and southernmost parts of the GSA between 400 and 700 m depth. Giant red shrimp occurs with *A. antennaus*, *P. longirostris* and *N. norvegicus*, depending on operative depth and area. Landings decreased from 2006 (166 tonnes) to 2009 (88 tonnes) before increasing in 2009 (127 tonnes). In 2011 observed landings of giant red shrimp in GSA 18 were 75 tonnes.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessment was done in 2012 by STECF EWG 12-19. A length cohort analysis was carried out using VIT software based on 2009-2011 data; management reference points were estimated based on a yield per recruit analysis.

REFERENCE POINTS: STECF proposes $F \leq 0.3$ as a management reference point (basis $F_{0.1}$ as a proxy of F_{MSY}) consistent with high long term yields.

STOCK STATUS: STECF considers the stock to be exploited unsustainably based on the results of the analysis ($F_{curr} = 1.0$).

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.78 Common Pandora (*Pagellus erythrinus*) in Geographical Sub Areas 15 and 16. Malta Island and South Sicily

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Common Pandora is an important demersal fishery resource in the Mediterranean, including in the Strait of Sicily. Trawling is carried out on the continental shelf of the Central Mediterranean throughout the year, and catches include also pink shrimp (*Parapenaeus longirostris*), Norway lobster (*Nephrops norvegicus*), giant red shrimp (*Aristaeomorpha foliacea*), hake (*Merluccius merluccius*), violet shrimp (*Aristeus antennatus*), scorpionfish (*Helicolenus dactylopterus*), grater forkbeard (*Phicys blennioides*), blackspot seabream (*Pagellus bogaraveo)* and monkfish (*Lophius spp.*). In addition to trawling, common Pandora is targeted by several artisanal gears, including set gillnets, trammel nets, pots and traps and set longlines. Considering data from both GSAs combined, catches by the OTB fleet have declined in 2006-2011, whilst catches from the artisanal fleet have remained stable since 2008. Trawlers were responsible for 80% of common Pandora landings in 2011. On average the Maltese fleet was responsible only for 3% of total landings in GSAs 15 and 16 in 2006-2011.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent available assessment was performed in 2012 during the STECF-EWG-12-10 and also presented during the WG on stock assessment of the GFCM SCSA.

REFERENCE POINTS: STECF proposes the following reference points as a basis for management advice:

$F_{MSY} = F_{0.1} =$ 0.3

$F_{\text{CURRENT (ages 2-7)}} =$ 0.72

STOCK STATUS: The stock is considered to be exploited unsustainably.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.79 Blue and red shrimp (*Aristeus antennatus*) in Geographical Sub Area 1. Northern Alboran Sea

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Since 2002, landings fluctuated between 150 and 422 t, with an average of 290 t, with a continuous decreasing trend. Landings in 2009 were reported to amount to 184 tons. This species is known to have no significant discards. STECF (stock review part II in 2007) noted that in the GSA 01 there are 140 trawlers, considering shelf and slope activity, and landings are around 400 tonnes by year.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent available assessment was done by STECF EWG 11-05.

REFERENCE POINTS: STECF proposed the reference points $F_{MSY} = 0.29$ ($F_{0.1}$ basis).

STOCK STATUS: STECF advised that overfishing was occurring in 2009 ($F_{2009} = 1.32$).

RECENT MANAGEMENT ADVICE: STECF considers that the relevant fisheries' effort to be reduced until fishing mortality is below or at the proposed level F_{MSY}, in order to avoid future loss in stock productivity and landings. This should be achieved by means of a multi-annual management plan taking into account mixed-fisheries effects.

STECF COMMENTS: STECF has no additional comments.

7.80 Common sole (*Solea solea*) in GSA 26. South Levant

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Egyptian Mediterranean coast (GFCM-GSA 26) is about 1100 km extending from El-Salloum in the West to El-Arish in the East. The mean annual fish production from this area was about 55 thousand ton (1990-2008). The main fishing gears operated in this region are trawling, purse - seining and lining especially long and hand lining.

The number of licensed trawl vessels ranged between 1100 and 1500 during the period from 1990 to 2007. The mean annual landing of trawl fishery is around 18 thousand tons accounting for approximately 33% of total catches in Egyptian Mediterranean.

The most dominant fish species in the catch are red mullet; bream; soles; European hake; the picarels; lizardfishes; elasmobranchs. Invertebrates are represented by shrimp, cuttlefish, squid, crab and bivalves. Family Soleidae, contributes about 4% of the total trawl catch in the Egyptian Mediterranean with a mean annual catch of 800 ton composed mainly of common sole (*S. solea*) and Egyptian sole (*S. aegyptiaca*).

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. The assessment for common sole in GSA 26 was carried out for the first time by the GFCM SCSA in 2010 and endorsed by the GFCM SAC. Monthly samples were collected from the commercial catch of trawl fishery during three years (2006-2008). The samples were collected from Port Said, Demmietta and Alexandria landing sites along the Egyptian Mediterranean coast, where the majority of Sole catch is landed. A yield per recruit (Y/R) analysis was performed using VIT software and the total mortality coefficient (Z) was estimated using a length converted catch curve.

REFERENCE POINTS: GFCM SAC proposes the following reference points as a basis for management advice: $F_{MSY} = F_{0.1} = \leq 0.41$ and $F_{max} = 0.81$

STOCK STATUS Based on the report of the GFCM SAC, overfishing was occurring in 2007 ($F_{2007} = 0.66 > 0.41$).

RECENT MANAGEMENT ADVICE: GFCM SAC advises that the relevant fleets' effort to be reduced by about 40-60% until fishing mortality is below or at the proposed level F_{MSY}, in order to avoid future loss in stock productivity and landings. Moreover the trawl selectivity should be improved and nursery grounds should be identified and protected.

STECF COMMENTS: STECF notes data deficiencies in the 2006-2008 length compositions. STECF advises that the assessment provided is considered unlikely to reflect the current exploitation rate and should not be used as a basis for management advice.

7.81 Common pandora (*Pagellus erythrinus*) in GSA 26. South Levant

The results from the most recent assessment and advice for this stock were released in 2010. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Egyptian Mediterranean coast (GFCM-GSA 26) is about 1100 km extending from El-Salloum in the West to El-Arish in the East. The mean annual fish production from this area was about 55 thousand ton (1990-2008). The main fishing gears operated in this region are trawling, purse - seining and lining especially long and hand lining.

The number of licensed trawl vessels ranged between 1100 and 1500 during the period from 1997 to 2008. This fleet targets many species such as red mullet, *Mullus surmuletus* and *M. barbatus*; the sparids, *Sparus aurata, Pagellus* spp., *Boops boops*, *Lithognathus mormyrus*, *Diplodus* spp.; the soles, *Solea* spp.; the European hake, *Merluccius merluccius*; the picarels, *Spicara* spp.; the lizardfishes, *Synodus saurus*; the cephalopods, *Sepia* spp., *Loligo* spp. and *Octopus* spp.; crabs, *Portunus pelagicus* and shrimp which represented by about 10 species. The vessel length varied between 18 and 22 m and its width varied from 4 to 6 m. Each vessel is powered by main engine of 150 to 600 hp but the majority of 250 hp engine. The fishing trip is about 7 to 10 days and the number of crew is about 6 to 15 persons. The mean annual landing of trawl fishery is around 17 thousand tons accounting for approximately 33% of total catches in Egyptian Mediterranean.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. The assessment for common pandora in GSA 26 was carried out for the first time by the GFCM SCSA in 2010 and endorsed by the GFCM SAC. The assessment is based on 2007-2008 catch length frequency distributions, which were analysed by LCA pseudocohort analysis in VIT and using a yield per recruit approach. The mean length-frequency data of two combined years (2007-2008) raised to the mean total catch of those two years was used.

REFERENCE POINTS: GFCM SAC proposes the following reference points as a basis for management advice: $F_{MSY} = F_{0.1} = \leq 0.34$ and $F_{max} = 0.57$

STOCK STATUS Based on the report of the GFCM SAC, overfishing was occurring in 2008 ($F_{2008} = 0.65 > 0.34$).

RECENT MANAGEMENT ADVICE: GFCM SAC advises that the relevant fleets' effort to be reduced by about 40-60% until fishing mortality is below or at the proposed level F_{MSY}, in order to avoid future loss in stock productivity and landings. Moreover nursery grounds should be identified and protected.

STECF COMMENTS: STECF agrees with the advice from the GFCM SAC.

7.82 Red mullet (*Mullus barbatus*) in Geographical Sub Areas 15 and 16. Malta Island and South of Sicily

FISHERIES: Red mullet (*M. barbatus*) is one of the main demersal resources of the coastal areas in the Mediterranean, fished by otter trawl and, in minor quantities, by trammel-nets, together with other several species such as *Mullus surmuletus, Merluccius merluccius, Pagellus sp., Uranoscopus scaber, Raja sp., Trachinus sp., Octopus vulgaris, Sepia officinalis, Eledone sp.* and *Lophius sp.*. In GSAs 15 and 16 red mullet is caught almost exclusively by inshore trawlers operating on shelf fishing-grounds of GSA 15 and 16. Landings data for GSAs 15 and 16 collected within the Data Collection Framework (DCF) showed a decrease from 1,409 t in 2005 to 608.5 t in 2011. More than 95% of the annual landing is due to bottom otter trawlers. The total contribution of the Maltese fleet to total landings in GSA 15 and 16 was 1% in 2005-2011. The effort of Italian otter trawl >24 m LOA decreased by 32% since 2004. Whereas the effort of Maltese trawlers of LOA>24 m showed an increasing trend. A decreasing pattern was also clear for both Italian and Maltese small scale vessels (6-12 m) equipped with trammel-nets.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent available assessment was performed by STECF EWG 12-10 and GFCM demersal WG meeting in November 2012 and endorsed by GFCM-SAC.

REFERENCE POINTS: STECF and GFCM-SAC proposes the following reference points as a basis for management advice:

$F_{MSY} = F_{0.1} =$ 0.45

$F_{CURRENT} =$ 1.3

STOCK STATUS: GFCM-SAC concluded that the stock showed a decreasing SSB trend, from 2,389 t in 2007 to 1,147 t in 2011. Both STECF and GFCM-SAC considered the stock to be exploited unsustainably.

RECENT MANAGEMENT ADVICE: STECF and GFCM-SAC advises that the relevant fleets' effort and/or catches to be reduced until fishing mortality is below or at the proposed F_{MSY} level, in order to avoid future loss in stock productivity and landings. STECF considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects. The current high discarding rate of juveniles of the 0 group needs to be reduced by improving the trawl net selectivity (i.e. adoption of sorting grids) and through the reduction of fishing effort on the continental shelf in autumn.

STECF COMMENTS: STECF has no additional comments.

7.83 Bogue (*Boops boops*) in Geographical Sub area 26. South Levant Egypt

The results from the most recent assessment and advice for this stock were released in 2010. The text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: In the Egyptian Mediterranean (GFCM-GSA26), Bogue (*Boops boops*) is exploited by bottom trawlers. About 1200 fishing boats are operated in this fishery. The catch of Bogue fluctuated between 1222 and 3980 ton for the period 1997-2008 with a mean value of 2000 tons. The trawl fishery in GSA 26 is a multi-specific fishery targeting a number of commercial important species like red mullet, breams, soles, shrimps, crabs and cephalopods.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. GFCM SAC 2010 based its advice on monthly fish samples collected from landing sites and local market, the stock assessment (2007-2008) LCA-Pseudo cohort analysis (VIT) and Y/R.

REFERENCE POINTS: GFCM SAC 2010 proposes the following reference points as a basis for management advice:

$F_{MSY} = F_{0.1} =$ 0.59

F_{MAX} 0.94

F current = 1.09

STOCK STATUS: GFCM SAC 2010 assessed the stock to be subject to overfishing.

RECENT MANAGEMENT ADVICE: GFCM SAC 2010 advised to reduce the fishing mortality by 40-60%.

STECF COMMENTS: STECF agrees with the advice from the GFCM SAC. STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

7.84 Pink shrimp (*Parapenaeus longirostris*) in Geographical Sub Area 5. Balearic Island

FISHERIES: In the Balearic Islands (western Mediterranean), commercial trawlers develop up to four different fishing tactics, which are associated with the shallow shelf, deep shelf, upper slope and middle slope, mainly targeted to: (i) *Spicara smaris*, *Mullus surmuletus*, *Octopus vulgaris* and a mixed fish category on the shallow shelf (50-80 m); (ii) *Merluccius merluccius*, *Mullus* spp., *Zeus faber* and a mixed fish category on the deep shelf (80-250 m); (iii) *Nephrops norvegicus*, but with an important by-catch of big *M. merluccius*, *Lepidorhombus* spp., *Lophius* spp. and *Micromesistius poutassou* on the upper slope (350-600 m) and (iv) *Aristeus antennatus* on the middle slope (600-750 m). The pink shrimp, *P. longirostris*, is an important by-catch species in the upper slope. Historical data landings showed important oscillations with maximum landings around 30-50 tonnes in 2000-2002 and values lower than 20 tonnes for the rest of the years. In 2012 4.17 tonnes of pink shrimp were landed by bottom otter trawlers in GSA 5.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most updated assessment was done in 2013 by STECF EGW 13-09. An Extended Survivor Analysis (XSA) was performed using as input data bottom trawl landings and age distributions from 2002-2012; standardized indices from bottom trawl surveys (BALAR and MEDITS) were used as tuning fleets.

REFERENCE POINTS: STECF proposes $F \leq 0.62$ as a management reference point (basis $F_{0.1}$ as a proxy of F_{MSY}) consistent with high long term yields.

STOCK STATUS: STECF considers that *P. longirostris* in GSA 5 is exploited unsustainably. The current F_{0-2}= 0.77, and thus slightly higher than $F_{0.1}$= 0.62.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.85 Pink shrimp (*Parapenaeus longirostris*) in Geographical Sub Area 11. Sardinia

No additional information on this stock was available to the STECF since 2012, hence the text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The species is only exploited by trawlers, which operate in all seas surrounding the island. Fishing grounds are typical muddy bottoms from 150 to 570 m depth, but the occurrence of the species is mainly between 200 and 450 meter of depth. *P. longirostris* is generally caught together with other important commercial species such as *Nephrops norvegicus*, *Merluccius merluccius*, *Eledone cirrhosa*, *Illex coindetii*, *Todaropsis eblanae*, *Helicolenus dactylopterus*, *Phycis blennoides*, *Micromesistius poutassou*, *Lophius* sp. The discard fraction is composed of species such us Glossanodon leioglossus, Capros aper, Galeus melastomus and Raja spp. The trawl fleet showed remarkable changes from 1994 to 2004, with a general increase in the number of vessels and the replacement of the older ones, low tonnage wooden boats by larger steel boats. Since 2004 for the entire GSA an increase of 85% for boats >70 tons class occurred. A decrease of 20% for the smaller boats (<30 GRT) was also observed. The landings show an increasing trend, from 43 t in 2009 to 71 t in 2011.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. An assessment for pink shrimp in GSA 11 was done by STECF EWG 12-10.

REFERENCE POINTS: STECF proposes the following reference points as a basis for management advice:

$F_{MSY} = F_{0.1} =$ 0.49

$F_{CURRENT} =$ 0.69

STOCK STATUS: The stock is considered exploited unsustainably.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.86 Norway Lobster (*Nephrops norvegicus*) in Geographical Sub Areas 15-16. Malta Island and South of Sicily

FISHERIES: Norway lobster catches in the Strait of Sicily is caught almost exclusively by the bottom trawlers. It is one of the main commercial species for trawlers exploiting fishing grounds on the upper slope to target mainly the deep-sea pink shrimp (*Parapenaeus longirostris*) and the giant red shrimp (Aristaeomorpha foliacea). Other accompanying species of commercial relevance are *Merluccius merluccius*, *Lepidorhombus* spp., *Lophius* spp..

The stock is exploited by trawlers being basically a by-catch of vessels targeting deep-sea pink shrimps and giant-red shrimps. Landings data for GSA16 collected within the Data Collection Framework (DCF) ranged between 428 (2004) and 797 t (2007). The contribution of the Maltese fleet was less than 1% in 2005- 2011.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessments available to STECF were carried out in 2013 at STECF EWG 13-09.

REFERENCE POINTS: STECF EWG 13-09 proposes the following reference points as a basis for management advice: $F_{MSY} = F_{0.1} = \leq 0.20$.

STOCK STATUS: STECF EWG 13-09 classified the stock as sustainably exploited ($F_{2012} = 0.15$).

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.87 Norway Lobster (*Nephrops norvegicus*) in GSA 18 – South Adriatic

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Norway lobster catches from the south Adriatic come exclusively from bottom trawl mixed fisheries carried out in the upper slope (350-600 m depth). Annual landings decreased from 1300 to 865 t in the period 2007-2011. The proportion of the discards is generally low (about 3%). The fishing effort of trawlers (kw*fishing days) decreased of 25% since 2004, from 2.536.454 to 1.900.240 kw*fishing days.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessment available to STECF was carried out in 2012 at STECF EWG 12-10. The DCF data for the period 2010-2011 were used to perform a length cohort analysis (LCA) along with a yield per recruit analysis (YPR) under a steady state assumption, using the VIT software. The analysis was carried out for the western side of the GSA 18 (Italian coasts), given the lack of available fishery data for the eastern side (Albania and Montenegro). A constant value of natural mortality M equal to 0.47 was estimated using Beverton & Holt Invariant method and terminal fishing mortality F_{term}= 0.5 was assumed. The F current has been calculated on the age range between 1 and 7, being these the age classes more represented in the catches.

REFERENCE POINTS: EWG 12-10 proposed $F_{0.1}$ = 0.30 as proxy of F_{MSY} and as the exploitation reference point consistent with high long term yields.

STOCK STATUS: Survey indices indicate a variable pattern of abundance (n/h) and biomass (kg/h) of adults. The stock spawning biomass was rather stable from 1997 to 2006; then there was a slight decrease in 2007 followed by a large increase in 2009. After this year the abundance indices decreased to a level similar to the average of the time series. However, in the absence of proposed biomass management reference points, EWG 12-10 was unable to fully evaluate the status of the stock spawning biomass in relation to these.

Recruitment estimates from MEDITS surveys in the GSA 18 showed an increase from 2007 and 2009 and then a decrease until 2011. Based on the report of the STECF-EWG 12-10, overfishing was occurring in 2011 (F =0.54 > 0.30)

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.88 Common octopus (*Octopus vulgaris*) in Geographical Sub Area 5. Balearic Islands

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: In GSA 05 the Common octopus is caught both by trawl and artisanal fisheries. However, the main catches are from trawlers, and represent between 80 and 95% of the total octopus landings. This species is mainly taken by trawlers operating on the shallow continental shelf, accounting for between 20 and 37% of total catches from these trawling grounds. Octopus landings showed a large decrease from the beginning of the available time series in 1977 (364 t) to mid-1980s (129 t) followed by a peak in 1992 (262 t). Since then, landings have oscillated between 96 and 179 t. The landing in 2011 was about 135 t. Octopuses are rarely discarded and when discarded they are still alive and returned to sea in good condition.

Three main phases can be distinguished in the evolution of the fishing effort over time: 1) from 1965 to the mid-1970s it increased by a factor of 2.5; 2) from the mid-1970s to 1994 it continued to grow but at a slower rate; and 3) from 1994 to the present it has gradually decreased.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has

provided advice to the European Commission. The most recent stock assessment available to STECF was carried out in 2012 at STECF EWG 12-10. Data used in the assessment were CPUEs and landings from Mallorca (GSA 05) for the period 1977-2011. The analysis was performed using the ASPIC 5.3 software (A Stock-Production model Incorporating Covariates) assuming a Schaefer model.

REFERENCE POINTS: STECF proposed F_{MSY}=0.32 as the exploitation reference point consistent with high long term yields.

STOCK STATUS: Data on the spawning stock size were not available from production model outputs owing to the inherent characteristics of the model (catch data is used as a whole, not split by sizes or ages). The analysis of the time series from 1977 to 2011 showed that octopus total biomass was larger than B_{MSY} before the 1980s ($B>B_{MSY}$), and has remained lower than B_{MSY} since then. The main output parameters in 2011 for determining the stock status in terms of biomass were: 1) MSY=197 t; 2) B_{MSY}=614 t; 3) B/B_{MSY}=0.506. Relative fishing mortality (F/F_{MSY}) has oscillated between 1 and 2.3 throughout the time series. In 2011, F was 1.48 times F_{MSY}. The main output parameters in 2011 for determining the stock status in terms of exploitation were: 1) F_{MSY}=0.320; 2) F/F_{MSY}=1.481.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.89 Blue whiting (*Micromesistius potassou*) in Geographical Sub Area 1. Northern Alboran Sea

FISHERIES: Trawl is the main fleet exploiting blue whiting in GSA 1. The number of trawlers decreased slightly from 2002 (187) to 2010 (167). In the case of biggest vessels (>24 m), they have increased during this period. There was no information about specific effort for blue whiting in GSA 01. The majority of landings are reported by otter trawlers. Landings fluctuated during the period 2002-2011 with a maximum value of 3125t in 2006 and a minimum value of 426t in 2008. Discards are reported in the period 2009-2011 but there was no detailed length or age distribution of these discards.

Landings data were reported to STECF EWG11-12 through the Data collection regulation (OTB and GTR). Otter trawl landings represent around the 87% of the catches. Total landings increased from 95 t in 2002 to 225 t in 2009 and decreased in 2010 to 200 t. Discards are considered negligible and range at or below one ton.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent assessment and advice was provided by STECF-EWG-12-19 (December 2012).

REFERENCE POINTS: STECF proposes the following reference point as a basis for management advice:

$F_{msy} \leq 0.3$ (basis $F_{0.1}$)

STOCK STATUS: Based on the assessment results, showing that F_{cur} was between 1.0 and 1.4 in the period 2009-2011, STECF concludes that the stock of blue whiting in GSA01 is subject to overfishing.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.90 Blue whiting (*Micromesistus potassou*) in in Geographical Sub Area 6. Northern Spain

No additional information on this stock was available to the STECF since 2012, hence the text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Blue whiting is a demersal species important locally, especially in the northern part of GSA 06 and it is mainly exploited by the otter trawlers. The majority of landings are reported by otter trawlers (OTB). Landings fluctuated during the period 2002-2011 with a maximum value of 4,723 t in 2006 and a minimum value of 1,276 t in 2003. Discards are reported as negligible (<0.05 t). In 2011 the landing was 1936 t.

The number of vessels and GT days at sea of OTB fleet in GSA 06 showed a decreasing trend from 2006 until 2010 in both number of vessels and GT days at sea in the fleet segment corresponding to small and medium vessels (VL0012 and VL1224). The number of the largest vessels (>24 m) have increased until 2008 and declined thereafter. There was no information about specific effort targeting blue whiting in GSA 06.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessment available to STECF was carried out in 2012 at STECF EWG 12-10. A length cohort analysis (LCA) using VIT was computed using as input the DCF data on landings (2009-2011) along with the size structure of the bottom otter trawl catches. A yield per recruit analysis was carried out for the period 2009-2011.

REFERENCE POINTS: STECF proposed $F_{0.1} = 0.32$ as proxy of F_{MSY} and as the exploitation reference point consistent with high long term yields.

STOCK STATUS: Taking into account the results obtained by the VIT analysis (current F is around 1.05) the stock was considered exploited unsustainably.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.91 Blue whiting (*Micromesistus potassou*) in Geographical Sub Area 9. Ligurian and North Tyrrhenian Sea

No additional information on this stock was available to the STECF since 2012, hence the text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Blue whiting represents an important resource for the otter trawling fleet operating on the slope over muddy bottoms and the highest biomass is found on epibathyal fishing grounds, which are often called "Norway lobster and blue whiting fishing grounds". Total landings of blue whiting based on DCF remained rather stable in 2009-2011 with a mean value of about 116 t. Seasonal fluctuations are a proper characteristic of the landings of this species, as shown by the landings per unit of effort (LPUE: in kg/boat/day) estimated for the fleet of Santa Margherita Ligure (Ligurian Sea) in the period 1987-1996 and in more recently years (2009-2010 and 2011-2012). The fishing effort (KW* days at sea) of trawlers, in the GSA 9 decreased of about 36% in the period 2004-2011.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessment available to STECF was carried out in 2012 at STECF EWG 12-10. A length cohort analysis (LCA) was performed using DCF landing data and the size structures of pseudocohorts for the period 2009-2011. A yield per recruit analysis was carried out to estimate F_{01} at the equilibrium using the LCA input data (natural mortality vector) and LCA estimates of annual recruitment and fishing selectivity pattern. A SURBA analysis of MEDITS data for the period 1994-2011 was also carried out to reconstruct the stock trend across the last 17 years.

REFERENCE POINTS: STECF proposed $F_{0.1} = 0.53$ as proxy of F_{MSY} and as the exploitation reference point.

STOCK STATUS: Results obtained did not show a particular trend the stock size. MEDITS survey indices for SSB also indicate a variable pattern without a clear trend. Since no biomass reference point for this stock has been proposed, EWG 12-10 cannot evaluate the stock status in relation to these. Taking into account the results obtained by the VIT analysis (current F is around 1.12) the stock was considered exploited unsustainably.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort

and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.92 Black-bellied anglerfish (*Lophius budegassa*) in Geographical Sub Area 5. Balearic Islands

FISHERIES: In the Balearic Islands (western Mediterranean), commercial trawlers develop up to four different fishing tactics, which are associated with the shallow shelf, deep shelf, upper slope and middle slope (Guijarro and Massutí 2006; Ordines et al. 2006), mainly targeted to: (i) *Spicara smaris*, *Mullus surmuletus*, *Octopus vulgaris* and a mixed fish category on the shallow shelf (50-80 m); (ii) *Merluccius merluccius*, *Mullus* spp., *Zeus faber* and a mixed fish category on the deep shelf (80-250 m); (iii) *Nephrops norvegicus*, but with an important by-catch of big *M. merluccius*, *Lepidorhombus* spp., *Lophius* spp. and *Micromesistius poutassou* on the upper slope (350-600 m) and (iv) *Aristeus antennatus* on the middle slope (600-750 m). The black bellied anglerfish, *L. budegassa*, is an important by-catch species in the upper slope although it is also caught in the shallow and deep shelf. SSB oscillates between 2001 and 2007, with a decreasing trend thereafter and with the minimum values at the end of the data series (2009-2011).

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessment available to STECF was carried out in 2013 at STECF EWG 13-05. An Extended Survivor Analysis (XSA) was performed using as input data bottom trawl landings and age distributions (from sliced length frequency distributions) from 2001-2011 (2002-2011 from DCF data and 2001 from other projects). Biological parameters used correspond to those available from GSA 06. Bottom trawl surveys (BALAR and MEDITS) were used as tuning fleets.

REFERENCE POINTS: STECF proposed $F_{0.1} = 0.18$ as proxy of F_{MSY} and as the exploitation reference point consistent with high long term yields.

STOCK STATUS: Assessment results showed an increasing trend in F during the period analysed. Recruitment showed fluctuations, with a maximum in 2009. SSB showed a certain decreasing trend, with the lowest values of the data series observed in the last three years. The current F_{1-5} (1.13) is larger than $F_{0.1}$ (0.18), which indicates that black-bellied anglerfish in GSA 05 is exploited unsustainably.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.93 Black-bellied anglerfish (*Lophius budegassa*) in Geographical Sub Area 7. Gulf of Lions

FISHERIES: In this area, *Lophius budegassa* is exploited by French and Spanish trawlers. Around 127 boats are involved in this fishery and, according to official statistics; total annual landings for the period 2005-2011 have oscillated around an average value of 252 tons (324 tons in 2011). The French trawlers fleet is the largest (77% of the boats) and makes most of the catches (87%). The length in the French trawler catches ranges between 18 and 80 cm total length (TL), with an average size of 32 cm TL. The Spanish trawlers fleet is smaller (23% of the boats and 13% of the catch), the length in the catch is in the range 14-77 cm TL, with an average size of 30 cm TL.

The trawl fishery exploits a highly diversified species assemblage: Hake (*Merluccius merluccius*), Striped mullet (*Mullus surmuletus*), Red mullet (*Mullus barbatus*), Black-bellied angler (*Lophius piscatorius*), European conger (*Conger conger*), Poor-cod (*Trisopterus minutus capelanus*), Four spotted megrim (*Lepidorhombus boscii*), Soles (*Solea spp*.), Horned octopus (*Eledone cirrhosa*), Squids (*Illex coindetii*), Gilthead seabream (*Sparus aurata*), European seabass (*Dicentrarchus labrax*), Seabreams

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has

provided advice to the European Commission. The most recent stock assessment available to STECF was carried out in 2012 at STECF EWG 12-10 and GFCM WG demersal in November 2012. A length cohort analysis (LCA) analysis was performed using the VIT program for the years 2009, 2010 and 2011 to provide an overview of the current state of exploitation for black-bellied anglerfish in GSA 07. This method was used as the results from a preliminary XSA run were not considered to be reliable. The GFCM demersal WG of November 2012 has also performed an LCA/XSA analysis but the assessment results were considered preliminary and not endorsed by the GFCM-SAC.

REFERENCE POINTS: STECF proposed $F_{0.1} = 0.29$ as proxy of F_{MSY} and as the exploitation reference point consistent with high long term yields.

STOCK STATUS: Results obtained did not show a particular trend in stock size. However, in the absence of proposed biomass management reference points, EWG 12-02 was unable to fully evaluate the status of the stock spawning biomass in relation to these. Taking into account the results obtained by the VIT analysis (current F is around 0.97), the stock is considered exploited unsustainably

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.94 Black-bellied monkfish (*Lophius budegassa*) in Geographical Sub Area 15-16. Malta Island-South of Sicily

FISHERIES: In the Strait of Sicily black-bellied monkfish is a high value commercial species. It is fished almost exclusively by trawlers operating mainly on the outer shelf-upper slope, together with other important species, such as *Mullus spp., Pagellus spp., Merluccius merluccius, Zeus faber, Raja spp, Eledone spp., Illex coindetii, Todaropsis eblanae, Parapenaeus longirostris* and *Nephrops norvegicus*. In the period 2009-2011, the landings of the Italian and Maltese trawl fleets combined ranged between 250 and 285 tons. Catch due to artisanal fisheries could be considered as negligible. The Italian fleet was responsible for more than 98% of the total landings. The segment of the Italian demersal trawlers revealed a 32% decrease in effort for vessels larger than 24 m in the period 2004-2011. The Maltese trawling fleet was responsible for only 1.6% of total trawling effort in GSAs 15 & 16 in 2006-2011; however the nominal effort of Maltese trawlers has increased by 67% in 2006-2011.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessment available to STECF was carried out in 2012 at STECF EWG 12-10 and presented to the GFCM WG on demersal species of November 2012. Data coming from DCF for the period 2002-2011 were used to run a SURBA (i.e. MEDITS abundance indices by age for 2002-2011). Age structure of the landings in 2009 to 2010 was used to assess stock status through a pseudocohort analysis using the VIT software. GFCM-SAC endorsed the STECF assessment presented to the GFCM WG.

REFERENCE POINTS: STECF proposed $F_{0.1} = 0.16$ as proxy of F_{MSY} and as the exploitation reference point consistent with high long term yields.

STOCK STATUS: According to SURBA estimates, recruitment remained quite stable from 2002 to 2008, followed by an increase in 2009 and 2010, and a large decrease in 2011. SURBA estimated an SSB increase from 2002 to 2006, followed thereafter by a slight decrease. The first estimates of absolute values of SSB obtained by VIT, ranged between 540 (2010) and 980 t (2009). However, in the absence of proposed biomass management reference points, EWG 12-02 was unable to fully evaluate the status of the stock spawning biomass in relation to these. Taking into account the results obtained by the VIT analysis (current F_{1-7} is around 0.30) the stock was considered exploited unsustainably.

RECENT MANAGEMENT ADVICE: Based on VIT results, STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that

this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.95 Poor cod (*Trisopterus minutus capelanus*) in Geographical Sub Area 9. Ligurian and North Tyrrhenian Sea

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Poor cod is a by-catch demersal species in the GSA 09, usually landed by trawlers together with other small-sized species. Almost all the landings of poor cod are from bottom trawl vessels. The remaining fraction is caught by artisanal vessels using set nets, in particular gillnets. Poor cod is one of the by-catch species of demersal trawl fishery targeting a highly diversified species assemblage on deep shelf, including hake (*Merluccius merluccius*), red mullet (*Mullus barbatus*) and horned octopus (*Eledone cirrhosa*). In the last eight years, the total landings of poor cod of GSA 09 fluctuated between a minimum of 91 in 2010 to a maximum of 226 tons in 2004. A clear decline was observed in 2004-2006, and then the landings remained quite constant around 100 tons per year (105 tons in 2011). Juveniles of poor cod are usually completely discarded at sea due to their low commercial value. In 2011, 37.4 tons have been discarded, corresponding to 26.4% of the total catch in GSA 09.

In the last 8 years, the fishing effort by the gears exploiting poor cod in the GSA 09 has shown different patterns; for bottom trawl demersal fishery, the main fleet targeting poor cod, an increasing trend is observed, from a minimum of 252,970 GT*fishing days to 1,270,144 in 2011; on the contrary, fishing effort of the bottom trawl mixed fishery, which exploits poor cod in a less extent, showed an evident decreasing trend in fishing effort in the period considered. However, it was not possible to exactly quantify the specific effort exerted by the demersal fishery fleet on this stock. Fishing effort of set nets (GNS and GTR) remained substantially stable.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessment available to STECF was carried out in 2012 at STECF EWG 12-10. Data used for the assessment included both MEDITS trawl survey and commercial catches (landings and discards) by size and age. The survey-based stock assessment approach SURBA was used on MEDITS (1994-2011) data to estimate trends in F, SSB and recruitment. A pseudocohort analysis (length cohort analysis: LCA) using VIT software on commercial catches for 2011 was performed to estimate F, numbers at age and other stock parameters. A yield per recruit model based on VIT input and LCA output (fishing selectivity pattern) was run to estimate $F_{0.1}$ under the steady state assumption.

REFERENCE POINTS: STECF proposed $F_{0.1} = 0.74$ as proxy of F_{MSY} and as the exploitation reference point consistent with high long term yields.

STOCK STATUS: The VIT analysis performed gave SSB estimations of 163 t in 2011. The MEDITS survey data showed fluctuations in stock abundance without a clear trend. However, since no biomass reference point for this stock has been proposed, EWG 12-10 cannot evaluate the stock status in relation to these. Annual recruitment was estimated to be about $3x10^6$ recruits in 2011. The SURBA analysis of MEDITS data for the period 1994-2011 showed a high fluctuation in the recruitment index with a negative trend in the last five years. Taking into account the results obtained by the VIT analysis (current F is around 0.90) the stock was considered to be exploited unsustainably.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.96 Greater forkbeard (*Phycis blennoides*) in Geographical Sub Area 9. Ligurian and North Tyrrhenian Sea

FISHERIES: On average around 80% the landings are taken by the otter trawl fleet, the remain portion is taken by small scale fishery using trammel net and gill net. Total landings of greater forkbeard, based both on National statistics and DCF, increased from 2007 to 2010 and remained stable in the last year with about 30 tons. Despite the seasonality fluctuations are a proper characteristic of the landings of this species, as shown by the LPUE (kg/boat/day) produced by the fleet of Santa Margherita Ligure in the period 1987-1996 and in more recently years (2009-2010 and 2011-2012) the mean LPUE values decrease respect to the past. Discards is occurring in otter trawl fleet and are represented by young specimens (mainly under 20 cm of total length) and represents more than 91% of the total catch (351 tons in 2011).

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessments available to STECF were carried out in 2012 at STECF EWG 12-19.

REFERENCE POINTS: STECF EWG 12-19 proposes the following reference points as a basis for management advice: $F_{MSY} = F_{0.1} = \leq 0.32$.

STOCK STATUS: STECF EWG 12-19 classified the stock as unsustainably exploited ($F_{2011} = 0.89$).

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF notes that a mistake occurred in the latest STECF EWG 12-19 report, where the value of $F_{current}$ in 2011 was reported as 1.01 instead of 0.89.

7.97 Mantis shrimp (*Squilla mantis*) in GSA 10. South Tyrrhenian Sea.

FISHERIES: In GSA10 the bulk of shrimp catches are produced by otter trawlers, with a low contribution of fixed nets. Landings of trawlers increased from 145 t in 2008 to 297 t in 2011. The discards amounted to 24.5 t in 2011.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessment available to STECF was carried out in 2012 at STECF EWG 12-10. Only one year (2011) of length frequency distributions of landings was analyzed under the steady state assumption, using age classes as pseudocohorts. A VPA based on pseudocohorts and Y/R analysis was applied using the *VIT4win* software package. Data of number at age were taken from the DCF official 2012 data call. Due to the low and sparse frequency of individuals in age classes 4 to 7, the analysis was carried out using a plus group for age 3 and older.

REFERENCE POINTS: EWG 12-10 proposed $F_{0.1} = 0.41$ as proxy of F_{MSY} and as the exploitation reference point consistent with high long term yields.

STOCK STATUS: Survey indices indicated a variable pattern of abundance, with the values in the last 3 years among the lowest observed in the period 1994-2011. Taking into account the results obtained by the VIT analysis (current F is around 1.08), the stock is considered exploited unsustainably

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.STECF also stresses the need to analyse a longer data series in order to confirm the results obtained for 2011.

STECF COMMENTS: STECF notes that the assessment is likely to benefit from a thorough review of the parameters for growth and natural mortality.

7.98 Mantis shrimp (*Squilla mantis*) in Geographical Sub Area 17. Northern Adriatic

FISHERIES: Although *S. mantis* ranks first among the crustacean landed in the Adriatic Italian ports of GSA 17, the species is not the target of a specialised fishery, but it is only an important component of local multispecies trawl and gillnet fisheries. Only in the Gulf of Trieste there a target artisanal fisheries with creels. In the Italian side of the GSA 17, the species is exploited by different types of gears although the majority of the landing comes from trawling. The Italian annual landing for 2011 was due for 63% to bottom trawl (2,399 tons), 30% to gillnet (1,136 tons) and 7% to "*rapido"* trawl (251 tons). The species is absent from the landings statistic of Croatia (FAO-FISHSTAT J – GFCM Database) and it accounted for 3.5 tons in the Slovenian landings of 2011 (2012 DCF data; not used in the assessment). Moreover *S. mantis* it is not present in the list of shared stock of GFCM.

About 400 bottom trawlers exploit the stock all year round in the coastal areas. Mantis shrimp is caught as a part of a species mix (e.g. *Sepia officinalis, Trigla lucerna, Merluccius merluccius, Mullus barbatus, Eledone spp.)* which constitutes the target of the trawlers operating on the continental shelf. Trawl catch is mainly composed by age 1 and 2 specimens with a lower contribution of the older age classes. *S. mantis* is also a by catch (only in few cases also target) of gillnetters targeting *Solea solea*, especially during spring-summer seasons in the coastal area.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessment available to STECF was carried out in 2012 at GFCM-SAC. The assessment was based only on Italian DCF catch data (landings + discards), because fishery data from the Croatian fleets were missing and for Slovenian the data on the size distribution of catches was not available. However, the contribution of Slovenian catches was negligible, considering that it represents less the 0.1% of the total catches. Considering the absence of specimens collected during SoleMon survey carried out inside the Croatian waters and the low abundance observed in the MEDITS data available from the eastern side of the basin (2002 and 2005), it is possible to assume that the assessment carried out during the EWG 12-10 covers almost completely the stock exploited in GSA 17. A steady state VPA, a separable VPA and a yield per recruit analysis was performed using commercial catches for the year 2011 in order to estimate F of the three fleets exploiting mantis shrimp (OTB, GNS and TBB), along with $F_{0.1}$.

REFERENCE POINTS: GFCM-SAC proposed $F_{0.1} = 0.50$ as proxy of F_{MSY} and as the exploitation reference point consistent with high long term yields.

STOCK STATUS: The results of the analyses conducted with a steady state VPA and a separable VPA show that the mantis shrimp in GSA 17 is fished unsustainably, being the current F (2011) estimates with VIT model and separable VPA respectively of 0.93 and 1.00, higher than the proposed reference point ($F_{0.1} = 0.50$). The MEDITS and SoleMon surveys also indicate a general decreasing trend in stock biomass.

RECENT MANAGEMENT ADVICE: GFCM-SAC recommends the relevant fleets' effort and/or catches to be reduced until fishing mortality is below or at the proposed F_{MSY} level, in order to avoid future loss in stock productivity and landings. This should be achieved by means of a multi-annual management plan taking into account mixed-fisheries considerations. Catches and effort consistent with F_{MSY} should be estimated.

STECF COMMENTS: STECF agrees with the assessment of the stock status and considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

7.99 Mantis shrimp (*Squilla mantis*) in Geographical Sub Area 18. Southern Adriatic Sea.

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: *Squilla mantis* does not represent a target species of fisheries of the southern Adriatic Sea, but it is part of the mixed species representing the by-catch of otter trawlers and set netters using gill net and trammel net. The species is absent from the landings statistic of Montenegro and Albania (FAO-FISHSTAT J – GFCM

Database) and it is not present in the list of shared stocks of GFCM. According to GFCM statistics, Adriatic landings account for 66 % of the Mediterranean landings of this species (FISHSTAT J – GFCM, 2008).

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessment available to STECF was carried out in 2012 at STECF EWG 12-10. Because fishery data from the eastern side of the basin were missing, the assessment was based only on Italian catch data of 2011, assuming that the Italian fleets exploit only the stock inhabiting the western side of GSA 18, which can be considered separated from the stock present in the eastern side of the basin. A steady state VPA analysis and a YPR (yield per recruit) was performed with VIT using commercial catches for the year 2011 in order to estimate F of the four fleets exploiting mantis shrimp (OTB_DEMSP, OTB_MDDWSP, GNS and GTR), along with $F_{0.1}$, numbers at age and other stock parameters.

REFERENCE POINTS: STECF proposed $F_{0.1} = 0.27$ as proxy of F_{MSY} and as the exploitation reference point consistent with high long term yields.

STOCK STATUS: The VIT analysis performed gave an SSB estimate in 2011 of 190 t. However, since no biomass reference point for this stock has been proposed, EWG 12-10 cannot evaluate the stock status in relation to these. The VIT analysis performed gave an estimation of $47x10^6$ recruits in 2011. Taking into account the results obtained by the VIT analysis (current F is around 1.04), the stock is considered exploited unsustainably.

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.STECF also emphasized the necessity to analyse a longer data series in order to confirm the results obtained for 2011.

STECF COMMENTS: STECF also notes that the assessment is likely to benefit from a thorough review of the parameters for growth and natural mortality.

7.100 Red mullet (*Mullus barbatus*) in Geographical Sub Area 18. Southern Adriatic Sea.

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Red mullet is mainly targeted by trawlers (93% of the annual landing) and at much lesser extent by small scale fisheries using gillnets and trammel nets. Fishing grounds are located along the coasts of the whole GSA. Red mullet co-occurs with other important commercial species such as *Pagellus spp., Eledone spp., Octopus spp.* and *M. merluccius*. In 2008 a management plan was adopted, which included the reduction of the fleet capacity associated with a reduction of the time at sea. Available landing data collected under the DCF ranged from 1,680 t in 2007 to 532 t in 2011, the latter being the lowest value registered in the period. The proportion of discards of red mullet in the GSA 18 was generally low (less than 6% of total landing) in 2007-2011 and was not included in the XSA input data.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The most recent stock assessment available to STECF was carried out in 2012 at STECF EWG 12-10. The assessment was based on both trawl surveys data (MEDITS survey from 1996 to 2011) and commercial catches for the period 2007-2011. The analysis was carried out for the western side of the GSA 18 (Italy), given the availability of fishery data only for this side. The stock was assessed by XSA, using as tuning data the MEDITS time series for 2007-2011, and a vector of natural mortality M. Management reference points were estimated by a yield per recruit analysis using the Yield software.

REFERENCE POINTS: STECF proposed $F_{0.1} = 0.50$ as proxy of F_{MSY} and as the exploitation reference point consistent with high long term yields.

STOCK STATUS: The XSA method showed a decreasing pattern in SSB in the period 2007-2011 (from 732 to 365 t). Recruitment showed a decrease between 2007 (150 million) and 2010 (68 million) and an increase in 2011 (130 million). EWG 12-10 was however unable to fully evaluate the status of the stock spawning biomass

and recruitment in relation to the absence of proposed biomass management reference points. The fishing mortality shows a decrease in time from 1.94 in 2007 to 1.48 in 2011. Taking into account the results obtained by the XSA the stock was considered exploited unsustainably

RECENT MANAGEMENT ADVICE: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

STECF COMMENTS: STECF has no additional comments.

7.101 Barracuda (*Sphyraena sphyraena*) in Geographical Sub Areas 12-13. Northern Tunisia-Gulf of Hammamet

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Barracuda is exploited in Tunisian coastal waters by both artisanal vessels using gillnets (77% of the catch) and purse seiners of 12-24 m LOA (23% of the catch). The annual catch in GSA 12 was about 130 t composed by specimens between 17 and 74 cm TL.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The stock was assessed for the first time by the working group on stock assessment of the GFCM in 2011 and endorsed by the 2011 GFCM SCSA and subsequently adopted by GFCM SAC. Annual landings by gear and their length frequency distributions for the period 2007-2010 were used to run a pseudocohort analysis (length cohort analysis: LCA) using the VIT software.

REFERENCE POINTS: The GFCM SAC has proposed $F_{0.1}$ as the reference point for fishing mortality.

STOCK STATUS: Taking into account the results obtained by the VIT analysis, the stock is considered to be exploited, above a level that is believed to be sustainable.

RECENT MANAGEMENT ADVICE: GFCM SAC recommended that F be reduced (40% in GSA 12 and 60% in GSA 13)

STECF COMMENTS: The values of the estimated current F and F_{max} were absent from the GFCM assessment summary sheet however the results from a yield-per-recruit analysis indicate that recent F is above F_{max}. STECF agrees with the Sub Committee on Stock Assessment (SCSA) of the GFCM that F_{max} should be replaced by $F_{0.1}$ as the reference for fishing mortality and adopted as the proxy for F_{MSY} in the absence of a more appropriate proxy.

7.102 Striped red mullet (*Mullus surmuletus*) in Geographical Sub Area 25. Cyprus Island

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Striped red mullet in GSA 25 is exploited mainly by the artisanal fleet using set nets (basically trammel nets) and by the bottom otter trawlers in a minor extent. In both fisheries the species is exploited with a number of other demersal species. Since 2006 the number of licensed bottom trawlers operating in GSA25 has been reduced by 50% (from 8 to 4). The artisanal vessels are 500. The total annual catch in the period 2009-2010 was about 37 t, of which the 96% was caught by the artisanal fleet. In the period 1985-2010 there have been fluctuations in the landings of stripped red mullet during the first half of the period, with a clear decreasing trend from the middle of the '90's. In 2009-2010 the landings remained at the same levels. The most exploited age classes by the artisanal fleet are the ages 1and 2, while the bottom trawl fishery exploits mainly the age classes 2 and 3.

Discards from the bottom trawl were evaluated for the first time in 2006, through a pilot study under the 2006 Cyprus National Fisheries Data Collection Programme, and are annually estimated from 2008. There are no/negligible discards of the species both in the bottom trawl fishery and artisanal fishery.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The stock was assessed for the first time by the working group on stock assessment of the GFCM in 2011 and endorsed by the 2011 GFCM SCSA and subsequently adopted by GFCM SAC. The assessment was based on landings data (i.e. total annual landings, age composition) by fleet segments/gear (artisanal vessels using fixed nets and bottom trawlers) and estimated biological parameters for the period 2009-2010. The VIT software was used to run two length cohort analysis (LCA) and yield per recruit (YPR) analysis, under the equilibrium assumption, for the two years separately.

REFERENCE POINTS: $F_{0.1}$ was adopted by GFCM-SAC as the reference for fishing mortality. Two values of $F_{0.1}$ were provided respectively derived from 2009 and 2010 data: F_{01} (2009) = 0.22; F_{01} (2010) = 0.23 as basis for management advice.

STOCK STATUS: Landings per unit effort (LPUE - kg/day) of stripped red mullet of artisanal vessels show a clear decline since mid '80s. LPUE of bottom trawlers, showed a peak in 1993-1994 and 2004. From 2006 there is a decreasing trend, with the lowest values (of the whole period 1985-2010) recorded in 2009-2010 The LCA estimated a recruitment of 1.5-1-6 millions in 2009-2010. The estimated SSB was 51 t in 2009 and 36 t in 2010. The mean F estimated by the LCA was 0.49 in 2010 and 0.42 in 2009. Based on the Y/R analysis of 2010 the current fishing mortality (0.49) was 53% higher than the $F_{0.1}$ (0.23). Based on the Y/R analysis of 2009 the fishing mortality (0.42) was 48% higher than the $F_{0.1}$ (0.22).

RECENT MANAGEMENT ADVICE: GFCM SAC recommended that F be reduced, considering that, based on 2009-2010 analysis, the current F was 24-28% over the estimated $F_{0.1}$.

STECF COMMENTS: STECF agrees with the advice of the GFCM – SAC. STECF noted that the assessment was based on two different values of $F_{0.1}$. Although these values are similar, STECF considers that the estimated value for $F_{0.1}$ of 0.23 is the most appropriate value to use since it is derived using the exploitation pattern most recently observed in the fishery. STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects.

7.103 Picarel (*Spicara smaris*) in Geographical Sub area 25. Cyprus Island

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Picarel in GSA 25 is exploited mainly by the bottom trawl fleet (67% of the annual catch) and by the artisanal fishery. Since 2006 the number of licensed bottom trawlers operating in GSA 25 has been reduced by 50% (from 8 to 4). In 2005-2010 the annual catch of trawlers fluctuated without trend between 97.4 and 168.9 t. The artisanal fleet landed 34.2-79.6 t in the same period. Bottom trawl discards were evaluated to be 15.9 t in 2006, 4.9 t in 2008 and 1.7 t in 2010. Discards from the artisanal fishery are considered negligible.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The stock was assessed by the STECF-EWG-11-12 and the GFCM in 2011.

REFERENCE POINTS: The STECF proposes F_{MSY}=0.31 ($F_{0.1}$ basis) as reference point.

STOCK STATUS: Considering the estimated values of current F (0.06 and 0.08), STECF classifies the stock's exploitation status as sustainable. The assessment carried out by the GFCM WG was endorsed by the SAC-GFCM as preliminary due to some inconsistencies in the results of the analyses on the two sets of data.

RECENT MANAGEMENT ADVICE: STECF advises future fisheries shall be maintained at a sustainable level. This would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects. GFCM-SAC, advised that an approximate reduction of 15% (10- 20%) of the current F could lead to $F_{0.1}$. This could be achieved with the reduction of licensed fishing vessels LOA 6-12m and trawlers LOA 12-24m. The increase of selectivity was also considered an important management objective.

STECF COMMENTS: STECF notes that the stock was assessed in the same year by both the GFCM WG on stock assessment and the STECF EWG 11-12. The two assessments were based on two different analytical approaches (GFCM: length cohort analysis; STECF: XSA) and returned different results in terms of F cur and

F_{01} estimates. However, the GFCM – SAC endorsed the assessment produced by its WG as preliminary and recommended to improve the analyses by using an analytical age-based approach (VPA or XSA). STECF agrees with the assessment of the stock status derived by the XSA and considers that in order to avoid future loss in stock productivity and landings the exploitation rate should be reduced to F = 0.31 or below.

7.104 Bogue (*Boops boops*) in Geographical Sub area 25. Cyprus

The results from the most recent assessment and advice for this stock were released in 2012. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: In the Cyprus (GFCM-GSA25), Bogue (*Boops boops*) is exploited by bottom trawlers. About 540 fishing boats are operated in this fishery. The catch of Bogue was around 256 ton in 2010. The bottom trawl fishery (12 boats) in GSA 26 is a multi-specific fishery targeting a number of commercial important species like albacore, picarel (*Spicara smaris*), stripped red mullet, or *Sparisoma cretense*.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The stock was assessed for the first time by the working group on stock assessment of the GFCM in 2011 and endorsed by the 2011 GFCM SCSA and subsequently adopted by GFCM SAC. GFCM SAC 2011 based its advice on monthly fish samples collected from landing sites and local market, the stock assessment (2005-2010) LCA-Pseudo cohort analysis (VIT) and Y/R (2005-2007 and 2008-2010).

REFERENCE POINTS: GFCM SAC 2011 proposes the following reference points as a basis for management advice:

$F_{0.1}$ = 0.24

STOCK STATUS: GFCM SAC 2011 assessed the stock to be subject to overfishing in 2008-2010, since the estimated F = 0.37 was higher than $F_{0.1}$.

RECENT MANAGEMENT ADVICE: GFCM SAC 2011 advised to reduce the pressure in the artisanal fisheries. By analysis of transition, reduce about 15% (10 -20%), the pressure current fishing would return to $F_{0.1}$. To achieve this, must reduce fishing boats of 6 to 12 m licensed and increase the gear selectivity.

STECF COMMENTS: STECF considers that in order to reduce fishing mortality to or below the proposed F reference point ($F_{0.1}$) and to avoid future loss in stock productivity and landings, fishing effort and catches of fleets that exploit this stock should be reduced. STECF also considers that this would best be achieved by implementing multi-annual fleet-management plans that take into account mixed-fishery effects. STECF agrees with the GFCM-SAC recommendation to improve the analyses for this stock by using an age-based analytical approach.

8 Elasmobranch Resources in the Mediterranean Sea

A long list of elasmobranch species has been reported to occur in the Mediterranean with 71 different species reported to be taken by Mediterranean fisheries. According to the official statistics provided by FAO-GFCM capture fisheries production dataset (Fishstat, 1970-20010, the nominal landings of elasmobranchs from the Mediterranean and Black Sea reached the highest values in the 1980s and 1990s, mainly reported in the Ionian Sea, with peaks of >23 000 tonnes in 1984, 1985, and 1994. From 1994, landings gradually declined, reaching a minimum of 8 732 tonnes in 2004. In the following years reported landings slightly increased. In 2010 the total nominal landing in the Mediterranean was decreasing to minimum value of 7641 t.

According to IUCN (based on assessments conducted in 2003), forty-two percent (30 species) of Mediterranean Chondrichthyans fishes are considered threatened (Critically Endangered, Endangered or Vulnerable) within the region. Of these, 18% (13 species) are *Critically Endangered*, 11% (8 species) are *Endangered* and 13% (9 species) are *Vulnerable*. A further 18% (13 species) of Mediterranean Chondrichthyans are assessed as Near Threatened and 14% (10 species) are assessed as Least Concern. Little information is known about 26% (18 species), which have therefore been assessed as Data Deficient. A higher percentage of elasmobranchs are clearly more seriously threatened inside the Mediterranean than they are globally.

A feature of concern is the large number of gaps in the time series for elasmobranch species for the Mediterranean and poor identification of species in the landings. For example, the collective groups "Shark, rays, skates, etc" and "Rays, stingrays, mantas" accounted for 75% of the total landings in 2010. In the Mediterranean, the collection of stock related variables is requested by DCF only for *Raja clavata* and *Raja miraletus*, but even for these two species member states may not collect any data if their landings for species are less than 200 tonnes on average during the three previous years or represent less than 10% of total Community landings (Commission Decision, 2008/949/EC, adopting a multi annual Community programme pursuant to Council Regulation (EC) No 199/2008 establishing a Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the Common Fisheries Policy. Consequently it is quite difficult to define and assess the most important stocks. 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. The text reported below provides a summary of the stock and fishery related information available to STECF from FAO-GFCM and ICCAT as well as from MEDITS and GRUND programs at the time of preparing the report.

No assessment was conducted by GFCM since 2011 meeting, (SCA-SCSA Stock assessment of selected species of elasmobranchs), in 2012 a workshop on age determination of elasmobranchs in the GFCM area was organized in order to enhance the knowledge on biological parameters lacking for Mediterranean area.

In 2011, the GFCM SAC organized one meeting for a Workshop on Stock Assessment of Selected Species of Elasmobranchs in the GFCM area (DG-MARE, Brussels, December 2011) the group made the following general conclusions:

- **Data deficiencies**: Assessments, in the main, have been hampered by a lack of reliable data. While survey data are available, both at a national level, and from co-ordinated surveys such as MEDITS, commercial data is not available in the same quantities and detail. The lack of length data from the commercial catch composition limits the types of stock assessment that can be carried out. There are three main data issues, two related to official landings statistics, the other to commercial data.
- **Official statistics**: While the availability of official landings statistics is improving, there appears to be an underreporting of landings, as compared to data available from individuals at the meeting. This can be for a number of reasons:
  - i) Fishermen may not take care when completing landings data records, for a variety of reasons;
  - ii) Administrations may not consider that it is important to collect accurate data for these species, or do not have adequate data collection systems in place;
  - iii) Some species could be underreported to avoid highlighting the level of by-catch,
  - iv) Some small inshore vessels may target (or have a by-catch of) certain elasmobranch species and the landings of such inshore vessels may not always be included in official statistics.

- **The use of generic landings categories**: Where landings data are supplied, they are rarely available at species level. Catches are frequently supplied to the GFCM in generic categories such as "dogfish sharks nei", "Raja, rays nei" or even just as "Sharks, rays, and skates etc. nei". The problems associated with this approach have been documented in other regions (ICES 2006, Johnston *et al.* 2005) The use of generic categories means that accurate species assessments are not possible, as the proportion of individual species within these categories cannot be calculated. Trends in landings or CPUE cannot be seen when landings are declared to these levels.
- **Port sampling data**: Stock assessment models require data on the age or length composition of the commercial catches. Port sampling programmes are required to collect these data. These programmes would have the added benefit of proving additional data that would help separate the generic catches outlined above into their constituent species.

GENERAL STECF COMMENTS: STECF notes that some updates have been added to the present report for a few species. However, more detailed data both on landings and on stocks are needed in the future for providing management advice for these stocks. Stock and fishery related data are not currently collected in the framework of the DCF for most of elasmobranchs, which makes stock assessment difficult for most species. In view of the reported or assumed declines in most stocks and the threatened status (according to IUCN) of 30 species of Mediterranean Chondrichthyans, STECF notes the need to increase the available information on elasmobranchs stocks and and agrees with the recommendations of the GFCM SCSA which were as follows:

- A. Commercial data collection programmes for both targeted and by-catch species and by-products should be developed in a standardized way at regional level with harmonized protocols based on the existing FAO and other guidelines already published.
- B. Elaboration of field practical guides for identification of the species and dissemination of the existing ones.
- C. Enhance capacity building through training workshops to improve knowledge on assessing the age such as the one being organized by the GFCM within the framework of the "medium term research program to improve the knowledge on elasmobranchs" currently in force and that was held from 12 to 16 March 2012 in Antalya, Turkey. Identification training workshops as well as on quantitative analysis are also advisable.
- D. Make use of the existing experience on the work in other areas, to use available methodologies to assess the status in cases of data shortage as for the specific cases of long lived species.
- E. To create a multi-choice table to facilitate the selection of methods to be used, adapted to the data available and to the Mediterranean context (data shortage).
- F. The research institutions from neighbouring countries sharing stocks should strengthen their collaboration.
- G. Collaboration needs to be granted among the organizations dealing with conservation issues (e.g. IUCN, RAC/SPA) so as not to duplicate efforts, base their evaluations on the most sound scientific knowledge, and also improve the consultation process with the GFCM.

STECF suggests that consideration be given to issuing a call to tender to undertake this work which will require multinational cooperation to obtain comprehensive information from all countries exploiting elasmobranchs in the Mediterranean Sea Areas.

8.1 Basking shark (*Cetorhinus maximus*)

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The Basking shark is a by-catch in several fisheries with a very low market interest. Basking shark was mostly taken as a by-catch by driftnets used for swordfish fishery (driftnets have been banned since January 1, 2002 for the EU fleets and since 2004 in all the Mediterranean according to ICCAT and GFCM Recommendations). It is also caught by several other fishing gears in the Mediterranean, mostly by gill and trammels nets or occasionally in pelagic trawls. This species is not considered as a commercial species in several areas. SAC-GFCM 13 report that aggregations of basking shark *Cetorhinus maximus*, have been observed in the northern Balearic region, the Northern Adriatic and the Tyrrhenian Sea.

On the basis of the most recent data reported by the FAO-GFCM Capture Fisheries Production Dataset (Fishstat, 1970-2008), landings for this species are only reported by Spain. The yearly landings ranged from 0 to 6 tonnes in the period 1996-2008, with a peak of 10 t in 2004, and represented from 0.1% to 0.7% of the total catch of elasmobranchs in the western Mediterranean.

Documented fisheries in several regions have usually been characterized by rapidly declining local populations as a result of short-term fisheries exploitation, followed by very slow or no recorded population recovery. There is likely potential for similar population declines to occur in the future from directed and by-catch fisheries, driven at least in part by the demand for fins in international trade. This species is considered extremely vulnerable to overfishing, perhaps more than most sharks, ascribed to its slow growth rate, lengthy maturation time, long gestation period, probably low fecundity and probable small size of existing population.

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM.

REFERENCE POINTS: None.

STOCK STATUS: No assessment was undertaken, due to insufficient data.

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 (Appendix 2), the Bonn Convention (Appendix 1) and the Bern Convention (Appendix 2), and is also listed in Appendix II of CITES. This species is listed as Vulnerable both in the Mediterranean (VU A2bd; assessed in 2003) and globally (VU A2ad+3d; assessed in 2005) in the IUCN Red List. Since 2009 it has been prohibited for

Community vessels to fish for, to retain on board, to tranship and to land basking sharks in all Community and non-Community waters (Council Regulation 43/2009).

Malta Environment and Planning Authority listed in 2006 Basking shark as "Animal and plant species of national interest in need of strict protection" (Flora, Fauna and Natural Habitats Regulations 311/2006). "Strict protection" is also request for Basking shark in Slovenia (Decree on Protected Wild Fauna, Official Bulletin 46/2004) issued by the Ministry of Environment and Physical Planning, Turkey (Circulars on Fisheries related to Fisheries Law: 1380 issued by the Ministry of Agriculture and Rural Affairs) and Croatia (OG n°7/2006, issued by Nature Protection Directorate, Ministry of Culture).

Basking shark is listed in Annex I, Highly Migratory Species (UNCLOS).

STECF COMMENTS: STECF notes the lack of available data and advises that in order to assess the possible impacts of fisheries on basking shark; there is a need to improve the reporting of incidental catches of Basking shark for all concerned fisheries.

8.2 Thresher shark (*Alopias vulpinus*)

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: This pelagic species may occupy all the Mediterranean Sea. It was observed in Syria, the Ionian Sea and Levantine basin, It is sometimes caught by several fishing gears, always as by-catch, but it is often retained on board and sold on the market for its good price. Adults and juveniles of the Thresher shark are regularly caught as by-catch in longline, purse seine and mid-water fisheries throughout the Mediterranean Sea, as well as in recreational fisheries. In the Northern Adriatic Sea, gillnets (often set for demersal species) also have a by-catch of pelagic species, with *Alopias vulpinus* taken during the summer. Surface long-line fisheries, that target tuna and swordfish, also catch *A. vulpinus*. A number of specimens of this species may be also taken in large driftnet fisheries, even though this fishery has been prohibited in the Mediterranean for several years. Recent observations show that thresher sharks are caught in tuna traps fisheries, in the trap of Sidi Daoud, north of Tunisia, the large sharks are 2.3% in biomass of total catch (combine data for *A. vulpinus*, *Carcharodon carcharias* and *Isurus oxyrhinchus*). The species has some important parturition and nursery areas in this region, for example the Alborán Sea, where aggregations of pregnant females have been observed. Recent investigations show that pelagic sharks, including this species, are being increasingly targeted in the Alborán Sea by the Moroccan illegal swordfish driftnet fleet. Data from this fishery suggest that both annual catches and mean weights of the Thresher shark have fallen as a result of fishing mortality.

Data on catches are extremely poor and sometimes include another species (*Alopias superciliosus*), much more rare in the Mediterranean. On the basis of the most recent data reported by FAO-GFCM Capture Fisheries Production Dataset (Fishstat, 1970-2010), landings for this species in the Mediterranean are reported by Spain, Portugal, Italy and France. The catches ranged from 3 to 21 tonnes in the period 1996-2010, representing from 0.1% to 1% of the annual total catch of elasmobranchs reported for the western Mediterranean. The annual mean catch was around 15 t between 1999 and 2007 but declined to 6 t in 2010.

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM, but this species is also under the ICCAT responsibility.

REFERENCE POINTS: None

STOCK STATUS: The Mediterranean is considered as a separate management unit for this species. In the IUCN Red List, the species is listed as Vulnerable both in the Mediterranean (VU A3bd; assessed in 2007) and globally (VU A2bd+3bd+4bd).

Malta Environment and Planning Authority listed in 2006 thresher shark as "Animal and plant species of national interest whose taking in the wild and exploitation may be subject to management measures" (Flora, Fauna and Natural Habitats Regulations 311/2006).

Thresher shark is listed as Annex I, Highly Migratory Species (UNCLOS).

RECENT MANAGEMENT ADVICE: None

STECF COMMENTS: STECF notes the lack of available data and advises that in order to monitor the possible impacts of fisheries on thresher shark; there is a need to improve the reporting of incidental catches of thresher

shark for all concerned fisheries. STECF suggests that regarding the wide distribution of the species and the lack of information on stocks identity, all incidental catches should be reported by the nations, and cooperation within the involved RMFO's should be encouraged to minimize incidental catches.

8.3 Tope shark (*Galeorhinus galeus*)

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: This pelagic species is caught by a variety of fishing gears, always as by-catch, but it is often retained on board and sold on the market. A target fishery used to be practiced two decades ago in the central Aegean Sea, with steel-wired longlines. Specimens may be caught in large pelagic long-line fisheries and set nets fisheries. Data on catches are extremely scarce, often mixed with other species. On the basis of the most recent data reported in the FAO-GFCM Capture Fisheries Production Dataset (Fishstat, 1970-2010), landings for this species are only reported by Spain (2004-2010), ranging between 15 and 38 t (33 t in 2010) and France (5 t in 2009 and 5t in 2010) , representing about 1% of the total catch of elasmobranchs in the western Mediterranean.

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM.

REFERENCE POINTS: None

STOCK STATUS: The Mediterranean is considered as a separate management unit for this species. Although there are no target fisheries for *G. galeus* in the Mediterranean, declines are suspected to have occurred, and by-catches are rare. Overfishing, together with habitat degradation caused by intensive bottom trawling, are considered some of the main factors that have produced the suspected decline of the Mediterranean stock. In the IUCN Red List, it is listed as Vulnerable both in the Mediterranean (VU A2bd; assessed in 2003) and globally (VU A2bd + 3d + 4bd; assessed in 2006).

RECENT MANAGEMENT ADVICE: None

STECF COMMENTS: To improve the understanding of the current situation of tope shark in the Mediterranean, STECF notes that the extent of incidental catches should be estimated and additional fisheries-dependent data by managemnet area is required and should be encouraged.

8.4 Smooth hammerhead (*Sphyrna zygaena*)

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: In the Mediterranean Sea this species is mainly caught by longlines and gillnets, particularly as bycatch in tuna and swordfish fisheries. A number of specimens of this species may be also taken in large driftnet fisheries, even though this fishery has been prohibited in the Mediterranean for several years. Recent investigations show that pelagic sharks, including this species, are being increasingly targeted in the Alborán Sea by illegal swordfish driftnet fleet. The impact of these fisheries on populations is unknown at present. Data on catches are extremely scarce. On the basis of the most recent data reported in the FAO-GFCM Capture Fisheries Production Dataset (Fishstat, 1970-2010), landings for this species are only reported by Albania (4 t in 2004) corresponding to around 0.3% of the total catch of elasmobranchs in the central Mediterranean. No catches were reported since 2004. These catches are clearly underestimated due to the non-reporting by many Mediterranean States.

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM, but this species is also under the ICCAT responsibility.

REFERENCE POINTS: None

STOCK STATUS: In the IUCN Red List, it is listed as Vulnerable both in the Mediterranean (VU A4bd; assessed in 2003) and globally (VU A2bd+3bd+4bd; assessed in 2005).

Smooth hammerhead is listed as Annex I, Highly Migratory Species on (UNCLOS).

In 2013, *Sphyran zygaena* was listed on Appendix II of CITES (Conference of Parties 16, Bangkok). However, the implementation of this listing has been delayed by 18 months (14 September 2014) to enable Range States and importing States to address potential implementation issues.

RECENT MANAGEMENT ADVICE: None.

STECF COMMENTS: To improve the understanding of the current situation of smooth hammerhead in the Mediterranean, STECF notes that additional fisheries-dependent data by management area and by EU Member States is required and should be encouraged.

8.5 *Carcharhinus spp.*

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: In the Mediterranean waters the genus *Carcharhinus* is represented by 8 taxa (*C. altimus, C. brachyurus, C. brevipinna, C. falciformis, C. limbatus, C. obscurus, C. plumbeus,* and *Carcharhinus* spp.), many of which occur primarily in the western parts, close to the Gibraltar Strait (FAO statistical sub-area 1.1) and North African coasts. These species are often caught as by-catch in surface long-line fisheries targeting tuna and swordfish. A number of specimens may also be caught by large driftnet fisheries, even though this fishery is prohibited in the Mediterranean. In Libya and Tunisia they can sometimes be considered as target species. Management units are suggested for all species known to occur in the Mediterranean.

The landings of most of these species are usually included by FAO (Fishstat, 1979-2010) in the large group of sharks, rays, skates, etc., and they are not included in the ICCAT SCRS report.

Carcharhinus plumbeus is caught with surface and bottom longlines, gillnets and occasionally trawls in the Mediterranean Sea, including in the Sicilian Channel, off Tunisia, Libya and Egypt, Spain, Morocco and Algeria and infrequently elsewhere. There are also anecdotal reports of by-catch of this species in fixed tuna traps ("Tonnara") in Sicily. Both coastal and pelagic fishing pressure is high throughout much of the Mediterranean Sea. This species was common until the 1980s along all the Levantine coasts but catches have substantially declined in recent years. The Gulf of Gabès, Tunisia, and an area off Turkey appear to be important nursery grounds for this species. This species was previously regularly seen on fish markets of southern Sicily and in the Adriatic Sea but has not been observed on the same markets in recent years. In Tunisia, the species is regularly landed and observed in fish markets. In the Gulf of Gabès, juvenile *C. plumbeus* are caught with longlines and trawls and adult females are targeted using specially-designed gillnets (locally known as "kallabia") during spring and early summer, when they move inshore to pup.

C. altimus is known to be important bycatch of the pelagic longline fishery operating from eastern Algerian ports. *C. brachyurus* is widespread in the Mediterranean but only sporadically reported possibly due to misidentification and lower abundance relative to other large sharks. *C. obscurus* is caught sporadically in longlines, gillnets and sometimes by tuna trap ("Tonnara") fisheries, principally off North African and rather less frequently by surface longlines, artisanal setlines and possibly trawlers in the Sicilian Channel.

SOURCE OF MANAGEMENT ADVICE: The advisory body for these species are SAC-GFCM and ICCAT.

REFERENCE POINTS: None

STOCK STATUS: Sandbar shark (*C. 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). In the IUCN Red List, it is listed as Endangered in the Mediterranean (EN A2bd + 4bd; assessed in 2003) and Vulnerable globally (VU A2bd+4bd; assessed in 2007).

Spinner shark, *C. 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 these two species is the Mediterranean, where their status is Data Deficient (DD; assessed in 2003) according to the IUCN. Globally they are listed as Near Threatened (NT; assessed in 2005) in the IUCN Red List.

In 2013, *Carcharhinus longimanus* was listed on Appendix II of CITES (Conference of Parties 16, Bangkok). However, the implementation of this listing has been delayed by 18 months (14 September 2014) to enable Range States and importing States to address potential implementation issues.

RECENT MANAGEMENT ADVICE: None.

STECF COMMENTS: To improve the understanding of the current situation of smooth hammerhead in the Mediterranean, STECF notes that additional fisheries-dependent data by management area and by EU Member States is required and should be encouraged.

8.6 Sixgill shark (*Hexanchus griseus*)

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: This large demersal species is occasionally caught by several fishing gears, as by-catch, and sometimes retained on board and sold on the market. Target fisheries (long lines or bottom gillnets) exist in some parts of the Mediterranean (e.g., in the Greek seas). Data on catches are extremely scarce. Studies conducted during the MEDITS project (1994-1999) assessed the standing stock biomass in the Mediterranean at about 440 tonnes. Deep commercial trawl surveys (1998-99) in the western Italian basins showed yields of about 1.2 kg/hour in average, with a peak of 4.7 kg/h in the Tyrrhenian Sea. On the basis of the most recent data reported in the FAO-GFCM Capture Fisheries Production Dataset (Fishstat, 1970-2010), landings for this species are only reported by Malta (4 t in 2010)..

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM.

REFERENCE POINTS: None.

STOCK STATUS: Due to the little information available, the stock should be managed for the whole Mediterranean. It is listed as Near Threatened (NT) in the IUCN Red List both in the Mediterranean and globally (assessed in 2003 and 2005 respectively).

RECENT MANAGEMENT ADVICE: Malta Environment and Planning Authority listed in 2006 Sixgill shark as "Animal and plant species of national interest whose taking in the wild and exploitation may be subject to management measures" (Flora, Fauna and Natural Habitats Regulations 311/2006).

Sixgill shark is listed as Annex I, Highly Migratory Species on (UNCLOS).

STECF COMMENTS: To improve the understanding of the current situation of the Sixgill shark in the Mediterranean, STECF notes that additional fisheries-dependent data by management area is required and should be encouraged. The MEDITS time series (1994-2010) of catches is an important source of data and should be analysed to enhance biological knowledge of the species.

8.7 Spurdog (*Squalus acanthias*)

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: This demersal species is commonly caught by trawlers and often retained on board and sold on the market. Data on catches are good in some countries (e.g., Greece) and poor in others, according to the various statistical systems adopted. The species is easily confused with *Squalus blainvillei*, also present in the Mediterranean. On the basis of the most recent data reported in the FAO-GFCM Capture Fisheries Production Dataset (Fishstat, 1970-2010), landings of this species in the Mediterranean and Black Sea were reported by France, Malta, Slovenia, Spain, Bulgaria, Romania and Ukraine and ranged from 86 to 1789 tonnes in the period 1970-2010, representing from 0.6% to 7.8% of the total catches of elasmobranchs reported in the Mediterranean and Black Sea. The catches peaked in 1988 at 1789 t and then gradually declined to levels around 100 t (123 t in 2010). Most of the catches were reported from the Black Sea.

Studies conducted during the MEDITS project (1994-1999) assessed the standing stock biomass in the Mediterranean at about 6,682 tonnes. Deep commercial trawl surveys (1998-1999) in the western Italian basins showed yields of about 0.14 kg/h in average, with a peak of 0.64 kg/h in the Sardinian Sea.

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM.

REFERENCE POINTS: None.

STOCK STATUS: Although naturally abundant, this is one of the more vulnerable species of shark to over-exploitation by fisheries because of its late maturity, low reproductive capacity, longevity, long generation time (25-40 years) and, hence, a very low intrinsic rate of population increase (2-7% per year). Population segregation and an aggregating habit make mature (usually pregnant) females highly vulnerable to fisheries

even when stocks are seriously depleted. In the MEDITS 2007 report, *Squalus acanthias* population exhibited no trend in abundance in 3 GSAs where it was evaluated. Mediterranean and Black Sea stocks are unmanaged, with a >60% decline reported in a Black Sea stock assessment for 1981-1992. For these reasons this species was listed as Endangered for the Mediterranean by the IUCN Red List (EN A2bd+4bd; assessed in 2006), while globally the species is listed as Vulnerable (A2bd + 3bd + 4bd; assessed in 2006).

RECENT MANAGEMENT ADVICE: The information available indicates that it may be appropriate to establish separate management areas for fisheries exploiting spurdog in the Mediterranean and Black Sea.

GFCM-SAC Sub-Committee on Stock Assessment 2011 mentioned special management for Ukrainian waters based on trawl surveys and commercial landings from coastal fisheries data:

-minimum commercial fishing size -85 cm (SL);

-allowable by-catch of its juveniles in target fisheries not more than 15% in numbers.

STECF COMMENTS: To improve future assessments and a better understanding of the current situation of spurdog in the Mediterranean, STECF notes that additional fisheries-dependent data by management area is required and should be encouraged. The MEDITS time series (1994-2010) of catches is an important source of data and should be analysed to find recent trends in the abundance and/or occurrence of the species.

8.8 Small-spotted catshark (*Scyliorhinus canicula*) in Geographical Sub-Area 9. Ligurian and North Tyrrhenian Sea

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The presence of *S. canicula* in the Mediterranean Sea is mainly linked to the continental shelf with the highest densities between 50 and 200 m. The main concentration areas of the juveniles (total length <28 cm, weight <68 g) are located at greater depths, essentially between 200 and 500 m (Corsica and Sardinia), with the exception of the western Morocco (100-200 m depth). The small-spotted catshark *Scyliorhinus canicula* is common over all the shelf of the northern Mediterranean Sea excluding the southern portion of Italy where it is less abundant. Trawlers and set gillnets very commonly catch this demersal species which is often retained on board and sold on the market. Data on catches are good in some countries and poor in others, according to the various statistical systems adopted. Although it is widespread over the Mediterranean, landings for this species are reported only by France (Fishstat, 1970-2010) and they amounted to around 30 tonnes/year in the period 2000-2010 (39 t in 2010), representing from 1.2% to 2.3% of the total catches of elasmobranchs reported in the western Mediterranean basin.

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM. The stock in the GSA 9 was assessed for the first time during the Workshop on Stock Assessment of selected species of Elasmobranchs in GFCM area (GFCM-SAC Sub-Committee on Stock Assessment) held at DG-MARE, Brussels on 12-16 December 2011). The Gedamke and Hoening method was used to estimate the total mortality (Z) and obtain an estimate of F using a constant value of natural mortality.

REFERENCE POINTS: $F_{0.1}$ = 0.13 as proxy of F_{MSY} and as the exploitation reference point consistent with high long term yields.

STOCK STATUS: Taking into account the assessment results (current F=0.33), the stock is considered exploited unsustainably. An indication at the present time is that the status of this species in the Mediterranean and globally is Least Concern (LC, proposed for the IUCN Red List).

RECENT MANAGEMENT ADVICE: The GFCM Workshop on Stock Assessment of selected species of Elasmobranchs in GFCM area recommended a reduction of F toward F_{MSY} in order to drive the stock to a more productive and sustainable status.

STECF COMMENTS: STECF agrees with the recommendations of the GFCM Workshop held in 2011 in Brussels. To these aim STECF advices that the relevant fleets' effort and/or catches should be reduced until fishing mortality is below or at the proposed F_{MSY} level, in order to avoid future loss in stock productivity and landings. This should be achieved by means of a multi-annual management plan taking into account mixed-fisheries considerations. Catches and effort consistent with F_{MSY} should be estimated.

8.9 Blackmouth catshark (*Galeus melastomus*) in Geographical Sub-Area 9. Ligurian and North Tyrrhenian Sea

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: This deep sea species is mainly distributed in the depth range 200-1000 m. *Galeus melastomus* it has a low commercial interest. Only relatively big-sized individuals are landed. It is caught as by-catch mainly in the Norway lobster and Red shrimps fisheries, by vessels operating within the depth range 250-500 m and 500-800 m respectively. Other species of the fishery are *Phycis blennoides, Micromesistius poutassou, Lepidopus caudatus, Trachurus trachurus, Conger conger, Macrouridae spp., Etmopterus spinax, Gadiculus argenteus,* and *Parapenaeus longirostris*. Annual landings are very low (<10 t in 2009) and show a high seasonal variability, with peaks in the 2nd and 3rd trimesters. High discard rates are likely.

Nursery areas characterized by the presence of young individuals densely concentrated are found in the depth range 200-400m of the northern portion of the GSA9.

In the last 15 years, a general decrease in the number of fishing fleets operating in the GSA9 targeting demersal species was observed. This general reduction did not occurred for the vessels targeting *Nephrops norvegicus* for which an increase in the number has been detected, at least in some ports, following an increasing trend of the abundance of the fishery's target species.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. Since 2008, the STECF-SGMED WG and STECF EWGs have also undertaken assessments and STECF has provided advice to the European Commission. The stock was assessed in 2011 by the STECF-EWG-11-12 and more recently by the working group on stock assessment of the GFCM. The assessment was endorsed by the 2011 GFCM- SCSA and subsequently adopted by GFCM SAC. The assessment was based on a length cohort analysis using the DCF catch data for 2009-2010.

REFERENCE POINTS: GFCM-SAC proposed the following reference points as a basis for management advice $F_{0.1}$=0.13

STOCK STATUS: Overfishing was occurring in 2009-2010 as F=0.35 > $F_{0.1}$. The size of first capture was too small (growth overfishing) and an increase in yield and a more safe situation for the stock as regards the possibility of self-renewal can be expected in the case a reduction of fishing effort do occur and/or more selective gears are used. MEDITS survey indices show a variable pattern of stock size without a clear trend.

RECENT MANAGEMENT ADVICE: GFCM-SAC advised for a reduction of F toward $F_{0.1}$ also through a decreasing of the catch in areas where juveniles concentrated. To this aim, GFCM SAC also advised to produce a map with the spatial distribution of juveniles.

EC addressed a special request to ICES WGEF in May 2013 regarding the modification of the deep-sea shark list. Opinion was asked on the exclusion of Blackmouth Catshark (*Galeus malanostomus*) and inclusion of Lowfin Gluper Shark (*Centrophorus lusanitus*) from Annex of. Council Regulation (EU) No 1262/2012. ICES WGEF stated that there is sufficient scientific information to warrant the exclusion of Blackmouth Catshark (*Galeus melanostomus*) and the inclusion of all *Centrophorus spp*. in the deep-shark list.

STECF COMMENTS: STECF agrees with the GFCM-SAC advice and the recent ICES WGEF statement on the deep-shark list revision. To these aim STECF advices that the relevant fleets' effort and/or catches should be reduced until fishing mortality is below or at the proposed F_{MSY} level, in order to avoid future loss in stock productivity and landings. This should be achieved by means of a multi-annual management plan taking into account mixed-fisheries considerations. Catches and effort consistent with F_{MSY} should be estimated.

8.10 Pelagic stingray (*Pteroplatytrygon violacea*)

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: This species is very commonly caught by pelagic gears as by-catch and more rarely by trawlers; it is sometimes retained on board and sold in a few markets. Data on catches are usually extremely poor. This species represented 9.3% in weight of the total catches obtained by swordfish long-lines in 1991 in the Tyrrhenian Sea. A number of specimens may be taken also in large driftnet fisheries, although this fishery is

prohibited since years in the Mediterranean. During twenty-two GRUND trawl surveys carried out from 1985 to 1998 in the Italian waters the percentage presence of *P. violacea* was low (6.20%).

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM.

REFERENCE POINTS: None.

STOCK STATUS: There are no reliable quantitative estimates of stock status. According to the IUCN Red List, the species is listed as Near Threatened (NT; assessed in 2003) in the Mediterranean and as Least Concern (LC; assessed in 2007) globally.

A study to estimate gear parameters in capture rate of pelagic stingray was carried out with nine longline vessels in the Strait of Sicily, between 2005 and 2007. Results showed that the larger the J hook, the lower the stingray capture rate. Moreover, 16/0 circle hooks had a significantly lower number of stingrays captured per 1000 hooks than J hooks, up to 80%. These results suggest that the adoption of large circle hooks by commercial and artisanal swordfish longline may be a measure to reduce their environmental footprint.

RECENT MANAGEMENT ADVICE: None**.**

STECF COMMENTS: STECF notes the lack of recent data. To improve future assessments and a better understanding of the current situation of the pelagic stingray in the Mediterranean, STECF notes that additional fisheries-dependent data by management area and by EU Member States is required and should be encouraged.

STECF suggests that the Mediterranean longline fleets be encouraged to adopt the use of large circle hooks in pelagic longline fisheries to mitigate pelagic stingray by-catches.

8.11 Thornback ray (*Raja clavata*) in Geographic Sub Area 9. Ligurian and Northern Tyrrhenian

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: *Raja clavata* is mainly exploited by trawlers. Most of the GSA catches come from the (Northern Tyrrhenian Sea), where a fleet of 80 vessels of different sizes and tonnage is based. Most of them target demersal resources and in general utilize bottom trawl nets locally called “volantina”. A reduced number of vessels utilizing the *rapido* (a variant of the beam trawl) and part of the small-scale fleet also targets demersal species, but landings of these fractions of the fleet are of modest entity. For *Raja clavata*, a nursery ground in the Tyrrhenian Sea was reported.

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM. The stock in the GSA 9 was recently assessed during the Workshop on Stock Assessment of selected species of Elasmobranchs in GFCM area (GFCM-SAC Sub-Committee on Stock Assessment) held at DG-MARE, Brussels on 12-16 December 2011). The Gedamke and Hoening method was used to estimate the total mortality (Z) and obtain an estimate of F using a constant value of natural mortality.

REFERENCE POINTS: The reference points proposed for this stock is $F_{0.1} = 0.08$

STOCK STATUS: Taking into account the assessment results (current F=0.33), the stock is considered exploited unsustainably.

RECENT MANAGEMENT ADVICE: The GFCM Workshop on Stock Assessment of selected species of Elasmobranchs in GFCM area recommended a reduction of F toward F_{MSY} in order to drive the stock to a more productive and sustainable status.

STECF COMMENTS: STECF agrees with the recommendations of the GFCM Workshop held in 2011 in Brussels. To this aim STECF advices that the relevant fleets’ effort and/or catches should be reduced until fishing mortality is below or at the proposed F_{MSY} level, in order to avoid future loss in stock productivity and landings. This should be achieved by means of a multi-annual management plan taking into account mixed-fisheries considerations. Catches and effort consistent with F_{MSY} should be estimated.

8.12 Starry skate (*Raja asterias*) in Geographic Sub Area 9. Ligurian and Northern Tyrrhenian

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: In Viareggio (Northern Tyrrhenian Sea are a fleet of 80 vessels of different sizes and tonnage. Most of them target demersal resources and in general utilize bottom trawl nets locally called "volantina". A reduced number of vessels utilizing the *rapido* (a variant of the beam trawl) and part of the small-scale fleet also targets demersal species, but landings of these fractions of the fleet are of modest entity. Although commercial valued resources are distributed over all the wide continental shelf and slope, considering the characteristics of the fishing vessels and traditions, the Viareggio fleet mainly exploit the coastal resources. The Thornback skate is one of the most abundant species in catches. For *Raja asterias*, a nursery ground in the Tyrrhenian Sea was reported.

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM. The stock in the GSA 9 was assessed for the first time during the Workshop on Stock Assessment of selected species of Elasmobranchs in GFCM area (GFCM-SAC Sub-Committee on Stock Assessment) held at DG-MARE, Brussels on 12-16 December 2011). An estimate the total mortality (Z) was obtained using a length converted catch curve using the commercial data collected in the Viareggio Port (Ligurian Sea) and assuming natural mortality M=0.3. A yield per recruit model was used to estimate fishing mortality reference points.

REFERENCE POINTS: The reference points proposed for this stock were $F_{0.1}$ = 0.2 as proxy for F_{MSY} and F_{MAX} =0.29.

STOCK STATUS: The preliminary assessment provided during the GFCM workshop clearly indicated that an overfishing status of the stock, since the current F=0.49 is higher than the adopted F_{01} value.

RECENT MANAGEMENT ADVICE: The GFCM Workshop on Stock Assessment of selected species of Elasmobranchs in GFCM area recommended a reduction of F toward F_{MSY} in order to drive the stock to a more productive and sustainable status.

STECF COMMENTS: STECF noting that this assessment is based on data that do not cover the entire GSA 9 area advises that while the estimate for $F_{0.1}$ is likely to relatively robust, the ratio of $F_{current}/F_{0.1}$, may not be representative of the exploitation rate of *R. asterias* throughout the whole of GSA 9.

8.13 Thornback ray (*Raja clavata*) in Geographic Sub Area 15-16. Malta Island and South of Sicily

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: *R. clavata* is the most commonly landed species of ray in the Strait of Sicily, it is frequently caught as by catch by otter trawls targeting the deep-water rose shrimp and bottom longlines targeting large sized demersal bony fishes. Almost all of the fishing effort exerted in the two GSAs is performed by the Italian and Maltese fleets. The contribution made by the Maltese fleet to the fishing effort exerted in the northern sector of the Strait of Sicily (GSA 15 & 16) in 2004-2009 was 28% for longline and 1.1% for bottom otter trawlers.

Data and parameters: data was collected within the framework of the GRUND and MEDITS scientific trawl surveys (2002-2009) for GSA 15 and (1994-2010) for GSA 16. All data were assigned to strata based upon the shooting position and average depth (between shooting and hauling depth). The abundance and biomass indices by km^2 were subsequently calculated as stratified means. Standardized length frequency distributions (LFD) were standardised to 100 km^2. Biological parameters (L-W relationship, size at first maturity, age and growth parameters, etc.) were collected from literature.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM.

REFERENCE POINTS: The reference points proposed for this stock are: F_{max} = 0.16and $F_{0.1}$ = 0.10. (sexes combined)

STOCK STATUS: The preliminary assessment provided the following results:

The stock was preliminary assessed as overexploited. *R. clavata* should be included within the "medium productivity category". This species is currently assessed as Least Concerned (LC) by the IUCN Red List, but further information on its status in the southern Mediterranean is needed.

RECENT MANAGEMENT ADVICE:

Actually, there are no formal management objectives for thornback ray in the GSA 15-16.

Due to lack of a time series of data from commercial fisheries, the assessment is considered as preliminary and therefore only partially able to provide management advice. SAC-GFCM advises a reduction of F.

STECF COMMENTS: STECF agrees with SAC-GFCM that future assessments should incorporate fishery dependent data from both GSAs with the aim to provide a more robust assessment and management advice.

8.14 Small-spotted catshark (*Scyliorhinus canicula*) in Geographical Sub-Area 4. Algeria.

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The Small-spotted catshark (*Scyliorhinus canicula* Linnaeus, 1758) in the Algerian basin (GSA 4) is exploited mainly by the bottom trawlers. The species is exploited with a number of other demersal species (*Pagellus acarne, Mullus barbatus, Parapenaeus longirostris, Merluccius merluccius*). Length frequency distributions were gathered for the assessment period (2000-2010) from the commercial landings of three region of Algerian coast. The most exploited length classes is the 42-51cm.

Data and parameters: Length frequency distribution of females and males of the western region of the Algerian basin were analyzed by ELEFAN I (Electronic Length Frequency Analysis) program to calculate the growth parameters (L_{inf}, K). Z was estimated by Pauly's model as M by Djabali's method.

West females: $LT = 61.43\ [1 - e^{-0.6*(t-0)}]$

West males: $LT = 58.28\ [1 - e^{-0.6*(t-0)}]$

L-W relationship (females): $WT = 0.0013\ LT^{3.2514}$

L-W relationship (males): $WT = 0.0042\ LT^{2.9136}$

Z, M and F values

Parameters / Gender	L_∞	K	T_0	Z (Pauly, 1984)	M (Djabali *et al.*,1993)	F
Females	61.43	0.6	13	2.11	0.58	1.53
Males	58.28	0.6	13	2.1	0.59	1.51

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM. VPA, and Thomson and Bell production model for females and males, for the period 2000-2010, was utilized using the mixed approach. The results have been compared to the yield per recruit performed (Y/R) by NOAA program with the female's data.

REFERENCE POINTS:

Model performance: The last model fitted well with the data, giving he $F_{0.1}$, F_{max}, F at 30% of MSY

Results: for the period 2000-2010 Females Y/R (NOAA program)

$F_{0.1}$: 0.38 Y/R: 61792 SSB per recruit: 116870 Total biomass per recruit: 184666

F_{max}: 1.051 Y/R: 67675 SSB per recruit: 57463 Total biomass per recruit: 121086

$F_{30\%}$ MSY: 0.637 Y/R: 64722 SSB per recruit: 97809 Total biomass per recruit: 164631

Females and males Y (VPA/Thomson & Bell production model, using the mixed approach)

F0.1

F_{max} 1.5

STOCK STATUS: The stock is in overfishing state, considering that the current F (1.5) should be reduced by more than 50% (based on the assessment period)

RECENT MANAGEMENT ADVICE: Reduction of F for *S. canicula* in GSA 4.

STECF COMMENTS: STECF agrees with the recommendations of the GFCM. To this aim STECF considers that the relevant fleets' effort and/or catches should be reduced until fishing mortality is below or at the proposed F_{MSY} level, in order to avoid future loss in stock productivity and landings. This should be achieved by means of a multi-annual management plan taking into account mixed-fisheries considerations. Catches and effort consistent with F_{MSY} should be estimated.

8.15 Blackchin guitarfish (*Glaucostegus cemiculus*) in Geographical Sub area 14. Gulf of Gabes, Tunisia

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Elasmobranchs constitute about 2% (2000 Tons/year) of the total Tunisian landings and about 70% of these landings are from GSA 14. They are captured mainly by the bottom trawl, gillnets and longlines. In the Gulf of Gabès, the Blackchin guitarfish, *Glaucostegus cemiculus* is targeted by a small artisanal fleet, attached to Zarzis port, using special gillnets from April to August and landed as by-catch throughout the year (except July to September) in trawl fisheries. Annual gillnets landings of this species are about 200 tons in Zarzis port. 20 metric tons were estimated to be landed as by-catch by trawlers working in the Gulf of Gabès.

SOURCE OF MANAGEMENT ADVICE: The scientific advisory body to the GFCM is the GFCM-SAC. VIT model fitted well with the data (CV=0.16)/Virtual Population Analysis Model (VPA/ADAPT) Length Based Yield Per Recruit (for the two gears, trawler and gillnets).

REFERENCE POINTS: GFCM SAC 2011 proposes the following reference points as a basis for management advice:

Trawl:

F = 0.003

Gillnets:

F = 0. 17 $F_{MSY} = F_{0.1} = 0.19$

STOCK STATUS: GFCM SAC 2011 assessed the stock to be subject to underexploited status. Considering that the current F is lower than the chosen reference point $F_{0.1}$ that is considered to produce good and sustainable yields. Landings show stability during 2001 to 2007.

RECENT MANAGEMENT ADVICE: The species appears in good exploitation status with a current fishing mortality rate which is lower than $F_{0.1}$, which is considered a proxy of FMSY. Catches does not show any negative trend, which is useful for checking for stability in abundance considering that the fishing effort remained almost constant during the analyzed period.

STECF COMMENTS: From the information presented in the report of the Workshop on Stock Assessment of Selected Species of Elasmobranchs in the GFCM area (DG-MARE, Brussels, December 2011), STECF is unable to determine the stock status in relation to proposed reference point or to provide objective management advice.

9 Resources in the Black Sea

9.1 Sprat (*Sprattus sprattus*) in GSA 29

FISHERIES: Sprat is one of the most important fish species, being fished and consumed traditionally in the Black Sea countries. The sprat fishery is taking place in the Black Sea (GFCM Fishing Sub-area 37.4 (Division 37.4.2) and Geographical Sub-area (GSA) 29). It is most abundant small pelagic fish species in the region, together with anchovy and horse mackerel and accounts for most of the landings in the north-western part of the Black Sea. Whiting is also taken as a by-catch in the sprat fishery, although there is no targeted fishery in the

Baltic (Raykov, 2006) except in Turkish waters. Sprat fishing takes place on the continental shelf on 15-110 m of depth (Shlyakhov, Shlyakhova, 2011). The opportunities of marine fishing are limited by the specific characteristics of the Black Sea. The exploitation of the fish recourses is limited in the shelf area. The water below 100-150 m is anoxic and contains hydrogen sulphide. In Bulgarian, Romanian, Russian and Ukrainian waters the most intensive fisheries of Black Sea sprat is conducted in April till October with mid-water trawls on vessels 15- 40 m long and a small number vessels >40m. Beyond the 12-mile zone a special permission is needed for fishing. The harvesting of the Black Sea sprat is conducted during the day time when its aggregations become denser and are successfully fished with trawls. The main fishing gears are mid-water otter trawl, pelagic pair trawls and uncovered pound nets. The main gears used for sprat fishery in Turkey (fishing area is constrained in front of the city of Samsun) are pelagic pair trawls working in spring at 20-40m depth and in autumn - in deeper water: 40-80m depths. The highest sprat catches are taken by Turkey and Ukraine.

The significance of the sprat fishery in Turkey in the last three years has increased and the landings reached 87 000 t in 2011 but dropped to 12000 t in 2012. The total landings in 2012 were around 35000 tonnes.

SOURCE OF MANAGEMENT ADVICE: STECF.

REFERENCE POINTS:

Table of limit and precautionary management reference points proposed by STECF

E (mean)	≤ 0.4

Table of limit and precautionary management reference points agreed by fisheries managers

F_{msy} (age range)=	none
B_{pa} (B_{lim}, spawning stock)=	none

STOCK STATUS:

- State of the adult abundance and biomass (SSB):

According to the present assessment, the SSB in recent years ranged at medium to high levels (between 200 000 and 500 000 t). In 2012 the SSB dropped to 228 000 t. Under a constant recruitment scenario and *status quo* F = 0.404, in 2013 the SSB is expected to increase to 268 750 and after to slightly increase up to 289 667 t by 2015. Since no precautionary level for the stock size of sprat in GSA 29 was proposed, EWG 13-12 cannot fully evaluate the stock status in relation to the precautionary approach.

- State of the juveniles (recruits):

Recruitment was estimated to be increasing up to 2008, and since then has followed a decreasing trend. Recruitment estimates are rather imprecise due to the lack of survey data. The most recent recruitment value is estimated as the geometric mean over 2009-2012.

- State of exploitation:

In recent years the fishing mortality peaked in 2010-2011 at levels of 0.75 - 1.12. Based on a limit reference exploitation rate of $E \leq 0.4$, which equals F = 0.64 (the F_{MSY} proxy), the EWG considers that the stock of sprat was exploited unsustainably during those years. However, the current F=0.404, which equals an exploitation rate of E=0.298 (natural mortality M=0.95), has resulted in a three-fold drop in total catch in 2012 compared to 2011. *Status quo* fishing during 2013 – 2015 implies catches in the range of 39 907 to 45 504 t, which are below the recommended (F_{MSY}) catch of 64 544 t,

- Source of data and methods:

International landings data at age were constructed and the Integrated Catch Analysis (ICA) assessment method was applied. Discards of sprat are believed to be low, but the fishery for sprat is thought to produce appreciable (but un-quantified) amounts of discards of other species (e.g., whiting). Short term predictions were based on a short term geometric average recruitment.

RECENT MANAGEMENT ADVICE:

STECF classifies the stock exploited sustainably. The present exploitation rate E=0.30 is below the reference point of E$\leqslant$0.4 (F_{MSY} proxy). STECF recommends the exploitation for 2014 to not exceed the F_{MSY} level, which corresponds to 64 544 t. In the absence of an allocation key for the international sprat catches, STECF is unable to advice on a specific EU TAC for sprat in the Black Sea.

Other considerations

A short term prediction of stock size and catches assuming a sustainable status quo fishing scenario has been provided together with a range of management options. Considering the short life span of sprat in the Black Sea and the high variation in estimated recruitment, STECF emphasizes that the short term projections based on a geometric mean recruitment and the resulting catch advice are subject to high uncertainty. The poor knowledge about the recruitment dynamics prevented the formulation of medium term projections.

STECF COMMENTS: STECF suggest that in order to improve the quality of the stock assessment and scientific advice to management and provide a source of fisheries independent information an international hydro-acoustic survey should be conducted to monitor the sprat across all national waters of the Black Sea, including Bulgaria, Romania, Georgia, Russia, Turkey and Ukraine.

9.2 Turbot (*Scophthalmus maximus*) in GSA 29

FISHERIES: Turbot (*Psetta maxima*) is the one of the most important demersal fish species in the Black Sea with high market demand and prices. Main fishing gear for all coastal states are gillnets, but in Turkey, the bottom trawling is also permitted. The turbot is often caught as a by-catch of sprat fishery, long lines and purse seine fishery. Turbot catches are higher in spring and autumn periods: March – April and October – November for Bulgaria and Romania; May – June for Ukraine, March - April and September – October for Turkey. Annual official landings during last 5 years range between 485 and 1035 t. Mis-reporting and illegal catches also occur. The overall official landings of turbot in the Black Sea declined in the last 6 years from 1035 t in 2007 to less than 528 t in 2012. The total catches including unreported landings range from 1901 t (2008) to 963 t (2012).

For Bulgaria and Romania quotas of 43.2 t in 2013 (roll-over from 2011) for each country were permitted.

Prohibition of fishing activity during reproduction period for turbot was in force from 15 April to 15 June in European Community waters of the Black Sea.

During the 37th Session of the General Fisheries Commission for the Mediterranean (GFCM), a recommendation was adopted to establish a set of minimum standards for turbot fisheries in the Black Sea. This recommendation established a minimum conservation size (45 cm) for turbot and a minimum mesh size (400 mm) for gillnets. At the national level, different technical or management measures are in force in Bulgaria, Romania, Turkey and Ukraine.In Ukraine turbot fisheries is conducted with bottom (turbot) gill nets with minimum mesh size 180 - 200 mm. The use of bottom trawls has been prohibited. Turbot fisheries in Ukraine have been regulated by TACs since 1996.

In Turkey turbot target fishing is conducted with bottom (turbot) gill nets with minimum mesh size 160 – 200 mm (Tonay, Öztürk, 2003) and with bottom trawls with minimum mesh size 40 mm. The minimum admissible landing size in Turkey is 40 cm total length. In Turkey – no TAC regulation of turbot catches. Seasonal fishing closures in Turkey are: for bottom trawls from 1st September – 15th April and for gillnets – from 1st May up to 30th June.

SOURCE OF MANAGEMENT ADVICE: STECF

REFERENCE POINTS:

Table of limit and precautionary management reference points proposed by STECF

Fmsy[1] =	0.26
B_{pa}[2]	4080
B_{lim}[3]	2914

[1] Derived from simulations; [2] Estimated as 39% of the maximum observed biomass; [3] $B_{pa}=1.4*B_{lim}$

Table of limit and precautionary management reference points agreed by fisheries managers

F_{MSY} (age range)=	none
B_{pa} (B_{lim}, spawning stock)=	none

STOCK STATUS:

- State of the adult abundance and biomass (SSB):

Uncertainties regarding the actual landings constrain STECF to interpret the SAM assessment results only in relative terms, i.e. they are considered indicative of trends only. In the absence of a biomass precautionary reference points the EWG is unable to fully evaluate the stock size in respect to this. However, survey indices and the SAM analyses indicate that the stock size is at a historic low and it is less than 10% of the SSB estimated in the end of the 1970s.

- State of the adult abundance and biomass (SSB):

Survey indices and the SAM analyses indicate that the stock size is currently at a historic low (around 1100 t) and it is around one third of the estimated Blim (2914 t). The F value estimated for 2012 (0.85) is more than three times higher than F_{MSY} (0.26).

- State of the juveniles (recruits):

Recruitment has decreased since 2003 and the recruitment values estimated for the most recent set of cohorts (born between 2006-2010) are among the lowest observed in the time series.

- State of exploitation:

The STECF EWG 13-12 proposes that Fmsy for this stock (i.e. F which maximizes average catches in the long run) is 0.26 per year and should be set as a limit reference point consistent with achieving high long term yields. Currently F is around the historical high level at 0.85, more than three times F_{MSY}. The EWG 13-12 classifies the stock of turbot in the Black Sea as being exploited unsustainably and at risk of collapse. The EWG notes that the fishing mortality remains at high level with no sign of reduction, despite the recently low TACs. The EWG considers that on precautionary grounds there should be no directed fishing for Black Sea turbot and that by-catch should be minimized.

The assessment, which covers the period 1950-2012, estimates that SSB reached its peak in 1979 and then declined dramatically during the 1980s to half as large as it was during the 1950s and 60s. During the most recent seven years SSB has declined steadily and it reached its historic low in 2012. It is unknow if these changes in biomass occurred uniformly in all regions of the Black Sea. However, given that the overall spawning biomass of turbot in the Black Sea is likely to be at very low levels (regardless of whether there are multiple stocks, or only one stock), it would be prudent to adopt a precautionary approach for managing Black Sea turbot, until such time that it can be established that there is more than one turbot stock and that the healthier stock(s) can be managed independently and without detriment to the weaker one(s).

- Source of data and methods:

The data set for the period 1950-2012 were compiled from historical data sources and new data for 2012. Available data, consisting of total landings, catches at age, weights and maturity at age, were considered appropriate for assessing the stock using the State-space Assessment Model (SAM) (Nielsen et al., 2012). All assessment runs were performed using version 0.99-3 of FLSAM, together with version 2.5 of the FLR library (FLCore). Five tuning series (four surveys and one commercial CPUE series) were compiled from previous assessments and recent data. In 2012, a new survey fleet for the Eastern Ukrainian Black Sea area was added to the existing survey fleets of Bulgaria, Romania, Western Ukrainian area and Turkish commercial CPUE.

RECENT MANAGEMENT ADVICE:

STECF advises on the basis of precautionary considerations that there should be no fisheries for turbot and all individuals caught should be promptly released. STECF considers also that a management plan should be initiated to restore spawning stock biomass to the estimated B_{pa} level.

STECF COMMENTS: STECF suggest that in order to improve the quality of the stock assessment and scientific advice for management, and provide a source of fisheries independent information, an international bottom trawl survey should be conducted to monitor turbot across all national waters of the Black Sea including Bulgaria, Romania, Georgia, Russia, Turkey and Ukraine.

9.3 Anchovy (*Engraulis encrasicolus*) in GSA 29

FISHERIES: Anchovy is targeted by both artisanal (with coastal trap nets and beach seines), and commercial purse-seines fishery on the wintering grounds. Majority of the landings is obtained by Turkey by purse seine vessels. The catch of the Black Sea countries increased until 1985-1986 after which a sharp decline occurred. For instance, the Turkish catch of anchovy in 1990-1991 fell to 13-15% of the 1985-1986 level. Intense fishing on small pelagic fish predominantly by the Soviet Union, and later also by Turkey, was carried out in a competitive framework without any agreement between the countries on limits to fishing. The total anchovy catch was progressively increasing since 1980 to 1988 when maximum yield was obtained (606,401t) then decreasing up to a minimum of 102,904 t in 1990 (excepting 1988), 90% from this quantity being obtained by Turkey.

In spite of improving the fishing effort by the continuous increase of fishing vessels number, at the end of the 1980's when the outbreak of the alien jellyfish occurred, catches dramatically declined up to three times.

The state of the anchovy stock has improved after the collapse in 1990s, and in 2000-2005 the catches reached levels of about 300,000 t. In 2005 the Turkish anchovy catches dropped to 119 thousand t. In this year, by catch of bonito reached the maximum amount over the last 50 years (63896 tons) and most of the purse seiners preferred to catch bonito considering the high market value of that fish. On the other hand, the possible causes of the drop may be attributed to the climate effects (raised water temperature may cause a dispersal of fish schools making them less accessible to the fishing gears), abundant predators (bonito) or overfishing. In 2012, the total international Black Sea catch was reported to be about 190 000 t with the major part, 126,000 t made by the Turkish fleets.

SOURCE OF MANAGEMENT ADVICE: STECF

REFERENCE POINTS:

Table of limit and precautionary management reference points proposed by STECF

F_{MSY}	≤ None

Table of limit and precautionary management reference points agreed by fisheries managers

F_{msy} (age range)=	None
B_{pa} (B_{lim}, spawning stock)=	None

STOCK STATUS:

None of the assessment approaches were able to produce results with appreciable certainty; therefore an assessment was not accepted and the stock status is therefore uncertain.

- Source of data and methods:

The national "Black Sea anchovy" landings of the countries except Russian Federation (fishing only Azov anchovy) were partitioned into ages using age-length keys and length-frequency data. Discarded catch, reported by Turkey and Romania, were added to the landings. XSA was tuned by a single commercial CPUE index for the major Turkish purse seiner. Assessments using SVPA and ASPIC were also considered.

RECENT MANAGEMENT ADVICE:

The assessment was not accepted and thus results were not sufficient to produce catch projections for management advice. **STECF COMMENTS:** STECF suggest that in order to improve the quality of the stock assessment and scientific advice for management and provide a source of fisheries independent information, an international hydro-acoustic survey should be conducted to monitor the turbot across all national waters of the Black Sea including Bulgaria, Romania, Georgia, Russia, Turkey and Ukraine.

9.4 Whiting (*Merlangius merlangus*) in GSA 29

FISHERIES: The whiting fishery in the Black Sea is almost solely conducted by Turkey. Landings have fluctuated between 2 500 t and 28 000 tIn the last 5 years, landings have ranged from around 8 200 t to 12 000 t and were reported to be around 6300 t in 2012. In the eastern part of the basin the whiting is subject to a

specialised fishery, while in its western part it is fished primarily as a by-catch in trawl sprat catches and by trap nets. It should be noted that fishing in Turkey is conducted without limitation of annual catch or the fishing efforts.

SOURCE OF MANAGEMENT ADVICE: STECF

REFERENCE POINTS:

Table of limit and precautionary management reference points proposed by STECF

F_{MSY}(1-3) proxy derived from F0.1	≤ 0.40

Table of limit and precautionary management reference points agreed by fisheries managers

F_{msy} (age range)=	none
B_{pa} (B_{lim}, spawning stock)=	none

STOCK STATUS:

- State of the adult abundance and biomass (SSB):

From 1994 to 2012 for age-classes 2 to 6+ the SSB varied cyclically with peaks in 2000 and 2009, but the SSB estimate for 2012 is the lowest of the series (12677 t). Given the absence of a biomass reference point, the EWG 13-12 is unable to fully evaluate the stock status with respect to it.

- State of the juveniles (recruits):

EWG 13-12 is unable to fully evaluate the state of recruitment due to the selection of only age 2-6+ for the assessment. The available information on age-0 and age-1 fish was considered unreliable because there have been significant (but unquantifiable) amounts of discards of young whiting.

- State of exploitation:

The EWG 12-16 proposed F_{MSY} (1-4) ≤ 0.4 as the limit reference point consistent with high long term yields and low risk of fisheries collapse. As the estimated F(2-4) = 0.958 exceeds this Fmsy, the EWG 13-12 classifies the stock of whiting in the Black Sea as being potentially exploited unsustainably. However, given the uncertainty regarding the amount of discards, the assessment results are mainly indicative of trends.

- Source of data and methods:

International landings at age were constructed for 1994-2012, but data on discards by age are incomplete for 1994-2002 and 2011-2012, and completely lacking for 2003-2010. The XSA analyses were tuned to data from a Romanian bottom trawl survey in 2008-2009 and by a second survey from Turkey for the period 2009-2012. Catch weight at age matrices were averaged across countries to derive a single mean weight at age matrix. Data from age-classes 0 and 1 were excluded from the XSA to reduce the influence of poor or missing estimates of discards of age-0 and age-1 whiting. The assessment was run using ages 2 to 6+ for the both the catch matrix and the tuning indexes.

RECENT MANAGEMENT ADVICE:

The assessment was only accepted as indicative of trends due to the large uncertainty in the assessment results caused by the poor quality of the discard data and thus a deterministic short term projection of stock size and catch was not performed **STECF COMMENTS:** STECF suggest that, in order to improve the quality of the stock assessment and scientific advice to management and provide a source of fisheries independent information, an international hydro-acoustic survey should be conducted to monitor the whiting across all national waters of the Black Sea including Bulgaria, Romania, Georgia, Russia, Turkey and Ukraine, in particular to provide a representative recruitment index. STECF notes that the assessment is affected by the lack of reliable discard data.

10 Stocks of the northwest Atlantic (NAFO)

10.1 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 Faroese longliners. Cod has also been taken as bycatch in the directed redfish fishery by Portuguese trawlers. Estimated bycatch in shrimp fisheries is low. Large numbers of small fish were caught by the trawl fishery in the past, particularly during 1992-1994. Catches since 1996 were very small compared with previous years. Catches exceeded the TAC from 1988 to 1994, but were below the TAC from 1995 to 1998. In 1999 the direct fishery was closed and catches were estimated in that year as 353 t, most of them taken by non-Contracting Parties. Yearly by-catches between 2000 and 2005 were below 60 t, rising to 339 and 345 t in 2006 and 2007, respectively. In year 2008 and 2009 catches were increasing until 889 and 1161 t, respectively. The fishery was reopened in 2010 with 5 500 t TAC and a catch of 9 192 t was estimated by STACFIS. A 10 000 t TAC was established for 2011. STACFIS reported catches in 2011 and 2012 to be around 13600 and 13700 tons.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. A Bayesian assessment based on an age-structured model was accepted to estimate the state of the stock.

REFERENCE POINTS: A spawning biomass of 14 000 t has been identified as *Blim* for this stock.

STOCK STATUS: Current SSB is estimated to be well above Blim. Recent recruitments are among the highest level of the time series, even if these estimates are imprecise. Fishing mortality in 2012 is high, at the level of more than twice Fmax (Median Fmax=0.135).

RECENT MANAGEMENT ADVICE: In the short term this stock can sustain values of F up to Fmax, however any fishing mortality above Fmax will result in an overall loss in yield in the long term. Therefore NAFO Scientific Council considers that yields at Fsq are not a viable option. Projections are heavily influenced by the 2010 year class, which is estimated to be extremely large, but with high uncertainty. Given the uncertainty in the projections, Scientific Council makes these recommendations for 2014 only, and does not advise using the 2015 results as a basis for management decisions. The stock should be reassessed in 2014.

SPECIAL COMMENTS: In a response to the Fisheries Commission NAFO Scientific Council concluded that is not possible at this time (2013) to provide candidates values of Bmsy and Fmsy for this stock.

STECF COMMENTS: STECF agrees with the recommendation/advice from the NAFO SC and notes that fishing at the Fmax level in 2013and 2014 is predicted to result in catches of around 14 000 t. STECF notes the recommendation of a new full assessment of this stock to be carried out in 2014.

10.2 Shrimp (*Pandalus borealis*) in Division 3LNO

FISHERIES: Most of this stock is located in Div. 3L and exploratory fishing began there in 1993. The stock came under TAC regulation in 2000, and fishing has been restricted to Div. 3L. Several countries participated in the fishery in 2011. The use of a sorting grid to reduce bycatches of fish is mandatory for all fleets in the fishery. Catches have fluctuated around 25 000 t in recent years until 2010, but declined since then. In 2012 and 2013 they were down to around 10000 t and 6000 t.

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

Catch and effort data are available from the commercial fishery. Biomass (total, fishable and female spawning stock) indices are available from research surveys conducted in Div. 3LNO during spring (1999 to 2013) and autumn (1996 to 2012). The Canadian survey in autumn 2004 was incomplete. Analytical assessment methods have not been established for this stock. Evaluation of the status of the stock is based upon interpretation of commercial fishery and research survey data.

REFERENCE POINTS: Current scientific advice for the management of Div. 3LNO shrimp is based on the relationship between trends in research vessel survey indices and the commercial landings. There is no accepted assessment model. 15% of the highest survey observation of female biomass (SSB) is currently accepted as a proxy for Blim (= around 19000 t). There is no current proxy for Flim. Fisheries commission has requested advice on the identification of Fmsy, Bmsy and advice on the appropriate selection of an upper reference point for biomass. Such advice is best provided using an accepted assessment model fit to the data. Progress has been made in fitting surplus production models using both maximum likelihood and Bayesian approaches.

STOCK STATUS: Biomass levels peaked in 2007 at a level of around 130000 t, then decreased substantially by 2009 and remained at this lower level (around 35000 t) in 2010 and 2011. The estimated level dropped further in 2012 to a very low level and the biomass and is now at the Blim level. The risk of the stock being below Blim in 2012 (43%) exceeds the maximum risk level (10%) specified in NAFO's precautionary approach framework. Given expectations of poor recruitment and increased fishing mortality, the stock is expected to decline further.

RECENT MANAGEMENT ADVICE: In view of the stock situation at present (2013) NAFO recommends that there be no directed fishery on this stock in 2014.

SPECIAL COMMENTS: Recent genetic analysis shows that this stock is part of a wider population spanning NAFO Subarea 2 and at least Div. 3KL. Migrations of shrimps across the management-area boundaries are not accounted for in the assessment and therefore introduce additional uncertainty. Scientific Council recommends exploration of alternative approaches that take into account the entire stock area.

STECF COMMENTS: STECF agrees with the NAFO SC recommendation for 2014 (no directed fishery).

10.3 Shrimp (*Pandalus borealis*) in Division 3M (Flemish Cap)

The most recent advice for this stock was provided by the NAFO Scientific Council in 2010. Hence, the following text remains unchanged from the Consolidated STECF Review of Advice for 2013 (STECF 12-22).

FISHERIES: The shrimp fishery in Div. 3M began in 1993. Initial catch rates were favourable and, shortly thereafter, vessels from several nations joined. Between 1993 and 2004 the number of vessels ranged from 40-110. In 2006 there were approximately 20 vessels fishing shrimp in Div. 3M. The number of vessels participating in the fishery has decreased by more than 60% since 2004 to 13 vessels in 2009.

The fishery was unregulated in 1993. Sorting grates and related by-catch regulations were implemented in 1996 and have continued to the present day. This stock is now under effort regulation. The effort allocations were reduced to 50% in 2010. Total catches were approximately 27 000 tons in 1993, increased to 48 000 tons in 1996, declined in 1997 and increased steadily through 2000. Catches in 2004 were around 45 000 tons and since then there has been an almost continuous decline to around 5400 t in 2009 and 2000 t in 2010. A moratorium has been imposed as from 2011 and no catches have been recorded during the 2011, 2012 and 2013.

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

Catch, effort and biological data were available until 2010 from several Contracting Parties. Time series of size and sex composition data were available mainly from two countries between 1993 and 2005 and survey indices were available from EU research surveys (1988-2013). Because of the moratorium catch and effort data have not been available since 2010, and therefore a standardised CPUE series is available only up to 2010.No analytical assessment was available. Evaluation of stock status is based on the development of the commercial fishery and research survey data.

REFERENCE POINTS: NAFO Scientific Council considers that the point at which a valid index of stock size has declined by 85% from the maximum observed index level provides a proxy for Blim, for Div. 3M shrimp, 2 600 t of female survey biomass. The female biomass index fluctuated around Blim in 2009 and 2010, but was below in 2011 and 2012. It is not possible to calculate a limit reference point for fishing mortality.

STOCK STATUS: The indices of biomass decreased sharply in 2009 to slightly below Blim and in 2011, 2012 and 2013 it has remained well below the Blim proxy. This trend indicates a strong decrease of this stock caused by weak recruitment in the last 9 years and an increase of the cod stock, one of their most important predators. The 2013 survey biomass index indicates the stock is well below the Blim proxy and remains in a state of impaired recruitment.

RECENT MANAGEMENT ADVICE: The most recent assessment was undertaken in 2013. The NAFO advice for 2014 is the same as for 2013: No directed fishery.

STECF COMMENTS: STECF agrees with the advice from NAFO on the basis of single stock management, i.e. there should be no directed fishery for Northern shrimp in Divisions 3M in 2014.

10.4 Greenland Halibut (*Reinhardtius hippoglossoides*) in Sub-area 2 and Divisions 3KLMNO

Advice for this stock for the years 2013 and 2014 was given in 2012 and the text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: TACs prior to 1995 were set autonomously by Canada; subsequent TACs have been established by the Fisheries Commission. Catches increased sharply in 1990 due to a developing fishery in the NAFO Regulatory Area in Div. 3LMNO and continued at high levels during 1991-94. The catch was only 15 000 to 20 000 t per year in 1995 to 1998 as a result of lower TACs under management measures introduced by the Fisheries Commission. The catch increased since 1998 and by 2001 was estimated to be 38 000 t, the highest since 1994. The estimated catch for 2002 was 34 000 t. The 2003 catch could not be precisely estimated, but was believed to be within the range of 32 000 t to 38 500 t. In 2003, a fifteen year rebuilding plan was implemented by the Fisheries Commission for this stock. Since the inception of the FC rebuilding plan, estimated catches for 2004-2009 have exceeded the TACs considerably, with the catch over-run ranging from 22-45%. The 2007, 2008 and 2009 catch was estimated to be 23 000 tonnes, 21 000 t. and 23 000 t. respectively. In 2010, the catches were estimated to be around 26 000 tonnes. Estimates of total catches for 2011 and 2012 are not available.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the NAFO Scientific Council.

Standardized estimates of CPUE were available from fisheries conducted by Canada, EU-Spain and EU-Portugal and unstandardized CPUE was available from Russia. Abundance and biomass indices were available from research vessel surveys by Canada in Div. 2+3KLMNO (1978-2009), EU in Div. 3M (1988-2009) and EU-Spain in Div. 3NO (1995-2009). Commercial catch-at-age data were available from 1975-2010.

Extended Survivors Analysis (XSA) tuned to the Canadian spring (Div. 3LNO; 1996-2010), and autumn (Div. 2J, 3K; 1996-2010) and the EU (Div. 3M; 0-700 m in 1995-2003; 0-1 400 m in 2004-2010) surveys were used to estimate the 5+ exploitable biomass, level of exploitation and recruitment to the stock. Natural mortality was assumed to be 0.2 for all ages.

NAFO SC states that due to inconsistency between the information available to produce catch figures used in the previous year's assessments as well as assessment data for 2011 and 2012 no new assessment has been made. A new assessment is planned for in 2014

REFERENCE POINTS: Limit reference points could not be determined for this stock. Fmax is computed to be 0.41 and F0.1 is 0.22, assuming weights at age and a partial recruitment equal to the average of each of these quantities over the past 3 years. A plot of these reference levels of fishing mortality in relation to stock trajectory indicates that the current average fishing mortality (0.37) is above $_{F0.1}$ level and approaching F_{MAX}.

STOCK STATUS: Biomass increased over 2004-2008 with decreases in fishing mortality. However, it has shown decreases over 2008-2011, as weaker year-classes have recruited to the biomass. The 2011 5+ biomass is estimated to be about 84 000 t. The 10+ biomass peaked in 1991 and although it remains well below that peak, it has tripled over 2006-2011 and is presently about 25% of the total 5+ biomass. Average fishing mortality (over ages 5-10) has been decreasing since 2003 but has increased in 2010 (F_{5-10} = 0.37). Recent recruitment has been far below average; however, recruitment estimates for 2009 and 2010 are considerable improved but will not recruit to the fishery for at least another 3 years.

In 2010 and in order to evaluate the population trends in the near term, stochastic projections from 2010 to 2014 were conducted assuming average exploitation pattern and weights-at-age from 2007 to 2009, and with natural mortality fixed at 0.2. Assuming the catch in 2010 remains at the 2009 level (23 150 t), the following projection scenarios were considered:

i) constant fishing mortality at $F_{0.1}$ (0.21)

ii) constant fishing mortality at F_{2009} (0.26)

iii) constant landings at 16 000 t (TAC in 2009), and

iv) constant landings at 23 150 t (estimated catches in 2009).

An additional projection was undertaken assuming that the catches in 2010 will match the TAC of 16 000 t and remain constant at this level in 2011-2013.

The NAFO Scientific Council noted that projected yield under $F_{0.1}$ is close to 16 000 t over 2011-2013. Thus under both the $F_{0.1}$ and 16 000 t constant catch options, total biomass is projected to increase by approximately 10%. In the case for which the 2010 catches are assumed to be 16 000 t in both 2010 and also in the projection period, total biomass is projected to increase by 20% by 2014. Total biomass remains stable under yields corresponding to F_{2009} fishing mortality, but is projected to decrease by 15% if catches remain at 23 200 t through 2013. Fishing at F_{2009} for the period 2011-2013 would correspond to a reduction in catch from 17 600 t in 2011 to 16 000 t in 2012 and 2013. If catches are maintained at the current TAC level, total biomass is projected to be 80% of the 140 000 t, with five years remaining in the recovery plan. The potential of recovery to 140 000 t by 2014 is strongly dependent on future recruitment to the exploitable biomass, and recruitment has been very low in recent years.

RECENT MANAGEMENT ADVICE: Based on 2010 assessment the following advice from the NAFO SC was given in its 2010 report:

Scientific Council noted that all year-classes which will recruit to the exploitable biomass in the short-term are weak. Projections at the $F_{0.1}$ level indicate about 10% growth in exploitable biomass over 2010-2014. Therefore, Scientific Council recommends that fishing mortality in 2011 be no higher than the $F_{0.1}$ level (median catch of 14 500 t in 2011). Consideration should be given to reducing fishing mortality below the $F_{0.1}$ level to increase the probability of stock growth.

Special Comments: Scientific Council notes that XSA diagnostics continue to indicate serious problems in model fit. This assessment was accepted noting that careful attention will continue to be paid to model diagnostics in future assessments. The Council reiterates its concern that the catches taken from this stock consist mainly of young, immature fish of ages several years less than that at which sexual maturity is achieved. Scientific Council noted that the prospects of rebuilding this stock have been compromised by catches that have exceeded the Rebuilding Plan TACs. Scientific Council reviewed the issue of using CPUE indices in the assessment and confirmed its view that CPUE indices for this stock should not be interpreted to reflect stock size. However, further investigation of CPUE standardizations has been recommended. During previous assessments, Scientific Council has noted that fishing effort should be distributed in a similar fashion to biomass distribution in order to ensure sustainability of all spawning components.

However, NAFO Fishery Commission, in its 2010 September meeting, agreed to implement a Management Strategy with a simple Harvest Control Rules (HCR) based on survey results following the NAFO Working Group on Management Strategy Evaluation simulation testing and conclusions. The agreed HCR will adjust the total allowable catch (TAC) from year (y) to year (y+1) according to:

$$TAC_{y+1} = TAC_y (1 + \lambda \times slope)$$

where :

slope = measure of the recent trend in survey biomass. The TAC is subject to constraints on a percentage change from one year to the next (maximum 5 %).

The management strategies based on the HCR identified above agreed by Fisheries Commission was:

	Management Strategy 2
Starting TAC Control Parameter	17, 500 t
λ if slope is negative	2.00
λ if slope is positive	1.00
Constraint on the rule-generated TAC change	± 5%

In 2010 average survey slopes over the most recent five years (2005-2009) for the Canadian Autumn Div. 2J3K index (“F2J3K”), the Canadian Spring Div. 3LNO index (“S3LNO”), and the EU Flemish Cap index covering depths from 0-1400m (“EU1400”) yields slope= -0.009. Therefore, the agreed TAC for 2011 was set at 17,185 tonnes (TAC 2011 = 17500 * (1+ (2* -0.09)).

In 2011, NAFO SC computed survey slopes over the most recent five years (2006-2010). The data series included in the HCR computation are the Canadian Autumn Div. 2J3K index ("F2J3K"), the Canadian Spring Div. 3LNO index ("S3LNO"), and the EU Flemish Cap index covering depths from 0-1400m ("EU1400"). Averaging the individual survey slopes yields *slope*= -0.1130. Therefore, the estimated TAC for 2012 will be 13301 t (17185*[1+2*(-0.1130)] = 13 301 t.). However, as this change exceeds 5%, the HCR constraint is activated and TAC for 2012 was set in 16,326 t. (0.95*17185=16 326 t). Applying the harvest control rule for 2013 gives 16326*[1+2*(-0.1099)] = 12 739 t. However, as this change exceeds 5%, the HCR constraint is activated and TAC 2013 should be calculated as 0.95*16326 = 15 510 t. In 2014, there will be a full review of the current Management approach

STECF COMMENTS: STECF agrees with the advice given by the NAFO Scientific Council in 2010 as the best option to assure the rebuilding of this stock to the agreed level of biomass in the Rebuilding Plan. A new assessment and subsequent new advice is expected in 2014.

10.5 Skates & Rays (*Rajidae*) in areas 3LNO

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

Thorny skate on the Grand Banks was first assessed by Canada for the stock unit 3LNOPs. Subsequent Canadian assessments also provided advice for Div. 3LNOPs. However, Subdivision 3Ps is presently managed as a separate unit by Canada, and Div. 3LNO is managed by the NAFO.

FISHERIES: Commercial catches of skates comprise a mix of skate species. However, thorny skate represents about 95% of the skates taken in the catches. Thus, the skate fishery on the Grand Banks can be considered as directed for thorny skate.

Catches for NAFO Div. 3LNO increased in the mid-1980s with the commencement of a directed fishery for thorny skate. The main participants in this new fishery were EU-Spain, EU-Portugal, Russia, and Canada. Catches by all countries in Div. 3LNOPs over 1985-1991 averaged 18 066 t; with a peak of 29 048 t in 1991. From 1992-1995, catches of thorny skate declined to an average of 7 554 t, however there are substantial uncertainties concerning reported skate catches prior to 1996. Total catch, as estimated by STACFIS, in Div. 3LNOPs, averaged 9 000 t during the period 2000 to 2009. Average STACFIS catch in Div. 3LNO for 2005-2009 was 5 000 t. Thorny skate came under quota regulation in September 2004, when the NAFO Fisheries Commission set a Total Allowable Catch (TAC) of 13 500 t for 2005-2009 in Div. 3LNO, and Canada set a TAC of 1 050 t for Subdivision 3Ps. For 2010 and 2011, the TAC for Div. 3LNO has been reduced to 12 000 t. Catch estimates (STACFIS) for 2010 and 2011 and 2012 are 3100 t, 5400 t, 4200 t respectively for Div. 3LNO. The catches for Subdivision 3Ps are 300 t, and 500 t. and 400 t. respectively.

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

Abundance and biomass indices were available from: annual Canadian spring (1971-1982; 1983-1995; 1996-2012) and autumn (1990-1994, 1995-2012) surveys. EU-Spain survey indices were available in the NAFO Regulatory Area of Div. 3NO (1997-2010). EU-Spain survey indices in the NRA of Div. 3L are available for 2006-2010 but are not considered due to the short time series. Commercial length frequencies were available for EU-Spain (1985-1991, 1997-2012), EU-Portugal (2002-2004, 2006-2011), Canada (1994-2008, 2010, 2012), and Russia (1998-2011).

REFERENCE POINTS: There are presently no biological reference points for thorny skate in Div. 3LNOPs.

STOCK STATUS:

This stock has remained at low levels since the mid-1990s, with low fishing mortality index since 2005. Recruitment index in 2010 and 2011 is 50% above average. The most recent survey data do not change the perception of the stock status. A new assessment is planned for in 2014.

RECENT MANAGEMENT ADVICE: The most recent management advice was given based on 2010 assessment. This stock has remained low since the mid-1990s. Catches in Div. 3LNO in excess of recent levels (2009-11 average = 4 700 t) will increase the risk of the stock failing to rebuild.

NAFO Scientific Council, to promote recovery of thorny skate, recommends that catches in 2011 and 2012 should not exceed 5 000 t (the average catch during the past three years) in NAFO Div. 3LNO. The agreed annual TAC for 2013 and 2014 is 7000 t.

STECF COMMENTS: STECF agrees with the recommendation by NAFO Scientific Council.

10.6 Redfish (*Sebastes spp.*) in Division 3LN

Advice for this stock for the years 2013 and 2014 was given in 2012 and the text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

There are two species of redfish, *Sebastes mentella* and *Sebastes fasciatus*, which occur in Div. 3LN and are managed together. These are very similar in appearance and are reported collectively as redfish in statistics. Most studies the Council has reviewed in the past have suggested a closer connection between Div. 3LN and Div. 3O, for both species of redfish. However, differences observed in population dynamics between Div. 3O and Div. 3LN suggest that it would be prudent to keep Div. 3LN as a separate management unit.

FISHERIES: Reported catches oscillated around an average level of 21 000 t from 1965-1985, rose to an average about 40 000 t from 1986-1993, and have dropped to a low level observed from 1995 onwards within a range of 450-3 000 t. The estimated catches in 2010 and 2011was of 4100 t and 5395 t. From 1998-2009 a moratorium on direct fishing was in place. Since 1998 catches were taken as bycatch primarily in Greenland halibut fishery by EU-Portugal and EU-Spain.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the NAFO Scientific Council.

Catch data since 1959 and data from surveys conducted by Canada, Russian Federation and EU-Spain were available. Length frequencies were available for both commercial catch and surveys.

REFERENCE POINTS:

The stock is estimated to be well above Blim (30% Bmsy) and fishing mortality is estimated to be well below Flim (=Fmsy).

STOCK STATUS: The biomass of redfish in Div. 3LN is above Bmsy, while fishing mortality is below Fmsy. This stock was assessed in 2012. An ASPIC model framework was used to assess the status of the stock. This framework uses a surplus production model to describe stock dynamics. Next full assessment will be in 2014.

RECENT MANAGEMENT ADVICE:

Redfish in Div. 3LN has been under moratorium from 1998 to 2009. NAFO recommended that a stepwise approach to direct fishery should start by a low exploitation regime in order to have a high probability that the stock biomass is kept within its present safe zone.

In 2012 NAFO Scientific Council recommended that fishing mortality in 2013 and 2014 should be kept around the current level. This corresponds to catch levels in 2013 and 2014 of around 6200 t. NAFO also recommended that by-catch of species under moratorium in the redfish fishery should be kept to the lowest possible level. In 2013 NAFO SC stated that although the stock has been increasing, this is a newly reopened fishery, and the response of the stock to fishing is uncertain and repeated its recommendation that fishing mortality in 2013 and 2014 should be kept around the current level (Fsq). This would imply catches in 2014 of around 6200 t.

STECF COMMENTS: STECF agrees with the advice from NAFO.

10.7 Redfish (*Sebastes spp.*) in Division 3M

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

There are three species of redfish that are commercially fished on Flemish Cap; the deep-sea redfish (*Sebastes mentella*), the golden redfish (*Sebastes marinus*) and the 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 (*S. mentella and S. fasciatus*). The reason for this approach is that evidence indicates this is the dominant redfish group on Flemish Cap.

FISHERIES: The redfish fishery in Div. 3M increased from 20 000 tons in 1985 to 81 000 tons in 1990, falling continuously since then until 1998-1999, when a minimum catch around 1 100 tons was recorded mostly as by-catch of the Greenland halibut fishery. An increase of the fishing effort directed to Div. 3M redfish is observed during the first years of the present decade, pursued by EU-Portugal and Russia fleets. A new golden redfish fishery occurred on the Flemish Cap bank from September 2005 onwards on shallower depths above 300 m,

basically pursued by Portuguese bottom trawl and Russia pelagic trawl. Furthermore, the reopening of the Flemish Cap cod fishery in 2010 also contributed to the actual level of redfish catch of 8 500 t. This new reality implied a revision of catch estimates, in order to split 2005-2010 redfish catch from the major fleets on Div. 3M into golden and beaked redfish catches. Estimated total catches of redfish in 2010-2012 were 8500, 11100 and 7600 t

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the NAFO Scientific Council.

REFERENCE POINTS: No updated information on biological reference points is available.

STOCK STATUS: Scientific Council concluded that the declines of stock abundance and biomass, observed since 2008, were extended to the survey female spawning component in 2009-2010. These declines could not be explained by a commercial catch that has been chronically small for more than a decade An exploratory three-species model has been used to investigate the joint dynamics of cod, redfish and shrimp in the Flemish Cap, and to explore the plausibility of producing a combined MSY for these three species. Different MSY scenarios were explored, including the maximization of combined yields for the three species (MS), as well as three single species scenarios where fishing rates were set to maximize the yield of each one of the individual species (Cod, Redfish, and Shrimp). Results from these explorations indicated, that simultaneously achieving the yields produced by single species MSY scenarios is not possible. Overall, achieving high yields for the fish species implies low levels of shrimp biomass, while maximizing shrimp yields would require accepting significantly lower levels of cod and redfish biomass.

RECENT MANAGEMENT ADVICE: In order to sustain the female spawning stock biomass on the short term, fishing mortality should be kept at its present low level. Because of weaker incoming recruitment and uncertainty regarding current levels of natural mortality, NAFO Scientific Council recommends not to increase the current (2013) TAC (6 500 t) in 2014 and 2015.

STECF COMMENTS: STECF agrees with the advice from the NAFO Scientific Council and notes that at the September 2011 NAFO Annual Meeting the NAFO Fisheries Commission agreed a annual TACs of 6,500 t for redfish in Division 3M for 2012 and 2013 in line with Scientific Council advice.

10.8 Redfish (*Sebastes* spp.) in Division 3O

There are two species of redfish that have been commercially fished in Div. 3O; the deep sea redfish (*Sebastes mentella*) and the Acadian redfish (*Sebastes fasciatus*). The external characteristics are very similar, making them difficult to distinguish, and as a consequence they are reported collectively as "redfish" in the commercial fishery statistics. Most studies the Council has reviewed in the past have suggested a closer connection between Div. 3LN and Div. 3O, for both species of redfish. However, differences observed in population dynamics between Div. 3LN and Div. 3O suggested that it would be prudent to keep Div. 3O as a separate management unit.

FISHERIES: The redfish fishery within the Canadian portion of Div. 3O has been under TAC regulation since 1974 and a minimum size limit of 22 cm since 1995, while catch in the NRA portion of Div. 3O during that same time was regulated only by mesh size. A TAC was adopted by NAFO in September 2004. The TAC has been 20 000 t from 2005-2010 and applies to the entire area of Div. 3O. Nominal catches have ranged between 3 000 t and 35 000 t since 1960. Catches averaged 13 000 t up to 1986 and then increased to 27 000 t in 1987 and 35 000 t in 1988. Catches declined to 13 000 t in 1989, increased gradually to about 16 000 t in 1993 and declined further to about 3 000 t in 1995, partly due to reductions in foreign allocations within the Canadian fishery zone since 1993. Catches increased to 20 000 t by 2001, and have declined since then. In 2010-2012 total annual landings were around 6500 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the NAFO Scientific Council.

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

STOCK STATUS: The assessment is considered data limited and as such associated with a relatively high uncertainty. Input data are research survey indices and fishery data. Surveys indicate that the stock has increased since the early 2000s. .

RECENT MANAGEMENT ADVICE: The most recent assessment was undertaken in 2010 and the following advice from the NAFO SC was given in its 2010 report. Advice (recommendations) for 2014 -16 is based on survey indices and catch trends:

There is insufficient information on which to base predictions of annual yield potential. Stock dynamics and recruitment patterns are also poorly understood. Catches have averaged about 13 000 t since the 1960s and over the long term, catches at this level appear to have been sustainable. NAFO Scientific Council is unable to advise on a more specific TAC level.

Special Comments: Length frequencies suggest that the Div. 3O redfish fishery targets predominantly immature fish.

The next full assessment is planned for in 2016.

STECF COMMENTS: STECF notes that at the September 2013 NAFO Annual Meeting the NAFO Scientific Council did not advise any specific annual TAC for the years 2014 -16, but pointed out that annual catch levels of around 13 000 t appear to have been sustainable.

10.9 White hake (*Urophycis tenuis*) in Divisions 3NO, and Subdivision 3Ps.

The advice requested by Fisheries Commission is for NAFO Div. 3NO. Previous studies indicated that white hake constitutes a single unit within Div. 3NO and sub-div. Ps and that fish younger than 1 year, 2+ juveniles, and mature adults distribute at different locations within Div. 3NO and Subdiv. 3Ps. This movement of fish of different stages between areas must be considered when assessing the status of white hake in Div. 3NO. Therefore, an assessment of Div. 3NO white hake is conducted with information on Subdiv. 3Ps included.

FISHERIES: Catches in Div. 3NO peaked in 1985 at 8 100 t, then declined from 1988 to 1994 (2,090 t average). Average catch was low in 1995- 2001 (464 t), then increased to 6 718 t and 4 823 t in 2002 and 2003, respectively, following recruitment of the large 1999 year class. Catches decreased to an average of 677 t in 2005-2010. Catches declined to 202 t and 139 t in 2011 and 2012 respectively in Div. 3NO.

Catches of white hake in Sub-div. 3Ps were at their highest in 1985-1993, averaging 1 114 t, decreasing to an average of 668 t in 1994-2003. Since 2007 Catches furter declined to 202 t and 212 t in 2011 and 2012 respectively in Sub-div. 3Ps.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the NAFO Scientific Council.

REFERENCE POINTS: The Scientific Council was unable to define reference points for this stock.

STOCK STATUS: The stock biomass remains at relatively low levels. No large recruitments have been observed since 2000. Fishing mortality is low.

RECENT MANAGEMENT ADVICE: Based on the low recruitment, NAFO Scientific council advises that catches of white hake in Div. 3NO should not exceed their current levels of 100-300 t.

Special comments

The next full assessment of this stock is planned for 2015.

STECF COMMENTS: STECF agrees with the advice from NAFO that catches of white hake in Div. 3NO should not exceed their current levels of 100-300 t.

11 Resources in the area of CECAF

This section contains the most recent information for those stocks in the area of CECAF (Committee for the Eastern Central Atlantic Fisheries) that have been recently exploited by fleets from the EU. The CECAF region covers the FAO area 34, which extends from the Gibraltar Strait (36ºN) down to the mouth of the Congo river (6ºS), including the archipelagos of Madeira, the Canaries, Cape Vert and Sao Tomé e Principe, and since the incorporation of Angola in 2006, part of FAO area 47, down to the border of Angola with Namibia (around 18ºS).

European fisheries in the CECAF region are conducted under Fisheries Partnership Agreements (FPAs) between the EU and the coastal countries. These FPAs refer to a wide range of resources including crustaceans (shrimps

and prawns), cephalopods (octopus, cuttlefishes and squids), small pelagics (sardines, sardinellas, horse mackerels, mackerels and anchovies), demersal finfish (hakes, seabreams, groupers, croakers, etc.) and tuna fish. The latter group of resources is of the responsibility of the ICCAT (International Commission for the Conservation of the Atlantic Tuna) and assessments on the state of these stocks are presented in Section 15 of this report.

FPAs have evolved along the time, as explained in previous reports (STECF-10-03, STECF-11-15 and STECF-12-22). Since 2009, Morocco, Mauritania and Guinea-Bissau have been the only CECAF coastal countries with FPA with the EU for demersal and/or small pelagic fishery, after the cease of these fishing activities in Senegal (2008) and Guinea (2009). However, the period 2011-2013 has been critical for the EU fishing activity in these countries due to the expiry of some FPAs, the new and restrictive conditions imposed by new FPAs or for other reasons as explained below.

The last FPA EU-Morocco expired in December 2011. After months of negotiation, a new protocol was signed in June 2013. This would be applied for a period of four years and allow more than 100 European vessels to fish in Moroccan waters. This protocol has not yet been implemented as it needs to be ratified by the European Parliament.

The expiration of the FPA EU- Mauritania on the 31st July 2012 meant the cessation of most of the fishing activities of the EU fleets in this fishing ground. A temporary protocol of 6 months duration was initiated on 26 July 2012, before the expiry of this last Protocol. The new protocol was published in December 2012 (COUNCIL DECISION of 18 December 2012). However, the conditions of these protocols were very restrictive and not profitable for most EU fleets, which mostly abandoned the Mauritanian fishing ground in April-May 2012 (pelagic trawlers) or July-August 2012 (shrimper and cephalopod fleets). In fact, the cephalopod fishing opportunities were excluded by these protocols. After some technical modifications of the December 2012 protocol, that mostly concerns the shrimper fleet, this was finally ratified by the European Parliament in October 2013.

The circumstances explained above have involved significant changes in the fishing activities developed by the European fleets in Mauritanian waters:

i) The EU pelagic trawlers abandoned the Mauritanian fishing ground in May 2012. Due to the restrictive conditions for this fishery imposed by the July and December 2012 protocols, and as far as it is known, only a small number of EU vessels from the Netherlands, Lithuania, Poland and Latvia has returned and are currently fishing in Mauritania;

ii) The Spanish demersal trawlers targeting black hake in Mauritania is currently the only demersal fleet still active in the area. However, the restrictive conditions also imposed on this fleet have involved the limited use of these fishing licenses;

iii) The shrimp fishery was allowed by the new protocols, but with very restrictive conditions, which involved the withdrawal of the European (mostly Spanish) shrimper vessels from the Mauritanian fishing ground in August 2012. The improvement of the technical conditions for this fleet approved in the October 2013 negotiation will probably mean the re-opening of this fishery in the future;

iv) The cephalopod fishery was finished at the end of the FPA in August 2012. This fishing category was excluded by the new protocols and therefore, this fishery was closed at that time.

The most recent protocol with Guinea-Bissau terminated on 15 June 2012. A new protocol was initialed in February 2012 but its adoption procedure was suspended *sine die* following the military coup in Guinea-Bissau in April 2012. There is currently no protocol in force and therefore, EU vessels are not allowed to fish in the EEZ of Guinea- Bissau, thus affecting the shrimper and cephalopods fisheries that were developed in this fishing ground.

Only one CECAF Working Group met in 2013. This was the FAO/CECAF Working Group on the Assessment of Small Pelagic Fish off Northwest Africa held in Nouadhibou, Mauritania, from 10 to 15 June 2013. The results from the assessments have not yet been formally published and the WG report was not available to the STECF. Thus, the text on the small pelagic stocks remains unchanged from that given in the Consolidated Review of advice for 2013 (STECF-12-22).

No Working Group on Demersal Resources has been carried out since 2011. For demersal stocks from the northern part of the CECAF area, there is no updated advice and the text of the stock sections remains mostly unchanged from the STECF Review of advice for 2013 (STECF 12-22). However, new information of the 2011 Working Group on demersal resources (South) has become available for the first time to the STECF.

As explained in previous reports, there is a serious lack of basic information regarding fisheries and biological information of CECAF stocks, which do not allow the application of state-of-the-art assessment methods currently in use for other fisheries. Therefore, a standard methodology has been used in the CECAF Working Groups during the last years, which is based on the application of a dynamic production model Biodyn (Barros, 2007a), specifically the Schaefer logistic model. This model uses catch and abundance indices to calculate biological reference points (limit and target reference points), used to give management advice, and projections of future yields and stock abundance (Barros, 2007b),

11.1 Sardine (*Sardina pilchardus*) off Morocco, Western Sahara (under Moroccan administration), Mauritania and Senegal

Advice for this stock for the years 2013 and 2014 was given in 2013 but this information is not available for the STECF, hence the text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

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). Sardines of Zone North used to be exploited as by-catch by a a maximum of 20 Spanish vessels (see STECF-12-22). However, this purse seiner fishery has been closed during the period 2012-2013, due the lack of FPA between the EU and Morocco. Fisheries for sardine in zones A and B are exclusively carried out by Moroccan boats. Those in zone C were fished by an unknown number of Moroccan purse seiners and long distance trawlers mainly from Russia and previously, by The Netherlands (until the end of the FPA). Sardine was the second most abundant small pelagic species in the total catch of the sub-region (Morocco, Sahara, Mauritania and Senegal). A total of 783 900 t has been reported in 2011, 73% registered in the Moroccan zone.

In 2011, sardine constituted about 61% of the total small pelagic catches in Moroccan waters, with values around 575 000 t, lower than previous years. The average catches of sardine over the last five years reported (2007 to 2011) were around 690 000 t.

In Mauritania, sardine exploitation in 2011 was carried out by a homogeneous fleet composed of freezer pelagic trawlers, mainly operating into the framework of either international fishing agreements (EU-Mauritania or Russian Federation-Mauritania) or private agreements. Values were around 205 000 t in 2011, which meant an increase of 65% from 2010 to 2011. This values may have greatly decreased to around 75 000 t in 2012, due to the cease of the EU pelagic fishery (mainly Dutch pelagic trawlers) in April 2012 (Rapport de la Sixième Réunion du Comité Scientifique Conjoint RIM-UE, 2013).

Sardine catches in Senegal, although much lower than in the rest of the area, highly increased from 2010 to 2011 (from 18 to 3 400 tonnes).

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the FAO small pelagics working group (North) of the Committee for the Eastern Central Atlantic Fisheries (CECAF). Assessment Working Groups have traditionally considered that the Moroccan 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 last FAO Working Group on the Assessment of Small Pelagics off Northwest Africa was held in Noadhibou (Mauritania), from 10 to 15 June 2013. The results from the assessments have not yet been formally published and the WG report was not available to the STECF. Thus, the stock status and advice for this stock for 2014 remains unchanged from that given for 2013 (STECF 12-22), based on the FAO Working Group on the Assessment of Small Pelagics off Northwest Africa held in Dakar (Senegal) in 2012. The results from these assessments have not yet been formally published and therefore the information provided may be considered as preliminary.

REFERENCE POINTS: Reference points were defined in the FAO Working Group on the Assessment of Small Pelagics off Northwest Africa that was held in Banjul (The Gambia) in 2006. B_{MSY} and F_{MSY} were adopted as Limit Reference Points, while $B_{0.1}$ and $F_{0.1}$ were chosen for Target Reference Points (FAO, 2006). Limit reference points for the stock C of *S. pilchardus* were B_{MSY} = 1 616 309 and F_{MSY} = 0.53, while target reference points were $B_{0.1}$ = 1 777 940 and $F_{0.1}$ = 0.48.

STOCK STATUS: The only biomass estimation available from acoustic surveys was that carried out in the area between Cape Juby and Cape Blanc (R/V Atlantida), which showed a biomass decrease of 60% in relation to 2010. The Schaefer logistical dynamic production model was used to assess the two stocks, the central stock A+B (Cape Cantin-Cape Bojador) and the southern stock C (Cape Bojador-Cape Blanc) using the BioDyn model (FAO, 2006). The model fit was not satisfactory for the central stock (A+B). Therefore, the exploitation status of this stock was diagnosed through the analysis on the main abundance indicators. The CPUE trend of the Moroccan fishery in this area showed a progressive decline of this resource since 2009. Furthermore, a progressive decrease of the sardine sizes was detected from catches during these last three years. For Zone C, the assessment results indicate that both the estimated biomass and the fishing mortality in 2011 were lower than the target values ($B_{cur}/B_{0.1}$= 85% and $F_{cur}/F_{0.1}$= 58%). The stock C was considered not fully exploited.

The CPUE decrease in the zone A+B is coincident with a CPUE increase in the zone C during the same period 2009-2011. These could be attributed to certain environmental conditions that favoured good recruitments of the sardine in the southern area.

RECENT MANAGEMENT ADVICE: For the central stock of sardine (A+B), the Working Group recommended that the 2012 total catch should not exceed the 2011 level, noting that this stock is highly dependent on recruitment, which fluctuates with changes in the environment.

The Working Group suggested that the total catch level should be adjusted to the natural fluctuations in the stock C, which are mainly due to environmental factors. Therefore, the stock structure and abundance should be closely monitored by fishery independent methods in order to establish management measures necessary to ensure sustainable exploitation of this fishery in time.

STECF COMMENTS: STECF agrees with the advice from the small pelagics working group (North) of the Committee for the Eastern Central Atlantic Fisheries (CECAF).

11.2 Anchovy (*Engraulis encrasicolus*) off Morocco and Mauritania

Advice for this stock for the years 2013 and 2014 was given in 2013 but this information is not available for the STECF, hence the text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: In 2011, anchovy was mainly exploited in the northern region of the Moroccan coast by purse seiners from Morocco, and in a lesser extent, from Spain. In 2012 and 2013, the Spanish purse seiners did not operate in Moroccan waters due to the expiry of the FPA EU-Morocco in November 2011. The activity of Moroccan boats is unknown. The anchovy is also fished in Mauritanian waters. Although it was not the main target of the fishery in the area, large quantities used to be caught as by-catch by the EU industrial pelagic trawlers fishing for sardinella, horse mackerel or mackerel, until the end of their activity in 2012

A great increase in total anchovy catch was experimented in the region in the period 2006-2011, which was partly explained by the high increase in the European, Russian and Ukrainian effort in Mauritania, and, to a lesser extent, by that of the Moroccan fleet in zone B. Total declared anchovy catches in the region reached near 150 400 t in 2011, keeping at the same levels than 2010. Catches averaged around 135 470 t during the last five reported years (2007-2011). However, it should be noted that around 74% of total anchovy catch in the region is fished in Mauritania, mainly by the Russian and Ukrainian fleets, which account for about 69% of the total. The catches of this species decreased in 2012, due to the withdrawal of the EU fleet from the Mauritanian fishing ground in April-May 2012 (Rapport de la Sixième Réunion du Comité Scientifique Conjoint RIM-UE, 2013).

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the small pelagic working group (North) of the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF). The last Working Group met in Noadhibou (Mauritania), from 10 to 15 June 2013. However, the results from the assessments have not yet been formally published and the WG report was not available to the STECF. Thus, the stock status and advice for this stock for 2014 remains unchanged from that given for 2013 (STECF 12-22), based on the FAO Working Group on the Assessment of Small Pelagics off Northwest Africa held in Dakar (Senegal) in2012. The results from these assessments have not yet been formally published and therefore the information provided may be considered as preliminary.

REFERENCE POINTS: Reference points were defined in the FAO Working Group on the Assessment of Small Pelagics off Northwest Africa that was held in Banjul (The Gambia), in 2006. F_{MAX} and $F_{0.1}$ were chosen as Biological Reference Points. Estimations of the limit and target reference points were F_{MAX}= 2.0and $F_{0.1}$= 0.78, respectively.

STOCK STATUS: No acoustic estimations of anchovy biomass in 2011 were presented in the Working Group. Available data for anchovy in the sub-region did not allow the use of a global model. A Length Cohort Analysis (LCA) was applied in order to estimate the current F level and the relative exploitation pattern on the fishery over the last few years. A length-based Yield per Recruit Analysis was then run on these estimates, to estimate the Biological Reference Points F_{MAX} and $F_{0.1}$. The LCA results indicated that the fishing mortality level in 2011 was higher than the fishing mortality corresponding to $F_{0.1}$ ($F_{cur}/F_{0.1}$=128%). The results showed that the anchovy stock in the region was fully exploited.

The Working Group noted the qualitative and quantitative insufficiency of anchovy data from the different fishing zones, especially from Mauritania and from the Zone C. In spite of the fact that anchovy in Mauritania could constitute and important part in the total catch of the region, biological and effort data were not available for whole the analyzed period. In Morocco, data were only available in the North Zone A+B. Furthermore, there were uncertainties about the stocks identity in the region. In addition, the abundance indexes from acoustic surveys showed important fluctuations that were not reflected in the model used. All these factors, together with the abundance dependency on the recruitment in this short living species, make that the consideration of full exploitation for this stock should be considered with caution.

RECENT MANAGEMENT ADVICE: While obtaining better information related to the identification of the anchovy stocks in the region as well as more reliable fishery statistics, it was suggested, as a precautionary measure that the stock should be exploited with prudence and the effort should not exceed the current level.

STECF COMMENTS: STECF agrees with the advice from the small pelagics working group (North) of the Committee for the Eastern Central Atlantic Fisheries (CECAF). STECF notes that the assessment of anchovy in the waters off Morocco and Mauritania would benefit from improved information on catches and effort from Mauritanian waters. In addition, biological studies on stock identification of *Engraulis encrasicolu*s in the area would also help to provide better assessments and advice.

11.3 Black hake (*Merluccius senegalensis* and *Merluccius polli*) off Western Sahara (under Moroccan administration), Mauritania and Senegal

The results from the most recent assessment and advice for this stock were released in 2010. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

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 off Western Sahara, Mauritania and Senegal where they have been traditionally targeted by a specialized fleet of Spanish trawlers, among other fleets. In a lesser extent, a Spanish longline fleet used to exploit these resources, but this fishery ceased its activity in 2009. These fleets formerly operated on the shelf of the three countries, depending on the hake seasonal abundance in the different areas. The end of the fishing agreements with Morocco, in 2011 restricted the hake fishery to Mauritanian waters.

The combined catch of black hake in the whole CECAF region (Sahara, Mauritania and Senegal) made by all the fleets operating in the area varied between 8,300 t and 22,600 t over the period 1983-2008. Most of the catches of these species were made in Mauritania where they have followed a cyclical but general increasing trend from 1983 to 2002, when a maximum historic value of 15 900 t was attained by 40 national and European vessels operating in the area. The Mauritanian fleet experimented and important regression from 2000 to 2007, when it completely stopped its activity. The EU (Spanish) has been the only fleet operating in the area since 2007. Spanish catches have oscillated, following a general decreasing trend, until a minimum level around 3200 t in 2012 (Rapport de la Sixième Réunion du Comité Scientifique Conjoint RIM-UE, 2013). Only two Spanish vessels have been operative in the area during 2012 and 2013. Several reasons explain the withdrawal of most vessels targeting black hakes in Mauritania: the price decrease of this product in the international market, the high competence of black hakes from other zones (Namibia, Chile, Argentina, etc.) and the restrictive conditions imposed by the last FPA, among others.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF). *Merluccius senegalensis* and *Merluccius polli* are regularly assessed by the Working Group on demersal resources in the northern zone. The last Working Group met in Agadir (Morocco) from 8 to18 February 2010. The results from the assessments have not yet been formally published and therefore the information provided may be considered as preliminary.

REFERENCE POINTS: Reference points defined for small pelagics in the FAO Working Group held in Banjul (Gambia) in 2006 (FAO, 2006) were also adopted for the black hake stock. These are B_{MSY} and F_{MSY} for Limit Reference Points and $B_{0.1}$ and $F_{0.1}$ for Target Reference Points (FAO, 2006). For Mauritanian stock, limit reference points were B_{MSY} = 11 123, F_{MSY} = 1.97 and target reference points were $B_{0.1}$ = 12 236 and $F_{0.1}$ = 1.77. For Senegalese stock, limit reference points were B_{MSY} = 15 600, F_{MSY} = 0.29 and target reference points were $B_{0.1}$ = 17 161 and $F_{0.1}$ = 0.26.

STOCK STATUS: The Schaefer logistical dynamic production model was used to assess the black hake stocks. Due to the fact that both species (*M. polli* and *M. senegalensis*) are fished and commercialized as the same (black hake), they were assessed as a one single stock (*Merluccius spp*.) For Mauritania and Senegal stocks, current black hake biomass resulted to be over the biomass required to produce maximum sustainable yield and over the target biomass. Current fishing effort was lower than that corresponding to the target effort and to the MSY. These results showed that the stock was not fully exploited. Moroccan stock could not be assessed due to the lack of available data.

RECENT MANAGEMENT ADVICE: For the Mauritanian and Senegalese stock, it was recommended not to increase the fishing effort.

STECF COMMENTS: It is well known that there is an important by-catch of black hakes made by other fleets not targeting this resource (industrial/artisanal national and foreign demersal and pelagic trawlers). It is worth noting the lack of fishing statistics from certain fleets operating in the area, which compromises the reliability to the assessments. In order to improve data on catches and catch composition, STECF suggests that consideration be given to implementing an on-board observer scheme to obtain representative samples from all fleets participating in the fishery.

11.4 Octopus (*Octopus vulgaris*) off Mauritania

The results from the most recent assessment and advice for this stock were released in 2010. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

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 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 returned to the fishery after several decades of absence, with around 25 freezer trawlers involved in the fishery during the last years. However, this fishery was closed when the last FPA expired in August 2012, as it was not included in the fishing opportunities established by the new fishing protocols. Octopus (*Octopus vulgaris*) was the target species in this fishery followed by cuttlefish (mainly *Sepia hierredda*), squid (*Loligo vulgaris*) and a miscellaneous group of many different finfish species.

Overall catches of octopus in the period 1990-2008 have ranged from a minimum of 17,400 t in 1998 and a maximum of 44,600 t in 1992. Mauritanian catches stabilized around 10 000-15 000 t during the 2000s, followed by an important decrease in 2010 (6500 t) and a new recover in the following year (11 000 t). After peaking in year 2000 with 13 000 t, European (mainly Spanish) catches showed a continuous decreasing trend. This represented a catch fall of 61% during the last 12 years period, until the end of this fishery in August 2012 (Rapport de la Sixième Réunion du Comité Scientifique Conjoint RIM-UE, 2013) .

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF). *Octopus vulgaris* is regularly assessed by the Working Group on demersal resources in the northern zone which met in Agadir (Morocco) from 8 to18 February 2010. The results from the assessments have not yet been formally published and therefore the information provided may be considered as preliminary.

REFERENCE POINTS: Reference points defined for small pelagics in the FAO Working Group held in Banjul (Gambia) in 2006 were also adopted for the octopus stock. These are B_{MSY} and F_{MSY} for Limit Reference Points and $B_{0.1}$ and $F_{0.1}$ for Target Reference Points (FAO, 2006). Limit reference points were B_{MSY} = 27 500 and F_{MSY} = 1.0. Target reference points were $B_{0.1}$ = 30 240 and $F_{0.1}$ = 0.9.

STOCK STATUS: The Schaefer dynamic production model was used to assess the Cape Blanc (Mauritanian) stock. Results showed that biomass in 2008 was below that producing the target biomass ($B_{cur}/B_{0.1}$= 86%) and that fishing mortality is higher than that needed to reach the target $F_{0.1}$ ($F_{cur}/F_{0.1}$= 150%). The Mauritanian Cape Blanc octopus stock was therefore considered overexploited. These results were the same as those from previous

assessments, despite the reduction in fishing effort and the improvement of the stock situation detected in scientific surveys since 2006.

RECENT MANAGEMENT ADVICE: Taking into account the assessment results it was recommend a general reduction in fishing effort for all fleets involved in the fishery and a strengthening of the management measures.

STECF COMMENTS: In order to improve data on catches and catch composition, STECF suggests that consideration be given to implementing an on-board observer scheme to obtain representative samples from all fleets participating in the fishery.

11.5 Cuttlefish (*Sepia hierredda* and *Sepia officinalis*) off Mauritania

The results from the most recent assessment and advice for this stock were released in 2010. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Cuttlefish species are taken as a by-catch in the same cephalopod fishery than the octopus. The cuttlefish catch can be composed of several different species among which *Sepia hierredda* is the most abundant one. Main catches (around 75%) are reported by the Mauritanian fleet, which operates in a shallower area than the EU fleet used to do (Rapport de la Sixième Réunion du Comité Scientifique Conjoint RIM-UE, 2013). Catches from this fleet showed a decreasing trend from 1992 (5100 t) to 2011 (1600 t), followed by a stabilization around 2200 t in 2012. The European (mainly Spanish) catches reached maximal values in the period 1999-2001, followed by a sharp drop during the last years, with only 200 t in 2012, year when the fishery was closed.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF). The cuttlefish is regularly assessed by the Working Group on demersal resources in the northern zone which met in Agadir (Morocco) from 8 to18 February 2010. The results from the assessments have not yet been formally published and therefore the information provided may be considered as preliminary.

REFERENCE POINTS: Reference points adopted for this species are the same than those of most species in the region. These are B_{MSY} and F_{MSY} for Limit Reference Points and $B_{0.1}$ and $F_{0.1}$ for Target Reference Points (FAO, 2006). However, as the assessment was rejected the values corresponding to the adopted reference points are currently not available.

STOCK STATUS: The Schaefer dynamic production model was applied to assess the stock. The fitting of the model to the available observed data was not satisfactory and the CECAF Working Group was unable to interpret the results. Nevertheless, abundance indices from annual research cruises conducted in Mauritania show a decreasing trend of cuttlefish biomass indicating a state of overexploitation of the stock.

RECENT MANAGEMENT ADVICE: Taking into account the uncertainties surrounding the assessment results and the indications of progressive decline on biomass of the stock as from the research cruises, the CECAF Working Group decided to recommend a reduction in fishing effort.

STECF COMMENTS: In order to improve data on catches and catch composition STECF suggests that consideration be given to implementing an on-board observer scheme to obtain representative samples from all fleets participating in the fishery.

11.6 Coastal prawn (*Farfantepenaeus notialis*) off Mauritania

The results from the most recent assessment and advice for this stock were released in 2010. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The crustaceans of commercial importance in Mauritanian waters are in order of importance, the deep water rose shrimp (*Parapenaeus longirostris*), the Southern pink shrimp (*Farfantepenaeus notialis*) and the striped red shrimp (*Aristeus varidens*). The exploitation of shrimps in Mauritanian waters started at the decade of the 1960s, with the incorporation of a Spanish industrial fleet, which progressively increased in the area to reach maximum effort values at the end of the eighties. During the 2000s, a Mauritanian fleet developed at the same time than other foreign fleets. Thus, the shrimp fishing activity, was increased during the middle 1990s-middle 2000s. However, it dropped in a 50% from 2007 to 2008, due to several reasons as the imposition of a second close season by the Mauritanian authorities in May and June and the transformation of most of the Mauritanian shrimpers to cephalopod trawlers. This fishery has been temporally closed with the withdrawal of

the EU (mainly Spanish) of the Mauritanian fishing ground in July-August 2012, at the end of the last FPA. However, it is expected to be reopened, after the ratification of the new FPA.

F. notialis catches made by the all the industrial fleets operating in the area showed important fluctuations between 1993 and 2009, varying between 405 t (1993) and 2747 t (2005) over the period 1987-2008 and with three main peaks occurring in 1999, 2002 and 2005-2006. After the 2006 main peak, catches continuously decreased. They newly recover in 2010 and 2011 to drop again due to the effort reduction of the Spanish fleet at the end of the FPA in 2012. Since 2008 and until the end of the EU activity in 2012, the European (Spanish and Italian) fleet was the main responsible of the *F. notialis* fishery (Rapport de la Sixième Réunion du Comité Scientifique Conjoint RIM-UE, 2013).

SOURCE OF MANAGEMENT ADVICE: The management advisory body is the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF) and *Farfantepenaeus notialis* is assessed by the Working Group on demersal resources in the northern zone which met in Agadir (Morocco) from 8 to 18 February 2010. The results from the assessments have not yet been formally published and therefore the information provided may be considered as preliminary.

REFERENCE POINTS: Reference points adopted for this species are B_{MSY} and F_{MSY} for Limit Reference Points and $B_{0.1}$ and $F_{0.1}$ for Target Reference Points (FAO, 2006). Limit reference points were B_{MSY} = 4,107 and F_{MSY} = 0.51. Target reference points were $B_{0.1}$ = 4,518 and $F_{0.1}$ = 0.46.

STOCK STATUS: The Schaefer dynamic production model was applied to assess the stock. The fitting of the model was rather good indicating that the Mauritanian stock of *Farfantepenaeus notialis* appeared to be overexploited in terms of biomass. The current biomass (in 2008) was below the target biomass level ($B_{cur}/B_{0.1}$= 71%) but the current fishing mortality F_{cur} was half that needed to reach the target $F_{0.1}$ ($F_{cur}/F_{0.1}$= 55%).

RECENT MANAGEMENT ADVICE: It was recommended not to exceed the fishing effort from the level observed in 2008, to achieve a sustainable catch level permitting recovery the biomass of the stock.

STECF COMMENTS: In order to improve data on catches and catch composition STECF suggests that consideration be given to implementing an on-board observer scheme to obtain representative samples from all fleets participating in the fishery.

11.7 Deepwater shrimp (*Parapenaeus longirostris*) off Mauritania

The results from the most recent assessment and advice for this stock were released in 2010. The text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The exploitation of shrimps in Mauritanian waters started at the decade of the 1960s, with the incorporation of a Spanish industrial fleet, which progressively increased in the area to reach maximum effort values at the end of the eighties. During the 2000s, a Mauritanian fleet developed at the same time than other foreign fleets. Therefore, the fishing effort that had diminished at the beginning of the '90s was newly increased during the following years. However, the shrimp fishing activity decreased 50% from 2007 to 2008, mainly due to the imposition of a second close season by the Mauritanian authorities in May and June and to the transformation of most of the Mauritanian shrimpers to cephalopod trawlers. This fishery has been currently temporally closed, after the withdrawal of the EU shrimper fleet, at the end of the FPA in August 2012. However, it is expected to be reopened after the ratification of the new FPA.

P. longirostris is the main target species in the fishery accounting for more than 50% to the total production. Catch of this species have suffered important interannual fluctuations, showing a general increasing trend during the period 1991-2010. Total catches of deep water rose shrimp made by all the fleets operating in the area have oscillated from 497 t (1992) to 5 984 t (2007). Catches dropped after peaking in 2007 to values around 1400 t in 2009, followed by a new increase (in 2010 and 2011) and decrease (in 2012), this last due to the end of the EU fishery in August 2012. The exploitation of *P. longirostris* during the last years was mainly performed by the Spanish fleet, with a small contribution (less than 4%) of other national and foreign fleets (Rapport de la Sixième Réunion du Comité Scientifique Conjoint RIM-UE, 2013).

SOURCE OF MANAGEMENT ADVICE: The management advisory body is the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF) and *Parapenaeus longirostris* is assessed by the Working Group on demersal resources in the northern zone, which met in Agadir (Morocco) from 8 to18 February 2010. The results from the assessments have not yet been formally published and therefore the information provided may be considered as preliminary.

REFERENCE POINTS: Reference points adopted for this species are B_{MSY} and F_{MSY} for Limit Reference Points and $B_{0.1}$ and $F_{0.1}$ for Target Reference Points (FAO, 2006). Limit reference points were B_{MSY} = 8 715 and F_{MSY} =0.41. Target reference points were $B_{0.1}$ = 9 586 and $F_{0.1}$ = 0.37.

STOCK STATUS: The Schaefer dynamic production model was applied to assess the stock. Mauritanian stock resulted to be not fully exploited. The current biomass at that moment was over the target biomass $B_{0.1}$ ($B_{cur}/B_{0.1}$=121%) and the fishing mortality in 2008 was below the target reference point ($F_{cur}/F_{0.1}$=77%).

RECENT MANAGEMENT ADVICE: The CECAF Working Group recommended that the fishing effort should not exceed the level of 2008.

STECF COMMENTS: In order to improve data on catches and catch composition STECF suggests that consideration be given to implementing an on-board observer scheme to obtain representative samples from all fleets participating in the fishery.

11.8 Atlantic horse mackerel (*Trachurus trachurus*) and Cunene horse mackerel (*Trachurus trecae*) off Mauritania and other countries in the northern CECAF region.

Advice for this stock for the years 2013 and 2014 was given in 2013 but this information is not available for the STECF, hence the text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The Atlantic horse mackerel is distributed off Western Sahara (under Moroccan administration) and Mauritania, while the Cunene horse mackerel is mainly found in Mauritanian and Senegalese waters. The limit of the distribution of these stocks is subject to long-term variations. Horse mackerels are exploited by both artisanal national fleets and industrial (mainly foreign) fleets in NW African waters. The two *Trachurus* species (*T. trachurus* and *T. trecae*) made up 96% of the total catches of horse mackerel in 2011. The Atlantic horse mackerel *T. trachurus* is mainly fished in Mauritania (83%) and Morocco (17%), while Mauritania and Senegal are the main fishing grounds for the Cunene horse mackerel *T. trecae* (81% and 14% of the catch, respectively). In the Moroccan fishing ground (Cape Spartel-Cape Bojador), *T. trachurus* is exploited by a national fleet.

The Cunene horse mackerel (*T. trecae*) is the most important species of horse mackerel in the subregion, constituting about 11% (approximately 257 000 t) of the total catch of the main small pelagic species in 2011. The catch of this species has fluctuated over the time series with an overall increasing trend in recent years. However, in 2011 the catch decreased by 27% in the subregion. The average annual catch of the Cunene horse mackerel over the period 2007-2011was estimated at about 333 000 t. About 67 600 t of Atlantic horse mackerel (*T. trachurus*) were landed in 2011 (3% of the main small pelagic fish in this year). This amount represented a decrease by 39% in relation to 2010. The average catch of Atlantic horse mackerel over the last five years was 103 400 t.

Around 70-80% of the total catches of *T. trachurus* and *T. trecae* are reported in the Mauritanian EEZ, which constitutes the main fishing area for these species in the region. Most catches are carried out by the "Russian type" vessels (Russia, Ukraine, Belize, etc.). The EU fleet only represented around 20% of the total catches in Mauritania (Rapport de la Sixième Réunion du Comité Scientifique Conjoint RIM-UE, 2013). This fleet abandoned the Mauritanian fishing ground in May 2012, due to the restrictive conditions of the new FPA. At the moment, only a small number of EU pelagic trawlers are operating in the area.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the small pelagic working group (North) of the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF). The last FAO Working Group on the Assessment of Small Pelagics off Northwest Africa was held in Noadhibou (Mauritania), from 10 to 15 June 2013. However, the results from the assessments have not yet been formally published and the WG report was not available to the STECF. Thus, the stock status and advice for this stock for 2014 remains unchanged from that given for 2013 (STECF 12-22), based on the FAO Working Group on the Assessment of Small Pelagics off Northwest Africa held in Dakar (Senegal) in 2012. The results from these assessments have not yet been formally published and therefore the information provided may be considered as preliminary.

REFERENCE POINTS: Reference points were defined in the FAO Working Group on the Assessment of Small Pelagics off Northwest Africa that was held in Banjul (The Gambia) in 2006. The indices B_{MSY} and F_{MSY} were adopted as Limit Reference Points, while the indices $B_{0.1}$ and $F_{0.1}$ were chosen for Target Reference Points (FAO, 2006). For *T. trachurus*, limit reference points were B_{MSY} = 250 000 and F_{MSY} =0.25, while target

reference points were $B_{0.1}$ = 275 000 and $F_{0.1}$ = 0.23. Reference points for *T. trecae* were B_{MSY} = 750 000 and F_{MSY}= 0.36 (limit) and $B_{0.1}$= 825 000 and $F_{0.1}$= 0.33 (target).

STOCK STATUS: The Working Group considered one stock for each *Trachurus* species in the whole region. Assessments of the two stocks were carried out using a surplus production model, using the CPUE of the Russian fleet as the abundance index. Results showed that the estimated biomass of *T. trecae* in 2011 was near half the value of the target biomass $B_{0.1}$ and that the fishing mortality exceeded the $F_{0.1}$ level in 127%. Therefore, the fishing effort was greatly higher than the one that would keep the stocks at sustainable levels. This result evidenced an overexploitation of the *T. trecae* stock. On the other hand, results of the assessment of *T. trachurus* showed that the estimated biomass and the fishing mortality in 2011 were approximately at the target levels ($B_{cur}/B_{0.1}$= 106% and $F_{cur}/F_{0.1}$= 101%). Therefore, this stock was considered fully exploited.

RECENT MANAGEMENT ADVICE: As a precautionary measure and taking into account the mixed nature of this fishery, it was suggested to decrease the effort of 2011 by 20%. The Working Group reiterated its recommendations of previous years and suggested that 2012 total catches of the two species should not exceed the 2011 level (325 000 t).

STECF COMMENTS: STECF agrees with the advice from the small pelagic working group (North) of the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF) that combined catches of. *T. trecae* and *T. trachurus* from northwest Africa in 2012 should not exceed 325 000 t.

11.9 Mackerel (*Scomber japonicus*) off Mauritania and other countries in the northern CECAF region.

Advice for this stock for the years 2013 and 2014 was given in 2013 but this information is not available for the STECF, hence the text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Two chub mackerel stocks have been identified in the Northwest Africa region. The northern stock is found between Cape Bojador (Western Sahara under Moroccan administration) and the north of Morocco and the southern stock is situated between Cape Bojador and the south of Senegal. In the northern zone (Tangier–Cape Bojador), the chub mackerel is only exploited by the Moroccan fleet. This fleet is composed of coastal purse seiners, which mainly target sardine but also fish chub mackerel depending on its availability.

Part of these Moroccan coastal purse seiners also operates in the zone between Cap Bojador and Cap Blanc, together with a Moroccan fleet of Refrigerated Sea Water (RSW) vessels and a fleet of Russian pelagic trawlers that temporally operates under a Morocco–Russian fishing agreement. Other vessels in this area are chartered vessels operated by Moroccans, and trawlers that used to fish into the framework of the EU-Morocco FPA, which ended in November 2011. The Ukrainian fleet that used to operate in this area are no longer operating since 2010. South of Cap Blanc, in the Mauritanian zone, pelagic trawlers from several countries (e.g. Russia, Ukraine, Poland, Lithuania, etc.) fish mackerel on a seasonal basis. Chub mackerel used to be taken as bycatch by the EU vessels ("Dutch type"). In The Gambia and Senegal, chub mackerel is considered as bycatch of the Senegalese artisanal fleet. In 2010, a Russian fleet composed of three industrial fishing vessels operated in Senegal.

Since 1991, the trend of total chub mackerel catches for the whole subregion has seen an overall increase over the time period. The catch in 2011 was 318 000 t, the highest of the time series. This mainly resulted from an increase in catches in zone C (north of Cape Blanc), with the Moroccan fleet being the main contributor. Higher caches were also observed to the south of Cape Blanc, in Mauritania and Senegal. The general increasing trend of catches of *S. japonicus* in the region has been also observed in Mauritanian waters. Almost 40% of the total catches in CECAF-North occurs in the Mauritanian EEZ, the EU fleet contributing to 20% of this total, until the end of the FPA in 2012 (Rapport de la Sixième Réunion du Comité Scientifique Conjoint RIM-UE, 2013). A total of 99 800 t were registered in 2011, which represented an increase of 33% in relation to the previous year. The average catch for the last five years reported period 2007-2011 in Mauritanian waters was estimated at around 33 100 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the small pelagic working group (North) of the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF). The last FAO Working Group on the Assessment of Small Pelagics off Northwest Africa was held in Noadhibou (Mauritania), from 10 to 15 June 2013. However, the results from the assessments have not yet been formally published and

the WG report was not available to the STECF. Thus, the stock status and advice for this stock for 2014 remains unchanged from that given for 2013 (STECF 12-22), based on the FAO Working Group on the Assessment of Small Pelagics off Northwest Africa held in Dakar (Senegal) in 2012. The results from these assessments have not yet been formally published and therefore the information provided should be considered as preliminary.

REFERENCE POINTS: The indices B_{MSY} and F_{MSY} were adopted as Limit Reference Points, while the indices $B_{0.1}$ and $F_{0.1}$ were chosen for Target Reference Points (FAO, 2006). Not specific values for the reference points were adopted in 2011.

STOCK STATUS: No acoustic biomass estimations of mackerel in 2011 were available to the Working Group. Fishery based assessments were carried out by applying a Schaefer dynamic surplus production model, but the results were not retained by the Working Group as there were uncertainties in relation to the abundance index used. Therefore, analytical models (XSA and ICA) were applied. The results of the XSA analysis showed that the level of fishing effort deployed was half the value of the target effort and that the current biomass was slightly below the target $B_{0.1}$. Based on these results, the Working Group considered the stock fully exploited.

RECENT MANAGEMENT ADVICE: As a precautionary approach and considering the good recruitment estimations, the Working Group recommended that the catch levels should not exceed a level of around 250 000 tonnes in 2012.

STECF COMMENTS: STECF agrees with the advice from the small pelagic working group (North) of the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF).

STECF notes that the advice for a catch of 250 000 t for 2012 represents a 21% reduction on the catches for 2011.

11.10 Sardinella *(Sardinella aurita* and *Sardinella maderensis*) off Mauritania and other countries in the northern CECAF region.

Advice for this stock for the years 2013 and 2014 was given in 2013 but this information is not available for the STECF, hence the text below remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Two species of sardinella occur in the region: the round sardinella (*Sardinella aurita*) and the flat sardinella (*Sardinella maderensis*). Both species are considered single stock units, covering the area from the south of Senegal to Morocco. In zone C to the north of Cap Blanc, sardinellas are exploited by a fleet of Moroccan purse seiners and by industrial trawlers from the Russian Federation. Industrial pelagic trawlers from the EU used to exploite sardinellas in Zone C until the expiry of the EU-Morocco FPA at the end of 2011. The greatest fishery takes place in Mauritania and Senegal. In Mauritania, the sardinellas were mainly exploited by long-distance trawlers from the EU until the fleet withdrawal from this fishing ground in May 2012. Pelagic trawlers from other foreign countries contribute to this fishery, together with some small purse seiners, and with an artisanal fleet of canoes that originate not only from Mauritania but also from Senegal. Until 2012, the industrial fleet in Mauritanian waters could be divided in two segments: the EU fleet (trawlers from The Netherlands, France, England, Germany and Lithuania) and the Russian-type fleet (all from East-European origin). This division was based on the fact that the Dutch-type fleet specifically targeted sardinellas, whereas the Russian-type fleet targets horse mackerel and mackerel, fishing sardinella only as by-catch. In Senegal, sardinellas are mainly exploited by the artisanal fleet. In 2011 there was also an industrial fleet of Russian trawlers operating in Senegal.

Sardinella spp constituted 26% of total catch of small pelagic fish off Northwest Africa in 2011, with 20% for round sardinella *S. aurita* and 6% for flat sardinella *S. maderensis*. The round sardinella is the second most important small pelagic species in terms of catch. Total catches of *S. aurita* in the region have increased in the last years, reaching the maximum value of 600 000 t in 2011, followed by a great decrease in 2012, due to the withdrawal of the EU fleet. Total catch of *S. aurita* was fluctuated around an average level of about 534 700 t in the period 2007-2011. For *S. maderensis*, the catches show a general decreasing trend since 2003, with values around 125 000 t in 2011. The average catch of this species for the last five year period available (2007-2011 was 132 200 t. Catches of *S. aurita* in Mauritanian waters contribute to 45% of the total catches in the region. The EU vessels (mainly "Dutch type") used to fish up to 20% of the total catches from the industrial fleets in Mauritanian waters during the last years (Rapport de la Sixième Réunion du Comité Scientifique Conjoint RIM-UE, 2013). This fleet abandoned the Mauritanian fishing ground in May 2012, due to expiry of the last EU-

Mauritania FPA and the restrictive conditions of the new protocols. Only a reduced number of EU units are currently operating in this area.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the small pelagic working group (North) of the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF). The last FAO Working Group on the Assessment of Small Pelagics off Northwest Africa was held in Noadhibou (Mauritania), from 10 to 15 June 2013. However, the results from the assessments have not yet been formally published and the WG report was not available to the STECF. Thus, the stock status and advice for this stock for 2014 remains unchanged from that given for 2013 (STECF 12-22), based on the FAO Working Group on the Assessment of Small Pelagics off Northwest Africa held in Dakar (Senegal) in June 2012**.** The results from these assessments have not yet been formally published and therefore the information provided may be considered as preliminary.

REFERENCE POINTS: Reference points were defined in the FAO Working Group on the Assessment of Small Pelagics off Northwest Africa that was held in Banjul (The Gambia) in 2006. The indices B_{MSY} and F_{MSY} were adopted as Limit Reference Points, while the indices $B_{0.1}$ and $F_{0.1}$ were chosen for Target Reference Points (FAO, 2006). Limit reference points for *S. aurita* were B_{MSY}= 854, F_{MSY}= 0.32 and target reference points for the same stock were $B_{0.1}$ = 940 and $F_{0.1}$ = 0.29.

STOCK STATUS: regional acoustic surveys were not carried out in 2011. The stocks of sardinella were assessed by applying the Schaefer dynamic surplus production model. The abundance indices of the coordinated regional acoustic surveys were used in previous years. However, considering certain major gaps in sampling coverage in recent years, the Working Group decided that the quality of the acoustic index series had become insufficient to be used for tuning the production model. As an alternative, the CPUE series of the Dutch vessels in Mauritania was used as abundance index. Although there are well-known drawbacks to the use of CPUE data as an abundance index for pelagic fish, the Working Group decided to use this series as there were no other alternatives available. Traditionally, catches by this fleet in Mauritania are mainly composed of *S. aurita* and therefore, the CPUE in this fleet was considered to reflect the abundance of this species. The model was run both for *S. aurita*, and for the two species combined. Only the results of the assessment of *S. aurita* were accepted. These indicated that the stock is severely overexploited. The relationships between the current biomass and fishing mortality and the target levels were not presented, as they were not considered consistent.

RECENT MANAGEMENT ADVICE:

The Working Group reported that current catches of sardinella were not sustainable and should be reduced in order to avoid a future depletion of the stock. The Working Group recommended a reduction of the fishing effort in 2012 and reinforced the recommendations expressed in the working groups of 2010 and 2011. The Working Group could not make a catch recommendation as at present it is unable to predict future recruitment.

STECF COMMENTS: STECF agrees with the advice from the small pelagic working group (North) of the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF).

11.11 Other demersal finfish in Mauritanian waters

The results from the most recent assessment and advice for this stock were released in 2010. The text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: This group is composed of around 100 different species that can be taken either in targeted fisheries or as by-catch in other fisheries. The targeted 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, including the EU fleets, 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 most of these species in Mauritania is unknown. Nevertheless, the CECAF Working Group was able to estimate annual series of production from four seabreams (family Sparidae): *Pagellus bellottii*, *Pagellus acarne*, *Dentex macrophthalmus* and *Pagrus caeruleostictus*, and one grouper (family Serranidae): *Epinephelus aeneus*.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF). Demersal finfish are assessed by the Working Group on demersal resources in the northern zone, which met in Agadir (Morocco) from 8 to18 February 2010. The results from the assessments have not yet been formally published and therefore the information provided may be considered as preliminary.

REFERENCE POINTS: Reference points adopted for these species are: B_{MSY} and F_{MSY} as Limit Reference Points, and $B_{0.1}$ and $F_{0.1}$ as Target Reference Points (FAO, 2006). The species specific values if estimated were not available to STECF.

STOCK STATUS: Assessments conducted by application of dynamic surplus production models and abundance indices derived from research surveys concluded the following situations: the Mauritanian stocks of red pandora (*Pagellus bellotti*) and seabream (*Pagrus caeruleostictus*) were overexploited; grouper (*Epinephelus aeneus*) continued to be severely over exploited and close to depletion. Although the models did not provide reliable results for *Dentex macrophtalmus*, other information from the fishery and scientific surveys indicated that this stock was fully exploited.

RECENT MANAGEMENT ADVICE: The Working Group recommended not exceeding the current level of fishing effort for *P. bellottii* and *D. macrophtalmus*, as well as reducing the current effort for *P. caeruleostictus.* It was strongly recommended to stop targeting *E. aeneus* and to decrease the fishing effort in the artisanal fisheries.

STECF COMMENTS: The presence of observers onboard should be recommended in order to obtain real estimations of total catches of the above mentioned (retained and discarded) produced by the industrial fleet operating in the area.

11.12 Deepwater shrimps off Guinea-Bissau

Last advice for this stock was given in 2011 but this information was not available for the STECF until this year. .

FISHERIES: The deep water rose shrimp (*Parapenaeus longirostris)* and the striped red shrimp *(Aristeus varidens*) constituted the main deep water shrimp resources in Guinea Bissau. These species have been traditionally exploited in a fishery conducted by European trawlers that operate into the framework of FPAs between the EU and the Republic of Guinea-Bissau and by other foreign fleets, mainly from China, Angola, Belize, Gabon and Senegal. The Spanish fleet, which increased from 12 vessels in 2007 to 21 vessels in 2010, was the bigger communitarian fleet in the area, followed by the Portuguese fleet (5 vessels). This fleet increase in Guinea-Bissauan waters was mainly related to the closure of the shrimp fishery in neighbouring fishing grounds such as Senegal (in 2006) and Guinea (2009). The deep water rose shrimp *P. longirostris* was the main target species of the Spanish fleet, constituting around the 65% of its total annual catches. Between 1998 and 2011, in the period after the civil war in Guinea Bissau, Spanish catches of *P. longirostris* oscillated between 39 t (1998) and 1104 t (2009). The EU shrimper fishery ceased again in April 2012, after the military coup in Guinea-Bissau, which also resulted in suspension of the adoption of the new FPA protocol.

SOURCE OF MANAGEMENT ADVICE: CECAF is the advisory body for this area. The last assessment working group on demersal resources from the southern area of the CECAF region was held in Accra (Ghana) in 2011. The results from the assessments have not yet been formally published and therefore the information provided may be considered as preliminary. The last published report of CECAF assessment working group on demersal resources, including crustaceans, was in 2003 (FAO/CECAF, 2006).

REFERENCE POINTS: Reference points adopted for this species are B_{MSY} and F_{MSY} for Limit Reference Points and $B_{0.1}$ and $F_{0.1}$ for Target Reference Points (FAO, 2006). Limit reference points were B_{MSY} = 3000 and F_{MSY} =0.71. Target reference points were $B_{0.1}$ = 3300 and $F_{0.1}$ = 0.64.

STOCK STATUS: *A. varidens* is not assessed in the CECAF Working Group. *P. longirostris* of Guinea-Bissau was considered as a single stock for the assessment. . The Schaefer dynamic production model was applied to assess this stock. Results showed that the deep water rose shrimp stock was fully exploited. The current biomass was over the target biomass $B_{0.1}$ ($B_{cur}/B_{0.1}$=139%) and the fishing mortality in 2010 was below the target reference point ($F_{cur}/F_{0.1}$=63%).

RECENT MANAGEMENT ADVICE: As a precautionary approach, the Working Group recommended not to increase the fishing effort and to keep the total catch below the average of most recent three years (2008-2010) of 2000 tonnes.

STECF COMMENTS: STECF agrees with the assessment and advice from the CECAF Working group.

However, STECF notes there are inconsistencies between the data provided by Guinea-Bissau to the WG and to the Joint Scientific Committees (JSCs) for FPAs between the EU and Guinea-Bissau. Thus, the results of this assessment should be considered with caution.

Financial constraints do not allow the Working Groups to meet with the recommended frequency. Therefore, assessments cannot be updated on an annual basis and management advice is based on historic data and assessments. Research on biological studies focussed on the identification of stocks should be undertaken in the region. Furthermore, the presence of onboard observers is desirable in order to obtain reliable estimates of total catches (retained and discarded) produced by the fleets operating in the area.

11.13 Octopus (*Octopus vulgaris*) off Guinea-Bissau

Last advice for this stock was given in 2011 but this information was not available for the STECF until this year.

FISHERIES: The cephalopod fishery in waters off Guinea-Bissau was mainly developed by Spanish trawlers. Access restrictions to Moroccan fishing grounds forced the Spanish cephalopod fleet to extend the scope of fishing agreements to other countries, first to Mauritania, from where it extended progressively to southern latitudes (Senegal, Guinea-Bissau and Guinea). The end of the fishery agreements, first with Senegal (2006) and later with Guinea (2008), restricted the fishing area of the EU cephalopod trawlers to waters off Mauritania and Guinea-Bissau. Originally, the fleet used to target cuttlefish (*Sepia officinalis* and *S. hierredda*), although the important increase of octopus catches during the last years led to a change in the target species.

Cephalopod fishery in Guinea-Bissau during the last years was developed by industrial trawlers mainly from the EU (Spain and Portugal) and China, being the Chinese fleet the one with greater effort in the area, followed by the Spanish fleet. The Spanish statistical series is the longer available. Spanish catches of octopus oscillated between very low values after the civil war years in Guinea-Bissau to a maximum value of 1187 t in 2007, when the higher effort was exerted by the Spanish fleet in these waters. The EU cephalopod fleet left this fishery after the military coup in April 2012.

SOURCE OF MANAGEMENT ADVICE: CECAF is the advisory body for this area. The last assessment working group on demersal resources from the southern area of the CECAF region was held in Accra (Ghana) in 2011. The results from the assessments have not yet been formally published and therefore the information provided may be considered as preliminary. The last published report of CECAF assessment working group on demersal resources was in 2003 (FAO/CECAF, 2006).

REFERENCE POINTS: Reference points adopted for this species are B_{MSY} and F_{MSY} for Limit Reference Points and $B_{0.1}$ and $F_{0.1}$ for Target Reference Points (FAO, 2006). Limit reference points were B_{MSY} = 5000 and F_{MSY} =0.5. Target reference points were $B_{0.1}$ = 5500 and $F_{0.1}$ = 0.45.

STOCK STATUS: The Working Group considered a single stock of *O. vulgaris* from Guinea-Bissau. The Schaefer dynamic production model was applied to assess it. Results showed that the octopus stock was not fully exploited. The current biomass was over the target biomass $B_{0.1}$ ($B_{cur}/B_{0.1}$=150%) and the fishing mortality in 2010 was below the target reference point ($F_{cur}/F_{0.1}$=34%).

RECENT MANAGEMENT ADVICE: the Working Group recommended not to exceed the effort levels exerted during the period 2007-2009, and to keep the catch at the average of the last years around 3000 tonnes. The WG noted that the data provided in 2010 were provisional and thus, they were not considered for the recommendation. In addition, the WG recommended to review the statistics series of all fleets that harvest this resource.

STECF COMMENTS: STECF agrees with the assessment and advice from the CECAF Working group.

However, STECF notes there are inconsistencies between the data provided by Guinea-Bissau to the WG and to the Joint Scientific Committees (JSCs) for FPAs between the EU and Guinea-Bissau. In addition the assessment was made with uncompleted data. Therefore, the results of this assessment should be considered with caution. Financial constraints do not allow the Working Groups to meet with the recommended frequency. Therefore, assessments cannot be updated on an annual basis and management advice is based on historic data and assessments. The lack of information of other countries targeting the same resource in the area does not permit reliable assessments of the stocks. Furthermore, the presence of onboard observers is desirable in order to obtain real estimations of total catches (retained and discarded) produced by the fleets operating in the area.

11.14 Cuttlefish (*Sepia spp.*) off Guinea-Bissau

Last advice for this stock was given in 2011 but this information was not available for the STECF until this year.

FISHERIES: The cephalopod fishery in waters off Guinea-Bissau was developed by Spanish trawlers. Access restrictions to Moroccan fishing grounds forced the Spanish cephalopod fleet to extend the scope of fishing agreements to other countries, first to Mauritania, from where it extended progressively to southern latitudes (Senegal, Guinea-Bissau and Guinea). The end of the fishery agreements, first with Senegal (2006) and later with Guinea (2008), restricted the fishing area of the EU cephalopod trawlers to waters off Mauritania and Guinea-Bissau. Originally, the fleet used to target cuttlefish (*Sepia officinalis* and *S. hierredda*), although the important increase of octopus catches during the last years led to a change in the target species.

Cephalopod fishery in Guinea-Bissau was developed by industrial trawlers mainly from the EU (Spain and Portugal) and from China, this last being the exerting the greatest effort in the area, followed by the Spanish fleet. The Spanish statistical series is the longer available. Spanish catches of cuttlefish oscillated between very low values after the civil war years in Guinea-Bissau to a maximum value of 570 t in 2007. The EU cephalopod fleet left this fishing ground after the military coup in April 2011.

REFERENCE POINTS: Reference points were defined in the FAO Working Group on the Assessment of Small Pelagics off Northwest Africa that was held in Banjul (The Gambia) in 2006. The indices B_{MSY} and F_{MSY} were adopted as Limit Reference Points, while the indices $B_{0.1}$ and $F_{0.1}$ were chosen for Target Reference Points (FAO, 2006). STECF did not have access to the specific values for the adopted reference points.

STOCK STATUS: The Working Group considered a single stock of *Sepia spp* from Guinea-Bissau. The Schaefer dynamic production model was applied to assess this stock. The assessment was not accepted and the working group recommended that the countries involved in this fishery should review and complete the catch and effort data series, as there was a general lack of information from important fleets operating in the area (i.e.: the Chinese fleet).

STECF COMMENTS: STECF agrees with the advice from the CECAF Working Group. The lack of information of other countries targeting the same resource in the area does not permit reliable assessments of the stocks. STECF suggests that an on-board observer scheme is implemented to obtain representative samples from all fleets participating in the fishery.

Financial constraints do not allow the Working Groups to meet with the recommended frequency, therefore, assessments cannot be updated on an annual basis and management advice is based on historic data and assessments.

REFERENCES:

Barros, P., 2007a. Biomass dynamic model with environmental effects. User instructions. *In*: Report of the FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa. *FAO Fisheries Report* No. 849: 213-224.

Barros, P., 2007b. Projections of future yields and stock abundance using dynamic surplus production models: general concepts. And implementation as excel spreadsheets. *In*: Report of the FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa. *FAO Fisheries Report* No. 849: 225-238.

FAO/CECAF, 2006. Report of the FAO/CECAF Working Group on the Assessment of Demersal resources. Conakry, Guinea, 19-29 September 2003/Rapport du Groupe de travail FAO/COPACE sur l'évaluation des ressources démersaux. Conakry, Guinée, 19-29 septembre 2003. CECAF/ECAF Series 06/67. FAO. Rome, 2006. 357 pp.

12 Resources in the area of WECAF

12.1 Shrimp (*Penaeus subtilis*), French Guyana

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

The text below largely arises from the report prepared for DG MARE under an ad hoc contract in 2012 (Blanchard, 2012; to be found in the background document section item 6.2 of the STECF-PLEN-12-03 meeting's website on: http://stecf.jrc.ec.europa.eu/web/stecf/plen03).

FISHERIES: Shrimp in the French Guyana EEZ, are now exclusively taken by shrimp trawlers from the EU (all French). The main shrimp species exploited on the continental shelf is *Farfantepenaeus subtilis*, with

landings representing nearly 95% of the total shrimp landings of the area. The other species landed is *F. brasiliensis*, which is not separated in landings, but its proportion is estimated from market samples. Due to fluctuations on the international market, a decrease in the demand was observed, resulting in a reduction in effort of the French fleets from 22500 days at sea in 1989 to 15700 in 1994. This was confirmed in 1997 and in 1998. Over the historical time period of the fishery (1968-1999), catches have fluctuated between 1500 t and 5600 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).

After 1999, the fishing effort continuously decreased to around 5000 days at sea in 2009 with landings of about 1500 tons. In 2010 and 2011, the fishing effort and landings decreased again to around 1000 tons. Actually, after 2000, an exponential increase of aquaculture production of shrimp from south-eastern Asia with lower costs of production, lead to a decrease of the selling prices in the international market, so that the firm turnover decreased (taking also into account the increasing exploitation costs of trawlers due to the fuel price increase) and it was more economically viable to exploit the stock with less vessels.

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).

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

STOCK STATUS: The most recent assessment of the shrimp stock of *Farfantepenaeus subtilis*, was conducted in early February 2012 by Ifremer using an analytical model (VPA on a monthly time step). The general conclusions were identical to the previous yearly assesments: stock biomass and recruitment were estimated to be at the lowest levels of the series, and recruitment showed a continuous decline since the mid-2000s. Examination of the results of this analysis did not show a change in fishing mortality that may explain the collapse of the stock: monthly fluctuations in mortality that are very important, but the trend is downward in recent years. Since 1999, high values of recruitment were no longer observed. Since 2006, a sharp recruitment decline was estimated. Moreover, the collapse of recruitment did not seem to be completely caused by a decline in spawner abundance, although, obviously, in recent years, the low spawner abundance produced small amounts of recruitment. In contrast, the spawning biomass was directly related to the recruitment. It thus appears that the fishing may not be the main cause of the collapse of the stock biomass and recruitment.

RECENT MANAGEMENT ADVICE: The trawl fishery has been controlled by a total allowable catch (TAC) system implemented by the European Union (EU) and since 1992, by a local licence system fixing the maximum number of trawlers allowed to exploit the stock. A precautionary TAC of 3317 t decided by the European Union covers all species of penaeid shrimps *(Penaeus subtilis* or brown shrimp, *P. brasiliensis* or pink shrimp, *P. notialis, P.schmitti* and *Xiphopenaeus kroyeri* or seabob) caught in the EEZ of French Guiana, of which 4 000 t are for the EU and 108t for ACP countries

STECF COMMENTS: STECF notes that while fishing pressure does not seem to be the main cause of the collapse of the stock, it may exacerbate a fragile situation. If the conditions again become favourable, maintaining a minimum of shrimp is essential. In this regard, the maintenance of moderate fishing effort and/or catches is probably the most relevant measure. It should also ensure that preservation of juveniles in coastal waters (below 30 m) thanks to the fishing ban is effective. In recent years, the number of licenses does not appear to be a factor of control of fishing since the number of shrimp trawler in activity is much lower than the licenses granted. The TAC has also rarely been achieved. It has been shown that the conditions of profitability of the vessels contribute to the self-regulation of the fishery today given the low catches. In conclusion, and in the case of a stock situation in the coming years comparable to recent years, it is likely that the fishery regulates itself regardless of the number of licenses granted. To give the stock a chance to improve if conditions again become favourable, it may be desirable to consider a revision of the TAC, and consequences of the licenses to ensure that the catches remain moderate to ensure a sustainable renewal of the stock.

12.2 Red snappers (*Lutjanus* spp.) waters of French Guyana

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

The text below largely arises from the report prepared for DG MARE under an ad hoc contract in 2012 (Blanchard, 2012; to be found in the background document section item 6.2 of the STECF-PLEN-12-03 meeting's website on: http://stecf.jrc.ec.europa.eu/web/stecf/plen03insert).

FISHERIES: The potential surface of the fishery for red snappers is approximately of 26 000 km^2, from the isobaths of 50-120 m. It has been harvested on the rocky grounds by a Venezuelan fleet of 45 licensed hand liners. The licences are nominative and free and assigned by the EU. Under the licence agreement, the skippers have to land and sell 75% of their catches to processors in French Guyana with whom they have a production contract. A new fishery exploited by fishermen from La Martinique and La Guadeloupe was initiated in 1996. They operate with pots mainly on muddy grounds. That fishery is also targeting vermilion snapper (*Rhomboplites aurorubens*) and lane snapper (*Lutjanus synagris*). Fishing effort expressed as a number of days fishing in the EEZ of French Guyana is the only data provided for both fleet segments (handline fleet and pot/trap fleet) in the logbooks. It is around 3800 fishing days. The activity of the Martinique (and more rarely of the Guadeloupe) pot fleet fishing in the EEZ of French Guiana is variable depending on the year with 1 to 6 vessels operating for 250 fishing days in total. The handline fleet for red snapper catches *Lutjanus purpureus* at 90%, while the pot fleet catches about 70% of *Lutjanus purpureus* and more than 25% of the snapper *Rhomboplites aurorubens*. The production landed in French Guyana fluctuates between 800 and 1600 tons, about 90% done by the handline fleet. The activity of shrimp trawlers is an important source of mortality for young red snappers.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the IFREMER Centre in Cayenne.

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

STOCK STATUS: Because of uncertainty in assessment model inputs, stock status is uncertain.

The results of the VPA based on ages showed that the red snapper recruitment in recent years seemed to remain at a high level (the last 2 years subject to some reservations due to the low number of data used in the analysis) with a value of around 6 million recruits at age 1. Total biomass increased steadily since 2003 and reached in 2010 the value that was observed in the 90s, before the collapse of the stock. Spawning biomass also increased, but less rapidly than the total biomass. Average fishing mortality F on ages 2-5, was maintained at a much higher level compared to the average F on ages 6 to 11. In the early 2000s, the stock had been declared in over-exploitation by the relevant Working group of the Committee on Fisheries of the west-central Atlantic (FAO). After 2002, recruitment and spawning biomass re-grew. In 2010, the total biomass was at the same level as that observed before the fall of the stock but with a different age composition: recruitment was higher but the spawning biomass was lower. The stock appeared to be recovering.

RECENT MANAGEMENT ADVICE: Given the uncertainty of the results, the most recent advice recommended to avoid any further increases in effort without improvements in the assessment.

STECF COMMENTS: With the new present information, that is to say an increase of recruitment, and a subsequent, but slower, recovery of the spawning stock biomass, we should recommend again to avoid further increases in effort (despite it has yet increased in 2012 from 41 to 45 licences delivered), in order to let the stock recover.

13 Resources in the southeast Atlantic Ocean (SEAFO)

13.1 Orange roughy (*Hoplostethus atlanticus*), SEAFO CA

The most recent advice for this stock was provided by the SEAFO Scientific Committee in 2012 and is reproduced below.

FISHERIES: Since 1995, landings of orange roughy from the SEAFO convention area have been reported by Namibia, Norway and South Africa. Between 1995 and 2005, reported annual landings have fluctuated without trend from less than 1 t to 94 t. There has been no fishing for orange roughy and no reported landings since 2005.

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

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

STOCK STATUS: The status of the stock is unknown.

RECENT MANAGEMENT ADVICE: The most recent advice is given in the 2012 report of the SEAFO Scientific Committee and reproduced below.

There is no data available for orange roughy within the SEAFO CA, as a result SC cannot provide a reliable state of the stock assessment within the CA. SC recommends that orange roughy assessment should be done separately for each aggregation area found in the SEAFO CA and subsequent quotas.

SC therefore recommend a status quo for the 2013-2014 TAC: Zero (0) tonnes in Sub-Division B1 and 50t in the remainder of the SEAFO CA.

STECF COMMENTS: STECF agrees with the advice from the SEAFO Scientific Committee that separate assessments for orange roughy for each aggregation area are desirable. However in the absence any reliable information on stock status and exploitation rate, STECF is unable to quantify an appropriate catch level for orange roughy in the SEAFO convention area.

13.2 Patagonian toothfish (*Dissostichus eleginoides*), SEAFO CA

The most recent advice for this stock was provided by the SEAFO Scientific Committee in 2012 and is reproduced below.

FISHERIES: Since 2002, landings of toothfish from the SEAFO convention area have been reported by EU (Spain), Japan, Korea and South Africa. The fishery is localized in Division D, between 40ºS and 50ºS. Three fishing grounds are in the area: Meteor Seamounts (Sub-Division D1), Discovery Seamounts (closed area) and the western part of Division D seamounts. The fishery takes place as part of vessels' trips between fishing grounds on the Patagonian slope, CCAMLR fishing grounds and the Indian Ocean and a maximum of four vessels have participated in the fishery in any one year. Reported landings and fishing effort have fluctuated without trend between 18 t and 393 t over the period 2002 – 2010. Reported landings for 2011 are 201t and the provisional reported landings for 2012 are 122 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the SEAFO. SEAFO decided to use the CCAMLR catch limit in Subarea 48.6 (north 60ºS) adjacent to SEAFO Division D.

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

STOCK STATUS: The status of the stock is unknown.

RECENT MANAGEMENT ADVICE: Based on the exploratory data analyses, it was found that mean lengths and depths showed decreasing trends (2009-2011) while nominal CPUE showed contradictory trends between areas. With this information, it is not possible to provide the status of the Patagonian toothfish stock in the SEAFO CA.

SC thus recommends to uphold the 2010 recommendation which was based on two opinions of 200t and 260t, for the 2013 fishing season.

STECF COMMENTS: STECF notes that the SEAFO Fishery Commission has set annual TACs for toothfish in the SEAFO convention area of 230 t for 2011 and 2012 and 2013.

13.3 Alfonsino (*Beryx* spp.), SEAFO CA

The most recent advice for this stock was provided by the SEAFO Scientific Committee in 2010. Hence, the following text remains unchanged from the Consolidated STECF Review of Advice for 2012.

FISHERIES: Since 1976, landings of alfonsino from the SEAFO convention area have been reported by Namibia, Norway, Russia, EU (Portugal), Ukraine and Korea and between 1976 and 2006 have fluctuated annually from less than 1 t and 4236 t. Between 1976 and 1982 reported landings averaged about 1130 t annually whereas between 1983 and 2006 average annually reported landings were about 67 t. There has been no fishing for alfonsino and no reported landings since 1995.

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

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

STOCK STATUS: The status of the stock is unknown.

RECENT MANAGEMENT ADVICE: The most recent advice is given in the 2012 Report of the SEAFO SC and relates to 2013 and 2014 as follows:

Information available on the stock status does not allow evaluating the stock status of the species. SC considers that there is not enough information to revise the TAC that has been proposed in 2010. SC agreed that inter-sessional work will be done in order to improve and update the advice on this species.

SC recommends a TAC of 200t is fixed for the SEAFO CA for 2013 and 2014.

STECF COMMENTS: STECF notes that the SEAFO Fishery Commission has set a TAC of 200 t for alfonsino for 2013 in the SEAFO Convention Area.

13.4 Deep-sea red crab (*Chaceon* spp.), SEAFO CA

FISHERIES: The fishery for deep-sea red crab is mainly located at Valdivia Bank (Sub-Division B1) and the main targeted species is *Chaceon erytheiae* although others *Chaceon* species are also distributed in the SEAFO CA. Since 2001 reported annual landings have varied from less than 1 t in 2001 and a peak of approximately 800 t in 2007. Vessels from Japan, Namibia, EU (Spain) and EU (Portugal) have all participated in the fishery for deep-sea red crabs. Reported landings in 2010 and 2011 were 200 t and 175 t respectively. Provisional landings for 2012(to end October 2012) aree reported as 5 t. Currently, the fishery usually takes place during approximately three months per year and is carried out by one or two vessels. In recent years landings of deep sea red crab have been from Sub-division B1 only.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the SEAFO. The assessment is based on catch level in 2005 and 2006.

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

STOCK STATUS: The status of the stock is unknown.

RECENT MANAGEMENT ADVICE: The most recent advice was given by the SEAFO SC in 2012 and is reproduced below.

It was agreed that for the SEAFO deep-sea red crab stock assessment a standardized CPUE series will suffice at this time for management purposes. However, the standardization of the deep-sea red crab CPUE is not as straight-forward as was expected and thus could not be completed within the context of the SC meeting. It was thus agreed that the CPUE standardization will be completed inter-sessionally and management advice updated by the next SC meeting in 2013.

SC therefore recommends that the status quo be maintained as set in 2010 (i.e. 200t of Sub-division B1, and 200t for the remainder of the SEAFO CA).

STECF COMMENTS: STECF notes that the SEAFO Fishery Commission has set TACs for deep- sea red crab in the SEAFO convention area for 2013 of 200 t for Sub-division B1, and 200t for the remainder of the SEAFO CA.

13.5 Pelagic armourhead (*Pseudopentaceros richardsoni*)

FISHERIES: Pelagic armourhead has an oceanic distribution, primarily in the vicinity of seamounts at depths ranging from 200 m – 500 m and are caught in the bottom and mid-water trawl fisheries directed to orange roughy and alfonsino in SEAFO regions A, C and B1. Between 1976 and 1982 reported landings varied between 53 t and 1435 t. Between 1983 and 2005, reported annual landings varied from zero and 25 t. No landings have been reported for the years 2005-2009 and apart from area B1, no catches of pelagic armourhead were reported for the years 2010 - 2011. Reported catches from area B1 in 2010 and 2011 were 918 t and 132 t respectively and in 2012 provisionally-reported catches were 117 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the Scientific Committee of the SEAFO.

REFERENCE POINTS: No reference points have been proposed for pelagic armourhead in the SEAFO convention area.

STOCK STATUS: The status of the stock(s) of pelagic armourhead in the SEAFO convention area is unknown. The time series of abundance data is insufficient to evaluate any changes in stock status.

RECENT MANAGEMENT ADVICE: The SEAFO SC could not reach a consensus on the recommendation regarding the Southern boarfish TAC and thus presents the three views discussed during the meeting:

Opinion 1 (Member Adoption: 4):

Southern boarfish adulthood population is concentrated in restricted area on the summit of seamounts. The actual fishing grounds are located in a small area of about 200 km2 at Valdivia Bank. The spatial behaviour of species and of the fishery makes the use of a local depletion method an adequate tool to evaluate the status of the population. The model results obtained show that the actual level of exploitation over the stock is too high and is likely to drive the population to extremely low levels. This condition of the stock is consistent with trend of annual catches and fishing effort (in number of fishing hauls) since the start of the fishery in 2010 (Fig. 3). For this unmanaged stock the catch in 2011 represents nearly 15% of that from 2010. This decrease occurred even though the fishing effort did not significantly differ between the two years. In 2012, although the fishing season has not finished yet the effort thus far is at the same level as that of 2011 (2011: 85 hauls, 2012: 89 hauls).

The spawning behaviour of the species strengthens the negative impact of fishing, since spawners are concentrated in the area and spawning is likely to occur in a specific season. Available data indicate that spawning in SEAFO takes place during the 2nd quarter of the year (May-June).

By considering the 2010 estimate of the biomass at the beginning of the fishing season (851 t) as a proxy virgin stock biomass(Bv) the BMSY estimate will be equal of about 425.5t. Following Gulland (1971) method (MSY = 0.5*M*Bv) and assuming 0.279 the estimate of natural mortality for the species, the maximum sustainable yield, MSY, estimate equals 120 t.

SC reviewed work from the North Pacific Armourhead fishery and notes that this stock failed to recover after an initial intense exploitation rate (Fig. 4). It was recognized that since this species have similar biology and population dynamics, when subjected to a similar exploitation, the fishery can deplete the stock within 1-3 years (Anon 2012).

Recommendation: For Option 1 it is recommended that the 2013 TAC for Armourhead be set at 120t for Sub-division B1.

Opinion 2 (Member Adoption: 1):

- The average length for 2010-2011 September: decreased (44.3 to 44.1 cm) and the median remained constant at 41.0cm.

- The estimated biomass (by Local depletion model) at the beginning of the fishing season for 2010-2011 decreased (¼ from 2010 to 2011).

- The fishing ground of P. richardsoni by Korean trawls: concentrated at Valdivia Bank (aggregate at the adulthood)

- The level of exploitation over the stock was considered high

∴ Setting a proper fishery management is required

Considering TAC

1. Bmsy was estimated as: 0.5*B=0.5*850=425 t (375-548).

Summary statistics of the biomass (tonne) at the beginning of the fishing season derived from 2000 bootstrap re-sampling estimates

Year	25% percentile	Estimate	75% percentile
2010	751	851	1096
2011	137	176	229

- The model to estimate virgin biomass (B0) used CPUE (haul-by-haul) and catch only without considering biological characteristics.
- The estimated biomass has many uncertainties because of unfitted assumptions for the population and lack of data for stock assessments.

- The estimated biomass through the process of the used model just reflected the catches.
- The estimated value is too small to use as the base value for calculating TAC.
- To get more reasonable results it is required to collect more data for a few years.

2. Need to consider catch and CPUE trend
- Mean catch for 2010-2011: (918+132)/2=525 t
3. Mean value between 425 (Bmsy) and 525 t (Mean catch): 475 t

Recommendation: For **Option 2** it is recommended that the 2013 TAC for Armourhead be set at **450t** for Sub-division B1.

Opinion 3 (Member Adoption: 1): Due to difficulties to have scientifically robust results on the status of the Armourhead stock in the 2012 SC, SC faced difficulties to produce the agreed TAC. However, as the SC has the consensus to suggest the TAC; it is suggested as the 3rd opinion, that the average catch in 2010-2011 (525 t) is proposed. Then, each year TAC needs to be reviewed scientifically with new information until the consensus is reached.

Recommendation: For Option 3 it is recommended that the 2013 TAC for pelagic armourhead be set at 525t for Sub-division B1.

STECF COMMENTS: STECF notes that the SEAFO Scientific Committee was unable to agree on the management options for pelagic armourhead. STECF also notes that no TAC has been agreed for 2013 and that currently there are no management measures to regulate the catches of pelagic armourhead in the SEAFO convention area. However given the vulnerability of aggregations to fishing and risk of rapid and possibly sequential depletion, STECF advises that it would seem prudent to introduce measures to limit catches of pelagic armourhead and to restrict any potential expansion of fisheries that exploit this species in the SEAFO convention

14 Resources in the southwest Atlantic Ocean

The south-west Atlantic (SW Atlantic), corresponding to FAO Statistical Area 41, includes a total continental shelf area of approximately 1.96 million km^2 of which a large portion lies off the coast of Argentina – the Patagonian Shelf – and extends beyond Exclusive Economic Zones (EEZs) in the region, making up an integral part of the Southeast South American Shelf Large Marine Ecosystem (SSASLME). Currently, there is no multilateral management regime in force for the fisheries in the SW Atlantic, this region being the only significant area for fisheries not covered by any Regional Fisheries Management Organisation (RFMO).

This section contains updated reviews of advice for stocks in Falkland Islands' waters. The Instituto Español de Oceanografía (IEO, Spanish Institute of Oceanography) conducted 13 multidisciplinary research cruises in international waters of the SW Atlantic between October 2007 and April 2010 to provide scientific advice to the Spanish Fisheries Administration. The core of this advice, consisting in the proposal of nine candidate areas for closure along the Patagonian Shelf and slope, due to identified presence of Vulnerable Marine Ecosystems (VMEs) or sensitive habitats and/or organisms. Accordingly to this advice, the Spanish Administration implemented on 1st July 2011 a fishing ban in the proposed areas for the Spanish bottom trawling fleets operating in the high seas of the SW Atlantic, this ban being still in force.

In October 2007, the IEO started a series of multidisciplinary research cruises on the High Seas of the SW Atlantic on board the Spanish R/V Miguel Oliver, with the aim of studying Vulnerable Marine Ecosystems (VMEs) in the area between coastal states' EEZs and the 1500 m depth contour. The study, comprising a total of 13 cruises, finished in April 2010 and included the analysis of bottom trawling activities on VMEs. Research activities involved cartography, benthos, geomorphology, sediment, fishing and hydrography. Three of these cruises were devoted to biomass estimates of the main commercial stocks in the referred area and the creation of a time series data for use in resource assessments. To date, the swept area biomass estimates for each of the commercially exploited resources in international waters of the Southwest Atlantic are the only available estimates. Results of the three fishing surveys were therefore incorporated in the appropriate stock sections of the Review of Scientific Advice for 2011.

The research undertaken and its main findings led to the delineating of nine areas to be protected, according to biological, geological and mix (biological and geological) criteria adopted for the quantitative, qualitative and

geographic description of the areas with the presence of organisms, habitats and ecosystems classified as vulnerable (figure 1).

The final report of the study with the location and features of candidate VMEs in the area, identifying any potential interactions with fishing activities was presented to the Spanish Administration[2] and also its main conclusions were discussed in a workshop held in Lisbon[3] in May 2011 to consider the United Nations General Assembly (UNGA) resolutions on high seas bottom fisheries: what progress has been made and what the outstanding issues are.

Finally, also the main conclusions of the study were presented in a workshop organised by the UNGA[4] to discuss implementation of paragraphs 80 and 83 to 87 of resolution 61/105 and paragraphs 117 and 119 to 127 of resolution 64/72 on sustainable fisheries, addressing the impacts of bottom fishing on vulnerable marine ecosystems and the long-term sustainability of deep sea fish stocks (New York, 15 - 16 September 2011).

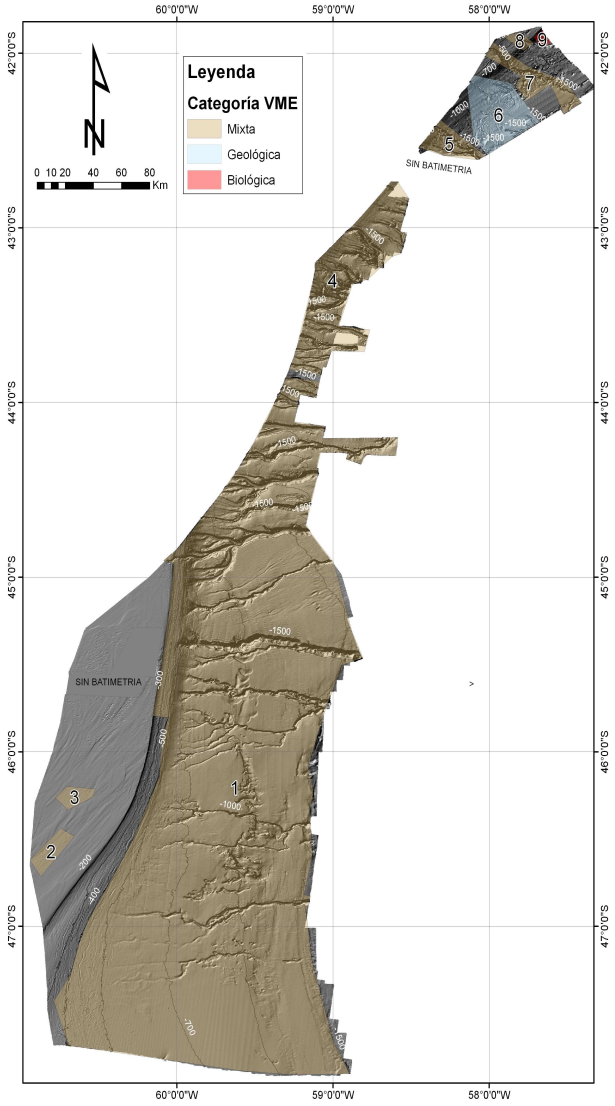

Figure 1. Candidate sites for protected areas in the HS of SW Atlantic. Only candidate areas 2 and 3 are on the continental shelf at depths less than 200 m.

[2] Informe sobre Ecosistemas Marinos Vulnerables en aguas internacionales del Atlántico Sudoccidental y de las posibles interacciones con las actividades pesqueras

[3] The impact of deep-sea fisheries and implementation of the UNGA Resolutions 61/105 and 64/72

[4] Workshop to discuss implementation of paragraphs 80 and 83 to 87 of resolution 61/105 and paragraphs 117 and 119 to 127 of resolution 64/72 on sustainable fisheries, addressing the impacts of bottom fishing on vulnerable marine ecosystems and the long-term sustainability of deep sea fish stocks

As no more surveys for biomass estimations have been carried out by IEO since April 2010, no updates on stock status or advice for stocks in international waters are provided in the present section of this report. However, updated information on stock status and advice within Falkland waters provided by the Falkland Islands Fisheries Department (FIFD) and data on catches by the Spanish fleet (2009-2012) supplied by the Spanish General Secretariat for Fisheries (Secretaría General de Pesca, SGP) are presented in this section.

RESOURCES IN FALKLAND ISLANDS WATERS

14.1 Patagonian hoki (*Macruronus magellanicus*), Falkland Islands

FISHERIES: Hoki is mainly caught in the western part of the Falkland Islands Interim Conservation and Management Zone (FICZ) and is targeted mainly by various European and Falkland Islands registered finfish trawlers. The species also forms a bycatch in the *Loligo* fishery in the skates-rays fishery. In summer 2011-2012, hoki aggregations were briefly targeted by a surimi vessel. Catches of hoki increased from about 10,000 t in early 1990s when they were mainly taken as a bycatch, to an average of 20,500 t per year by targeted trawlers over the last decade. The total annual catch has fluctuated between 16,000 and 26,000 tonnes since 2002, showing no directional trend over time. The total catch for the January-September period varied from 18,850 t in 2011 to 9,785 t in 2012 and 15,187 t in 2013. Hoki is mainly targeted in two seasons, from February-May and from July-October.

Logbooks from Spanish trawlers provided by the SGP reported a total catch of hoki within Falkland waters up to 5,737 t in 2009, 12,722 t in 2010, 12,235 in 2011 and 7,887 t in 2012.

SOURCE OF MANAGEMENT ADVICE: The Falkland Islands Fisheries Department (FIFD) is responsible for management advice to the Falkland Islands Government.

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

STOCK STATUS: The stock is considered to be in good condition at present, however, historically, catches of hoki were quite variable and there is some concern that the current high catches may not be sustainable in the long term. Catches from 2005 to 2008 have tended to be lower than catches in the previous years 2002 to 2004 and in the years 2009-2011 the total annual catch established at the level 19,000-23,000 t – similar to the period 1998-2004. The stock assessment for hoki in Falkland Islands' waters is problematic because of its migratory behaviour and only a small percentage of the stock is caught in the FICZ. Inter-annual variability in catch is linked to the incidence of skipped spawning. Fish that do not undertake spawning migrations remain in Falkland waters for feeding over winter and are targeted by finfish trawlers.

RECENT MANAGEMENT ADVICE: Fishing effort in the Falkland Zone is being held constant.

STECF COMMENTS: STECF notes that in order to provide informative advice on this transboundary stock information from the fisheries exploiting it throughout its range is required. This may be best achieved through the creation of an RFMO for the SW Atlantic.

14.2 Deep-sea grenadiers (*Macrourus carinatus*, *Macrourus holotrachys*), Falkland Islands

FISHERIES: *Macrourus holotrachys* (Günther, 1878) and *M. carinatus* (Günther, 1878) are two species, inhabiting deep seas of the Southwest Atlantic. *M. carinatus* is known to be distributed on the slopes of South America and other areas between 300 and 1100 m. *M. holotrachys* occurs around South America, Falkland Islands and Shag Rocks between 150 and 1750 m depth. In Falkland Islands' waters both species are taken as a bycatch in the longline fishery targeting Patagonian toothfish (*Dissostichus eleginoides)* at depths of 650–2000 m and occasionally by trawlers at 200–350 m depth.

In the years 2006-2011 dense commercial aggregations (CPUEs >15 tonnes per day) of grenadiers were explored in the eastern and southern Falkland slopes, mostly between 700 and 900 m depth. Total catches of these grenadiers were 932 t in 2008, 958 t in 2009, 450 t in 2010, 2,058 t in 2011, and 151 t by the end of September 2012. Decrease in the total catch in the year 2012 was due to interruption of exploratory activity. Total longline bycatch in January – September 2012 was 70 t, the rest being taken by trawlers. The minimum biomass of grenadiers in the Falkland waters was estimated as 184,000 t, that on the high seas, 40,000 t

Logbooks from Spanish trawlers provided by the SGP reported a marked variability in the total catch of grenadiers within Falkland waters of 741 t in 2009, 179 t in 2010, 1,778 in 2011 and 100 t in 2012.

SOURCE OF MANAGEMENT ADVICE: Falkland Island Fisheries Department (FIFD) produces all management advice and stock assessments of grenadiers.

REFERENCE POINTS: No reference points have been proposed.

STOCK STATUS: In good condition, stable as it is still mainly unexploited.

RECENT MANAGEMENT ADVICE: Fishing effort in Falkland Zones is being held constant.

STECF COMMENTS: STECF notes that in order to provide informative advice on this transboundary stock information from the fisheries exploiting it throughout its range is required. This may be best achieved through the creation of an RFMO for the SW Atlantic.

14.3 Southern blue-whiting (*Micromesistius australis*), Falkland Islands

FISHERIES: Since 1992 Southern blue-whiting (SBW) has been mainly targeted by surimi vessels in Falkland Islands' waters. The targeted fishery occurred mainly in the Southwest of the Falkland Islands Interim Conservation and Management Zone (FICZ) during the austral summer, from October until March (2005-2006) or from October until the end of January (2007-2011). During this period, vessels fished for aggregations of post-spawning fish, which were still feeding in the Falkland waters before dispersing. Effort by surimi vessels in 2012 yielded only poor catches and as a result, no effort has been expended by surimi vessels since October 2012. Southern blue whiting is currently taken as an occasional by-catch by finfish trawlers and in the *Loligo* squid fishery. By-catch of small Southern blue whiting in *Loligo* fisheries has increased in recent years. The total catch of Southern blue whiting for the January-September period increased in 2013 (2,648 t) relative to 2010-2012 (mean 1,890 t) but remains below the 10-year average (6,899 t) since 2003..

The Spanish SGP reported total catches of Southern blue whiting within Falkland waters of 275 t in 2009, 1,022 t in 2010, 740 t in 2011 and 1,082 t in 2012.

SOURCE OF MANAGEMENT ADVICE: The Falkland Islands Fisheries Department (FIFD).

PRECAUTIONARY REFERENCE POINTS: The total catch of SBW should be limited to 50,000 t or even lower in the Southwest Atlantic. It was agreed to restrict the total catch of *M. australis* in the Falkland Islands' Conservation Zones to 6,000 t. However, actual catch in 2011 yielded only 3,974 t.

STOCK STATUS: The latest stock assessments of Southern blue whiting in the Southwest Atlantic performed by FIFD in April 2012 suggested that the spawning stock biomass (SSB) decreased rapidly since the early 90's (1,500,000 t) and reached a level of ~200,000 t at the end of 2010. SSB for 2012 was estimated at about 15% of B_0 (initial SSB of 1,517,221) - similar to 2011 (13%) which may indicate that the stock has stabilized at a lower abundance level. In the last two years with complete closure of fishing on spawning grounds, the abundance of small fish (12-18 cm total length) has increased. This is an example of the demises of a once lucrative fishery due to over fishing.

RECENT MANAGEMENT MEASURES: Fishing in the southern region of FICZ which corresponds to the Southern blue whiting spawning grounds is banned for all vessels from 15 August until 15 October to protect pre-spawning aggregations of Southern blue whiting and to allow the fish to spawn undisturbed.

STECF COMMENTS: STECF notes that in order to provide informative advice on this transboundary stock information from the fisheries exploiting it throughout its range is required. This may be best achieved through the creation of an RFMO for the SW Atlantic.

14.4 Red cod (*Salilota australis)*, Falkland Islands

FISHERIES: Red cod is fished in the western part of the FICZ, mainly as a by-catch of the hoki and hake fisheries. Additionally, Spanish trawlers targeted red cod in Austral spring (September-October) in the vicinity of their spawning grounds to the southwest of the Islands. Since 2010 these grounds are closed between 1 September and 31 October. Annual catches of red cod decreased from 4,649-9,313 t in 1996-2000 to 2,285-2,781 t in 2003-2005. In 2006, the annual catch increased up to 3,469 t, with the further increasing trend in 2007-2011 (3,129-5,195 t). The total catch in January-September 2013 was 4,583 t. Both 2010 and 2011 were lower than 2007-2009 mainly due to the fishing ban on their spawning grounds. The closure of the Southern

blue whiting spawning grounds in September may have also had an impact on catches of red cod. Annual catch appears to have stabilised, with record high monthly catches reported in 2013.

The Spanish SGP reported a total catch of red cod within Falkland waters of 904 t in 2009, 1,960 t in 2010, 2,281 t in 2011 and 2,616 t in 2012 representing an increasing trend in landings over recent years.

SOURCE OF MANAGEMENT ADVICE: The Falkland Islands Fisheries Department (FIFD) is responsible for management advice to the Falkland Islands Government and has carried out stock assessments in 2008 and in 2009.

PRECAUTIONARY REFERENCE POINTS: No reference points have been proposed.

STOCK STATUS: Historically, the stocks have had a decreasing trend in their abundance due to fishing pressure on spawning aggregations during October. This declining trend now appears to have stabilised with signs of increasing catches. Stock assessments conducted in 2008 and 2009 indicate that SSB is at 26% of SSB_0.

RECENT MANAGEMENT MEASURES: A management plan has been set in place which bans fishing red cod and blue whiting on their common spawning grounds in September-October to allow the stock to recover. This closure continued through 2013.

STECF COMMENTS: STECF notes that in order to provide informative advice on this transboundary stock information from the fisheries exploiting it throughout its range is required. This may be best achieved through the creation of an RFMO for the SW Atlantic.

14.5 Argentine hake, Austral hake (*Merluccius hubbsi, Merluccius australis*), Falkland Islands

FISHERIES: Hakes are mainly caught in the north and western portions of the FICZ in water depths between 170 and 220 m. 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 Interim/Outer Conservation Zone) decreased from 12,000 t in 1990 to 1,500 t in 1994-1997, and then stabilised at the level of 1,678-3,069 t in 2000-2005. Common hake (*M. hubbsi*) are targeted mainly in winter during their migrations to the Falkland waters from the Patagonian shelf. Austral hake (*M. australis*) are targeted almost exclusively in the southwest of the Islands in September-November after their spawning in the around the Southern tip of South America. Catches of hake since 10 years have increased from lows of 1,900-2,700 t annually in 2003-2005 to highs of 8,400-13,600 t per year since 2006. The cumulative annual catch of hakes up to 30th September reached 8,750 t in 2011, 9,658 t in 2012 and 10,704 t in 2013. The cause of such an increase in abundance of hakes in Falkland waters in recent years is not entirely clear. Migrations of larger abundances of common hakes to FICZ/FOCZ might be caused by increased abundance of their main prey – Patagonian rock cod *Patagonotothen ramsayi*.

The Spanish SGP reported total catches of hakes within Falkland waters of 3,760 t in 2009, 11,252 t in 2010, 7,266 t in 2011 and 10,576 t in 2012.

SOURCE OF MANAGEMENT ADVICE: Falkland Islands Government is responsible for management of hake resources.

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 with only a relatively small proportion of the stock migrating in Falkland Zones. The stock was in poor condition in 1991-1999. However, after strong recruitments in 2001-2002 when the juvenile abundance increased 5-10 times in respect to a period of 1996-2000 this stock is evidently improved, given exceptional catches of hakes in the last five years. Consistently high catches since 2008 and higher-than-average hake CPUE in 2012 suggest that current harvest levels for hake in Falkland waters are sustainable.

RECENT MANAGEMENT MEASURES: Fishing effort in Falkland Zones for hakes is being held constant.

STECF COMMENTS: STECF notes that in order to provide informative advice on this transboundary stock information from the fisheries exploiting it throughout its range is required. This may be best achieved through the creation of an RFMO for the SW Atlantic.

14.6 Argentine short-finned squid (*Illex argentinus*), Falkland Islands

FISHERIES: In 2013, this squid was a major fishery resource of the Falkland Islands with the total annual catch reaching 142,406 t. 99 jigging vessels belonging to Korea and Taiwan were licensed to fish for *Illex* in 2013. Of those, only 41 vessels started to work in Falkland waters at the beginning of the season on 15th February. Catches at that time were negligible (0.1-0.2 t per night), and most of vessels sailed to the high seas to fish. Warm water inflow started to form in the northern part of FOCZ that favoured migrations of the South Patagonian Stock inside the fishing area. During the last two days of February, up to 16 jigging vessels operated in the northern part of FOCZ and had average catches of 10 t per night. In March, most licensed jiggers (90-91 vessels) worked in the Falkland Zones. On the 12th March, squid started to migrate in big numbers to the fishing area of FICZ/FOCZ, and mean catches of jigging vessels reached 15-20 t per night. After the first peak, catches decreased to 6-11 t between 18 and 29 March, and only in the last two days of the month, the second peak in catches was observed (19-23 t per night). In April, the fishery performance greatly improved with mean CPUEs fluctuating from 20.8 t per night in the first week to 28.2 t per night in the last four days of the month. Maximum daily catches per vessel attained 150 t per night in the beginning of the month, and 136 t per night at the end of the month. Most of the catches were taken in the western part of the Falkland waters along the border with the Argentinean EEZ. Stable high catches of *Illex* carried on in May, with high CPUEs especially in the first ten days of the month (40 t per night). Catches decreased gradually to 20-25 t per night by the end of May. Korean jiggers (29 vessels) had licensed to fish for *Illex* in June. During the first week of June, the catches were good, with mean daily CPUEs ranging between 17 and 25 t (maximum catch being 74 t per night). Then, catches decreased (mean 6-13 t per night) and became more sporadic. By the end of the second week, CPUEs decreased further, and vessels started to leave the fishery for the high seas. On the last day of the fishery (14th June), only 16 jiggers were fishing within FICZ. Overall in 2013 season, the South Patagonian Stock had high abundance in both the early and late migration groups.

The Spanish SGP reported total catches of *Illex* squid by Spanish trawlers within Falkland waters up to 674 t in 2009, 890 t in 2010, 1,945 t in 2011 and 585 t in 2012, confirming that the main fishing grounds for Spanish vessels targeting this species are located on the high seas.

SOURCE OF MANAGEMENT ADVICE: The Falkland Islands Fisheries Department (FIFD) is responsible for management advice to the Falkland Islands Government.

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, the fishery should be closed.

STOCK STATUS: The status of the stock is changing every year due to the short life cycle of the squid (1 year). In 2013, the winter-spawning South Patagonian Stock had a high abundance.

RECENT MANAGEMENT ADVICE: Stock management on the High Seas (international waters of 42°S and 45-47°S) remains one of the main issues for management as there is no regulation at present. To be able to predict the stock status for the following fishing season, joint multilateral studies of *Illex* spawning grounds are needed.

STECF COMMENTS: STECF notes that in order to provide informative advice on this transboundary stock information from the fisheries exploiting it throughout its range is required. This may be best achieved through the creation of an RFMO for the SW Atlantic.

14.7 Patagonian squid (*Doryteuthis* (*formerly Loligo) gahi*), Falkland Islands

FISHERIES: *Doryteuthis (Loligo) gahi* is the second major fishery resource in the Falkland waters. It is a domestic resource with stable effort; consisting of 16 mainly Falkland registered trawlers. In 2013, the abundance of both cohorts of *Loligo* was at the average level for the last decade.

The first fishing season started on 24th February with 11 C-licensed trawlers fishing in the southern part of the *Loligo* box around Beauchene Island. The catches were moderate (10-14 t per day). In the first half of March, vessels mainly fished aggregations of squid that immigrated from shallow waters to the northern part of the *Loligo* box. Catches improved during the first week of the month, with a peak in catches (mean 38 t per day, maximum catch 53 t per day) observed on 3rd March. Then, the fishery became relatively stable with trawlers moving between the northern and southern parts of the *Loligo* Box. However, CPUEs were lower (27.5 mt per day) than those observed in the same time in 2012 (44 t per day). In the first four days of April, the fleet fished exclusively in the northern part of the *Loligo* box, having average daily CPUEs of 24-38 t per day (maximum 65.5 t per day). Then, the decreased CPUEs forced some vessels to move to the southern part of the Box, where

they had also good catches in the second week of April 25-37 t per day. Total catch of *Loligo* for the first season reached 20,044 t which is the average figure for the first seasons since 2003. It was estimated that approximately 17,500 t of the *Loligo* biomass was left in the water after the season with 5% risk of overfishing.

The second fishing season started as usual on 15th July mainly in the southern part of the *Loligo* box. The beginning of the season was featured with some strong winds and stormy weather, with poor catches in the first three days. Then the catches stabilized at 20-25 t per day, with maximum catches up to 50mt per day in the south. Bad weather at the end of the month caused the catches to drop again to 7-15 t per day. After relatively low peak on the 3rd August with average daily CPUEs of 20-23 t per day, catches gradually dropped to 12-16 t by the end of the second week. Another peak in catches was recorded between 14 and 19 August (~20 t per day), with maximum catch of 44 t per day. Then the catches dropped again to 12-15 t per day until the end of the month. Similar to the situation in July, the stock of the spring-spawning cohort was dispersed throughout the whole *Loligo* Box. Lack of dense aggregations forced the fishing fleet to spread their effort almost equally between the northern and southern regions. In September, the fishery was stable but at low level with CPUEs of 11-14 t per day (maximum CPUE of 30.5 t per day). The last peak in catches occurred between 23 and 27th September (17-19 t per day) in the northern part of the Box. The Spawning Stock Biomass of the second, spring-spawning cohort was estimated to be > 40,000 t. As the stocks were not depleted, the fishery was closed at its common end of the second season (30th September) with the total catch attaining 19,975 t, and the total annual catch attaining 40,019 t, making it the 7th highest annual catch in the last decade.

The Spanish SGP reported total catches of *Loligo* squid by Spanish trawlers within Falkland waters of 737 t in 2009, 4,246 t in 2010, 3,111 t in 2011 and 7,041 t in 2012.

SOURCE OF MANAGEMENT ADVICE: The Falkland Islands Fisheries Department (FIFD) is responsible for management advice to the Falkland Islands Government.

PRECAUTIONARY REFERENCE POINTS: A minimum spawning stock biomass of 10,000 t at the end of each fishing season.

STOCK STATUS: Stocks of both cohorts of *Loligo* (autumn- and spring-spawning cohorts) are in good and stable condition with the trend to grow in biomass.

RECENT MANAGEMENT MEASURES: Due to the medium *Loligo* abundance in2013, both fishing seasons were finished at their common end date.

STECF COMMENTS: STECF notes that in order to provide informative advice on this transboundary stock information from the fisheries exploiting it throughout its range is required. This may be best achieved through the creation of an RFMO for the SW Atlantic.

14.8 Patagonian toothfish (*Dissostichus eleginoides*), Falkland Islands

FISHERIES: *Dissostichus eleginoides* is the most valuable resource in terms of price per kilo in the Falkland Zones. One Falkland company holds exclusive rights to fish for toothfish deeper than 600 m, usually consisting on one vessel. In 2013 a second vessel was contracted to fish for 2 months. Stock assessments indicated that the TAC for the main fishery (below 600 m) should remain at 1,200 t for 2013 as was the advice for 2008-2012. The total catch by trawl (less that 600 m) and longline fisheries in January – September 2013 was 1,270 t, which is slightly higher than for the same period of 2012 (1,194 t) but lower than 2011 (1,338 t).The Spanish SGP reported a total catches of toothfish by Spanish trawlers within Falkland waters of 82 t in 2009, 363 t in 2010, 297 t in 2011 and 156 t in 2012.

SOURCE OF MANAGEMENT ADVICE: The Falkland Islands Fisheries Department (FIFD) is responsible for management advice to the Falkland Islands Government.

PRECAUTIONARY REFERENCE POINTS: An annual TAC of 1,200 t has been assigned and $SSB_{current}$: B_o reference point set at 0.45 for stock conservation action to be taken.

STOCK STATUS: The fishery data for 2012 indicated a stabilised toothfish stock abundance at 52% SSB_0. Stock assessment recommended that a TAC of 1,200 remains for 2013. There have been encouraging levels of recruitment of juvenile fish in shelf waters since 2006 with 2010 seeing the second largest abundance on the shelf since records began.

RECENT MANAGEMENT ADVICE: The spawning grounds, on the Burdwood Bank, were closed between 1st July and 31st August from 2007 in order help the stock rebuild by enhancing potential recruitment. This continued through 2008 - 2013.

STECF COMMENTS: Current evidence indicates separate Falkland Islands and Argentinian stocks. However, efforts are currently being made to improve and confirm stock identification.

14.9 Rockcod (*Patagonotothen ramsayi*), Falkland Islands

FISHERIES: *Patagonotothen ramsayi* is the most abundant species of the genus *Patagonotothen*, which includes 14 species that inhabit the shelf waters off southern South America. This is a medium-sized fish with a maximum total length 47 cm L_T. It occurs on the Patagonian Shelf from 35ºS to the Burdwood Bank in the south (55ºS) and plays an important role in the food web both as predator and prey on Southwest Atlantic shelves, consuming a variety of benthic and bentho-pelagic crustaceans and being consumed by most large fish including hakes, toothfish, kingclip, rajids and others[5].

Prior to 2007 this species was not targeted due to a lack of marketability. Catches of Spanish and Falkland trawlers in the first half of 2007 were not high, but later in the year mean daily catches sometimes exceed 30 tonnes, with some vessels attaining as much as 60-70 t/day, resulting in an annual catch of 30,635 t that year. Most of the rockcod was taken in the northwestern part of FICZ. Fish have been targeted between 100 and 300 m, and the best catches obtained between 150 and 200 m depth. In 2008 the annual catch achieved 60,165 t, 50,755 t corresponding to finfish licensed trawlers targeting rockcod and the rest taken as bycatch in other fisheries. In 2009 the annual catch reached 58,149 t, 52,594 of them corresponding to finfish licensed trawlers and the rest taken as bycatch in other fisheries. In 2010 rockcod abundance was higher than in 2007-2009 and total catch reached 41,000 t by the end of May[4].

Catches of rockcod within Falkland waters provided by the SGP based on logbooks from Spanish trawlers reported total catches of 14,050 t in 2009, 40,947 t in 2010, 32,083 t in 2011 and 38,044 t in 2012. Rock cod is becoming the most important species for the Spanish fleet in terms of captures in Falkland waters.

SOURCE OF MANAGEMENT ADVICE: The Falkland Islands Fisheries Department (FIFD) is responsible for management advice to the Falkland Islands Government.

PRECAUTIONARY REFERENCE POINTS: Reference points have not been defined for this stock.

STOCK STATUS: The rockcod assessment carried out by the FICZ in 2010 resulted in an estimated biomass (ExB_0) of the unexploited stock at a median value of 937,942 t with a 95% confidence interval of [594,797 to 1,941,325 t]. Median sustainable yield (Y) was estimated at a value of 72,547 t with a 95% confidence interval of [17,181 to 184,848 t].

RECENT MANAGEMENT ADVICE: Total fishing effort in 2012 was recommended to remain at the same level than in 2010-11.

STECF COMMENTS: It is unclear if this is a separate stock from Argentine or Falklands stocks, so efforts should be made to improve stock identification. STECF notes that in order to provide informative advice, information from the fisheries exploiting this stock throughout its range is required. This may be best achieved through the creation of an RFMO for the SW Atlantic.

RESOURCES IN INTERNATIONAL WATERS

Assessments of these stocks are based on surveys only. No more surveys for biomass estimations have been made since 2010. Hence, sections 14.10 to 14.18 remain largely unchanged from the STECF review of advice for 2013 (STECF 12-22). The most relevant change refers to catches by Spanish trawlers in this area reported by the Spanish administration (SGP).

Biomass estimations in 2010 cannot be compared to those in 2008 and 2009 due to a change in the survey methodology in 2010, halving the number of trawls in deeper strata (> 500 m) in order to reduce the impact on the VMEs found and described in these strata during previous cruises.

[5] Winter, A, Laptikhovsky, V., Brickle, P. and Arkhipkin, A. (2010). Rock cod (*Patagonotothen ramsayi* (Regan, 1913)) stock assessment in the Falkland Islands. Directorate of Natural Resources. Falkland Islands Fisheries Department.

Based on the results of the study carried out by the IEO, including 13 multidisciplinary surveys, nine large areas on the high seas along the Patagonian Shelf and slope were proposed in 2011 to be designated as VMEs and closed to bottom trawling. Accordingly to this advice, the Spanish Administration implemented on 1st July 2011 a fishing ban in the proposed areas for the Spanish bottom trawling fleets operating in the high seas of the SW Atlantic. Seven of the areas cover most of the slope between 300 and 1,500 metres, while the remaining two cover areas along the shelf at depths shallower than 200 metres. These areas are located between 42º and 48ºS, an area where a fleet of approximately 27 Spanish bottom trawlers fish, primarily for hake and *Illex* squid. The closure is a condition of the permit to fish in the region issued by the Government of Spain, pursuant to EC regulation 734/2008. Further studies carried out by the IEO analysing the impact of bottom trawling on VMEs in international waters concluded that, due to intense bottom trawling over the last 40 years by international fleets, conservation measures are not relevant in the shelf area, but they are most likely needed in the upper and middle slope. Allegations from the Spanish fishing sector to modify the coordinates of the polygons enforced for protection are still under discussion.

14.10 Patagonian hoki (*Macruronus magellanicus*), International waters

Assessments for this stock are based on surveys only. No surveys have been undertaken since 2010. Hence the text below remains largely unchanged from the STECF review of advice for 2013 (STECF 12-22).

FISHERIES: Hoki is fished as a by catch during *Illex* and hake fisheries by bottom trawlers from several countries. In this area, hoki is caught by Spanish trawlers until 350 m depth.

Catches of hoki by Spanish trawlers in international waters reported by the SGP amounted to a total of 1,016 t in 2009, 587 t in 2010, 1,676 t in 2011 and 1,305 t in 2012, being the total for the whole period 8 times lower than those within Falkland waters.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for international waters of the Patagonian Shelf.

REFERENCE POINTS: Reference points have not been defined for this stock.

STOCK STATUS: The swept area biomass estimates for this stock in 2008, 2009 and 2010 were 13,792, 8,497 and 5,947 t respectively, biomass estimate in 2009 representing a decline of 39% compared to the previous year. Biomass was observed to be highest at depths between 401 and 700 m in both years. As aforementioned, biomass estimation for this species in 2010 cannot be compared to these in 2008 and 2009, due to a change in the survey methodology in 2010. No new information on stock status has been made available since 2010.

RECENT MANAGEMENT MEASURES: Since 1st July 2011 and following scientific advice by the IEO, a fishing ban was put in force by the Spanish Administration in certain areas of the international waters for the Spanish bottom trawling fleets operating there.

STECF COMMENTS: It is unclear if this is a separate stock from hoki in Argentine or Falkland Islands waters, so effort to improve stock identification are desirable. STECF notes that in order to provide informative advice, information from the fisheries exploiting this stock throughout its range is required. This may be best achieved through the creation of an RFMO for the SW Atlantic.

14.11 Deep-sea grenadiers (*Macrourus carinatus*, *Macrourus holotrachys*), International waters

Assessments for this stock are based on surveys only. No surveys have been undertaken since 2010. Hence the text below remains largely unchanged from the STECF review of advice for 2013 (STECF 12-22).

FISHERIES: Commercial catches of *Macrourus carinatus and Macrourus holotrachys* are negligible in the area where the fisheries take place in international waters (<300 m depth). Results from the three mentioned research surveys carried out by IEO indicate that despite being the most abundant species in the study area, Patagonian grenadier (*Macrourus carinatus*) is mainly distributed between 500-1000 m depth, far beyond the depth range in which the fleet operates (98% of the commercial hauls at less than 300 m depth). Similarly, *Macrourus holotrachys* has its highest densities between 1001-1500 m depth.

Catches of grenadiers by Spanish trawlers in international waters reported by the SGP amounted to a total of 28 t in 2010, 18 t in 2011 and 4 t in 2012. It is unknown to which extent these low catches can be attributed to a

deeper distribution of this species (> 700 m) beyond the depth range of the fishery, or to misreporting. Usually the Spanish trawlers do not fish at depths greater than 400 m.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

REFERENCE POINTS: Reference points have not been defined for this stock.

STOCK STATUS: The only estimates of stock biomass are those derived from the two first research surveys undertaken by the IEO in March-April 2008 and February-March 2009, as results of the 2010 cruise cannot be used due to a change in the methodology. *Macrourus carinatus* was found to be the most abundant species during both research cruises with an estimated swept area biomass of 116,679 t in 2008 and 212,768 t in 2009, this representing an increase of about 82% in 2009 with respect to 2008. Estimated biomass in 2010 was 98,486 t. *Macrourus carinatus* is distributed between 200 and 1500 m depth, but the highest catches have been obtained between 501 and 1000 m depth. In terms of abundance, *Macrourus holotrachys* was the seventh largest stock among the 12 assessed commercial species, with an estimated biomass of 4,178 t and 5,479 t in 2008 and 2009 respectively. The highest catches were taken between 1001-1500 m depth in both years. Estimated biomass in 2010 was 2,627 t. No new information on stock status has been made available since 2010.

RECENT MANAGEMENT MEASURES: Since 1st July 2011 and following scientific advice by the IEO, a fishing ban was put in force by the Spanish Administration in certain areas of the international waters for the Spanish bottom trawling fleets operating there. The greater of these areas correspond to those at depths > 500 m roughly between 44º-48ºS, the area with highest concentrations of *Macrourus carinatus*. This management measure would prevent from a possible displacement of the fishery in the future, to target for this species in the mentioned area.

STECF COMMENTS: It is unclear if this is a separate stock from Patagonian grenadier in Argentine or Falklands waters, so efforts to improve stock identification are desirable. STECF notes that in order to provide informative advice, information from the fisheries exploiting this stock throughout its range is required. This may be best achieved through the creation of an RFMO for the SW Atlantic.

14.12 Southern blue-whiting (*Micromesistius australis*), International waters

Assessments of this stock are based on surveys only. No surveys have been undertaken since 2010. Hence the text below remains largely unchanged from the STECF review of advice for 2013 (STECF 12-22).

FISHERIES: Southern blue whiting is fished as by catch during *Illex* and hake fisheries by bottom trawlers from several countries, mainly from Spain.

Catches of Southern blue whiting by Spanish trawlers in international waters reported by the SGP amounted to a total of 33 t in 2009, 10 t in 2010, 52 t in 2011 and 53 t in 2012, these low catches due to a southernmost distribution of this species.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

REFERENCE POINTS: Reference points have not been defined for this stock.

STOCK STATUS: biomass estimations from the two first IEO surveys resulted in 858 t and 710 t of southern blue whiting for 2008 and 2009, distributed between 300 and 700 m, but with most of the catches obtained at 501-700 m depth. Estimated biomass in 2010 was 611 t. No new information on stock status has been made available since 2010.

RECENT MANAGEMENT MEASURES: Since 1st July 2011 and following scientific advice by the IEO, a fishing ban was put in force by the Spanish Administration in certain areas of the international waters for the Spanish bottom trawling fleets operating there.

STECF COMMENTS: It is unclear if this is a separate stock from southern blue whiting in Argentine or Falkland Islands waters, so efforts to improve stock identification are desirable. STECF notes that in order to provide informative advice, information from the fisheries exploiting this stock throughout its range is required. This may be best achieved through the creation of an RFMO for the SW Atlantic.

14.13 Red cod (*Salilota australis)*, International waters

Assessments of this stock are based on surveys only. No surveys have been undertaken since 2010. Hence the text below remains unchanged from the STECF review of advice for 2013 (STECF 12-22).

FISHERIES: Red cod is caught as by-catch in hake and *Illex* squid fisheries by bottom trawlers from several countries, mainly from Spain.

The Spanish SGP reported a total catch of red cod by Spanish trawlers in international waters up to a total of 188 t in 2009, 157 t in 2010, 217 t in 2011 and 193 t in 2012.**SOURCE OF MANAGEMENT ADVICE:** No management advisory body exists for International waters of the Patagonian Shelf.

REFERENCE POINTS: Reference points have not been defined for this stock.

STOCK STATUS: A biomass of 118 t and 163 t of red cod was estimated during the IEO cruises in 2008 and 2009 respectively. Estimated biomass in 2010 was 57 t. No new information on stock status has been made available since 2010.

RECENT MANAGEMENT MEASURES: Since 1st July 2011 and following scientific advice by the IEO, a fishing ban was put in force by the Spanish Administration in certain areas of the international waters for the Spanish bottom trawling fleets operating there.

STECF COMMENTS: It is unclear if this is a separate stock from red cod in Argentine or Falkland Islands waters, so efforts to improve stock identification are desirable. STECF notes that in order to provide informative advice, information from the fisheries exploiting this stock throughout its range is required. This may be best achieved through the creation of an RFMO for the SW Atlantic.

14.14 Argentine hake, Austral hake (*Merluccius hubbsi, Merluccius australis*), International waters

Assessments of this stock are based on surveys only. No surveys have been undertaken since 2010. Hence the text below remains unchanged from the STECF review of advice for 2013 (STECF 12-22).

FISHERIES: Argentine hake is targeted by bottom trawlers from several countries, mostly Spain. International waters are the most important area for Spanish trawlers targeting 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 t, corresponding most of them to the High Seas. The main fishing grounds for *M. hubbsi* are located between parallels 44º-48ºS. Relatively low catches of the order of 50 t annually of *M. australis* have been reported from this area, as this species has a southernmost distribution to the Southeast of the Falkland Islands.

The maximum effort in terms of numbers of vessels in International waters and Falkland Islands by Spanish vessels was reported in 1990 (c. 100 vessels) and has decreased since then, mainly due to the development of new fisheries in other areas (i.e the North West Atlantic, NAFO fisheries). Currently, the number of fishing units flagged to Spain operating in this area is around 27 vessels. In International waters *M. hubbsi* is more abundant at shallower waters, i.e. close to the 200 nm limit of the Argentinean EEZ. Therefore, the fishing strategy of the Spanish fleet when targeting hake is to fish around this area.

Catches reported by the Spanish SGP referring to Spanish vessels operating on the high seas were up to a total of 8,574 t in 2009, 17,094 t in 2010, 16,596 t in 2011 and 21,779 t in 2012, being this geographical area the most significant one concerning hakes.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

REFERENCE POINTS: Reference points have not been defined for this stock.

STOCK STATUS: The swept area biomass estimates for Argentine hake from both surveys were 15,877 t (2008) and 18,512 t (2009), with highest biomass below 200 m depth. No specimens of *M. hubbsi* were taken at depths greater than 300 m. The bathymetric distribution of this species was very similar during both cruises. Estimated biomass in 2010 was 17,273 t. STECF notes that the reduced coverage in the Spanish bottom trawl survey in 2010 is likely to be comparable to the surveys undertaken in the previous two years since Argentine hake is primarily distributed at depths less than 200 m. No new information on stock status has been made available since 2010.

Austral hake was the least abundant commercial species in the cruises of 2008 and 2009, with an estimated swept area biomass of 48 t and 206 t respectively. Estimated biomass in 2010 was 79 t (it should be noted that this species mainly distributes to the Southeast of the Falkland Islands). No new information on stock status has been made available since 2010.

RECENT MANAGEMENT MEASURES: Since 1st July 2011 and following scientific advice by the IEO, a fishing ban was put in force by the Spanish Administration in certain areas of the international waters for the Spanish bottom trawling fleets operating there.

STECF COMMENTS: It is unclear if hakes in international waters constitute separate stocks from those in Argentine or Falkland Islands' waters, so efforts to improve stock identification are desirable. STECF notes that in order to provide informative advice, information from the fisheries exploiting this stock throughout its range is required. This may be best achieved through the creation of an RFMO for the SW Atlantic.

14.15 Argentine short-finned squid (*Illex argentinus*), International waters

Assessments of this stock are based on surveys only. No surveys have been undertaken since 2010. Hence the text below remains unchanged from the STECF review of advice for 2013 (STECF 12-22).

FISHERIES: The Argentine short-finned squid (*Illex argentinus*) is a common neritic-oceanic species occurring in waters off Brazil, Uruguay, Argentina, the Falkland Islands and on the High Seas in the Southwest Atlantic. *Illex* is the most important cephalopod species in the area and plays a significant role in the ecosystem. It is the target of major fisheries by both bottom trawlers and jigging vessels during the first half of the year. Bottom trawlers are mainly from Spain, whereas jiggers belong to several Asian countries such as Japan, Korea and Taiwan. The main fishing area on the High Seas is between parallels 44º-47ºS.

Concentrations of short-finned squid are found 45º-46ºS in January or February and the animals gradually migrate southward towards the Falkland Islands while growing rapidly. Peak concentrations are found around the Falkland Islands between March and May. Towards the end of this period, animals start migrating northward to spawn in South Brazil waters and die around July or August.

In the early 1980s, Argentine short-finned squid have been caught by Spanish bottom trawlers as by-catch in the hake fishery. Currently, this squid species is considered as one of the target species for the Spanish fleet operating in the Southwest Atlantic, with mean annual catches of about 35,000 t. As an annual species, its catches fluctuate markedly from year to year depending on environmental conditions. Main catches of *Illex* are reported around the 300 m isobath.

Catches of *Illex* squid reported by the Spanish SGP referring to Spanish vessels operating on the high seas were up to a total of 3,828 t in 2009, 6,016 t in 2010, 8,460 t in 2011 and 14,089 t in 2012, being this geographical area the most significant one concerning *Illex* squid.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

REFERENCE POINTS: Reference points have not been defined for this stock.

STOCK STATUS: The swept area biomass estimates for Argentine short-finned squid from the IEO surveys was 45,073 t in 2008 and 22,149 t in 2009 (around 50% less in the second cruise). Estimated biomass in 2010 was 7,941 t. STECF notes that the reduced coverage in the Spanish bottom trawl survey in 2010 is likely to be comparable to the surveys undertaken in the previous two years since Argentine short-finned squid is primarily distributed at depths less than 300 m. No new information on stock status has been made available since 2010.

RECENT MANAGEMENT MEASURES: Since 1st July 2011 and following scientific advice by the IEO, a fishing ban was put in force by the Spanish Administration in certain areas of the international waters for the Spanish bottom trawling fleets operating there.

STECF COMMENTS: It is unclear if this is a separate stock from *Illex argentinus* in Argentine or Falkland Islands' waters stocks, so efforts to improve stock identification are desirable. STECF notes that in order to provide informative advice, information from the fisheries exploiting this stock throughout its range is required. This may be best achieved through the creation of an RFMO for the SW Atlantic.

14.16 Patagonian squid (*Loligo gahi*), International waters

Assessments of this stock are based on surveys only. No surveys have been undertaken since 2010. Hence the text below remains unchanged from the STECF review of advice for 2013 (STECF 12-22).

FISHERIES: *Loligo gahi* is caught in relatively small quantities as by-catch by bottom trawlers during hake and *Illex* fisheries. The main fishing area is around parallel 42ºS, where big catches of mainly juvenile Patagonian squid have been reported in different years by observers on board of Spanish vessels.

Catches of *Loligo* reported by the Spanish SGP referring to Spanish vessels operating on the high seas were up to a total of 56 t in 2009, 1,312 t in 2010, 2,377 t in 2011 and 5,726 t in 2012.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

REFERENCE POINTS: Reference points have not been defined for this stock.

STOCK STATUS: The swept area biomass estimates for *L. gahi* in 2008 and 2009 were 2,108 t and 1,867 t respectively. Spatial distribution of this species was similar in both cruises, with the highest estimates at depths less than 200 m and south of parallel 46ºS (the fishing grounds around 42ºS were not included in the geographical range of the surveys). Estimated biomass in 2010 was 42 t. No new information on stock status has been made available since 2010.

RECENT MANAGEMENT MEASURES: Since 1st July 2011 and following scientific advice by the IEO, a fishing ban was put in force by the Spanish Administration in certain areas of the international waters for the Spanish bottom trawling fleets operating there.

STECF COMMENTS: It is unclear if this is a separate stock from Argentine or Falklands stocks, so effort should be made to improve stock identification. STECF notes that in order to provide informative advice, information from the fisheries exploiting this stock throughout its range is required. This may be best achieved through the creation of an RFMO for the SW Atlantic.

14.17 Patagonian toothfish (*Dissostichus eleginoides*), International waters

Assessments of this stock are based on surveys only. No surveys have been undertaken since 2010. Hence the text below remains unchanged from the STECF review of advice for 2013 (STECF 12-22).

FISHERIES: Patagonian toothfish is the most valuable fishery resource in the SW Atlantic and Sub-Antarctic waters around Antarctica. It is the largest known nototheniid fish, attaining more than 2 m total length. This species has been taken as a by catch since the start of the trawl fishery by the Spanish fleet. Catches from International waters are low due to its more southern distribution and bathymetric range (usually > 500 m depth).

Catches of toothfish reported by the Spanish SGP referring to Spanish vessels operating on the high seas were up to a total of 18 t in 2009, 16 t in 2010, 50 t in 2011 and 27 t in 2012.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

REFERENCE POINTS: Reference points have not been defined for this stock.

STOCK STATUS: Biomass estimates of Patagonian toothfish by the swept-area method during surveys carried out by IEO in 2008, 2009 and 2010 resulted in 3,123, 3,716 and 1,974 t respectively. It must be taken into account, that, in 2010 and due to a change in the survey methodology to reduce the pressure impact on the VMEs, the number of trawls was halved at depths between 500 and 1000 m and none trawl was conducted > 1000 m, the depth stratum with highest densities in 2008 and 2009.

RECENT MANAGEMENT ADVICE: Since 1st July 2011 and following scientific advice by the IEO, a fishing ban was put in force by the Spanish Administration in certain areas of the international waters for the Spanish bottom trawling fleets operating there.

STECF COMMENTS: It is unclear if this is a separate stock from Argentine or Falklands stocks, so efforts should be made to improve stock identification. STECF notes that in order to provide informative advice,

information from the fisheries exploiting this stock throughout its range is required. This may be best achieved through the creation of an RFMO for the SW Atlantic.

14.18 Rockcod (*Patagonotothen ramsayi*), International waters

Assessments of this stock are based on surveys only. No surveys have been undertaken since 2010. Hence the text below remains unchanged from the STECF review of advice for 2013 (STECF 12-22).

FISHERIES: The importance of *Patagonotothen ramsayi*, both from its ecological and from the fisheries points of view, is based on the fact that it was found to be, respectively, the second and the most abundant species in the surveys carried out in 2009 and 2010 by IEO for biomass estimations in International waters of the SW Atlantic.

At the start of the fisheries by the Spanish fleet in this area in 1983, and until relatively recently, rockcod was not targeted due to market reasons and 100% discarded. A research project funded by the European Commission to analyze the potential of this species to be marketed run between 2003 and 2004, and possibly, as a result of this research, rockcod is currently one of the target species in this area. Highest catches of rockcod are reported at depths < 200 m. Small specimens (< 22 cm) are discarded, meanwhile medium – sized and large fish are processed as HGT and exported to Eastern Europe.

Catches of rockcod reported by the Spanish SGP referring to Spanish vessels operating on the high seas were up to a total of 4,392 t in 2009, 1,683 t in 2010, 2,727 t in 2011 and 3,224 t in 2012.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

REFERENCE POINTS: Reference points have not been defined for this stock.

STOCK STATUS: During the surveys carried by the IEO for assessment of main commercial species in this area, the estimated biomass of rockcod grew up from 19,791 t in 2008 to 80,096 t in 2009 and finally, to 121,346 in 2010, being the second more caught species in the 2009 cruise and the first one in 2010. No new information on stock status has been made available since 2010.

RECENT MANAGEMENT ADVICE: Since 1st July 2011 and following scientific advice by the IEO, a fishing ban was put in force by the Spanish Administration in certain areas of the international waters for the Spanish bottom trawling fleets operating there.

STECF COMMENTS: It is unclear if this is a separate stock from Argentine or Falklands stocks, so efforts should be made to improve stock identification. STECF notes that in order to provide informative advice, information from the fisheries exploiting this stock throughout its range is required. This may be best achieved through the creation of an RFMO for the SW Atlantic.

15 Highly migratory fish (Atlantic Ocean and Mediterranean Sea)

15.1 Bluefin (*Thunnus thynnus*), Eastern Atlantic and Mediterranean

The stock status for bluefin tuna in the East Atlantic and Mediterranean was not updated by ICCAT SCRS in 2013. The majority of the text below therefore remains largely unchanged from the STECF Review of Advice for 2012**.**

FISHERIES: East Atlantic bluefin tuna is under a quota regime since 1998. Declared catches in the East Atlantic and Mediterranean reached a peak of over 50,000 t in 1996 and then decreased substantially after the adoption of TAC. In 2008 and 2009, declared catches were about 23,849 and 19,701 t (in total for the East Atlantic and Mediterranean together) respectively. Catch data for 2012 suggest a much more dramatic drop in catch to around 10,800 t undoubtedly in part due to the strict enforcement of the 13,500 t. quota in most of the areas. Reported catches in 2006 and 2007 are likely underestimates of removals.

Available indicators from fisheries exploiting juvenile bluefin in the Bay of Biscay since the mid 1970s do not show any clear trends. This result is not particularly surprising because of strong inter-annual variation in year class strength. ICCAT-SCRS reports that qualitative information from eastern Atlantic fisheries since 2007, together with the results of aerial surveys in 2009, give consistent indications of higher abundance or higher

concentration of small bluefin tuna in the north-western Mediterranean than found in surveys conducted in 2000-2003. This could reflect a positive outcome from the recent increase in the minimum legal size, implemented under ICCAT Rec. 06-05 and/or recruitment success since 2003, not reflected by the declared catches due to the minimum size regulation. Catch rate indicators from longliners and traps targeting large fish (spawners) in the Eastern Atlantic and the Mediterranean Sea also displayed a recent increase in cpue and mean size after a general decline since the mid-1970s. This increasing trend in CPUE and mean size is confirmed by the preliminary 2010 data, while all trap data in the current year showed high catches and several thousands of bluefin tuna were released at sea.

Bluefin tuna fisheries have been very active in the Mediterranean Sea and in the Black Sea since ancient times. The latest reported catches of bluefin tuna from the Black Sea are from the beginning of 1960's, but a few specimens were reported to have been caught there again since 2007, after more than 40 years of absence, while large bluefin tuna schools have been recently reported moving towards the Marmara Sea. The 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. For EU Member States, driftnet fishing for tuna has been banned since January 1st 2002, while the ban entered into force in 2004 for all the other Contracting Parties to ICCAT, as well as the GFCM Member States, but a driftnet fishing activity is still officially permitted in Morocco. Recreational fishing is also a relevant but unquantifiable source of fishing mortality on juvenile bluefin.

The rapid development of tuna farming in the Mediterranean Sea has induced further pressure on this stock and compounds the serious and well known problem of obtaining accurate catch data. Length compositions of the catches is affected by under-reported or over-quota components but also by technical problems in detecting the size of farmed tuna when they enter into the cages. Data on juvenile bluefin catches from the Mediterranean have not been available for many years, even though many fisheries targeting the first three age-groups occur in many areas. The lack of reliable data on juvenile catches has also compromised the ICCAT-SCRS assessments and advice for many years, particularly on recruitment.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT SCRS providing advice on the basis of an update assessment conducted in 2012.

REFERENCE POINTS: STECF notes that precautionary reference points have not been proposed for this stock and that biological reference points derived from the recent assessment are still poorly defined. ICCAT provided the following values based on the latest assessment approach under differing assumptions.

EAST ATLANTIC AND MEDITERRANEAN BLUEFIN TUNA SUMMARY

Current reported yield (2012)	10,852 t	
	Reported catch	Inflated catch
Maximum Sustainable Yield[1]		
Low recruitment scenario (1970s)	21,500 t	23,370 t
Medium recruitment scenario (1950-2006)	30,700 t	35,900 t
High recruitment scenario (1990s)	52,900 t	74,900 t
$F_{0.1}$ [2,3]	0.10 yr^{-1}	0.083 yr^{-1}
$F_{2011}/F_{0.1}$	0.70	0.36
$SSB_{F0.1}$		
Low recruitment scenario (1970s)	318,500 t	342,500 t
Medium recruitment scenario (1950-2006)	452,500 t	524,100 t
High recruitment scenario (1990s)	774,700 t	1,087,000 t
$SSB_{2011}/SSB_{F0.1}$		
Low recruitment scenario (1970s)	0.89	1.16
Medium recruitment scenario (1950-2006)	0.63	0.76
High recruitment scenario (1990s)	0.37	0.37
TAC (2010 - 2013)	13,500 t - 12,900 t - 12, 900 t - 13,400 t	

STOCK STATUS: Estimates of current stock status relative to MSY benchmarks are highly sensitive to the selectivity pattern (and thus to some technical assumptions in the VPA) and, for the biomass reference point, to the hypotheses about the recruitment levels. Nonetheless, the perception of the stock status derived from the 2012 updated assessment has improved in comparison to previous assessments, as F for both younger and older fish have declined during the recent years. All the runs investigated by the Group also showed a clear increase of the SSB, but both the speed and magnitude of this upward trend remain highly uncertain, as these strongly depend on model specifications. F2011 appears to clearly be below the reference target F0.1 (a reference point used as a proxy for FMSY that is more robust to uncertainties than FMAX) in both catch scenarios: F2011/F0.1= 0.7 and 0.36 for the reported and inflated catch scenarios, respectively. If F2011 would be consistent with the Convention Objectives, current SSB remained most likely to be under the level expected at F0.1: SSB2011/SSB0.1= 0.63 and 0.76 for reported and inflated catch scenario when considering medium recruitment. In the reported catch scenario, the median of the SSB is about 37% (high recruitment scenario) to 89% (low recruitment scenario) of the biomass that is expected under a F0.1 strategy. In the inflated catch scenario, the median SSB ranges from 37% (high recruitment) to 116% (low recruitment, the only scenario for which current biomass would be above target reference biomass level).

RECENT MANAGEMENT ADVICE: In [Rec. 09-06, 10-04] the Commission established a total allowable catch for eastern Atlantic and Mediterranean bluefin tuna at 13,500 t and 12,900 t in 2010, 2011 and 2012, respectively. Additionally, in [Rec.09-06] the Commission required that the SCRS provide the scientific basis for the Commission to establish a three-year recovery plan for 2011-2013 with the goal of achieving BMSY through 2022 with at least 60% of probability.

The Kobe matrices are presented in Table below indicating the probabilities of F<FMSY, SSB>SSBMSY and F<FMSY and SSB>SSBMSY for quotas from 0 to 30,000 t for 2013 through 2022. Shading corresponds to the probabilities of being in the ranges of 50-59 %, 60- 69 %, 70-79 %, 80-89 % and greater or equal to 90 %.

BFTE-Table 3 The probabilities of $F<F_{MSY}$ and $SSB>SSB_{MSY}$ for quotas from 0 to 30000 t for 2013 through 2022. Shading corresponds to the probabilities of being in the ranges of 50-59 %, 60- 69 %, 70-79 %, 80-89 % and greater or equal to 90 %.

Kobe II Strategy matrix, $P(F \leq F_{MSY})$ *and* $P(SSB \geq SSB_{MSY})$

TAC	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
0	36	46	54	63	72	82	92	97	100	100
2000	36	45	54	62	70	81	90	97	99	100
4000	36	45	53	61	69	79	89	96	99	100
6000	36	44	52	59	67	77	87	94	98	100
8000	36	43	51	58	66	75	85	92	97	99
10000	35	43	50	56	64	73	83	91	96	99
12000	35	42	48	55	63	70	80	88	95	98
12900	35	42	48	55	62	69	79	87	93	98
13500	35	42	48	54	61	69	78	87	93	97
14000	35	42	47	54	60	68	77	86	92	97
16000	35	41	46	52	58	66	74	83	90	94
18000	34	40	45	51	56	63	71	79	86	92
20000	34	39	44	49	54	60	68	75	83	88
22000	33	37	42	46	51	56	63	70	76	83
24000	30	34	38	41	46	51	56	63	69	74
26000	28	31	34	37	41	45	50	57	62	67
28000	25	27	31	34	38	41	46	51	56	60
30000	23	25	28	31	34	38	41	46	50	54

The implementation of recent regulations through [Recs. 10-04, 09-06, and previous recommendations] has clearly resulted in reductions in catch and fishing mortality rates. All CPUE indices showed increasing tendencies in most recent years. The Committee notes that maintaining catches at the current TAC (12,900 t) or at the 2010 TAC (13,500 t) under the current management scheme will likely allow the stock to increase during that period and is consistent with the goal of achieving FMSY and BMSY through 2022 with at least 60% of probability, given the quantified uncertainties. A period of stabilization in the main management regulations of

the rebuilding plan would allow the SCRS to better estimate the magnitude and speed of recent trends in F and SSB in the coming years.

STECF COMMENTS: STECF note the ICCAT-SCRS advice, and notes that the results from simulation runs that SSB is expected to reach $SSB_{F0.1}$ with a greater than 50% probability by 2015 under a < 10,000 t TAC scenario based on the Kobe II matrix. However the information also implies that further reductions of TAC including a zero-catch option will provide little benefit in the probability of SSB being greater than $SSB_{0.1}$in the future This apparent contradiction underlines the difficulty in interpretation of the matrix when different assumptions or assessments have been combined in the simulations without consideration of their relative likelihoods. Basically the probability distribution has several peaks. For example assuming an inflated catch & low recruitment scenario, SSB is virtually certain to be above $SSB_{0.1}$ in 2015 while there is very little chance of it being so assuming a high recruitment scenario .

Using a probability based reference point, here $P(SSB > SSB_{0.1}) > 0.6$, can be misleading when the results from different assumptions or assessments are combined in a single Kobe matrix so that the reference point may refer to an extremely unlikely event on the likelihood surface in the very flat areas between peaks. Potentially very small changes in the parameter estimate on in the models underlying the peaks in the likelihood matrix, distorts the view of the effectiveness of management measures if the probability profile around the reference point is extremely flat. This is exemplified by the dramatic change in the estimation of stock status of western bluefin tuna compared to the advice based on the previous assessment. The 2010 assessment indicated that there was virtually zero probability of reaching SSB_{MSY} by 2020 even under a catch moratorium, while the 2012 update suggests a reasonable likelihood of reaching it in 2015 despite catches in 2010-2014. Therefore the Kobe II matrices combining models with different processes (models or assumptions) is misleading in this case.

STECF further notes that prior to 2008, poor or incomplete enforcement of adopted management plans has probably contributed to the poor status of this stock, while the more stringent measures adopted by ICCAT Rec.08-05 and Rec. 09-06, were fully implemented and enforced in 2009 and 2010. STECF recommends that efforts be taken to ensure that management measures are fully implemented and enforced in all the bluefin tuna fisheries concerned.

STECF agrees with the ICCAT-SCRS 2009 advice that a sensible minimum catch size would be 25 kg instead of the present 30 kg, in order to avoid misreporting and/or discarding of unavoidable catches of mature fish between 25 kg and 30 kg.

STECF reiterates its support for methodologies able to explore the correlations between oceanographic and environmental factors and bluefin tuna distribution and concentration.

15.2 Bluefin (*Thunnus thynnus*), Western Atlantic

The stock status for bluefin tuna in the Western Atlantic was not updated by ICCAT SCRS in 2013. The majority of the text below therefore remains largely unchanged from the STECF Review of Advice for 2011.

FISHERIES: Western bluefin fisheries have been managed by TAC since the early eighties and catches were relatively stable around 2,500 t until 2001, increased in 2002 to 3,319 t and have been declining since then, reaching 1,624 t in 2007. In 2008, catches increased again to 2,015 t declining since then to 1,830 t in 2010. Most of the catches are taken by vessels from the USA, Canada and Japan. The average weight is increasing since 1970. There are very high uncertainties about the year of first maturation for the western bluefin tuna and the data have been recently discussed; the huge discrepancy in the first maturation between the eastern and the western stock is considered unrealistic and possibly due to a very limited research within the spawning area of this species.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT SCRS providing advice on the basis of an update assessment conducted this year.

REFERENCE POINTS: B in relation to Bmsy and F in relation to Fmsy.

WEST ATLANTIC BLUEFIN TUNA SUMMARY (Catches and Biomass in t)		
Current (2012) Catch (including discards)	1,750 t	
Assumed recruitment	Low potential	High potential
Maximum Sustainable Yield (MSY)	2,634 (2,452-2,834)[1]	6,472 (5,736-7,500)[1]
SSB_{MSY}	12,943 (12,717-13,268)[1]	93,621 (77,288-116,679)
SSB_{2011}/SSB_{MSY}	1.4 (1.14-1.72)[1]	0.19 (0.13-0.29)[1]
F_{MSY}	0.17 (0.14-0.19)[1]	0.064 (0.056-0.074)[1]
$F_{0.1}$	0.11 (0.10-.12)[1]	0.11 (0.10-.12)[1]
$F_{2008-2010}/F_{MSY}$[2]	0.61 (0.49-0.74)[1]	1.57(1.24-1.95)[1]
$F_{2008-2010}/F_{0.1}$	0.92 (0.77-1.12)[1]	0.92 (0.77-1.12)[1]
Stock status	Overfished: NO	Overfished: YES
	Overfishing: NO	Overfishing: YES
Management Measures:	[Rec. 08-04] TAC of 1,900 t in 2009 and 1,800 t in 2010, including dead discards.	
	[Rec. 10-03, Rec. 12-02] TAC of 1,750 t in 2011-2013, including dead discards.	

[1] Median and approximate 80% confidence interval from bootstrapping from the assessment.
[2] $F_{2008-2010}$ refers to the geometric mean of the estimates for 2008-2010 (a proxy for recent F levels).

STOCK STATUS: Uncertainties in the stock assessment preclude SCRS from presenting a definitive view of the status of this stock. Preliminary results indicate that the stock is not overfished and is fished below its MSY levels if low recruitments are expected, but can change dramnatically if high recruitments are considered. It is also worth noting that the productivity of this stock is closely linked to that of the Eastern Atlantic one.

RECENT MANAGEMENT ADVICE:

The outlook for bluefin tuna in the West Atlantic is similar to that from the 2010 assessment. The low recruitment scenario suggests the stock is above the MSY level with greater than 60% probability and catches of 2,500 t or lower will maintain it above the MSY level. Constant catches of 2,000 t would result in 2019 SSB nearly equal to that in 2012. If the high recruitment scenario is correct, then the western stock will not rebuild by 2019 even with no catch, although catches of 1,200 t or less are predicted to have a 60% chance to immediately end overfishing and initiate rebuilding. The Committee notes that considerable uncertainties remain for the outlook of the western stock, including the effects of mixing and management measures on the eastern stock.

STECF COMMENTS: STECF agrees with the assessment of the state of the stock, but questions the utility of the management advice in the form of the Kobi II matrix as this suggests that there is virtually no impact in the short-term of any management measures. The problem is the diametric opposition of the productivity scenarios examined. These result incomplete separation of sustainability indicators between the two hypotheses so that the change due to management is lost. Within a specific set of assumptions the effect of management is very clear, but without scientific advice as to the relative likelihood of the two hypothesis management if unable to interpret the results. For a more detailed explanation of the problem see Section 15.1.

15.3 Albacore (*Thunnus alalunga*), North Atlantic Ocean

FISHERIES: The northern stock is exploited by surface fisheries targeting mainly immature albacore and longline fisheries targeting both immature and adult individuals. The main surface fisheries are carried out by EC fleets (Ireland, France, Portugal and Spain) in the Bay of Biscay, in the adjacent waters of the northeast Atlantic, and in the vicinity of the Canary and Azores Islands in summer and fall. The main longline fleet is the Chinese Taipei fleet which operates in the central and western North Atlantic year round.

Landings of Northern Albacore remained relatively stable at around 35,000 t/year between 1984 to 2000. Catches decreased to a low of 22,741 t in 2002 (primarily due to a decrease in catches in the surface fishery) and increased again thereafter, reaching a peak of 36,199 t in 2006. The total catch in 2012 was 26,237 t, an increase from those reported in 2011.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT SCRS. The most recent assessment for North Atlantic albacore was undertaken in 2013.

REFERENCE POINTS: MSY=31,700t

STOCK STATUS: Based on the 2013 assessment (which includes catch and effort since the 1930s and size frequency since 1959), ICCAT-SCRS consider that spawning stock is currently still overfished but close to the BMSY levels (SSB2012/SSBMSY=0.94), and that overfishing is not occurring.

RECENT MANAGEMENT ADVICE: Projections at the current TAC level (28,000 t) indicate that the stock would rebuild by 2019 with 53% probability, which would meet the objective of the albacore recovery plan (11-04). The recovery of the stock with similar probabilities would be faster (by 2016) if the catches remain at the level of recent catches (around 20,000 t). Higher probabilities of rebuilding would require longer timeframes. For instance, 75% probability of rebuilding would be achieved by 2019 with a constant catch of 20,000 t, and by 2027 with a constant catch of 28,000t. Catches above 34,000 t would not rebuild the stock with at least 50% probability in the projected timeframes.

These projections were complemented by a set of projections under alternative provisional HCRs that could serve the Commission to decide on desired timeframes and probabilities for recovering the north Atlantic stock and which are consistent with the decision framework of Rec [11-13] in that there is a high probability of F<FMSY in as short a time as possible. A range of time-frames and probability levels for achieving the Commission's goals established in Rec [11-13] are provided in **ALB-Table 4**. Longer time frames provide more options for HCR parameters that project higher probabilities of being 'Green'. The HCR projections indicate, for example, should the Commission wish to have a 'high probability' of 75% within a 10 year time-frame, then the HCR with a Biomass Threshold at BMSY paired with a Target F of .9FMSY would provide the highest expected 10 year cumulative catch amongst options and the average catch expected from 2014-2016 would be approximately 26,260 t. Should the Commission consider a 'high probability' of 60% sufficient within a five year time-frame, then the HCR with a Biomass Threshold at BMSY paired with a Target F of 0.9FMSY would also meet that objective and provide the highest expected cumulative catch amongst options that would provide at least 60% probability within five years and the average catch from 2014-2016 would remain approximately 26,260 t. Unlike the constant catch projections, the HCR projections imply increasing catch as the population biomass increases resulting in higher cumulative catch over time to achieve equivalent conservation objectives of a constant catch policy. Consideration of implementation and other uncertainties in these projections would likely change the probability level estimates.

S**TECF COMMENTS:** STECF agrees with the advice from ICCAT that catches below 28,000 t should achieve by 2019, the ICCAT conservation objective of BMSY.

STECF notes that to achieve recovery to BMSY and maintain the stock above at that level with high probability, fishing mortality will need to be less than Fmsy. The trade-offs between the level of F and the probability of achieving BMSY are illustrated in the 2013 ICCAT SCRS report.

15.4 Albacore (*Thunnus alalunga*), South Atlantic Ocean

FISHERIES: Recent South Atlantic albacore landings can largely be attributed to four fisheries; surface baitboat fleets from South Africa and Namibia, and longline fleets of Brazil and Chinese Taipei.

The surface fleets are entirely albacore directed and mainly catch juvenile and sub-adult fish (70-90 cm FL). These surface fisheries operate seasonally, from October to May, when albacore are available in coastal waters. Brazilian longliners target albacore during the first and fourth quarters of the year, when an important concentration of adult fish (> 90 cm) is observed off the northeast coast off Brazil. The Chinese Taipei longline fleet operates over a larger area and throughout the year, and consists of vessels that target albacore and vessels that take albacore as by-catch, in bigeye directed fishing operations. On average, the longline vessels catch larger albacore (60-120 cm) than the surface fleets.Total reported albacore landings for 2012 were 24,726 t, higher than the last five year average. This value is above the TAC, 24,000 t, which could have an impact in the probability of recovery of the stock to MSY levels by 2020.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT SCRS. The management is based on the 2013 assessment based on the results of 4 ASPIC and 4 BSP assessments with alternate settings as well as projections based on those models (Kobe 2 strategy matrix integrating with equal weights the uncertainty from all models and scenarios).

REFERENCE POINTS: The latest advice is based on the integration of uncertainty across several models and settings and, thus, ICCAT provides a range of plausible values of MSY between 19,109 t and 28,360 t with a median value of 25,228 t.

STOCK STATUS: Considering all scenarios, there is 57% probability for the stock to be both overfished and experiencing overfishing, 13% probability for the stock to be either overfished or experiencing overfishing but not both, and a 30% probability that biomass is above and fishing mortality is below the Convention objectives.

RECENT MANAGEMENT ADVICE: Results indicate that, most probably, the South Atlantic albacore stock is around the spawning biomass and the fishing mortality that can sustain the maximum sustainable levels. However, there is considerable uncertainty about the current stock status, as well as on the effect of alternative catch limits on the rebuilding probabilities of the southern stock.

Projections at a level consistent with the 2013 TAC (24,000 t) showed that probabilities of being in the green area would exceed 50% only after 2020. Similar probabilities could be achieved earlier with lower TAC values.

With catches around 20,000 t, probabilities of 50% would be exceeded by 2015, and probabilities of 60% would be exceeded by 2018. Further reductions in catches would increase the probability of recovery in those timeframes. And likewise, increases would reduce rebuilding probabilities and extend the timeframes. Catches over the current TAC (24,000 t) will not permit the rebuilding of the stock with at least 50% probability over the projection timeframe.

STECF COMMENTS: : STECF agrees with the advice from ICCAT-SCRS but notes that recent reported catches have been slightly higher than the TAC, which is already higher than the 20,000 t level recommended by SCRS as likely to recover the stock by 2017/2022. Projections from the last round of assessment models indicate that the probability of stock recovery to MSY levels by 2020 is less than 50% with catches at the level of the current TAC. This fact in conjunction with the large uncertainty in the stock assessment, would indicate the need for more conservative management.

15.5 Albacore (*Thunnus alalunga*), Mediterranean Sea

The stock status for Albacore in the Mediterranean Sea was not updated by ICCAT SCRS in 2013. The majority of the text below therefore remains largely unchanged from the STECF Review of Advice for 2013.

FISHERIES: Albacore fishing is a traditional activity for a number of fleets in the Mediterranean including those of Cyprus, Greece, Italy, Spain, and Malta (France has a sporadic fishery entirely dependent upon the presence of the albacore in the Liguro-Provencal basin). ICCAT statistics, however, are considered quite incomplete for many years, due to unreported catches from several countries and the complete lack of data in some years from some other countries. Even though catches of Mediterranean albacore have been increasing for the past few years, there is a lack of general information on this stock. Reported albacore catches in the Mediterranean since 1982 have fluctuated between 1,235 t in 1983 and 7,894 t in 2003. The 2005 catches account only for 3,529 t, reaching 5,947 t in 2006. In 2007, the reported catches accounted for 6,546 t, dropping to 2970 t in 2008 and increasing again in 2009 with 4,021 t, and they were obtained mainly by long-lines (3,175t), other surface gears (820 t) and purse seines (25 t). STECF believes that even catches reported as "purse-seines" might relate to other surface gears, including gillnets. EC-Italy has the highest catch in this fishery (2,724 t in 2009). The annual average catch was 3,555 in the period 1983-2004 and 5,347 t in the period 2005-2007, showing an average increase of 50,4% when compared with the previous 22 year catches. The driftnet fishery for albacore has been banned since January 1st 2002 in the EC countries and from 2004 in all the ICCAT Mediterranean countries, but it is known that illegal fishing activity still occurs in some areas.

SOURCE OF MANAGEMENT ADVICE: The advisory bodies are ICCAT SCRS and FAO/GFCM, through the ICCAT/GFCM expert consultation. Management advice is based on the first assessment of Mediterranean Sea Albacore in 2011.

REFERENCE POINTS: No reference points have been proposed for this stock, but ICCAT proposed an 'assumed M' as a provisional proxy for F_{MSY} in light of considerable uncertainty in growth and true M and the known sensitivities of reference points to variability in these life history parameters, until additional information becomes available to develop more robust estimates.

STOCK STATUS: The available information on Mediterranean albacore stock status indicates a relatively stable pattern for albacore biomass over the recent past. Unfortunately, very little quantitative information is available to SCRS for use in conducting a robust quantitative characterization on biomass status relative to Convention Objectives. While additional data to address this issue might exist at CPC levels, our ability to provide quantitative management advice will be seriously impeded until such data become available either through recovery of historical data or institution of adequate fishery monitoring data collection programs.

RECENT MANAGEMENT ADVICE: Recent fishing mortality levels appear to have been reduced from those of the early 2000's, which were likely in excess of FMSY, and might now be at about or lower than that level. However, there is considerable uncertainty about this and for this reason, the Commission should institute management measures designed to limit increases in catch and effort directed at Mediterranean albacore.

STECF COMMENTS: STECF notes that data collection for this species is mandatory within the EC data collection framework. STECF has in the past strongly supported the previous recommendation of the ICCAT/SCRS concerning the collation of historical data. Some of this work has been carried out towards the 2011 assessment, but according to ICCAT this work needs to continue. In addition, STECF has commented in the past that there has been considerable illegal fishing in the recent past and it is not clear from the ICCAT report whether attempts have been made to incorporate this information in the most recently available datasets. STECF advises caution in the use of the proposed proxy for FMSY as a basis for management decisions because of the circularity of fixing an assumed value for natural mortality and at the same time using the same value as a proxy for a management reference point.

15.6 Yellowfin (*Thunnus albacares*), Atlantic Ocean

The stock status for Yellowfin in the Atlantic Ocean was not updated by ICCAT SCRS in 2013. The majority of the text below therefore remains largely unchanged from the STECF Review of Advice for 2013.

FISHERIES: Yellowfin tuna are caught between 45°N and 40°S by surface (purse seine, baitboat, troll and handline) and sub-surface gears (longline). In contrast to the increasing catches of yellowfin tuna in other oceans worldwide, there has been a steady decline in overall Atlantic catches of 63% between 2001-2007. This was followed by a small increase of ~8% in 2008 (relative to 2007). Catches of YFT in 2012 amounted to 101,866 t. The purse seine fishery is the major contributor to total catches of this species. Landings from baitboats and purse seiners generally declined between 2001-2009, but purse-seine catches are showing a moderate increase in 2009, in the eastern Atlantic. Landings from other surface gears remained relatively stable. Landings from longliners fluctuated but remained relatively stable overall in this period. Of the total landings in 2009 the purse seine fisheries contributed 77,757 t (65,4%), long line catches were 22,800 t (19,2%), bait boat catches were 12,280 t (10,3%) and other gears were 5,660 t (4,8%). Baitboat catches declined markedly between 2001 and 2009, largely because of reduced catches by Ghanian baitboats, which resulted from a combination of reduced days fishing, a lower number of operational vessels, and the observance of the moratorium on fishing using floating objects. In the western Atlantic, both purse seine catches and bait boat catches have declined strongly. However both in the east and west Atlantic longline catches have remained more or less stable in recent years.

SOURCE OF MANAGEMENT ADVICE: The advisory body is the ICCAT SCRS. The current advice is based on the 2011 assessment of the stock.

REFERENCE POINTS: The estimate MSY for this stock is 144,600 t. with a range between 114,200 and 155,100 t.. The B_{2010}/B_{MSY} was estimated around 0.85 (0.61-1.12) and F_{2010}/F_{MSY} 0.87 (0.68-1.40). When the uncertainty around the point estimates from various models options is taken into account, there was only an estimated 26% chance that the stock was not overfished and overfishing was not occurring in 2010.

STOCK STATUS: A full stock assessment was conducted for yellowfin tuna in 2011, applying both an age-structured model and a non-equilibrium production model to the available catch data through 2010. As has been done in previous stock assessments, stock status was evaluated using both production and age-structured models. Models used were similar in structure to those used in the previous assessment, however, other alternative model structures of the production model and the VPA were explored in sensitivity runs. These runs confirmed that some of the estimated benchmarks obtained from production models are somewhat sensitive to the assumption used that MSY is obtained at half of the virgin biomass. This assumption was used in the production models that contributed to benchmark estimates found in this report.

The estimate of MSY (~144,600 t) may be below what was achieved in past decades because overall selectivity has shifted to smaller fish the impact of this change in selectivity on estimates of MSY is clearly seen in the results from age structured models. When the uncertainty around the point estimates from both models is taken into account, there was only an estimated 26% chance that the stock was neither overfished nor was overfishing occurring in 2010.

In summary, 2010 catches are estimated to be well below MSY levels, stock biomass is estimated to most likely be about 15% below the Convention Objective and fishing mortality rates most likely about 13% below FMSY.

The recent trends through 2010 are uncertain, with the age-structured models indicating increasing fishing mortality rates and decline in stock levels over the last several years, and the production models indicating the opposite trends.

RECENT MANAGEMENT ADVICE: The Atlantic yellowfin tuna stock was estimated to be overfished in 2010. Continuation of current catch levels (around 110,000 t) is expected to lead to a biomass somewhat above BMSY by 2016 with a 60% probability. Catches approaching 140,000 t or more would reduce the chances of meeting Convention Objectives below 50%, even after 15 years (2025). In addition, the Commission should be aware that increased harvest of yellowfin on FADs could have negative consequences for bigeye tuna in particular, as well as other by-catch species. Should the Commission wish to increase long-term sustainable yield, the Committee continues to recommend that effective measures be found to reduce FAD-related and other fishing mortality of small yellowfin.

If the provisional estimates of unreported purse seine catches are considered, estimates of current stock status and projections would be more pessimistic. It is especially important to implement effective full monitoring of the fleet for which the Committee has provisionally estimated unreported catch.

STECF COMMENTS: STECF agrees with the ICCAT advice, but notes that the current procedure of using median or maximum likelihood values of exploitation or biomass based on the potentially multi-modal bootstrap probability profiles summed over a number of assessments may be inappropriate or at least unhelpful when trying to ascertain the most likely state of the stock. As a result the uncertainty in the assessment results may be greater than that indicated by the probabilities ascribed to the estimates of F/F_{MSY} and SSB/SSB_{MSY} given above.

15.7 Bigeye (*Thunnus obesus*), Atlantic Ocean

The stock status for Bigeye in the Atlantic Ocean was not updated by ICCAT SCRS in 2013. The majority of the text below therefore remains largely unchanged from the STECF Review of Advice for 2012.

FISHERIES: Catches have been increasing from the lowest historic level since 1988 of 65,873 t in 2006, reaching 79,597 t in 2007 and decreasing again to 70,000 t. in 2008, still at much lower levels than in the 1990s. Total landings in 2011 of Bigeye tuna in the Atlantic are currently estimated around 77,795 t a considerable decrease from 2009 (81,539 t). In the Atlantic this stock is exploited by three major gears/fisheries: longline, purse seine and baitboats (using live bait). In 2009, for example, total landings were distributed across these 3 fisheries as follows: 56% by longline, 27% by purse seine and 17% by bait boats. The decline in total catches since 1999 is mainly due to declines in the long line catches.

During the period 2005-2008 an overall TAC for the major fleets was set at 90,000 t. The TAC was later lowered (ICCAT Rec. 09-01) to 85,000 t. Estimates of catch for 2005-2011 seem to have been always lower than the corresponding TAC.

Significant catches of small bigeye tuna continue to be channeled to local West African markets (specially Ghana) and sold as "*faux poissons*" in ways that make their monitoring and official reporting challenging. Monitoring of such catches has progressed in some countries but there is still a need for a coordinated approach that will allow ICCAT to properly account for these catches and thus increase the quality of the basic catch data available for assessments.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT SCRS. The last stock assessment was carried out in 2010, with the same methodology of the previous one in 2007.

REFERENCE POINTS: SCRS has estimated an MSY value of between 78,700-101,600 t (median 92,000 t)

STOCK STATUS: Consistent with previous assessments of Atlantic bigeye, the results from non-equilibrium production models are used to provide the best characterization of the status of the resource. The current MSY estimated using a joint distribution of different runs ranged from around 78,100 t to 101,600 t (80% confidence limits), with a median MSY at 92,000 t. In addition, these estimates reflect the current relative mixture of fisheries that capture small or large bigeye; MSY can change considerably with changes in the relative fishing effort exerted by surface and longline fisheries.

The biomass at the beginning of 2010 was estimated to be at between 0.72 and 1.34 (80% confidence limits) of the biomass at MSY, with a median value of 1.01, and the 2009 fishing mortality rate was estimated to be between 0.65-1.55 (80% confidence limits) with a median of 0.95.

It is noteworthy that the modeled probabilities of the stock being maintained at levels consistent with the Convention Objective over time are about 60% for a future constant catch of 85,000 t. Higher odds of rebuilding to and maintaining the stock at levels that could produce MSY are associated with lower catches and lower odds of success with higher catches. It needs to be noted that projections made by the Committee assume that future constant catches represent the total removals from the stock, and not just the TAC of 85,000 t established by ICCAT [Rec. 10-01]. Catches made by other fleets not affected by ICCAT Rec. 10-01 need to be added to the 85,000 t for comparisons with the future constant catch scenarios.

RECENT MANAGEMENT ADVICE: Projections indicate that catches reaching 85,000 t or less will promote stock growth and further reduce the chances in the future that the stock will not be at a level that is consistent with the convention objectives. The Commission should be aware that if major countries were to take the entire catch limit set under Recommendations 04-01 and 10-1, and other countries were to maintain recent catch levels, then the total catch could well exceed 100,000 t. The Committee recommends that the Commission sets a TAC at a level that would provide a high probability of maintaining at or rebuilding to stock levels consistent with the Convention objectives. In considering the uncertainty in assessment results, the Committee believes that a future total catch of 85,000 t or less would provide such high probability, although the catches of fleets not under the present TAC regime should be taken into account.

The assessment and subsequent management recommendations are conditional on the reported and estimated history of catch for bigeye tuna in the Atlantic. The Committee reiterates its concern that unreported catches, including those part of the "*faux poisson*" category, from the Atlantic might have been poorly estimated. There is a need to expand current statistical data.

STECF COMMENTS: STECF agrees with the advice from ICCAT/SCRS

15.8 Swordfish (*Xiphias gladius*), North Atlantic

FISHERIES: Atlantic swordfish has a broad geographical distribution, (from 45°N to 45°S, both coastal and offshore) and is available to a large number of fishing countries. The largest proportion of Atlantic catches are made using surface drifting longlines, mostly by Spain, United States, Canada and Portugal. However, many additional gears are used. Since a 1987 peak in landings there was a decrease in estimated catches in the North Atlantic until 2002. This was in response to ICCAT recommendations but also attributed to shifts in fleet distributions, including movement of some vessels to the South Atlantic and out of the Atlantic.

For the past decade, the North Atlantic estimated catch (landings plus dead discards) has averaged about 11,332 t per year. The catch in 2012 (13,700) represents a near 33% decrease since the 1987 peak in North Atlantic landings (20,236 t) and since 2003 the catch has been maintained around 12,000 t. These reduced landings have been attributed to ICCAT regulatory recommendations and shifts in fleet distributions, including the movement of some vessels some years to the South Atlantic or out of the Atlantic. In addition, some fleets, including at least the United States, EC-Spain, EC-Portugal and Canada, have changed operating procedures to opportunistically target tuna and/or sharks, taking advantage of market conditions and higher relative catch rates of these species previously considered as by-catch in some fleets. Recently, socio-economic factors may have also contributed to the decline in catch.

The nominal catch rates by fleets contributing to the production model series have an increasing trend since the late 1990s, but the United States catch rates remained relatively flat. There have been some recent changes in United States regulations which may have impacted catch rates, but these effects remain unknown.

The most frequently occurring ages in the catch include ages 2 and 3. There are reports of increasing average size of the catch in some North Atlantic fisheries, including United States and Canada.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT SCRS and the 2013 advice is based on the 2013 assessment conducted for this stock.

REFERENCE POINTS: MSY reference points for this stock are MSY=13,660 t (13,250-14,080),

F_{MSY} = 0.22 B_{MSY} = 65,060**.**

STOCK STATUS: The estimated relative biomass trend in the base case model shows a consistent increase since 2000. The current results indicate that the stock is at or above BMSY. The relative trend in fishing mortality shows that the level of fishing peaked in 1995, followed by a decrease until 2002, followed by small increase in the 2003-05 period and downward trend since then. Fishing mortality has been below F_{MSY} since 2005. The results suggest that there is greater than 50% probability that the stock is at or above B_{MSY}, and thus

the ICCAT rebuilding objective has been achieved. In summary, the stock is estimated to be not overfished (B> B.) and overfishing is not occurring ($F<F_{MSY}$).

However, catches in 2012 (13,972 t) slighty exceeded the TAC (13,700 t) Which could slow down the recovery of the stock if catches continue to grow. Catches over 15,000 t are likely to decrease the probability of the stock remaining above BMSY over the next decade to less than 50%.

Other analyses conducted by the ICCAT-SCRS (Bayesian surplus production modeling, and Virtual Population analyses) generally support the results described for the base case surplus production model above.

RECENT MANAGEMENT ADVICE: For continuity of advice relative to previous assessments, ASPIC results are used although other models were considered. These show the ranges of total catch limits and associated probabilities associated with stock status by year. The current TAC of 13,700 t has an 83% probability of maintaining the North Atlantic swordfish stock in a rebuilt condition by 2021 while maintaining nearly level biomass. This TAC would be in accordance with [Rec.11-13], adopted by the Commission that indicates that 'For stocks that are not overfished and not subject to overfishing (i.e., stocks in the green quadrant of the Kobe plot), management measures shall be designed to result in a high probability of maintaining the stock within this quadrant'. However, the Committee acknowledges that without better direction from the Commission with regard to what constitutes a 'high probability', it cannot provide more specific advice. TACs up to 14,300 t would still have a higher than 50% probability of maintaining the stock in a rebuilt condition by 2021 but would be expected to lead to greater biomass declines**.**

STECF COMMENTS: STECF agrees with the advice from ICCAT.

STECF notes the concern expressed by ICCAT/SCRS that current regulations may have had a detrimental effect on the availability and consistency of data (catches, sizes, and CPUE indices) from the Atlantic fleet and the possible effects of this on future assessments.

STECF further notes that, because of the poor size-selectivity of longliners, regulating minimum landing size may inadvertently have resulted in under-reporting of juvenile catches. Alternative methods for reducing juvenile catches, such as time and/or area closures or technological changes in gear deployment, may be more effective and their utility should be further investigated.

15.9 Swordfish (*Xiphias gladius*), South Atlantic

FISHERIES: The historical trend of catch (landings plus dead discards) can be divided in two periods: before and after 1980. The first one is characterized by relatively low catches, generally less than 5,000 t (with an average value of 2,300 t). After 1980, landings increased continuously up to a peak of 21,930 t in 1995, levels that match the peak of North Atlantic harvest (20,236 t). This 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. Expansion of fishing activities by southern coastal countries, such as Brazil and Uruguay, also contributed to this increase in catches. The reduction in catch following the peak in 1995 resulted from regulations and partly due to a shift to other oceans and target species. In 2011, the preliminary reported catches were 12,763 t about 42% lower than the 1995 reported level and catches have been at this level following a decline in 2008 from near 15,000t.

As observed in the 2006 assessment, the CPUE trend from targeted and non-targeted fisheries show different trends and high variability which indicates that at least some are not depicting trends in the abundances of the stock . It was noted that there was little overlap in fishing area and strategies between the by-catch and targeted fleets used for estimating CPUE pattern, and therefore the by-catch and targeted fisheries CPUE trends could be tracking different components of the population.

Since 1991, several fleets have reported dead discards. The volume of Atlantic-wide reported discards since then has ranged from 215 t to 1,139 t.

SOURCE OF MANAGEMENT ADVICE: The advisory body is the ICCAT SCRS and the 2013 advice is based on the 2013 assessment conducted for this stock.

REFERENCE POINTS: MSY reference points for this stock have not been estimated.

STOCK STATUS: The results of all models indicated that there was a conflicting signal for several of the indices used and substantial conflict between the landings history and the indices. There was low confidence in the estimation of the absolute productivity level of the stock or on MSY-related benchmarks. Determination of

likely stock status was this based on qualitative indicators (mean size in catch) and comparison with trends observed in the North Swordfish stock. Conclusions are therefore highly debatable and uncertain.

RECENT MANAGEMENT ADVICE: SCRS considered that no advice could be provided given the uncertainties in the stock status and productivity.

STECF COMMENTS: STECF generally agrees with the advice from ICCAT, but notes with concern the high degree of uncertainty in the stock assessment, the fact that current regulations are having the effect of degrading data sources further likely leading to future increases in the uncertainty of assessments and the inability to evaluate the efficacy of the management plan being developed.

15.10 Swordfish (*Xiphias gladius*), Mediterranean Sea

The stock status for swordfish in the Mediterranean Sea was not updated by ICCAT SCRS in 2013. The majority of the text below therefore remains largely unchanged from the STECF Review of Advice for 2012.

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 with average annual reported catches similar to those of larger areas such as the North Atlantic. Landings showed an upward trend from 1965-72, which become stabilised between 1973 and 1977, and then resumed an upward trend reaching a peak of about 20,000 t in 1988. Since then, the reported landings have declined and since 1990 they fluctuate from about 12,000 t to 16,000 t and closer to 12,000 t more recently with the exception in 2010 where closer to 13,500 t.catches reported in 2012 are in the level of 9,160 t. The biggest producers of swordfish in the Mediterranean Sea in the recent years are, in the order, EC-Italy, EC-Greece, EC-Spain and Morocco. Also, Algeria, EC-Cyprus, EC-Malta, EC-Portugal, Tunisia and Turkey have fisheries targeting swordfish in the Mediterranean. Incidental catches of swordfish have also been reported by Albania, Croatia, EC-France, Japan, and Libya. There may be additional fleets taking swordfish in the Mediterranean, for example, Egypt, Israel, Lebanon, Monaco and Syria, but the data are not always reported. Prior to 2002 longlines and driftnets were the main gears used, but minor catches were also reported by harpoon, traps and sport fishing. The driftnet fishery for swordfish has been banned since January 1st 2002 in EU countries and from 2004 in all ICCAT Mediterranean countries (in Morocco the driftnet fishery is still permitted, within a progressive dismissing plan), but illegal fishing is known to still occur in various areas. The use of nets and longlines in sport and recreational fishery was banned from 2004 (ICCAT Rec. 04-12). ICCAT imposed a Mediterranean-wide one month fishery closure for all gears targeting swordfish in 2008. A two months closure was adopted for 2009, but only for pelagic longlines directly targeting swordfish (ICCAT Rec.08-03). Additionally, several countries have imposed technical measures, such as closed areas and seasons, minimum landing size regulations and license control systems. There is a high and growing demand for swordfish for fresh consumption in most Mediterranean countries.

Standardised CPUE series from the main longline and gillnet fisheries targeting swordfish, which were presented during the 2010 stock assessment session (Spanish longliners, Italian longliners, Greek longliners and Moroccan gillnetters), did not reveal any trend over time. CPUE series, however, covered only the last 10-20 years and not the full time period of reported landings. Similarly to CPUE, not any trend over the past 20 years was identified regarding the mean fish weight in the catches.

SOURCE OF MANAGEMENT ADVICE: The advisory bodies are ICCAT SCRS and GFCM through the joint GFCM/ICCAT working groups. The current management advice is based on the most recent (2010) stock assessment.

REFERENCE POINTS: MSY is estimated to be around 14,600 t but current replacement yield is estimated at around 12,100 t.

STOCK STATUS: The results from a workshop on stock structure in 2006 demonstrated that Mediterranean swordfish compose a separate stock to swordfish in the Atlantic but further research is needed to clearly define stock boundaries and the degree of any stock mixing. The stock assessments carried out in 2008 and2010 used two different methods.

Two forms of assessment (production modelling and age-structured analysis - XSA), indicated that current SSB levels are much lower than those in the early 80's, although not any trend appears in the last 15 years. The extent of the decline differ among models, with the production model suggesting a decline of about 30%, while XSA results indicate that current SSB level is about 1/4 of that in the middle 80's. Results indicate that the fishery underwent a rapid expansion in the late 1980s resulting in Fs and catches above those that could support

MSY. Estimates of population status from production modeling indicated that current stock level is slightly lower (~5%) to the optimum needed to achieve the ICCAT Convention objective, but these estimates have a high degree of uncertainty (CV~30%). Additionally, it should be noted that production model biomass estimates are very sensitive to the assumption made about the initial stock biomass ratio. In general, the low contrast in the available catch-effort series affects the reliability of biomass estimates, as well as, the predictions of effort changes on future catch levels. Results of yield-per-recruit analyses based on the analytical age-structured assessment in which we have more confidence indicated that the stock is in overfished condition and slight overfishing is taking place. Current (2008) SSB is 46% lower than the value that would maximize yield per-recruit. Current F is slightly higher to the estimated FMSY. Note, however, that these conclusions are based on deterministic analyses of the available data. The level of uncertainty in these estimates has not been evaluated. The SCRS again 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 three years old usually represent 50-70% of the total yearly catches in terms of numbers and 20-35% in terms of weight. A reduction of the volume of juvenile catches would improve yield per recruit and spawning biomass per recruit levels.

The assessment of Mediterranean swordfish indicates that the stock is below the level which can support MSY and that current fishing mortality slightly exceeds FMSY. Overall results suggest that fishing mortality (and near-term catches) needs to be reduced to move the stock toward the Convention objective of biomass levels which could support MSY and away from levels which could allow a rapid stock decline. A reduction of current F to the F0.1 level would result to a substantial (about 40%) long-term increase in SSB.

Seasonal closure projections based on highly-aggregated data derived from the age-structured assessment and which assume no compensation in effort, no interaction with other management actions in place, and an improvement in recruitment with increasing spawning stock biomass (SSB), are forecast to be beneficial in moving the stock condition closer to the Convention objective, resulting in increased catch levels in the medium term, and reductions in the volume of juvenile catches. Although simulations suggest that the stock can be rebuild to the mid-1980s SSB levels only in the case of six month closures, SSB increases up to the optimum levels suggested by the yield-per-recruit analysis can be achieved within 2-3 generations (8-12 years) even under the current management status (2-month closure), provided that fishing mortality is kept on 2008 levels, which were quite lower than the previous years. Risk analysis, however, indicates that a small probability (<5%) of stock collapse still exists in this case.

RECENT MANAGEMENT ADVICE: SCRS has recommended that ICCAT should adopt a Mediterranean swordfish fishery management plan with the goal of rebuilding the stock to levels that are consistent with the ICCAT Convention objective. Given the uncertainties on optimum SSB level estimates and the rapid fishery expansion in the 80's, which resulted in severe stock biomass declines, the SSB levels in the late 80's may be also considered as a good proxy for the stock. These levels, are around to 60000-70000 t, not very far however, from the currently estimated B_{MSY} value (~62000 t). Analysis has suggested that the seasonal closures have beneficial effects and can move the stock condition to the level which will support MSY, but the effect of the recently employed two-month closure could not be evaluated due to incomplete 2009 data.

Following the results from recent studies, technical modifications of the longline fishing gears, as well as, the way they are operated can be considered as an additional technical measure in order to reduce the catch of juveniles. The Committee recommends this type of measures be considered as part of a Mediterranean swordfish management plan. Given that the current capacity in the Mediterranean swordfish fishery exceeds that needed to efficiently extract MSY, management measures aimed at reducing this capacity should also be considered part of a Mediterranean swordfish management plan adopted by the Commission.

ICCAT agreed recommendation [11-03] where a ban on swordfish, both as a targeted fishery and as by-catch, is implemented in the Mediterranean during the period from 1 October to 30 November and for one calendar month between 15 February and 31 March each year, until a long-term management plan is decided by ICCAT.

STECF COMMENTS: STECF notes that assessment models used by the ICCAT SCRS give different perceptions of the stock status in relation to B_{MSY}. While both models indicate that the biomass is below B_{MSY}, the degree to which the stock is overfished is substantially different in the two models. STECF agrees with the finding that the stock is overfished but is unable to quantify by how much it is overfished. Nevertheless, STECF broadly agrees with the advice from ICCAT regarding fishery closures and recommends that any fishery closure (no fishing with all surface longlines able to catch swordfish and eradication of all illegal driftnet fisheries) should apply to the entire Mediterranean area and extend for a minimum of two months. STECF notes that to

achieve the ICCAT objectives for swordfish, the closure should be for a period greater than 2 months. STECF also recommends that fishing capacity for swordfish should not be allowed to increase and preferable that it be reduced. STECF also notes that shifting the effort, without an effective monitoring, towards large fish using deep longlines might result in an unacceptably-high increase in mortality on older age-classes. STECF also indicates the EU Data Collection framework should be adjusted to be consistent with the format used by ICCAT for assessment purposes, with particular attention to CPUE data. STECF again stresses the importance to better define the mixing rate between the Mediterranean and the Atlantic swordfish stock already known to occur in the Atlantic area close to Gibraltar. STECF notes that the identification of the vessels authorized to catch swordfish in the Mediterranean, included in the ICCAT Rec.09-04, which is necessary to define the fishing capacity, was not provided to SCRS and then recommends that the Commission takes all the necessary measures to provide this list.

15.11 Skipjack (*Katsuwonus pelamis*), Eastern Atlantic

The stock status for skipjack in the Eastern Atlantic was not updated by ICCAT SCRS in 2013. The assessment and advice below therefore remains largely unchanged from the STECF Review of Advice for 2013.

FISHERIES: The numerous changes that have occurred in the skipjack fishery since the early 1990s (such as the progressive use of FADs and the increase of the fishing area towards the west) have brought about an increase in skipjack catchability and in the biomass proportion that is exploited. At present, the major fisheries are the purse seine fisheries, particularly those of EU-Spain, Ghana, Belize, Panama, EU-France and Curaçao, followed by the baitboat fisheries of Ghana, EU-Spain, EU-Portugal and EU-France. The preliminary estimates of catches made in 2012 in the East Atlantic amounted to 207,500 t, that is, a sharp increase of about 46% as compared to the average of 2007-2011. A strong increase in the skipjack catches by European purse seiners is noted, probably due to the high selling price of this species. In recent years, the seasonal fishing by European purse seiners on free schools, off Senegal, has decreased sharply and consequently, the proportion of the catches on floating objects continued to increase up to 2007, reaching slightly more than 90% of the catches. The high catches, unusual for this type of fishing off Mauritania beyond 15^{o}N latitude in 2012 between August and November, reinforces this trend. It should be noted that the catches are made on practically single species schools.

The unreported catches of some purse seine catches were estimated by comparing monitored landings in West African ports and cannery data to catches reported to ICCAT. The Committee has had cooperation from many CPCs of this region and from the professional sector in estimating these catches and significant revisions have been made in recent years for the purse seiners as well as for the other fleets since 2005. On the other hand, species composition and catch at size of the Ghanaian baitboat and purse seine fleet, has been thoroughly reviewed. This review has resulted in new estimates of Task I and Task II catch and effort and size for these fleets for the 1973-2005 period. Similar estimates for the 2006-2012 period, are expected to be available soon. This revision has shown that skipjack tuna catches by Ghanaian fleets were significantly higher, on average around 9,000 t/year for the 1996-2005 period, compared to what was previously estimated. The estimate of the average discard rate of skipjack tuna under FADs from data collected since 2001 by observers on-board Spanish purse seiners operating in the East Atlantic has been confirmed by the two studies conducted on board French purse seiners (estimated at 42 kg per ton of skipjack landed). Furthermore, the amount of small skipjack (average size 37 cm FL) landed in the local market of Abidjan in Côte d'Ivoire as faux- poisson has been estimated at 235 kg per ton of skipjack landed. However, new estimates, on the specific composition in particular, of faux-poisson, carried out during the recent Tropical Tuna Species Group Inter- sessional Meeting on the Ghanaian Statistics Analysis, indicate amounts of around 11,000 t/year between 2005 and 2010 for the overall purse seiners operating in the East Atlantic (4,092 t/year between 2003 and 2012 for the European and associated purse seiners).The Committee regularly integrates these estimates in the reported historical catches for the EU-purse seiners since 1981, as well as in the catch-at-size matrix and this procedure should be extended to all the fleets landing faux-poisson.

Although the fisheries operating in the east have extended towards the west beyond 30ºW longitude, the Committee decided to maintain the hypothesis in favor of two distinct stock units, based on available scientific studies.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT. Management advice is based on the most recent stock assessment conducted in 2008.

REFERENCE POINTS: Maximum sustainable yield is estimated to be around 143,000 t – 170,000 t.

STOCK STATUS: Stock assessments for eastern Atlantic skipjack were conducted in 2008 using available catches up to 2006. Although the fisheries operating in the east are extending towards the west beyond 30°W longitude, the SCRS decided to maintain the hypothesis in favor of two distinct stock units, based on available scientific studies.

Recent investigations by the SCRS using a new Bayesian method, using only catch information (under a Schaefer-type model parameterization), estimated the MSY at 143,000-156,000 t, a result which agrees with the estimate obtained by the modified Grainger and Garcia approach: 149,000 t.

In addition, two non-equilibrium surplus biomass production models (a multi-fleets model and a Schaefer-based model) were applied for 8 time series of CPUEs, and for a combined CPUE index weighted by fishing areas. To account for the average increase in catchability of purse seine fisheries, a correction factor of 3% per year was applied to the CPUE series. As for the Bayesian model application that only uses catches, different working hypothesis were tested on the distribution of the priors of the two surplus production models (i.e., the growth rate, the carrying capacity, the catchability coefficient of each fleet, etc.). In general, the range of plausible MSY values estimated from these models (155,000-170,000 t) were larger than in the Bayesian model based on catches. The Committee stated the difficulty to estimate MSY under the continuous increasing conditions of the exploitation plot of this fishery (one-way of the trajectory to substantially weaker effort values) and which as a result, the potential range distribution of some priors needs to be constrained (e.g., for growth rate, or for the shape parameter of the generalized model).

While caution is needed as regards to the generalization of the diagnosis on the stock status of the overall spatial components of this stock in the East Atlantic, due to the moderate mixing rates that seem to occur among the different sectors of this region, it was unlikely that until recent years skipjack were overexploited in the eastern Atlantic. The high catches and the extension of the fishing zone reported recently suggest an increase in the available biomass or an increase in fishing mortality, and the development of the fishery towards a new exploitation regime which should be evaluated very soon.

MANAGEMENT MEASURES : The repealing in 2006 of Recommendation [Rec. 05-01] on the 3.2 kg minimum size limit on yellowfin tuna [Rec. 72-01] and the establishment of a time/area closure of the surface fishery [Rec. 04-01], which aims at decreasing mortality due to juvenile bigeye tuna fishing, are regulatory measures whose effects were analyzed by the Species Group meeting. The new Recommendation [Rec. 11-01] which replaces that relative to the complete closure of the surface fishery and establishes a new moratorium on FAD fishing in the area that extends from the coast to 10ºS and 5ºW latitude to 5ºE longitude during the months of January and February, will enter into force in 2013 and will most likely have an impact on the skipjack catches.

RECENT MANAGEMENT ADVICE: The Committee reiterated its advice that catches should not be allowed to exceed MSY. As recent catches have clearly exceeded the estimate of MSY, made in 2008, and taking into account: 1) the uncertainties related to the status of these stocks, relative to this reference point, in the new exploitation scheme, and 2) uncertainties identified in the 2008 assessment, it is difficult to know if the current catches can produce overexploitation. Therefore, the Committee recommends an assessment of the skipjack stocks in 2014.

The Commission should be aware that increasing harvests and fishing effort for skipjack could lead to involuntary consequences for other species that are harvested in combination with skipjack in certain fisheries.

STECF COMMENTS: STECF agrees with the advice from ICCAT/SCRS

15.12 Skipjack (*Katsuwonus pelamis*), Western Atlantic.

The stock status for skipjack in the Eastern Atlantic was not updated by ICCAT SCRS in 2013. The assessment and advice below therefore remains largely unchanged from the STECF Review of Advice for 2013.

FISHERIES: In the West Atlantic, the major fishery is the Brazilian baitboat fishery, followed by the Venezuelan purse seine fleet. Catches in 2012 in the West Atlantic have been estimated at 33,200 t, which is close to the historic record of 40,000 t obtained in 1985. This very strong increase (29% compared to the average catches observed in the last 5 years) is largely due to the good catches reported by Brazilian baitboats. As the fishing effort of this fleet has not increased, this increase could be due to an increase either due to the productivity or catchability. The catches taken by EU vessels on this stock have been, historically, negligible.

SOURCE OF MANAGEMENT ADVICE: The advisory body is the ICCAT SCRS.

REFERENCE POINTS: MSY was tentatively estimated at around 30,000-36,000 t.

STOCK STATUS: Stock assessments for western Atlantic skipjack were conducted in 2008 using available catches up to 2006. The standardized CPUEs of Brazilian baitboats remain stable while that of Venezuelan purse seiners and USA rod and reel decreased in recent years. This decrease, also observed in the CPUE time series for Venezuelan purse seine, could be linked to specific environmental conditions (high surface temperatures, lesser accessibility of prey). The absence of a larval index trend, limited to the Gulf of Mexico, seems to reinforce this hypothesis. However, the average weight of skipjack caught in the western Atlantic is higher than in the east (3 to 4.5 kg vs. 2 to 2.5 kg), at least for the Brazilian baitboat fishery. The assessment model from catches estimated MSY at around 30,000 t (similar to the estimate provided by the Grainger and Garcia approach) and the Bayesian surplus model (Schaefer formulation) at 34,000 t.

The Committee attempted several sensitivity analyses for values of natural mortality with Multifan-CL. For this stock only the three fisheries mentioned above were considered. The final estimate of MSY converges also at about 31,000-36,000 t. It must be stressed that all of these analyses correspond to the current geographic coverage of this fishery (i.e., relatively coastal fishing grounds due to the deepening of the thermocline and of the oxycline to the East). For the western Atlantic stock, and in the light of the information provided by the trajectories of B/B_{MSY} and F/F_{MSY}, it is unlikely that the current catch is larger than the current replacement yield.

RECENT MANAGEMENT ADVICE: No precise management recommendations were proposed by the ICCAT. Catches are recommended not to exceed MSY.

STECF COMMENTS: STECF agrees with the advice from ICCAT/SCRS and notes that recent catches are close to the estimated MSY.

15.13 Marlins (*Makaira nigricans* and *Tetrapturus albidus*), Atlantic Ocean

The most recent assessment for blue marlin was carried out by the ICCAT SCRS in 2011. The majority of the text pertaining to blue marlin stock therefore remains largely unchanged from the STECF Review of Advice for 2013 (STECF 12-22). For White Marlin a 2012 assessment forms the basis of the advice and the relevant sections have been updated.

FISHERIES: These species are primarily taken by longline fisheries (including various EU longline fisheries), but also by purse seines (including EU purse seiners catching a few hundred tonnes yearly), by some artisanal gears which are the only fisheries targeting marlins (Ghana, Cote d'Ivoire, including EU ones in the Antilles) and also by various sport fisheries located in both sides of the Atlantic. This group of species, together with spearfish and sailfish, 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.

Over the last 20 years, Antillean artisanal fleets have increased the use of Moored Fish Aggregating Devices (MFADs) to capture pelagic fish. Catches of blue marlin caught around MFADs are known to be significant and increasing in some areas, however reports to ICCAT on these catches are incomplete. Even though catches from the Antillean artisanal fleets were included in the stock assessment, additional documentation of past and present catches from these fisheries is required. Recent reports from purse seine fleets in West Africa suggest that blue marlin are more commonly caught with tuna schools associated with FADs than with free tuna schools. Task I catches of blue marlin in 2012 were 1,834 t, compared to 2,252 t reported for 2011. Task I catches of blue marlin for 2012 are preliminary. Task I catches of white marlin in 2011 and 2012 were 384 t and 403 t, respectively (WHM-Table 2). Task I catches of white marlin for 2012 are to be considered preliminary. Due to the work conducted by the Committee and improved reporting by CPCs the amount of unclassified billfish has been minimized.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT. Blue marlin advice is based on the 2011 assessment while white marlin advice is based on a new 2012 assessment.

REFERENCE POINTS:

ATLANTIC BLUE MARLIN SUMMARY	
	BUM
Maximum Sustainable Yield	2,837 t (2,343 – 3,331 t)[1]
Current (2012) Yield	1,834 t[2]
Relative Biomass (SSB_{2009}/SSB_{MSY})	0.67 (0.53 – 0.81)[1]
Relative Fishing Mortality (F_{2009}/F_{MSY})	1.63 (1.11 – 2.16)[1]
Overfished	Yes
Overfishing	Yes
Conservation and Management Measures in Effect:	Recommendation [Rec. 12-04]. The annual amount of blue marlin that can be harvested by pelagic longline and purse seine vessels and retained for landing must be no more than 33% for white marlin and 50% for blue marlin of the 1996 or 1999 landing levels, whichever is greater.

[1] Stock Synthesis version 3.2.0.b model results. Values correspond to median estimates, 95% confidence interval values are provided in parenthesis.
[2] 2012 yield should be considered provisional. The 2009 yield used in the 2011 assessment was 3,341 t.

ATLANTIC WHITE MARLIN SUMMARY	
MSY	874 t[1] - 1604 t[2]
Current (2012) Yield	403 t[3]
Relative Biomass:	
B_{2010}/B_{MSY}	0.50 (0.42-0.60)[4]
SSB_{2010}/SSB_{MSY}	0.322 (0.23-0.41)[5]
Relative Fishing Mortality:	
F_{2010}/F_{MSY}	0.99 (0.75-1.27)[4] 0.72 (0.51-0.93)[5]
$Catch_{recent}$[6]/$Catch_{1996}$ Longline and Purse seine	0.30
Overfished	Yes
Overfishing	Not likely[7]
Conservation and Management Measure in Effect:	Recommendation [Rec. 12-04]. The annual amount of white marlin that can be harvested by pelagic longline and purse seine vessels and retained for landing must be no more than 33% for white marlin of the 1996 or 1999 landing levels, whichever is greater.

[1] ASPIC estimates.
[2] SS3 estimates.
[3] 2012 yield should be considered provisional, 2011 yield was 384 t.
[4] ASPIC estimates with 10 and 90 percentiles.
[5] SS3 estimates with approximate 95% confidence intervals.
[6] $Catch_{recent}$ is the average annual longline and purse seine catch for 2009-2011.
[7] Overfishing could be occurring if catches are under reported.

STOCK STATUS:

BLUE MARLIN: Unlike the partial assessment of 2006, the Committee conducted a full assessment in 2011, which included estimations of management benchmarks. The results of the 2011 assessment indicated that the stock remains overfished and undergoing overfishing. This is in contrast to the results of the 2006 assessment

which indicated that even though the stock was likely overfished, the declining trend had partially stabilized. However, the Committee recognizes the high uncertainty with regard to data and the productivity of the stock. The current blue marlin stock assessment indicates that the stock is below BMSY and the fishing mortality above FMSY (2009).

WHITE MARLIN: The results of the 2012 assessment indicated that the stock remains overfished but most likely not undergoing overfishing. Relative fishing mortality has been declining over the last ten years and is now most likely to be below FMSY. Relative biomass has probably stopped declining over the last ten years, but still remains well below BMSY. There is considerable uncertainty in these results. The two assessment models provide different estimates about the productivity of the stock, with the integrated model suggesting that white marlin is a stock that can rebuild relatively fast whereas the surplus production model suggests the stock will rebuild very slowly. The results from both approaches are considered to be equally plausible. These results are conditional on the reported catch being a true reflection of the fishing mortality experienced by white marlin. Sensitivity analyses suggest that if recent fishing mortality has been greater than reported, because discards are not reported by many fleets, estimates of stock status would be more pessimistic and current relative biomass would be lower and overfishing would continue. The presence of unknown quantities of roundscale spearfish in the reported catches and data used to estimate relative abundance of white marlin increases the uncertainty for the stock status and outlook for this species.

RECENT MANAGEMENT ADVICE:

BLUE MARLIN: In 2012, the Commission implemented [Rec. 12-04], intended to reduce the total harvest to 2,000 t in 2013, 2014, and 2015 to allow the rebuilding of the blue marlin stock from the overfished condition. The Committee expressed its concern on the effectiveness of such measure in light of severe under reporting currently occurring in some fisheries. Therefore, the Committee alerts the Commission that unless such non-compliance issues are properly addressed the adoption of additional measures might be rendered ineffective.

The Commission may consider the adoption of measures such as, but not limited to the mandated use of non-offset circle hooks as terminal gear. Recent research has demonstrated that in some longline fisheries the use of non-offset circle hooks resulted in a reduction of marlin mortality, while the catch rates of several of the target species remained the same or were greater than the catch rates observed with the use of conventional J hooks or offset circle hooks. The Committee considers that this approach may be more efficient and enforceable than time-area closures and, thus, it recommends that the Commission considers this alternative approach. Currently, three ICCAT member nations (Brazil, Canada, and the U.S.) already mandate or encourage the use of circle hooks on their pelagic longline fleets. In addition, reducing fishing mortality of blue marlin from non-industrial fisheries should be considered.

WHITE MARLIN:
In 2012, the Commission implemented [Rec. 12-04], intended to reduce the total harvest to 400 t in 2013, 2014, and 2015 to allow the rebuilding of the white marlin stock from the overfished condition. The Committee expressed its concern on the effectiveness of such measure in light of the misidentification of spearfishes in the white marlin catches, which causes uncertainty in stock assessment results and enforcement related problems.

One approach to reduce fishing mortality could be the use of non-offset circle hooks as terminal gear. Recent research has demonstrated that in some longline fisheries the use of non-offset circle hooks resulted in a eduction of marlin mortality, while the catch rates of several of the target species remained the same or were greater than the catch rates observed with the use of conventional J hooks or offset circle hooks. The Committee considers that this approach may be more efficient and enforceable than time-area closures and, thus, it recommends that the Commission considers this alternative approach. Currently, three ICCAT Contracting Parties (Brazil, Canada, and the United States) already mandate or encourage the use of circle hooks on their pelagic longline fleets. In addition, reducing fishing mortality of white marlin from non-industrial fisheries should be considered.
S**TECF COMMENTS:** STECF agrees with the advice from ICCAT-SCRS. Furthermore, STECF stresses the need for correct identification and reporting of billfish species in all EU fisheries in accordance with the DCF.

15.14 Sailfish (*Istiophorus platypteus)* Atlantic Ocean

The stock status for sailfish in the Atlantic Ocean was not updated by ICCAT SCRS in 2012 however ICCAT added reference points and provided additional advice so that there are significant changes from the STECF Review of Advice for 2013.

FISHERIES: Sailfish has a pan-tropical distribution. ICCAT has established, based on life history information on migration rates and geographic distribution of catch, that there are two management units for Atlantic sailfish, eastern and western.

Sailfish are targeted by coastal artisanal and recreational fleets and, to a less extent, are caught as by-catch in longline and purse seine fisheries. Historically, catches of sailfish were reported together with spearfish by many longline fleets. In 2009 these catches were separated by the Working Group Historical catches of unclassified billfish continue to be reported to the Committee making the estimation of sailfish catch difficult. Catch reports from countries that have historically been known to land sailfish continue to suffer from gaps and there is increasing ad-hoc evidence of un-reported landings in some other countries. These considerations provide support to the idea that the historical catch of sailfish has been under-reported, especially in recent times where more and more fleets encounter sailfish as by-catch or target them.

Task I catch for 2012 was 1,153 t and 891 t for the east and west stocks, respectively. Task I catches of sailfish for 2012 are preliminary because they do not include reports from all fleets. These species are primarily taken by longline fisheries (including various EU longline fisheries), but also by purse seines (including EU purse seiners catching a few hundred tonnes yearly), by some artisanal gears which are the only fisheries targeting marlins (Ghana, Cote d'Ivoire, including EU ones in the Antilles) 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. The advice is based on the most recent (2009) assessment.

REFERENCE POINTS:

ATLANTIC SAILFISH SUMMARY

	West Atlantic	**East Atlantic**
Maximum Sustainable Yield (MSY)	600-1,100[1] t	1,250-1,950[1] t
2012 Catches (Provisional)	891 t	1,153 t
B_{2007}/B_{MSY}	Possibly < 1.0	Likely < 1.0
F_{2007}/F_{MSY}	Possibly > 1.0	Likely > 1.0
Overfished	Possibly	Likely
Overfishing	Possibly	Likely
2008 Replacement Yield	Not estimated	Not estimated
Management Measures in Effect:	None[2]	None[2]

[1]Results from Bayesian production model with informative priors. These results represent only the uncertainty in the production model fit. This range underestimates the total uncertainty in the estimates of MSY.
[2] Some countries have domestic regulations.

STOCK STATUS: ICCAT recognizes the presence of two stocks of sailfish in the Atlantic, the eastern and western stocks. There is increasing evidence that an alternative stock structure with a north western stock and a south/eastern stock should be considered. Assessments of stocks based on the alternative stock structure option have not been undertaken to date, however, conducting them should be a priority for future assessments. In 2009 ICCAT conducted a full assessment of both Atlantic sailfish stocks through a range of production models and by using different combinations of relative abundance indices. It is clear that there remains considerable uncertainty regarding the stock status of these two stocks, however, many assessment model results present evidence of overfishing and evidence that the stocks are overfished, more so in the east than in the west. Although some of the results suggest a healthy stock in the west, few suggest the same for the east. The eastern stock is also assessed to be more productive than the western stock, and probably able to provide a greater MSY. The eastern stock is likely to be suffering stronger overfishing and most probably has been reduced further below the level that would produce the MSY than the western stock. Reference points obtained with other methods reach similar conclusions. Examination of recent trends in abundance suggests that both the eastern and western stocks suffered their greatest declines in abundance prior to 1990. Since 1990, trends in relative abundance conflict between different indices, with some indices suggesting declines, other increases

and others not showing a trend. Examination of available length frequencies for a range of fleets show that average length and length distributions do not show clear trends during the period where there are observations.

RECENT MANAGEMENT ADVICE:

The Committee recommends that catches for the eastern stock should be reduced from current levels. It should be noted, however, that artisanal fishermen harvest a large part of the sailfish catch along the African coast.

The Committee recommends that catches of the western stock of sailfish should not exceed current levels. Any reduction in catch in the West Atlantic is likely to help stock re-growth and reduce the likelihood that the stock is overfished. It should be noted, however, that artisanal fishermen harvest a large part of the sailfish catch of the western sailfish stock.

One approach to reduce fishing mortality could be the use of non-offset circle hooks as terminal gear. Recent research has demonstrated that in some longline fisheries the use of non-offset circle hooks resulted in a reduction of istiophorid mortality, while the catch rates of several of the target species remained the same or were greater than the catch rates observed with the use of conventional J hooks or offset circle hooks. The Committee considers that this approach may be more efficient and enforceable than time-area closures and, thus, it recommends that the Commission considers this alternative approach. Currently, three ICCAT Contracting Parties (Brazil, Canada, and the United States) already mandate or encourage the use of circle hooks on their pelagic longline fleets. In addition, reducing fishing mortality of sailfish from non-industrial fisheries should be considered.

The Committee is concerned about the incomplete reporting of sailfish catches, particularly for the most recent years, because it increases uncertainty in stock status determination. The Committee recommends all countries landing or having dead discards of sailfish, report these data to the ICCAT Secretariat.

STECF COMMENTS: STECF agrees with the advice from ICCAT, remarking the high uncertainty of the data and the assessment. Furthermore, STECF stresses the need for correct identification and reporting of billfish species in all EU fisheries in accordance with to the DCF.

15.15 Spearfish, Atlantic Ocean

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The generic common name Spearfish includes several species and, among them, at least Tetrapturus angustirostris (Shortbill spearfish, SSP), Tetrapturus georgii (Roundscale spearfish, RSP) and Tetrapturus pfluegeri (Longbill spearfish, SPF). The ICCAT/SCRS used Task I catches as the basis for the estimation of total removals. The reported landings in 2010 were 246 t a level which appears to have been maintained since the early 1980 after initially declining from a high around 1,250 t in 1966. In recent years large catches of billfish continue to be reported as unclassified billfish and reporting gaps remain for many important fleets. In addition the ICCAT 2012 report suggests that the roundscale spearfish is regularly misidentified as white marlin which further compromises the reliability of these catch estimates.

These species are primarily taken by longline fisheries (including various EU longline fisheries), but also by purse seines (including EU purse seiners), by some artisanal gears (including EU ones in the Antilles) and also by various sport fisheries located in both sides of the Atlantic. The increasing use of anchored FADs by various artisanal and sport fisheries is possibly increasing the vulnerability of these stocks.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT.

REFERENCE POINTS: None.

STOCK STATUS: unknown.

RECENT MANAGEMENT ADVICE: None. In 2008, the SCRS recommended all countries landing or having dead discards of spearfish report these data by species to the ICCAT Secretariat.

STECF COMMENTS: STECF remarks that these species have been apparently forgotten in the last three SCRS reports and that data on catches appear mixed-up among several species. STECF is concerned about the lack of attention about these species, because they might present the same problems of other billfish species and recommends the Commission to support more attention by ICCAT. STECF recommends that all these species should be accurately monitored, particularly for the EU fleets within the EC data collection framework. In the

absence of any official figure at least of the catch by species, STECF is not in the position to provide any management comment.

15.16 Mediterranean Spearfish (*Tetrapturus belone*)

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The Mediterranean fisheries catch mostly one species among sailfish and spearfish, the Mediterranean Spearfish (*Tetrapturus belone*), usually a by-catch in longline and driftnet fishery, but one of the target species for the traditional harpoon fishery and occasionally in sport fishing activity, also taking into account the high market price. Catches are unofficially known to occur in all the Mediterranean States where driftnet and longline fishing is carried out. The landings are largely unknown, although they seem to have increased in the most recent years, certainly over a level of about 100 t, even considering that only a very few Countries (Italy, Spain and Portugal) are reporting their catches to ICCAT. In 2005 and 2006 catches have shown fluctuation, while the geographic distribution of the species seems to be affected by the oceanographic situation. EC-Italy reported a total catch of 266 t in 2008, while data for most of the countries are mixed up among billfish species (BIL) in the ICCAT data. Other billfish and spearfish species are only very rarely present in most of the Mediterranean Sea, but recent data show that catches could occur with a relative higher frequency in the western and central basins. No additional information is available.

SOURCE OF MANAGEMENT ADVICE: The advisory body is the ICCAT.

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 Mediterranean Spearfish, due to the lack of data from many fisheries.

RECENT MANAGEMENT ADVICE: ICCAT have not provided any kind of management recommendations for this stock.

STECF COMMENTS: While generally not a target species for commercial fleets, spearfish and billfish catches, including those from the recreational fishery, should be monitored carefully. Catches of Mediterranean spearfish must be reported by all MS concerned, also according to the EC Data collection framework. STECF remarks that this management unit has been apparently forgotten in the last two SCRS reports.

15.17 Small tunas (Black skipjack, Frigate tuna, Atlantic bonito, Spotted Spanish mackerel, King mackerel and others), Atlantic and Mediterranean

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: There are over fourteen species within the ICCAT category of small tunas, which includes Blackfin tuna -BLF (Thunnus atlanticus), Bullet tuna - BLT (Auxis rochei), Frigate tuna - FRI (Auxis thazard), Atlantic Bonito - BON (Sarda sarda), Plain bonito - BOP (Orcynopsis unicolor), Serra Spanish mackerel – BRS (Scomberomorus brasiliensis), Cero - CER (Scomberomorus regalis), King mackerel - KGM (Scomberomorus cavalla), Scomberomorus unclassified - KGX (Scomberomorus spp.), Little tunny - LTA (Euthynnus alletteratus), West African Spanish mackerel - MAW (Scomberomorus tritor), Atlantic Spanish mackerel - SSM (Scomberomorus maculatus), Narrow-barred Spanish mackerel - COM (Scomberomorus commerson) and Wahoo WAH (Acanthocybium solandri), plus some vagrant species which includes the Indian mackerel (Rastrelliger kanagurta) and maybe also the Black skipjack – BKJ (Euthynnus lineatus) and Dogtooth tuna – DOT (Gymnosarda unicolor).Only five of these account for about 81% of the total catch by weight each year, according to the official statistics. In the ’80s there was a marked increase in reported landings compared to previous years, reaching a peak of about 139,412 t in 1988. Reported landings for the 1989-1995 period decreased to approximately 92,637 t, and since then values have oscillated, with a minimum of 69,895 t in 1993 and a maximum of 123,600 t in 2005. Declared catches were 79,228 t in 2006 and 74,087 t in 2007. Overall trends in the small tuna catch may mask declining trends for individual species because annual landings are often dominated by the landings of a single species. These fluctuations seem to be partly related to unreported

catches, as these species generally comprise part of the by-catch and are often discarded, and therefore do not reflect the real catch.

A preliminary estimate of the total nominal landings of small tunas in 2012 is 97,274 t. The Small Tunas Species Group pointed out the relative importance of small tuna fisheries in the Mediterranean and the Black Sea, which account for about 28% of the total reported catch in the ICCAT area for the period 1980-2010. Despite the recent improvements in the statistical information provided to ICCAT by several countries, the Committee also noted that uncertainties remain regarding the accuracy and completeness of reported landings in all areas. There is a general lack of information on the mortality of these species as by-catch, exacerbated by the confusion regarding species identification.

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, troll lines, driftnets, surface drifting long-lines and small scale gillnets. Several recreational fisheries also target small tunas. 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 and trends are now available from the Mediterranean and the Black Sea, thanks to the ICCAT/GFCM joint expert group in 2008. More information, particularly on specific fishing effort, is needed from all areas. The small tuna fishery seems to be quite important for the coastal communities, 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 for the catches in the Mediterranean and the Black Sea.

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

STOCK STATUS: There is little information available to determine the stock structure of many small tuna species. The SCRS suggests that countries be requested to submit all available data to ICCAT as soon as possible, in order to be used in future meetings. Assessments of stocks of small tunas are also important because of their position in the trophic chain, where they are the prey of large tunas, marlins and sharks and they are predators of smaller pelagic species. It may therefore be best to approach assessments of small tunas from the ecosystem perspective. Generally, current information does not allow the SCRS to carry out an assessment of stock status of the majority of the species. Some analyses will be possible in future if data availability improves with the same trend of the latest year. Nevertheless, few regional assessments have been carried out.

The King mackerel in the Gulf of Mexico and South Eastern United States Atlantic, and the Spanish mackerel in the South Eastern US were assessed in 2008. During the period 2004-2007, the CRFM undertook assessments of the Serra Spanish mackerel, King mackerel and Wahoo fisheries operating within the South-Eastern Caribbean. Further progress in the CRFM assessments requires improvements in statistics and estimation of key biological parameters, as well as close collaboration with neighbouring non-CRFM countries sharing these fisheries within the sub-region.

RECENT MANAGEMENT ADVICE: No management recommendations have been presented by ICCAT due to the lack of proper data, historical series and analyses. ICCAT/SCRS, in 2010, reiterated its recommendation to carry out studies to determine the state of these stocks and the adoption of management solutions, with some priority species for the West African area: Atlantic bonito, Little tunny, Bullet tuna and West African Spanish mackerel. However, the information available for the major part of the stocks suggests that the majority of the stocks can be managed at the regional or sub-regional level. GFCM/ICCAT had identified some priority species, namely Bullet tuna, Atlantic bonito, Little tunny and Plain bonito. CRFM analyses of eastern Caribbean stocks have been limited by the quality and quantity of the available data, and in view of this, changes in current management approaches have not yet been recommended.

ICCAT-SCRS in 2010 noted that there is an improvement in the availability of catch and biological data for small tuna species particularly in the Mediterranean and the Black Sea. However, biological information, catch and effort statistics for small tunas remain incomplete for many of the coastal and industrial fishing countries. Given that, many of these species are of high importance to coastal fishermen, especially in some developing countries, both economically and often as a primary source of proteins, therefore the SCRS recommends that further studies be conducted on small tuna species due to the limits of information available.

STECF COMMENTS: STECF noted that several small tuna species have been included in the EC data collection framework and that this should possibly result in an improved availability of data in a few years, if properly implemented by the MS concerned. Independently from the small tuna species listed in the DCF, STECF recommends that fisheries and biological data be collected for all small tunas and not only those in the DCF, particularly in the countries in the southern and eastern part of the Mediterranean Sea, in the Black Sea and in the southern Atlantic ocean, where these species have a high socio-economical relevance.

15.18 Luvarus (*Luvarus imperialis*), Mediterranean Sea

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The Luvarus is usually a species not considered among the catches of the Mediterranean fisheries, but this poorly known species regularly occurred as a commercial by-catch in several driftnet fisheries, particularly between May and June, when this fishing activity was largely practiced. Catches may be significant in some periods; individuals of this species can exceed 80 kg. A minor by-catch occurs even in long-line fisheries but data are usually not reported. To date landings have not been never 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.

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 1st 2002 and from 2004 in all the ICCAT Mediterranean countries could results in a partially positive effect for the stock, even if illegal driftnet fishery is known to still occur in various areas.

RECENT MANAGEMENT ADVICE: GFCM have not provided any kind of management recommendations for this stock.

STECF COMMENTS: STECF comments that this species is not on the GFCM priority list so that no advice is likely to be provided by this body in the near future.

15.19 Shortfin Mako (*Isurus oxyrinchus*), North Atlantic Ocean and Mediterranean.

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

During 2013 ICCAT Shark Specialist Group held a meeting to develop a Special Research Programme on sharks, as recommended at the 2012 shortfin mako assessment meeting. The Shark Research and Data Collection Programme was drafted during the meeting and an approach for identifying key research needs and components of and a roadmap for developing the 2015-2020 SCRS Strategic Plan was outlined.

A data-preparation meeting was held in 2011. The assessment models used were: (1) a Bayesian surplus production model, (2) a catch-free model, and (3) an age-structured production model using the data from Long Line fisheries CPUE of US, Japana and Spain for the northern stock and Uruguay. Combined CPUE series using a GLM approach were also estimated for each stock using two weighting schemes: (a) area covered by each fishery, and (b) catch.

FISHERIES: Shortfin mako sharks (SMA) show a wide geographical distribution, most often between 50ºN (60°N in NE Atlantic) and 50ºS latitude, including the Mediterranean Sea.

The ICCAT-SCRS (2009) considered two separate stocks, one in the North Atlantic and one in the South Atlantic. According to the IUCN report in 2009, stock status of shortfin mako in the Mediterranean remains unclear and futher investigations are needed to clarify its status. The western basin of Mediterranean is considered to be a nursery area for the short fin mako but the western Mediterranean population is currently considered as belonging to the northeast Atlantic stock for assessment purposes.

The shortfin mako in the North Atlantic is mostly taken by pelagic longlines, which account for more than 99% of the catches of this species reported to ICCAT in recent years. Catches in ICCAT Task I from North Atlantic range from 785 t in 1990 to a peak of 5,063 t in 2004 (but SCRS estimates about 7,000 t). In Atlantic reported

catches in 2007 are 3,915 t (but SCRS estimates a total of 5,996 t), in 2008 accounted 5284 t (Task 1), while preliminary and incomplete catch reports in 2010 amount to 5432 t. EU fleets report the majority of the catches: EC-Spain (1,6521 in 2010 (55 % of the total catch) and 3115 in 2009) and EU Portugal (1652 in 2010 (30%) and 1672 t in 2009),while lower or occasional catches are reported by EU-France (15 t in 2009) and EU-United Kingdom (1 ton in 2008 and 26 t in 2009).

In the Mediterranean Sea, this pelagic species is taken by a variety of fishing gears, always as by-catch, but it is rarely discarded as there is a market demand in the Mediterranean countries. Data on catches are extremely poor and largely incomplete, because many countries are not reporting them. On the basis of the most recent data reported by FAO-GFCM Capture Fisheries Production Dataset (Fishstat, 1970-2006) and ICCAT, landings for this species in the Mediterranean are only reported by Spain (1997-2006), Portugal (2001-2006) and Cyprus (2006-2007). The catches ranged from 2 to 8 tonnes in the period 1997-2003. A sharp increase occurred in 2004 (33 t) and 2005 (17 t) mostly due to the catches reported by Portugal. In 2006 official catches were reduced to 10 t, decreasing to 2 t in 2007. Preliminary and incomplete reported catches in 2008 account only to 1 t.

GFCM:SAC13/2011/Dma2 reported shortfin mako (Isurus oxyrhincus) in the trap of Sidi Daoud, north of Tunisia (fixed trap tagerting blue fin tuna), the sharks are 0.3 and 2.3% in biomass of total catch (Hatour et al., 2004). Shortfin mako is the second species of elasmobranch captured in surface longlines mediterannaen fisheries targeting swordfih (after Blue shark Prionace glauca). GFCM:SAC13/2011/Dma2 also mentioned some by-catches of shortfin mako in drift net fiecheries from France, Italy , Morocco and Tunisia.

A number of standardized CPUE data series for shortfin mako were presented in 2012 as relative indices of abundance. The ICCAT/SCRSe placed emphasis on using the series that pertained to fisheries that operate in oceanic waters over wide areas.

SOURCE OF MANAGEMENT ADVICE: The ICCAT has competence for the management advice throughout the ICCAT Convention area and for reporting catches from the large pelagic fisheries. Advice can also be provided by ICES and SAC-GFCM for all the other fisheries. IUCN also provides advice on the conservation status of shortfin mako.

REFERENCE POINTS: Estimates of SSB/SSBMSY across all ***CFASPM*** scenarios explored in the 2012 assessments, ranged from 1.63 to 2.04 and estimates of F/FMSY ranged from 0.16 to 0.62.

STOCK STATUS: ICCAT- SCRS report in 2012 includes the assessment of the shoprtfin mako in the North Atlantic. Assessment of the status of North Atlantic stock of shortfin mako shark was conducted with updated time series of relative abundance indices and annual catches. Coverage of Task I and number of CPUE series have increased since the last stock assessment in 2008, with Task I data being available for most major longline fleets. The available CPUE series showed increasing or flat trends for the finals years of each series (since the last stock assessment) for North, hence the indications of potential overfishing shown in the previous stock assessment have diminished and the current level of catches may be considered sustainable.

The results indicated in general that the status of the North Atlantic stock is healthy and the probability of overfishing is low; however, they also show apparent inconsistencies between estimated biomass trajectories and input CPUE trends, producing wide confidence intervals in estimated trajectories and other parameters. In the south Atlantic particularly, the increasing trend in the abundance indices since the 1970s is not consistent with the increasing catches. Taking into consideration results from the modeling approaches used in the assessment, the associated uncertainty, and the relatively low productivity of shortfin mako sharks, the Working Group recommends, as a precautionary approach, that the fishing mortality of shortfin mako sharks should not be increased until more reliable stock assessment results are available for both the northern and southern stocks. The high uncertainty in past catch estimates and deficiency of some important biological parameters, particularly for the southern stock, are still obstacles for obtaining reliable estimates of current status of the stocks.

The IUCN listed the shortfin mako as “Vulnerable” in 2007:

In the Mediterranean catches are inadequately reported or non-recorded, so data collected for the Mediterranean were not considered sufficient to conduct quantitative assessments for this species. At the same time, SCRS did not include the very low catches from the Mediterranean in its 2012 assessment.

RECENT MANAGEMENT ADVICE: ICCAT SCRS in 2012 recommends, as a precautionary approach, that the fishing mortality of shortfin mako sharks should not be increased until more reliable stock assessment results are available for both the north and south stocks.

In general, precautionary management measures should be considered for stocks where there is the greatest biological vulnerability and conservation concern, and for which there are very few data. For example, minimum landing lengths or maximum landing lengths would afford protection to juveniles or the breeding stock, respectively, although other technical measures such as gear modifications, time-area restrictions, or other approaches, could be alternative means to protecting different life stages, provided they are tested for effectiveness through research projects before they are implemented.

Research recommendations:

The ICCAT- SCR- SSG recommends the development of a Special Research Program on Sharks focused on the reduction of the main sources of uncertainty in the formulation of scientific advice. The program will be defined during 2013 and framed within the SCRS Science Strategic Plan foreseen for the period 2014-2020. The ICCAT- SCRS- SSG considers this a priority as this research program could resolve many of the issues/problems experienced by the Group during the 2012 assessment session. This program would largely address many of the following recommendations.

Due to the past reporting problems of shark species, especially prior to 1997, the ICCAT- SCRS- SSG had difficulties in obtaining reliable estimates of total catches by species. The Working Group, acknowledging coverage of Task 1 and the number of CPUE series have increased since the last stock assessment in 2008, considers proper reporting of species-specific Task I data critical as well as conducting analyses aimed at obtaining reliable estimates of shark catches by species for the entire time series.

The ICCAT- SCRS- SSG analyzed new alternative series of catches, including those provided by EUROSTAT and FAO, and found important unexplained discrepancies. The ICCAT- SCRS- SSG recommends investigation into the reasons for these discrepancies through the coordinated work of database experts from each organization (ICCAT/EuroStats/Fao).

There is a need for CPCs to determine whether their Task 1 shark catches include or not dead discards. Therefore, the ICCAT- SCRS- SSG recommends that the CPCs conduct a crosscheck analysis with their observer data to verify this information.

The ICCAT- SCRS- SSG recommends conducting data mining to recover historical data together with the exploration of comparative analysis of CPUE of SMA with CPUE of other target and non-target species, within a modeling framework, as a potential method of estimating historical catches of SMA.

Due to the uncertainty in the estimates of the absolute level of historic catches, the Working Group recommends the development and evaluation of alternative methods for providing management advice that are less dependent on absolute catch data, e.g. catch-free methods, those based on trends, those that make use of length-based or tagging information, and hierarchical models that can make use of information from multiple stocks or fleets.

The ICCAT- SCRS- SSG encourages the continuation of elasticity analysis in order to evaluate the relative importance of assumptions made in the assessment and management of shark species and in the establishment of an objective basis for defining research priorities on biological aspects and in the recovery of fishery statistics. The ICCAT- SCRS also recommends the integration of methods such as the elasticity analysis with the ERA application.

The ICCAT- SCRS- SSG recommends that a proposal for biological sampling priorities be defined during the Sharks Working Group meeting in September 2012 based on the ERA (and potentially elasticity) outcomes. Moreover, the coordination of the ongoing and future sampling activities conducted by the different CPCs should be encouraged. The ICCAT- SCRS- SSG emphasized again the critical necessity that observers be allowed to collect biological samples from those species whose retention is prohibited by current regulations.

The ICCAT- SCRS- SSG acknowledges the importance of ICCAT and considers that the information provided by sound scientific observer programs and/or its alternative scientific monitoring approach are critical for filling the gaps in knowledge on the fishing activities impacting sharks populations and specifically paragraph 2a, i.e., species composition of the catches, Task I, Task II. Therefore, ICCAT- SCRS- SSG encourages CPCs to make available the information obtained by these programs as soon as possible.

Considering the need to improve stock assessments of pelagic shark species impacted by ICCAT fisheries, the ICCAT- SCRS- SSG recommends that the CPCs provide the corresponding statistics of all ICCAT and non-ICCAT fisheries capturing these species, including recreational and artisanal fisheries. The Working Group considers that a basic premise for correctly evaluating the status of any stock is to have a solid basis to estimate total removals.

In the future, relevant RFMOs should be identified with which collaboration can be carried out regarding research on shark species of common interest.

The ICCAT- SCRS-SSG recommends that one of the main priorities for the By-catch Coordinator be the collation of the observer data collected by the different CPCs to make it available to the different SCRS Working Groups, especially to the Sharks Working Group and the Sub-Committee on Ecosystems. The Working Group encourages a closer collaboration with the SCECO in relation to the optimization of the observer programs in general.

STECF COMMENTS: STECF agrees with the ICCAT- SCRS-SSG advice that, as a precautionary approach, the fishing mortality of shortfin mako sharks should not be increased until more reliable stock assessment results are available for both the north and south stocks. STECF also agrees with SCRS/ICCAT the research recommendations for enhancement of data quality and collaboration within countries involved and RMFO's concerned.

15.20 Shortfin Mako (*Isurus oxyrinchus*), South Atlantic Ocean.

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

The most recent advice for this stock was provided by ICCAT SCRS in 2012. A data-preparation meeting was held in 2011. The models used were: (1) a Bayesian surplus production model, (2) a catch-free model, and (3) an age-structured production model using Long Liners fisheries CPUE data from the Uruguay, Japan, Brazil and Spain the the southern stock. Combined CPUE series using a GLM approach were also estimated for each stock using two weighting schemes: (a) area covered by each fishery, and (b) catch.

FISHERIES: Shortfin mako sharks show a wide geographical distribution, most often between 50ºN and 50ºS latitude. The shortfin mako in the South Atlantic is mostly taken by pelagic longlines, which account for about 99% of the catches of this species reported to ICCAT in recent years. Catches in ICCAT Task I from South Atlantic range from 262 t in 1987 to a peak of 3,426 t in 2003 (but SCRS estimates about 5,900 t in 2000). Reported catches in 2007 are 2,716 t (but SCRS estimates a total of about 4,600 t), 1,894 t in 2008 while preliminary and incomplete catch reports in 2009 account 1,937 t. SCRS estimates were obtained during the 2008 assessment. EC fleets report the large majority of the catches: EC-Spain (628 t in 2008, equal to 37,2% of the total catch, but 939 t in 2009) and EC-Portugal (321 t in 2008 and 503 t in 2009), while occasional catches are reported by EC-United Kingdom (12 t in 2009),

SOURCE OF MANAGEMENT ADVICE: This species is under the ICCAT responsibility for the whole Convention area for the large pelagic fisheries. IUCN also provides an advice on the conservation status.

REFERENCE POINTS: All inputs for the South Atlantic stock were the same as for the North Atlantic, except for the indices, which included Uruguay, Japan, Brazil, Spain, and Portugal. Only two runs were explored: no weighting (run 11), and inverse CV weighting (run 12). Stock status estimates were very similar to those for the North Atlantic, with an estimated relative depletion of 72% of virgin conditions. In this case there was somewhat more information in the data as the estimates of M and alpha differed more from the means of the specified priors than in all cases for the North Atlantic. However, F for the historic and modern periods had to be fixed for the model to fit the indices. The current fishing mortality was estimated at 38-40% of what would be required to drive the stock to MSY (F/FMSY=0.38-0.40) and current SSB was estimated at a little over 2 times that producing MSY (SSB/SSBMSY=2.00-2.16). As in the North Atlantic, stock status was not overfished and overfishing not occurring although again, the fit of the estimated relative biomass to the CPUE series was poor.

STOCK STATUS: For the South Atlantic, the catches and most of the CPUE indices increased between the 1970s and the present. As in the North Atlantic, the catches and the CPUE data are not consistent with each other. All 13 runs had good diagnostics of convergence, although several of the runs estimated the starting biomass ratio close to the lower boundary of 0.2. The models generally estimated either a flat or an increasing trend at the mode of the posterior distribution. The credibility intervals of the B/BMSY trend were relatively narrow, but F/FMSY was poorly estimated. The posterior distributions for r were very similar to the prior, but K had a very flat posterior, with a non-zero probability of values as high as the upper bound of K.

For the South Atlantic stock, both the CPUE indices and the catches appear to be increasing from the 1970s to the present. Several of the model runs fit this trend by assuming that the population had been severely depleted in 1971 and increased throughout the time series. However, there is no evidence of large fisheries in the South

Atlantic before the 1970s. The trend could be partly explained by better reporting of shark catches over time. Increases in catchability may also be a factor.

All the model runs estimated a median biomass above BMSY and a median fishing mortality rate below FMSY. The continuity run estimated a lower biomass than the current model runs, presumably because of the lower mean value for the prior for r.

For both the North and South Atlantic stocks, because of the uncertainty in catch data, the ICCAT SCRS-SSG (shark study group) mentioned using alternative methods to estimate population status, such as size-based methods, tagging data and life history data. For example, life history data has been used to estimate r, and FMSY can be calculated from r. Fishing mortality rates can be estimated using length data and then used to compute current fishing mortality relative to FMSY. Tagging and recapture data can also be used to estimate fishing mortality rates. Such methods require fewer assumptions about historical catches. Simulation testing could be used to evaluate any proposed method. In addition, it was suggested that a hierarchical modeling exercise be conducted to evaluate the CPUE indices for all species and all fleets together, to determine whether any of the trends in the CPUE indices can be explained by changes in regulations or changes in fishing methodology. For example, in the Uruguayan longline fishery, there appears to be a correlation between shortfin mako shark and swordfish catches, which may indicate that increased swordfish targeting increases mako catches.

The IUCN listed the shortfin mako as "Vulnerable" in 2007:

RECENT MANAGEMENT ADVICE: ICCAT SCRS in 2012 recommends, as a precautionary approach, that the fishing mortality of shortfin mako sharks should not be increased until more reliable stock assessment results are available for both the north and south stocks.

Other research recommendations, provided by ICCAT SCRS- SSG in 2012 are presented section 15.19.

STECF COMMENTS: STECF agrees with the ICCAT- SCRS-SSG advice that, as a precautionary approach, the fishing mortality of shortfin mako sharks should not be increased until more reliable stock assessment results are available for both the north and south stocks. STECF also agrees with SCRS/ICCAT the research recommendations for enhancement of data quality and collaboration within countries involved and RMFO's concerned.

15.21 Porbeagle (*Lamna nasus*) in the North-West Atlantic

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Northwest Atlantic porbeagles are largely concentrated in the waters on and adjacent to the continental shelf of North America. Observer data from the Canadian, U.S., Spanish and Icelandic fleets indicate that porbeagles are found throughout the high seas of the North Atlantic north of 35°N, but that the CPUE on the high seas is relatively low. Conventional tagging data (~200 recaptures from three separate studies) indicate that NW Atlantic porbeagles are highly migratory within their stock area, but do not undertake trans-Atlantic migrations. More recent satellite tagging results reinforce this conclusion. Therefore the ICCAT sub-group concludes that there is a single stock of porbeagle in the NW Atlantic north of 35°N and west of 42°W, corresponding roughly to ICCAT region BIL94b and NAFO areas 0-6.

According to the ICCAT catch table for the North Atlantic (including both NW and NE Atlantic), the portbeagle fishery ranged from a minimum 427 t in 2009 to a maximum of 2,588 t in 1992. Recent catches for EU fleets are dominated by France (311 t in 2008 and 228 t in 2009), followed by Spain (37 t in 2008 and 49 in 2009), Ireland (7 t in 2008 and 3 t in 2009) and Portugal (3 t in 2008 and 17 t in 2009),, while Denmark, Germany, Netherlands and Sweden have only some occasional catch in the past. Canada reports catches in the order of 124 t, all related to the NW Atlantic. Unclassified Lamnidae are reported by Spain (15 t in 2008).

There are two TAC established for the NW Atlantic porbeagle fishery: 185 t for the Canadian EEZ and 11.3 t for the USA.

Given that catch reports to ICCAT are incomplete, the Committee attempted to develop a more accurate estimate of shark mortality and capture related to the Atlantic tuna fleets on the basis of the expected proportions among tunas and sharks and in the landings of these fleets as well as using shark fin trade data. These information sets were used to reconstruct plausible estimates of historic catches used in porbeagle

assessment in 2009. According to this estimate, ICCAT considered that catches in NW Atlantic were in the order of 144.3 t in 2008.

SOURCE OF MANAGEMENT ADVICE: The main recent source of information and advice on porbeagle in the Northwest Atlantic is usually ICES. There is no fishery-independent information on this stock, except for the tagging data. Landings data for porbeagle may be reported as porbeagle, or as 'various sharks nei' in the official statistics. This means that the reported landings of porbeagle are likely an underestimation of the total landing of the species from the NE Atlantic. Recently, due to the relevance of catches taken by tuna and tuna-like fisheries, the management advice was provided by ICCAT/SCRS, after a joint ICCAT/ICES assessment.

REFERENCE POINTS: No precautionary reference points have been agreed for porbeagle in the Northeast Atlantic.

STOCK STATUS: In 2009, the ICCAT/SCRS updated the Canadian assessment of the Northwest Atlantic porbeagle stock. The results indicate that biomass is depleted to well below BMSY, but recent fishing mortality is below FMSY and recent biomass appears to be increasing. Additional modelling using a surplus production approach indicated a similar view of stock status, i.e., depletion to levels below B_{MSY} and current fishing mortality rates also below F_{MSY}. The Canadian assessment projected that with no fishing mortality, the stock could rebuild to B_{MSY} level in approximately 20-60 years, whereas surplus-production based projections indicated 20 years would suffice. Under the Canadian strategy of a 4% exploitation rate, the stock is expected to recover in 30 to 100+ years according to the Canadian projections. No new assessment was carried out by ICCAT/ICES since 2009.

A recent analysis by Campana *et al.* (2013), utilising a forward-projecting age- and sex-structured population dynamics model found that the Canadian porbeagle population could recover from depletion, even at modest fishing mortalities. The population is projected forward from an equilibrium starting abundance (assumed an unfished equilibrium at the beginning of 1961–prior to directed commercial fisheries) and age distribution by adding recruitment and removing catches. All models predict recovery to 20% of spawning stock numbers before 2014 if the fishing mortality rate is kept at or below 4% of the vulnerable biomass. Under the low productivity model, recovery to spawning stock numbers at maximum sustainable yield (SSNMSY) was predicted to take over 100 years at exploitation rates of 4% of the vulnerable biomass.

Porbeagle is subject to the UN agreement on highly Migratory Stocks. In IUCN (2004), porbeagle is classified as Endangered for the North West Atlantic.

Porbeagle is listed under CMS Appendix II (Conventionon Migratory SPecies 2007). The range states of Appendix II species (migratory species with an unfavourable conservation status that need or would significantly benefit from international cooperation) are encouraged to conclude global or regional agreements for their conservation and management (www.cms.int).

In 2013, a renewed proposal to list porbeagle shark on Appendix II of CITES was accepted at the Conference of Parties (16) Bangkok. However, the implementation of this listing has been delayed by 18 months (14 September 2014) to enable Range States and importing States to address potential implementation issues.

RECENT MANAGEMENT ADVICE: ICCAT-ICES recommended that the ICCAT should adopt management measures that support the recovery objectives of the Canadian Management Plan. High-seas fisheries should not target porbeagle and all by-catch should be reported. Due to their lower abundance in the high seas, by-catch data collection and reporting would require scientific observer sampling at a high level of coverage.

Areas known to have high abundance of important life-history stages (e.g. mating, pupping and nursery grounds) should be subject to fishing restrictions. Such grounds are not exclusively in the Canadian EEZ. Increased effort on the high seas within the stock area could compromise stock recovery efforts.

ICCAT-SCRS recommended that precautionary management measures should be considered for stocks where there is the greatest biological vulnerability and conservation concern, and for which there are very few data. Management measures should ideally be species-specific whenever possible. For example, minimum landing lengths or maximum landing lengths would afford protection to juveniles or the breeding stock, respectively, although other technical measures such as gear modifications, time-area restrictions, or other approaches, could be alternative means to protecting different life stages, provided they are tested for effectiveness through research projects before they are implemented.

Both porbeagle stocks in the NW and NE Atlantic are estimated to be overfished. The main source of fishing mortality on these stocks is from non-ICCAT, directed porbeagle fisheries that are being managed by most of the relevant Contracting Parties through quotas and other measures. The ICCAT-SCRS recommended that countries initiate research projects to investigate means to minimize by-catch and discard mortality of sharks, with a particular view to recommending to the ICCAT complementary measures to minimize porbeagle by-catch in fisheries for tuna and tuna-like species. For porbeagle sharks, the SCRS recommends that the ICCAT work with countries catching porbeagle, particularly those with targeted fisheries, and relevant RFMOs to ensure recovery of North Atlantic porbeagle stocks. In particular, porbeagle fishing mortality should be kept to levels in line with scientific advice and with catches not exceeding current level. New targeted porbeagle fisheries should be prevented, porbeagles retrieved alive should be released alive, and all catches should be reported. Management measures and data collection should be harmonized among all relevant RFMOs, and ICCAT should facilitate appropriate communication.

Other considerations

APEX Tagging program results was presented during the ICCAT 2011 : 1960 porbeagle tagged off the northest coast of USA since 1961, 360 recaptures were registered in 2011 with a maximum of 10 year at liberty (average 41% < year at liberty) suggesting few intrusion in the central Atlantic.

UK electronic tagging studies (14 sharks and 2062 days of data) was conducted recently around the British Isles. The furthest confirmed distance recorded by a porbeagle shark from the British Isles, was from a shark which moved to the west central Atlantic after being tagged in north-west Ireland during the summer.

A recent genetic study suggests that the stock is genetically robust, although further confirmation is required.

The history of the fishery is not well documented, and reports often emphasized or omitted some aspects (economic drivers, Danish participation, results of the 1958–62 Norway prospecting) that may alter the perception of the fishery dynamics.

STECF COMMENTS: STECF notes that management advices provided by ICCAT/ICES and by ICCAT/SCRS are partly different. STECF agrees with the specific measures indicated by ICCAT/ICES and underline the requirement for all countries to document all incidental by-catches of this species and that regarding the large distribution of this species and its aggregative behaviour, some international collaborative survey could be a way fill the lack of information requested for an assessment.

15.22 Porbeagle (*Lamna nasus*) in the South-West Atlantic

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Like in other areas, this pelagic species is sometimes caught by several fishing gears as by-catch, but it is usually retained on board and sold on the market for its good price. The high commercial value (in target and incidental fisheries) of mature and immature age classes makes this species highly vulnerable to over-exploitation and population depletion.

According to the ICCAT catch table for the South Atlantic (including both SW and SE Atlantic), the portbeagle fishery ranged from a minimum of 0 t in many years to a maximum of 91 t in 2008, while catches in 2009 account for 28 t. The largest portion of the catches are obtained by surface longlines. Recent catches for EU fleets are dominated by Spain (3 t in 2008 and 2 in 2009), while Bulgaria, Netherlands, Poland and Portugal have only some occasional catch in the past. The major catches are reported by Japan (47 t in 2008 but catches are lacking in 2009) and Uruguay (40 t in 2008 and 14 t in 2009), the latter certainly attributed to the SW Atlantic area. Unclassified Lamnidae are reported by Spain (12 t in 2008).

Given that catch reports to ICCAT are incomplete, the Committee attempted to develop a more accurate estimate of shark mortality and capture related to the Atlantic tuna fleets on the basis of the expected proportions among tunas and sharks and in the landings of these fleets as well as using shark fin trade data. These information sets were used to reconstruct plausible estimates of historic catches used in porbeagle assessment in 2009. According to this estimate, ICCAT considered that catches in SW Atlantic were in the order of 164.6 t in 2008.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT, but this species is also under the responsibility of other RFMOs managing different fisheries.

REFERENCE POINTS: None.

STOCK STATUS: The ICCAT-ICES subgroup in 2009 considered the distribution of the porbeagle stock in the SW Atlantic, south of 25°S and west of 20°W. It was suggested that it could apparently comprise waters of the southeast Pacific Ocean but more robust data are required to confirm this fact which would have direct implications on the management of this stock.

ICCAT/SCRS in 2009 stated that, in general, data for southern hemisphere porbeagle are too limited to provide a robust indication on the status of the stocks. For the Southwest stock, limited data indicate a decline in CPUE in the Uruguayan fleet, with models suggesting a potential decline in porbeagle abundance to levels below MSY and fishing mortality rates above those producing MSY. But catch and other data are generally too limited to allow definition of sustainable harvest levels. Catch reconstruction indicates that reported landings grossly underestimate actual landings. No assessment was carried out in 2010.

Porbeagle is listed under CMS Appendix II (Conventionon Migratory SPecies 2007). The range states of Appendix II species (migratory species with an unfavourable conservation status that need or would significantly benefit from international cooperation) are encouraged to conclude global or regional agreements for their conservation and management (www.cms.int).

In 2013, a renewed proposal to list porbeagle shark on Appendix II of CITES was accepted at the Conference of Parties (16) Bangkok. However, the implementation of this listing has been delayed by 18 months (14 September 2014) to enable Range States and importing States to address potential implementation issues.

RECENT MANAGEMENT ADVICE: For porbeagle sharks, the ICCAT/SCRS recommended that the ICCAT work with countries catching porbeagle, particularly those with targeted fisheries, and relevant RFMOs to prevent overexploitation of South Atlantic stocks. In particular, porbeagle fishing mortality should be kept to levels in line with scientific advice and with catches not exceeding current level. New targeted porbeagle fisheries should be prevented, porbeagles retrieved alive should be released alive, and all catches should be reported.

STECF COMMENTS: STECF recommends a better reporting of the porbeagle catches from all the fisheries and Member States involved in the SW Atlantic area, with the purpose to provide a reliable assessment of the state of the resource and the possible impacts due to the different fisheries concerned.

15.23 Porbeagle (*Lamna nasus*) in South-East Atlantic

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: This pelagic species is sometimes caught by several fishing gears as by-catch, but it is usually retained on board and sold on the market for its good price. Target fisheries were also reported since decades. The high commercial value (in target and incidental fisheries) of mature and immature age classes makes this species highly vulnerable to over-exploitation and population depletion.

According to the ICCAT catch table for the South Atlantic (including both SW and SE Atlantic), the portbeagle fishery ranged from a minimum of 0 t in many years to a maximum of 91 t in 2008 while catches in 2009 account for 28 t. The largest portion of the catches are obtained by surface longlines. Recent catches for EU fleets are dominated by Spain (1 t in 2008 and 2 in 2009), while Bulgaria, Netherlands, Poland and Portugal have only some occasional catch in the past. The major catches are reported by Japan (47 t in 2008 but catches are lacking in 2009) and Uruguay (40 t in 2008 and 14 t in 2009),, the latter certainly non attributed to the SE Atlantic area. Unclassified Lamnidae are reported by Spain (17 t in 2008).

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT, but this species is also under the responsibility of other RFMOs managing different fisheries.

REFERENCE POINTS: None.

STOCK STATUS: The ICCAT-ICES sub-group in 2009 considered the distribution of the porbeagle stock in the SE Atlantic, south of 25°S and east of 20°W. It was suggested that it could apparently comprise waters of the southwest Indian Ocean but more robust data are required to confirm this fact which would have direct implications on the management of this stock. There is belief that catches made in the southwestern Indian Ocean impact the SE Atlantic porbeagle stock which should be taken into consideration into future assessments.

Neither the ICCAT/ICES sub-group in 2009 nor the ICCAT/SCRS 2010 provided any assessment for this stock, possibly because of the lack of sufficient data and information.

Porbeagle is listed under CMS Appendix II (Conventionon Migratory SPecies 2007). The Range States to CMS Appendix II species (migratory species with an unfavourable conservation status that need or would significantly benefit from international cooperation) are encouraged to conclude global or regional agreements for their conservation and management (www.cms.int).

In 2013, a renewed proposal to list porbeagle shark on Appendix II of CITES was accepted at the Conference of Parties (16) Bangkok. However, the implementation of this listing has been delayed by 18 months (14 September 2014) to enable Range States and importing States to address potential implementation issues.

RECENT MANAGEMENT ADVICE: The ICCAT/SCRS 2009 recommended that the ICCAT work with countries catching porbeagle, particularly those with targeted fisheries, and relevant RFMOs to prevent overexploitation of South Atlantic stocks.

STECF COMMENTS: STECF notes that better reporting of the porbeagle catches from all the fisheries and Member States involved is required, with the purpose to assess the state of the resource and the possible impacts due to the different fisheries.

15.24 Porbeagle (*Lamna nasus*) in the Mediterranean Sea

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: This pelagic species is sometimes caught by some fishing gears as by-catch, but it is usually retained on board and sold on the market for its good price. The high commercial value (in target and incidental fisheries) of mature and immature age classes makes this species highly vulnerable to over-exploitation and population depletion. Finning is not usually carried ou in the Mediterranean.

Data on catches are extremely poor. On the basis of the most recent data reported by FAO-GFCM Capture Fisheries Production Dataset (Fishstat, 1970-2008) and ICCAT, landings of this species in the Mediterranean are only reported by Albania, Spain, Italy and Malta. The total yearly landings were very low, amounting to around 1 t with a peak of 4 tonnes in 2006. Reported catches in 2009 account only 1 t. However, even if the total quantity possibly taken annually is low, these catches appear to be underestimated due to the misreporting or not-reporting by some States.

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM, but this species is also under the ICCAT responsibility.

REFERENCE POINTS: None.

STOCK STATUS: The Mediterranean was considered as a separate management unit for this species for a number of years, even in the absence of a precise identification of the stock. IUCN (2007) considered the porbeagle in the Mediterranean as a sub-population and the ICES WG in 2009 stated that there is no evidence of mixing between the NE Atlantic and the Mediterranean.

In 2009, the very recent ICCAT/SCRS attempted an assessment of the Northeast Atlantic porbeagle stock, including the Mediterranean.

The porbeagle shark is considered globally as a Vulnerable species and the IUCN (2007) had confirmed this status for the Mediterranean sub-population. In 2009, the UNEP/MAP had proposed to assess the Mediterranan porbeagle as “Critically Endangered” (CR A2bd). The porbeagle shark in the Mediterranean is listed in the Barcelona Convention (App. III) and in the Bern Convention (App. III).

Porbeagle is listed under CMS Appendix II (Conventionon Migratory SPecies 2007). The range states of CMS Appendix II species (migratory species with an unfavourable conservation status that need or would significantly benefit from international cooperation) are encouraged to conclude global or regional agreements for their conservation and management (www.cms.int).

In 2013, a renewed proposal to list porbeagle shark on Appendix II of CITES was accepted at the Conference of Parties (16) Bangkok. However, the implementation of this listing has been delayed by 18 months (14 September 2014) to enable Range States and importing States to address potential implementation issues.

RECENT MANAGEMENT ADVICE: The ICCAT/SCRS 2009 recommended that the ICCAT work with countries catching porbeagle and relevant RFMOs to prevent overexploitation of porbeagle stocks.

STECF COMMENTS: STECF, in line with its Plenary 09-02 report, recommend that stock or sub-populations should be properly documented on scientific basis before including or excluding them in any specific assessment. For this reason, STECF remarks that the uncertainties created by IUCN, UNEP, ICES and ICCAT about the existence of a discrete Mediterranean stock of porbeagle need to be analysed and clarified if sufficient scientific information is available. Nevertheless, STECF recommends a better reporting of the porbeagle catches from all the fisheries and Member States involved, taking into account that this is a mandatory species within the EC data collection framework.

15.25 Blue shark (*Prionace glauca*) in the North Atlantic

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: This species, having a wide distribution, is caught by several gears, but most of the catches are reported by pelagic longlines. It is a major by-catch and accessory species of European large pelagic fisheries. Blue shark accounts for more than 90% of all sharks caught by pelagic longlines. A number of standardized CPUE data series for blue shark were presented to ICCAT/SCRS in 2008 as relative indices of abundance.

Data on catches are partly or under-reported, particularly for some fleets. Historical catches range from 121 t in 1984 to 33,208 t in 2009, the highest record so far. The major catches are reported by EC-Spain, with 24,465 t in 2009 (20,788 t in 2008), usually accounting for more than 60% of the total North Atlantic catches. Relevant catches are reported also by EC-Portugal with 6,249 t in 2009 (6,165 t in 2008) and Japan with 2,686 in 2008 (2,696 t in 2007), but cathes are missing for 2009. Minor or occasional catches are also sometimes reported by several EC countries as France (119 t in 2008 and 83 t in 2009), Denmark, Ireland, Netherlands (1 t in 2009) and United Kingdom (5 t in 2008 and 95 t in 2009).

Given that catch reports to ICCAT are incomplete, the SCRS attempted to develop a more accurate estimate of shark mortality and capture related to the Atlantic tuna fleets on the basis of the expected proportions among tunas and sharks and in the landings of these fleets as well as using shark fin trade data. These information sets were used to reconstruct plausible estimates of historic catches used in blue shark assessment in 2009. According to this estimate, ICCAT considered that catches in North Atlantic were in the order of 61,845 t in 2008.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT, but data on this species is also possibly collected by other RFMOs.

REFERENCE POINTS: None.

STOCK STATUS: Blue shark shows a wide geographical distribution, most often between 50°N and 50°S latitude. A characteristic of this species is usually their tendency to segregate temporally and spatially by size-sex, according to its respective processes of feeding, mating-reproduction, gestation and birth. Numerous aspects of the biology of this species are still poorly understood or completely unknown, particularly for some regions, which contributes to increased uncertainty in quantitative and qualitative assessments.

ICCAT/SCRS (2009) reported that ecological risk assessments for eleven priority species of sharks (including blue shark) caught in ICCAT fisheries demonstrated that most Atlantic pelagic sharks have exceptionally limited biological productivity and, as such, can be overfished even at very low levels of fishing mortality. All species considered in the ERA are in need of improved biological data to evaluate their biological productivity more accurately and thus specific research projects should be supported to that end. No new trials have been carried out in 2010.

For both North and South Atlantic blue shark stocks, although the results are highly uncertain, biomass is believed to be above the biomass that would support MSY and current harvest levels below FMSY. Results from all models used in the 2008 assessment were conditional on the assumptions made (*e.g.*, estimates of historical catches and effort, the relationship between catch rates and abundance, the initial state of the stock in

the 1950s,and various life-history parameters), and a full evaluation of the sensitivity of results to these assumptions was not possible during the assessment. Nonetheless, as for the 2004 stock assessment, the weight of available evidence does not support hypotheses that fishing has yet resulted in depletion to levels below the Convention objective.

The blue shark is subject to the UN agreement on highly Migratory Stocks. In IUCN (2007), the blue shark is classified as Near Threatened globally.

RECENT MANAGEMENT ADVICE: No specific management advice was provided by ICCAT/SCRS in 2010. Precautionary management measures should be considered for stocks where there is the greatest biological vulnerability and conservation concern, and for which there are very few data. Management measures should ideally be species-specific whenever possible.

STECF COMMENTS: STECF again recommends improving the data collection on the blue shark from all the fisheries and Member States involved, with the purpose of assessing the status of this stock. STECF notes that this species is a mandatory one in the EC Data collection framework and in the EC POA.

15.26 Blue shark (*Prionace glauca*) in South Atlantic

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: This species, having a wide distribution, is caught by several gears, but most of the catches are reported by pelagic longlines. It is a major by-catch and accessory species of European large pelagic fisheries. Blue shark accounts for more than 90% of all sharks caught by pelagic longlines. A number of standardized CPUE data series for blue shark were presented to ICCAT/SCRS in 2008 as relative indices of abundance.

Data on catches are partly or under-report with many countries non-reporting any catch. Historical catches range from 0 t in the ‘80s to 22,439 t in 2009. The major catches are reported by EC-Spain, with 13,099 t in 2009 (9,616 t in 2008), usually accounting for about 40% of the total South Atlantic catches. Relevant catches are reported also by EC-Portugal with 5,358 t in 2009 (4,866 t in 2008), Brazil with 1,274 t in 2009 (1,986 t in 2008), Namibia with 207 t in 2009 (1,829 t in 2008) and Japan with 1,945 t in 2008 (896 t in 2007 but no catches reported in 2009). Minor or occasional catches are also sometimes reported by a few EC countries as Netherlands and United Kingdom (14 t in 2009).

Given that catch reports to ICCAT are incomplete, the SCRS attempted to develop a more accurate estimate of shark mortality and capture related to the Atlantic tuna fleets on the basis of the expected proportions among tunas and sharks and in the landings of these fleets as well as using shark fin trade data. These information sets were used to reconstruct plausible estimates of historic catches used in blue shark assessment in 2009. According to this estimate, ICCAT considered that catches in South Atlantic were in the order of 37,075 t in 2008.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT, but data on this species is also possibly collected by other RFMOs.

REFERENCE POINTS: None.

STOCK STATUS: Blue shark shows a wide geographical distribution, most often between 50ºN and 50ºS latitude. A characteristic of this species is usually their tendency to segregate temporally and spatially by size-sex, according to its respective processes of feeding, mating-reproduction, gestation and birth. Numerous aspects of the biology of this species are still poorly understood or completely unknown, particularly for some regions, which contributes to increased uncertainty in quantitative and qualitative assessments.

ICCAT/SCRS (2009) reported that ecological risk assessments for eleven priority species of sharks (including blue shark) caught in ICCAT fisheries demonstrated that most Atlantic pelagic sharks have exceptionally limited biological productivity and, as such, can be overfished even at very low levels of fishing mortality. All species considered in the ERA are in need of improved biological data to evaluate their biological productivity more accurately and thus specific research projects should be supported to that end.

For both North and South Atlantic blue shark stocks, although the results are highly uncertain, biomass is believed to be above the biomass that would support MSY and current harvest levels below FMSY. Results from all models used in the 2008 assessment were conditional on the assumptions made (*e.g.*, estimates of historical catches and effort, the relationship between catch rates and abundance, the initial state of the stock in

the 1950s,and various life-history parameters), and a full evaluation of the sensitivity of results to these assumptions was not possible during the assessment. Nonetheless, as for the 2004 stock assessment, the weight of available evidence does not support hypotheses that fishing has yet resulted in depletion to levels below the Convention objective. No new trials have been carried out in 2010.

The blue shark is subject to the UN agreement on highly Migratory Stocks. In IUCN (2007), the blue shark is classified as Near Threatened globally.

RECENT MANAGEMENT ADVICE: No specific management advice was provided by ICCAT/SCRS in 2009. Precautionary management measures should be considered for stocks where there is the greatest biological vulnerability and conservation concern, and for which there are very few data. Management measures should ideally be species-specific whenever possible.

STECF COMMENTS: STECF again recommends improving the data collection on the blue shark from all the fisheries and Member States involved, with the purpose of assessing the status of this stock. STECF notes that this species is a mandatory one in the EC Data collection framework and in the EC POA.

15.27 Blue shark (*Prionace glauca*) in the Mediterranean Sea

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: This pelagic species (BSH) is often caught by several fishing gears, always as by-catch and sometimes marketed. Catches mainly come from large pelagic long-line fisheries targeting tuna fish and swordfish and small driftnet fisheries. It is a major by-catch and accessory species of European large pelagic fisheries. Blue shark accounts for almost 95% of all sharks caught by drifting longlines. A number of specimens may be also taken in large driftnet fisheries; (these nets have been banned since January 1, 2002 for the EU fleets and since 2004 in all the Mediterranean according to ICCAT and GFCM Recommendations). The driftnet fishery in the Alboran Sea by Moroccan vessels is reported catching large numbers of blue sharks (estimated at more than 26,000 individuals per year). Recently this species has increased in commercial value and incidental catches are now very rarely discarded in several areas, with the meat marketed in Greece, Italy (in some regions), Spain and in north-African countries and fins sometimes exported to Asia.

Data on catches exist but they are very partial and many countries are not reporting their catches (including Morocco). On the basis of the most recent data reported to ICCAT, landings for this species are reported by Spain, France, Cyprus, Italy, Malta, Japan and Portugal. The yearly landings ranged from 0 to 185 t in the period 1984-2009. In 2009, reported catches reached the historical maximum of 185 t. Reported catches are 51 t in 2007, 80 t in 2008 and 185 in 2009, with a clear increasing trend. The highest catch is reported by EC-Italy, with 176 t in 2009 (75 t in 2008), followed by EC-Spain with 7 t in 2009 (2 t in 2008) and Malta with 2 t in 2008 and 2009, while catches have been reported in the past also by EC-Portugal and EC-Cyprus.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT, but this species is also under the GFCM responsibility.

REFERENCE POINTS: None.

STOCK STATUS: The Mediterranean is considered to host a separate stock of blue shark and should be managed as a separate unit.

The blue shark is listed in the Barcelona Convention (Appendix III) and in the Bern Convention (Appendix III). In the Mediterranean it is listed as vulnerable (A3bd + 4bd), while the global population is listed as LR/nt (Lower Risk, near threatened) in the IUCN Red List.

RECENT MANAGEMENT ADVICE: Data must be collected in the ICCAT area.

STECF COMMENTS: STECF notes that this species is a usual component of the by-chatch in all longline (and gillnet) fisheries targeting large pelagic species. STECF again recommends improving the data collection on the blue shark from all the fisheries and Member States concerned, with the purpose of assessing the status of this stock. STECF notes that this species is a mandatory one in the EC Data collection framework but the understanding of this stock cannot improve if some EC-countries and non-EC countries will continue in non-reporting their catches to ICCAT or GFCM.

15.28 Thresher shark (*Alopias vulpinus*) in the Atlantic Ocean and the Mediterranean

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: This pelagic species is sometimes caught by several fishing gears, always as by-catch, but it is often retained on board and sold on the market for its good price. In the Northern Adriatic Sea, in the Mediterranean, gillnets (often set for demersal species) also have a by-catch of *Alopias vulpinus* particularly in the summer. This species may be also taken in large driftnet fisheries, even though this fishery is prohibited in the Mediterranean since years. Surface long-line fisheries, that target tuna and tuna-like species in the Atlantic Ocean and the Mediterranean, also catch *A. vulpinus*.

Data on catches are extremely poor and are suspected to include other species belonging to the same genus.

Data on catches are largely not reported or under-reported, with several countries never reporting them. According to the ICCAT data base (ALV), catches ranged from a minimum of 2 t in 1993 to a maximum of 158 t in 2000, with 70 t reported in 2008 and 148 t in 2009. The highest catch was reported by EC-Portugal with 53 t in 008 and 70 t in 2009, Spain (31 t in 2009) and France (10 t in 2008 and 26 t in 2009), while very minor catches were reported by a number of countries. Landings for this species in the Mediterranean are reported by Spain (1997-2006), Portugal (2001-2006), Italy and France (1999-2009), ranging from 3 to 21 t in the period 1996-2006. Preliminary catch report in 2009 was provided only by Italy(14 t in 2009 and 6 t in 2008), and France (6 t) while no reports are available by any other CPCs, nor in the Atlantic or the Mediterranean.

Reported catches of unclassified thresher shark (*Alopias* spp., THR) ranged from a minimum of 6 t in 1986 to a maximum of 189 t in 1987, with 134 t reported in 2008. In 2008 the highest catch was reported by EC-Spain with 81 t, followed by USA with 48 t. Minor or occasional catches were historically reported also by other EC countries (Ireland, Portugal and United Kingdom). No reports are available by any other CPCs, nor in the Atlantic or the Mediterranean in 2009.

SOURCE OF MANAGEMENT ADVICE: The advisory bodies are ICCAT (for the tuna and tuna-like fisheries) and all the relevant RFMOs (for all the other fisheries).

REFERENCE POINTS: None

STOCK STATUS: There is no mention of separate populations of this species, even if some WGs had considered the specimens living in the Mediterranean as a separate unit in the past. There is no assessment of the Atlantic and Mediterranean stock available, while conservation assessments have been conducted by IUCN in 2003 and 2007, defining this species as globally “Vulnerable”, besides the lack of catch data, incomplete knowledge of stock structure, and uncertainty over life history parameters which make it impossible to determine population size and fluctuations.

RECENT MANAGEMENT ADVICE: None.

STECF COMMENTS: STECF recommends a better reporting of the Thresher shark catches from all the fisheries and Member States involved, with the purpose of better understanding the current state of the stock. From the lack of 2009 data it is evident that several EU Member States are not fulfilling the DCF and ICCAT reporting obligations.

15.29 Bigeye thresher shark (*Alopias superciliosus*) in the Atlantic Ocean and the Mediterranean

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: This pelagic species (BTH) is sometimes caught by several fishing gears, always as by-catch, but it is often retained on board and sold on the market for its good price. This species might be confused in the catch statistics with other thresher sharks.

Data on catches are extremely poor. According to the ICCAT data base, catches ranged from a minimum of 6 t in 1986 to a maximum of 189 t in 1987, with 108 t reported in 2008 and 133 t in 2009. The highest catch in 2008 was reported by EC-Spain with 81 t (59 t in 2009), followed by USA with 48 t, while very minor catches

were sometimes reported by some of countries, including EC-Ireland, EC-Portugal (2 t in 2008) and EC-United Kingdom. Catch reports in 2009 are still incomplete.

SOURCE OF MANAGEMENT ADVICE: The advisory bodies are ICCAT (for the tuna and tuna-like fisheries) and all the relevant RFMOs (for all the other fisheries).

REFERENCE POINTS: None

STOCK STATUS: There is no evidence of separate populations of this species, There is no assessment of the Atlantic and Mediterranean stock available, while a conservation assessments was conducted by IUCN in 2007, defining this species as globally "Vulnerable", besides the lack of catch data, incomplete knowledge of stock structure, and uncertainty over life history parameters which make it impossible to determine population size and fluctuations.

RECENT MANAGEMENT ADVICE: ICCAT Rec. 08-07 recommends CPCs shall require vessels flying their flag to promptly release unharmed, to the extent practicable, bigeye thresher sharks (*Alopias superciliosus)* caught in association with fisheries managed by ICCAT which are alive, when brought along side for taking on board the vessel. CPCs shall also require that incidental catches as well as live releases shall be recorded in accordance with ICCAT data reporting requirements.

Article 19 of EC Regulation No. 44/2012 prohibits the retention, transshipment or landing any part or whole carcass of bigeye thresher shark *Alopias superciliosus* in any fishery, and also prohibits any directed fishery for thresher sharks Alopias spp. in the ICCAT area.

Other considerations

Some Van Bertalanffy growth parameters for the bigeye thresher shark of the tropical northeastern Altantic estimated on 117 specimens ranging from 176 o 407 cm TL as well as maturity information on the bigeye thresher shark from the Atlantic were provided by Fernandez-Carvalho et al. (2011 and 2012). Significant differences were found in the size distribution of the species and the sex ratios between the North and South Atlantic. Sizes at first maturity (L50) were estimated at 206.09 cm FL for females and 159.74 cm FL for males.

Ecological risk assessments were undertaken by ICCAT- SRCS- SSG for 11 pelagic sharks (ICCAT, 2011). These analysis demonstrated that the bigeye thresher has the lowest productivity and highest vulnerability with a productivity rate of 0.010, and that the common thresher is 10^{th} in rank with a productivity rate of 0.141

One *A. supersillosus* was electronically tagged in Gulf of Mexico in 2008 by Carlson & Gulak. After 120 days at sea the bigeye thresher shark moved from 51 km, spending most of his time between 25 and 50 m depth in waters between 20 and 22 °C. Compare to previous studies by Weng & Block (2004) this individual exhibit very light diurnal movement pattern that may be caused by the deep of the tagging location.

STECF COMMENTS: STECF agrees with the ICCAT recommendation and recommends a better reporting of the bigeye thresher shark catches from all the fisheries and Member States concerned, with the purpose of better understanding the current state of the stock. From the lack of 2009 data it is evident that several EU Member States are not fulfilling the DCF and ICCAT reporting obligations.

15.30 Smooth hammerhead (*Sphyrna zygaena*) in the Atlantic Ocean and the Mediterranean Sea

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The Smooth hammerhead (SPZ) is a relatively common and widespread shark, captured in a number of fisheries throughout its range, mostly by gillnet and pelagic long-line. There might be a significant mortality of this species in large-scale long-line and driftnet fisheries, although the impact on populations is unknown at present.

Data on catches are considered scarce, suspected to include other species belonging to the same genus and they are largely not reported or under-reported, with several countries never reporting them. According to the ICCAT data base, catches ranged from a minimum of 1 t in 1995 to a maximum of 1,472 t in 2002, with 109 t reported in 2008 (17 t as 2009 preliminary and incomplete catch report). The highest catch in 2008 was reported by Senegal (103 t), followed by Ivory Coast (which usually reports catches in the order of 40 t) and EC-Portugal (6 t in 2008 and 17 t in 2009), while very minor catches were historically reported by a number of countries, including EC-Spain, EC-Italy and EC-Malta.

SOURCE OF MANAGEMENT ADVICE: The advisory bodies are ICCAT (for the tuna and tuna-like fisheries) and all the relevant RFMOs (for all the other fisheries).

REFERENCE POINTS: None

STOCK STATUS: There is no evidence of separate populations of this species, There is no assessment of the Atlantic and Mediterranean stock available, while a conservation assessments was conducted by IUCN in 2008, defining this species as globally "Vulnerable"; IUCN (2007) and UNEP/SPA (2008) had proposed a separate evaluation of this species in the Mediterranean, even in the absence of any evidence of a separate sub-population.

In 2013, *Sphyran zygaena* was listed on Appendix II of CITES (Conference of Parties 16, Bangkok). However, the implementation of this listing has been delayed by 18 months (14 September 2014) to enable Range States and importing States to address potential implementation issues.

RECENT MANAGEMENT ADVICE: None. UNEP/SPA in 2008 proposed the inclusion of this species in the Annex II of the SPA/BD protocol of the Barcelona Convention.

STECF COMMENTS: STECF reiterates the concerns about the different classification of conservation status in various areas in the absence of any evidence of sub-populations, raised during the STECF Plenary 09-02. STECF recommends the collection of catch data and basic information on this species by the EU Member States to better understand the current situation of the stock. From the lack of 2009 data it is evident that several EU Member States are not fulfilling the DCF and ICCAT reporting obligations.

15.31 Other Hammerhead sharks (*Sphyrnidae*) in the Atlantic Ocean and the Mediterranean Sea

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The hammerhead sharks are widespread species, captured in a number of fisheries throughout its range, mostly by gillnet and pelagic long-line. There might be a significant mortality of these species in large-scale long-line and driftnet fisheries, although the impact on populations is unknown at present.

Data on catches are considered scarce, not well defined by species, and they are largely not reported or under-reported, with several countries never reporting them. According to the ICCAT database, catches by species or category are the followings:

Sphyrna lewini (SPL): reported catches ranged from a minimum of 0 t in 2006/2007 to a maximum of 363 t in 1990, with 56 t reported in 2008 and 62 t in 2009. Historically, catches were reported also by EC-Spain (2 tons in 2009).

Sphyrna tiburo (SPJ): reported catches are available only in 2004 with 77 t reported by USA.

Sphyrna mokarran (SPK): reported catches ranged from a minimum of 0 t in 2004 to a maximum of 19 t in 1992, with only 1 t reported in 2008 and 2009 by St. Lucia. Historically, catches were reported also by EC-Spain. No other catches have been reported in 2009.

Sphyrna spp. (SPN): reported catches ranged from a minimum of 0 t in 1992 to a maximum of 883 t in 1987, with 199 t reported in 2008 and 138 t in 2009 (incomplete report). The highest catch in 2008 was reported by Brazil (122 t), followed by USA (56 t), EC-Portugal (27 t) and Namibia (25 t),. In 2009 catches were reported mostly by EC-Spain (172 t) and EC-Portugal (21 t)..

Sphyrnidae (SPY): reported catches ranged from a minimum of 47 t in 2004 to a maximum of 198 t in 2008. The highest catch in 2008 was reported by EC-Spain (198 t); Uruguay usually reports catches of these undefined sharks. No catches have been reported in 2009.

Catches of these species in the Mediterranean area are incidental.

SOURCE OF MANAGEMENT ADVICE: The advisory bodies are ICCAT (for the tuna and tuna-like fisheries) and all the relevant RFMOs (for all the other fisheries).

REFERENCE POINTS: None

STOCK STATUS: There is no evidence of separate populations of these species. There is no assessment of the Atlantic and Mediterranean stocks available, while a conservation assessments was conducted by IUCN in 2008, defining *Sphyrna lewini* and *Sphyrna mokarran* as globally "Endangered

RECENT MANAGEMENT ADVICE: None. UNEP/SPA in 2008 proposed the inclusion of *Sphyrna mokarran* and *Sphyrna lewini* in the Annex II of the SPA/BD protocol of the Barcelona Convention for the Mediterranean.

In 2013, *Sphyrna mokarran* and *Sphyran zygaena* were listed on Appendix II of CITES (Conference of Parties 16, Bangkok). However, the implementation of this listing has been delayed by 18 months (14 September 2014) to enable Range States and importing States to address potential implementation issues.

STECF COMMENTS: STECF reiterates the concerns about the different classification of IUCN status in various areas in the absence of any evidence of sub-populations, raised during the STECF Plenary 09-02. STECF recommends the collection of catch data and basic information on these species (possibly with a precise identification) by the EU Member States to better understand the current situation of the stocks. From the lack of 2009 data it is evident that several EU Member States are not fulfilling the DCF and ICCAT reporting obligations.

15.32 Carcharhinus spp.

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: This important group of pelagic species includes at least 17 species in the Atlantic Ocean, while only 8 of them are reported in the Mediterranean Sea. Among those, the ICCAT data base reports catches concerning 14 species in the various areas. These species are often caught as by-catch in surface long-line fisheries targeting tuna and tuna-like species. A number of specimens may also be caught by large driftnet fisheries, even though this fishery is prohibited since years. In some countries there is also a target fishery for some species.

The landings reported to ICCAT are the followings :

Species	code	name	Min catch	Max catch	Latest catch
Carcharhinus plumbeus	CCP	Sandbar shark	<1 t (1990)	468 t (1996)	22 t (2009)
Carcharhinus limbatus	CCL	Blacktip shark	7 t (1990)	565 t (2005)	62 t (2009)
Carcharhinus melapterus	BLR	Blacktip reef shark		<1 t (2007)	<1 t (2007)
Carcharhinus acronotus	CCN	Blacknose shark		49 t (2004)	49 t (2004)
Carcharhinus longimanus	OCS	Oceanic whitetip shark	<1 t (1990)	642 t (2000)	54 t (2009)
Carcharhinus porosus	CCR	Smalltail shark	10 t (2006)	306 (2002)	<1 t (2009)
Carcharhinus obscurus	DUS	Dusky shark	<1 t (2003/4)	270 t (1994)	15 t (2009)
Carcharhinus falciformis	FAL	Silky shark	7 t (2006)	531 t (1996)	70 t (2009)
Carcharhinus leucas	CCE	Bull shark	<0 t	375 t (2003)	10 t (2009)
Carcharhinus brachyurus	BRO	Copper shark	1 t (2001)	7 t (2008)	1 t (2009)
Carcharhinus brevipinna	CCB	Spinner shark	10 t (2006)	306 t (2002)	<1 t (2009)
Carcharhinus signatus	CCS	Night shark	< 1 t	1466 t (2002)	35 t (2009)
Carcharhinus isodon	CCO	Finetooth shark		<1 t (2004)	<1 t (2004)
Carcharhinus altimus	CCA	Bignose shark	<1 t (2003)	43 t (2004)	<1 t (2009)
Carcharhinidae	RSK	Requiem sharks nei	20 t (2004)	861 t (2008)	142 t (2009)
Carcharhiniformes	CVX		127 t (2006)	2279 t (2003)	1262 t (2009)

	PXX	Pelagic sharks nei	15 t (2005)	1011 t (1997)	15 t (2005)

SOURCE OF MANAGEMENT ADVICE: The advisory body for these species is ICCAT for the tuna and tuna-like fisheries, but also the RFMOs concerned by catches obtained by other gears.

REFERENCE POINTS: None

STOCK STATUS: No stock assessment was ever attempted by ICCAT or any other RFMO in the area. IUCN carried out some conservation assessments, including the following species in the Red List:

"Low Concern": *C. falciformis*;

"Near Threatened": C. *limbatus, C. melanopterus, C. obscurus, C. leucas, C. brevipinna, C. plumbeus* (IUCN, in 2007, listed this latter species as "Endangered" for the Mediterranean – see STECF comment);

"Vulnerable": *C. longimanus*.

Retaining on board, transhipping or landing any part or whole carcass of oceanic whitetip sharks (*Carcharhinus longimanus*) and silky shark (*Carcharhinus falciformis*) taken in any fishery is prohibited in the ICCAT area by Council Regulation (EC) N° 44/2012

In 2013, *Carcharhinus longimanus* was listed on Appendix II of CITES (Conference of Parties 16, Bangkok). However, the implementation of this listing has been delayed by 18 months (14 September 2014) to enable Range States and importing States to address potential implementation issues.

RECENT MANAGEMENT ADVICE: None.

STECF COMMENTS: STECF reiterates the comments made during its Plenary 09-02, about the adoption of a different conservation status in the Mediterranean in the absence a discrete and well-defined sub-population.

STECF recommends the collection of basic information on the catches of the different *Carcharhinus* species occurring in the Mediterranean and in the Atlantic with the aim of better understanding the current state of these species and assessing the possible impacts of the different fisheries. From the lack of 2009 data it is evident that all EU Member States concerned are not fulfilling the DCF and ICCAT reporting obligations.

15.33 Blue stingray (*Pteroplatytrygon violacea*)

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: This species is very commonly caught by pelagic gears (long-lines, driftnets) as by-catch and more rarely by trawlers; it is sometimes retained on board and sold in a few markets. Data on catches are usually extremely poorly reported and no catches of this species are included in the ICCAT data bank at the moment. This species often represents the most common Chondrichthyes species in the pelagic longline fishery in the Mediterranean, abundant in some areas and seasons.

SOURCE OF MANAGEMENT ADVICE: The advisory body for these species is ICCAT for the tuna and tuna-like fisheries, but also the RFMOs concerned by catches obtained by other gears.

REFERENCE POINTS: None.

RECENT MANAGEMENT ADVICE: None by RFMOs. IUCN (2007) classified this species for the Mediterranean as "Near threatened".

STECF COMMENTS: STECF notes the lack of recent data and recommends a better reporting of the Blue stingray catches from all the fisheries and Member States involved due to the high number of specimens reported in surface fisheries in some geographical areas. STECF recommend that catches of this species must be regularly reported to ICCAT. From the lack of 2009 data it is evident that all EU Member States concerned are not fulfilling the DCF and ICCAT reporting obligations.

15.34 Chondrichthyes species n.e.i

Many species of Chondrichthyes, besides of those individually listed above, are usually caught by the various fisheries targeting large pelagic species. The reported catches are sometimes very sporadic. STECF notes that, in agreement with the European Action Plan for Sharks and the ICCAT rules, many species must be recorded, in

order to understand their status. ICCAT, in 2009, made a very strong effort and recovered data about many shark species, which are here reported, with the only purpose to provide a general idea about the number of species concerned and the quantity, showing the complexity of this particular segment of the catches, taking into account that several species are still missing from the list.

16 Highly migratory fish (Indian Ocean)

All the highly migratory species in the Indian Ocean are managed by the Indian Ocean Tuna Commission (IOTC), an FAO body. The IOTC is supported by a Scientific Committee (SC), composed of representatives from each Commission member. The Scientific Committee is responsible for all scientific work and provides scientific advice on management measures; the last meeting of the committee was December 2011.

About 24 percent of the world production of tuna is from the Indian Ocean, making this the second largest region for tuna fishing after the Western and Central Pacific Ocean. Preliminary estimates of catches of skipjack, yellowfin, bigeye and albacore in 2012 are around 830,000000 tonnes, a 2% decline from 2011. There has been a general tendency for the total catch of those species to decline since 2005, when a record 1.20 million tonnes were caught.

Average catches for the period 2007-2012 provide an indication of the recent performance of the fisheries: Skipjack accounts for 48% of the catches in weight, followed by yellowfin (35%), bigeye (12%), and albacore (5%). In recent years, purse-seine vessels take about 35% of the total catch, followed by gillnet (30 %), longline (7%), and pole-and-line (10%).

The problem of piracy in the Indian Ocean, especially in the vicinity of Somalia, has had an important impact: the fishing capacity (in number of boats) of the EU purse seine fleet has decreased by 25% from the 2005-2008 average due to vessels leaving to fish in other regions. Similarly, vessels from Japan, Taiwan and Korea have shifted their areas of operation and a number of local fleets from Kenya and Seychelles have been affected. Recent decreases in piracy activity and its geographic extension is bringing fleets back into their previous patterns of exploitation, and the Scientific Committee has warned that this could bring an increase in both nominal and effective effort.

Despite recent improvements, fishery statistics are still not available for some fisheries, particularly for several artisanal fisheries, which form a very important component of the total catch in the region. Many smaller tuna and tuna-like species are not currently assessed by the IOTC, although data on these is improving and some fishery indicators are now available.

16.1 Pelagic Sharks

FISHERIES: For the Indian Ocean there is currently little quantitative information available on the fisheries targeting or having significant by-catch of pelagic sharks. The Scientific Committee (December 2012) noted the paucity of information available on sharks and that the situation is not expected to improve in the short to medium term. There is no quantitative stock assessment and few basic fishery indicators currently available for any shark species in the Indian Ocean. While stocks status are highly uncertain, they are likely to be poor for some species and/or areas.

The Indian Ocean borders on the top two shark-fishing nations in the world, Indonesia and India, which together have accounted for 22% of the total FAO-reported chondrichthyan global landings since 2000. Landings of these species have been steadily rising in both the Eastern and Western Indian Ocean since the 1950s, although there has been a slight decline reported since 2004.

Qualitatively, at least 15 species of sharks are caught in open ocean fisheries in the Indian Ocean, with blue (*Prionace glauca*) and silky (*Carcharhinus falciformis*) sharks probably the most prevalent species, but other species, specifically shortfin mako (*Isurus oxyrinchus*) are also taken in significant number. The Scientific Committe has in 2012 reviewed an Ecological Risk Assessment (ERA) for Indian Ocean sharks. Tables 16.1 and 16.2 show the 10 most vulnerable species, for longline and purse seine, respectively, and compares this list with those for which IOTC requests catch information be included in logbooks.

Table 16.1: List of the 10 most vulnerable shark species to longline gear compared to the list of shark species/groups required to be recorded in logbooks, as listed in Resolution 12/03 on the recording of catch and effort by fishing vessels in the IOTC area of competence (from Table 4, IOTC-2012-SC15-R[E]).

PSA vulnerability ranking	Most susceptible shark species to longline gear	FAO Code	Shark species listed in IOTC Resolution 12/03 for longline gear	FAO Code
1	Shortfin mako (*Isurus oxyrinchus*)	SMA	Blue shark (*Prionace glauca*)	BSH
2	Bigeye thresher (*Alopias superciliosus*)	BTH	Mako sharks (*Isurus* spp.)	MAK
3	Pelagic thresher (*Alopias pelagicus*)	PTH	Porbeagle shark (*Lamna nasus*)	POR
4	Silky shark (*Carcharhinus falciformis*)	FAL	Hammerhead sharks (*Sphyrna* spp.)	SPN
5	Oceanic whitetip shark (*Carcharhinus longimanus*)	OCS		
6	Smooth hammerhead (*Sphyrna zygaena*)	SPZ		
7	Porbeagle (*Lamna nasus*)	POR		
8	Longfin mako (*Isurus paucus*)	LMA		
9	Great hammerhead (*Sphyrna mokarran*)	SPM		
10	Blue shark (*Prionace glauca*)	BSH		

Table 16.2: List of the 10 most vulnerable shark species to purse seine gear compared to the list of shark species/groups required to be recorded in logbooks, as listed in Resolution 12/03 on the recording of catch and effort by fishing vessels in the IOTC area of competence (from Table 5, IOTC-2012-SC15-R[E]).

PSA vulnerability ranking	Most susceptible shark species to purse seine gear	FAO Code	Shark species listed in IOTC Resolution 12/03 for purse seine gear	FAO Code
1	Oceanic whitetip shark (*Carcharhinus longimanus*)	OCS	Whale sharks (*Rhincodon typus*)	RHN
2	Silky shark (*Carcharhinus falciformis*)	FAL		
3	Shortfin mako (*Isurus oxyrinchus*)	SMA		
4	Great hammerhead (*Sphyrna mokarran*)	SPM		
5	Pelagic stingray (*Pteroplatytrygon violacea*)	PLS		
6	Scalloped hammerhead (*Sphyrna lewini*)	SPL		
7	Smooth hammerhead (*Sphyrna zygaena*)	SPZ		
8	Longfin mako (*Isurus paucus*)	LMA		
9	Dusky shark (*Carcharhinus obscurus*)	DUS		
10	Tiger shark (*Galeocerdo cuvier*)	GAC		

- Four CPCs have reported detailed data on sharks (*i.e.* Australia, EU (Spain, Portugal and United Kingdom), South Africa, and Sri-Lanka while nine CPCs have reported partial data or data aggregated for all species (*i.e.* Belize, China, Japan, Korea, Malaysia, Oman, Seychelles, Mauritius, UK-territories).
- Catches of unidentified shark in 2011 totaled 55,135 t (average 2007-2011 63,783 t).

Blue shark (*Prionace gluaca*)

Blue sharks are commonly taken by a range of fisheries in the Indian Ocean and in some areas they are fished in their nursery grounds. Apparently, as other shark stocks have declined fewer blue sharks are being discarded.

- Australia, Spain, Portugal, United Kingdom and South Africa report longline data by species: 74% of the catch of sharks by longliners, all targeting swordfish, were blue sharks.
- Catches reported in 2011 were of 9.540 t for blue shark.(average 2007-2011 9,452 t)

Silky shark (*Carcharhinus falciformis*)

- The silky shark is one of the most abundant large sharks inhabiting warm tropical and subtropical waters throughout the world. Essentially pelagic, the silky shark is distributed from slopes to the open ocean. It also ranges to inshore areas and near the edges of continental shelves and over deepwater reefs. It also demonstrates strong fidelity to seamounts and natural or man-made objects like FADs.
- Silky sharks often form mixed-sex schools containing similar sized individuals. Maximum age is estimated at 20+ years for males and 22+ years for females and maximum size is over 3 m long.

- For CPCs reporting longline data by species (*i.e.* Australia, Spain, Portugal, United Kingdom and South Africa), 1.5% of the catch of sharks by longliners, all targeting swordfish, were silky sharks, and for CPCs reporting gillnet data by species (*i.e.* Sri Lanka), 22% of the catches of shark were silky sharks.
- Catches reported in 2011 were of 3,353 t for silky shark (average 2007-2011 1,396 t)

Oceanic Whitetip sharks (*Carcharhinus longimanus*)

- The oceanic whitetip shark is one of the most common large sharks in warm oceanic waters.
- Oceanic whitetip sharks are relatively large sharks and grow to up to 4 m. Females grow larger than males. The maximum weight reported for this species is 167.4 kg.
- For CPCs reporting longline data by species *(i.e.* Australia, Spain, Portugal, United Kingdom and South Africa), 0.6% of the catch of sharks by longliners, all targeting swordfish, were oceanic whitetip sharks, and for CPCs reporting gillnet data by species (*i.e.* Sri Lanka), 7% of the catches of shark were oceanic whitetip sharks.
- Catches reported in 2011 were of 388 t for Oceanic whitetip shark (average 2007-2011 347 t)
- This species has been added to CITES appendix II (Entry into effect delayed by 18 months, i.e. until 14 September 2014)

Shortfin Mako sharks (*Isurus oxyrinchus*)

- The shortfin mako shark is a large and active shark and one of the fastest swimming shark species. It is known to leap out of the water when hooked and is often found in the same waters as swordfish. This species is at the top of the food chain, feeding on other sharks and fast-moving fishes such as swordfish and tunas.
- For CPCs reporting longline data by species *(i.e.* Australia, Spain, Portugal, United Kingdom and South Africa), 12% of the catch of sharks by longliners, all targeting swordfish, were shortfin mako sharks.
- Catches reported in 2011 were of 1,361 t for shorfin mako shark (average 2007-2011 1,207 t)

Scalloped hammerhead sharks (*Sphyrna lewini*)

- The scalloped hammerhead shark (Sphyrna lewini) is widely distributed and common in warm temperate and tropical waters down to 275 m. It is also found in estuarine and inshore waters. In some areas, the scalloped hammerhead shark forms large resident populations. In other areas, large schools of small-sized sharks are known to migrate polewards seasonally.

Catches reported in 2011 were of 120 t for scalloped hammerhead shark (average 2007-2011 36 t)

This species has been added to CITES appendix II (Entry into effect delayed by 18 months, i.e. until 14 September 2014)

SOURCE OF MANAGEMENT ADVICE: The advisory body is the Scientific Committee of the IOTC.

REFERENCE POINTS: None.

STOCK STATUS: unknown

RECENT MANAGEMENT ADVICE: Overall, there is a paucity of information available on sharks and this situation is not expected to improve in the short to medium term. There is no quantitative stock assessment or basic fishery indicators currently available for any of the sharks in the Indian Ocean therefore the stock status for all species is highly uncertain. In general, the life history characteristics of sharks; including that they are relatively long lived, typically take (at least) several years to mature, and have relativity few offspring, means that they are vulnerable to overfishing.

STECF COMMENTS: STECF is unaware of any new information on the stock status or advice on the management of fisheries exploiting pelagic sharks in the Indian Ocean.

16.2 Yellowfin tuna (*Thunnus albacares*)

FISHERIES: Yellowfin tuna is fished throughout the Indian Ocean, however the majority of catches are taken in western equatorial waters and the location of the fishery has changed little since 1990.

The main fishing gears are purse seines, longliners and the artisanal fisheries using a variety of gear (pole and line, gillnet, driftnet and hand line). Contrary to the situation in other oceans, the artisanal fishery component in the Indian Ocean is substantial, contributing some 35 % to the total catch over the years 2000-2008.

Total annual catches increased steadily from the start of the fishery in the late 1950s, reaching 100,000 t in 1984, 200,000 t in 1989 and 400,000 t in 1993. Catches peaked at 523,000 tonnes in 2004 but since then have fallen. Yellowfin catches in 2011 were about 303,000 tonnes, a 4 % increase from 2010. The main fishing gears for which catches have declined recently are purse seine and longline. In contrast, catches from pole and line vessels have been relatively stable. Catches by gillnet have become more important in recent years. Overall catches have declined by 45% from the record high in 2004.

SOURCE OF MANAGEMENT ADVICE: The advisory body is the Scientific Committee of the IOTC.

REFERENCE POINTS: MSY is estimated to be around 344,000 t.

STOCK STATUS:

The 2012 updated assessment undertaken by the Scientific Committee (SC15) provided results that did not differ greatly from those in 2011. Point estimates from the base case model used by the Scientific Committee suggest that the stock is not overfished and overfishing is not occuring.

- The ratio of Fcurrent/FMSY is 0.69 (range: 0.59-0.90), indicating that the situation is not of concern, although overfishing probably occurred in the 2004-2006 period of high catches.
- The stock does not appear to be in an overfished state as spawning biomass seems to be above the BMSY level (Bcurrent/BMSY = 1.24. Range: 0.91-1.40), although uncertainty is large.
- The median value of MSY is estimated to be 344,000 tonnes (range of 290,000 and 453,000 t.). During the period 2003-2006, catches substantially exceeded this level and the stock experienced a rapid decline.
- If the fishing effort that has been displaced recently due to piracy returns to traditional fishing areas, then catches (and F) will likely increase.
- 30% of the catch is made by gillnets, a gear expected to have high bycatch rates, but no mitigation measures are in place and monitoring is extremely deficient.

RECENT MANAGEMENT ADVICE:

The status of this stock has prompted concern as catches in 2003-2006 exceeded the MSY level. Since then however – largely as a result of piracy but also due to a decrease in catch rates - catches have decreased considerably, as fishing effort was displaced to zones with lower catch rates or into other oceans.

- The Scientific Committee has expressed concern that catches could increase again if the piracy situation is reversed, and recommended that catches are limited to 300,000 tonnes or less in order to bring the stock to biomass levels that could sustain catches at the MSY level in the long term.
- If recruitment continues to be lower than average, catches below 300,000 t would be needed to maintain stock levels.

The main binding conservation measure established by the IOTC for yellowfin is Resolution 10/01, which affects vessels greater than 24 m as well as smaller vessels fishing on the high seas. This measure calls for a one month closure for purse seiners and longliners in an area 10°x20°. A resolution has also established a series of meetings for members of IOTC to agree a quota allocation scheme, with a view to possibly adopting a Total Allowable Catch or similar measures in the future. A recent recommendation has established a set of interim target and limit reference points for IOTC stocks.

- The Scientific Committee considers that management measures that allow an appropriate control of fishing pressure to be implemented should be continued.
- The effect of time-area closures cannot yet be directly translated into management quantities of direct effect on the status of the stock, such as catches or fishing mortality, so their possible effect on the future evolution of the stock cannot be evaluated.

STECF COMMENTS: STECF agrees with the advice from IOTC and stresses the importance of avoiding any future increase of fishing effort and catches above MSY reference point(s) levels.

16.3 Bigeye tuna (*Thunnus obesus*)

FISHERIES: Bigeye tuna is fished throughout the Indian Ocean, with the majority of the catch being taken in western equatorial waters.

Reported catches in the Indian Ocean peaked between 1997 and 1999 at 144 - 150,000 t per year, and total annual catches averaged 121,700 t over the period 2004 to 2008. The catch in 2011 was estimated at 87,400 t, a 14% decline from the 2007-2011 average, mostly due to the longline effort decrease due to the Somalian piracy.

Bigeye is predominantly caught by industrial long liners, but also as a bycatch of juveniles on the FAD skipjack fishery by purse seines, and occasionally by artisanal fisheries.

1. The longline fisheries started to target bigeye in the 1970s and mainly catch adults >80 cm. Large bigeye tuna (above 30 kg) are primarily caught by deep longliners. Catches by longline have been declining from a high in 2004.
2. 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 bigeye less than 80 cm, that is, juveniles (under 10 kg). This results in purse seiners taking a larger numbers of individual fish than longliners. Over 75% of purse seine bigeye catches are taken in log-schools along with skipjack and yellowfin tuna. Catches increased from the beginning of the fishery, peaked at over 30,000 t from 1997 to 1999 and then stabilized at around 20,000 t; catches have been relatively stable since 2000.

SOURCE OF MANAGEMENT ADVICE: The advisory body is the Scientific Committee of the IOTC.

REFERENCE POINTS: MSY = 114,000 t (95,000-183,000).

STOCK STATUS: The 2011 updated assessment conducted by the Scientific Committee of IOTC (SC14) gave similar results to the 2010 assessment in terms of average trends. The uncertainty in the results is perceived to be significant, as a result of the Scientific Committee having considered a much broader range of model assumptions than before. The updated assessment indicates that the stock is probably not overfished, and overfishing is probably not occurring. However, the stock is probably at full utilization, and the possibility of overfishing cannot be ruled out given the existing uncertainty, and the continuing observed decline in catch rates.

1. The ratio of Fcurrent/F_{MSY} is estimated at 0.70 (range of 0.5-0.9), indicating that overfishing is not likely to be occurring.
2. The ratio of spawning biomass Bcurrent/B_{MSY} is estimated at 1 (range of 0.80-1.24). This indicates that that the stock is not in a clearly overfished state but it is close to it.
3. The median estimate of MSY is 114,000 tonnes. Given that the mean annual catch for the period 2005-2009 was 114,600 t, it appears that the stock is being exploited at around its maximum level.

RECENT MANAGEMENT ADVICE:

Despite the uncertainty on estimated MSY values and the levels of error in the nominal catch data for bigeye, the recent declines in catches led the SC to recommend no management action, but suggested that catches should be closely monitored and should not exceed the catch levels of 2009, 102,000 t. This value should give low probability of catches exceeding MSY.

The main binding conservation measure established by the IOTC for bigeye is Resolution 10/01, which affects vessels greater than 24 m as well as smaller vessels fishing on the high seas. This measure calls for a one-month closure for purse seiners and longliners in an area of size 10°x20°. The effect of the closure in Resolution 10/01 on the status of IO tuna stocks cannot be evaluated yet, but is likely to be insignifcant according to the analyses conducted by the Scientific Committee.

STECF COMMENTS: STECF agrees with the advice from the Scientific Committee of the IOTC and stresses the importance of keeping the total catch and effort under strict control, as well as reducing catches of juveniles.

16.4 Skipjack (*Katsuwonus pelamis*)

FISHERIES: Skipjack catches in the Indian Ocean in 2011 were about 398,200 tonnes, a slight decrease of 9% from the 2007-2011 average. Purse seine (39%) and gillnets (37%) dominate the catches, followed by pole-and-line (17%). The pole-and-line catches have been decreasing markedly since 2005.

Catches of skipjack increased slowly from the 1950s, reaching around 50,000 t at the end of the 1970s, mainly due to the activities of baitboats (pole and line) and gillnets. The catches increased rapidly with the arrival of the purse seiners in the early 1980s, and skipjack became one of the most important tuna species in the Indian Ocean. Annual total catches exceeded 400,000 t in the late 1990s, and peaked at 618,200t in 2006. Since then, catches have been declining rapidly to 446,000 t in 2009, with an average annual catch for the period from 2007 to 2011 of 435,500t.

In recent years, the proportions of the catch taken by the industrial purse seine fishery and the various artisanal fisheries (baitboat, gillnets and others) have been fairly consistent, the majority of the catch originating from the western Indian Ocean. Purse seine, baitboat and gillnets representing 95% of the total skipjack catches. In general, there is low inter-annual variability in the catches taken in the Indian Ocean compared to those taken in other oceans.

The increase of skipjack catches by purse seiners is due to the development of a fishery in association with Fish Aggregating Devices (FADs). In 2009, 94% (86% on average for the European/Seychelles fleet during the last 10 years) of the skipjack tuna caught by purse-seine was taken in FAD-associated schools.

The Maldivian fishery has increased its effective fishing effort with the mechanization of its pole-and-line fishery since 1974 and the use of anchored FADs since 1981. However, a strong decline (more than 50%) in the catch has been observed during the last 3 years; from a catch of 136,700t in 2006 to 65,000 t in 2009. The reasons behind this drastic decline of the catch are not yet clear. Little information is available on the gillnet fisheries (mainly from Sri Lanka, Iran, Pakistan, India and Indonesia). However, it is estimated that the gillnet fisheries take around 30 to 40 % of the total catch of skipjack.

The average weight of skipjack caught in the Indian Ocean is around 3.0 kg for purse-seine, 2.8 kg for the Maldivian baitboats and 4-5 kg for the gillnet. For all fisheries combined, it fluctuates between 3.0-3.5 kg; this is larger than in the Atlantic, but smaller than in the Pacific. It was noted that the mean weight for purse seine catch exhibited a strong decrease since 2006 (3.1) until 2009 (2.4), for both free (3.8kg to 2.4kg) and log schools (3.0kg to 2.4kg).

Catches of skipjack by industrial purse seiners have declined over the last five years, although the are still in the range observed since the full development of the FAD fishery.The activities of pirates off the coast of Somalia have meant that approximately ten purse-seine vessels have left the Indian Ocean, that the purse-seine fleet has avoided traditional skipjack fishing grounds where catch rates were high, and that boats have been required to change their fishing activties to increase security, but no clear decline in catch rates has been observed in this fleet similar to that reported from the Maldives. This would indicate that the decline in catch rates in the Maldives fishery could be due to environmental causes such as higher than average sea surface temperatures, market considerations, like the marked increase of the fuel price, or other operational issues such as the availability of live bait.

SOURCE OF MANAGEMENT ADVICE: The advisory body is the Scientific Committee of the IOTC.

REFERENCE POINTS: MSY = 478,000 t (360,000 – 598,000t)

STOCK STATUS: A complete stock assessment of skipjack has first conducted in 2011 and updated in 2012. The results indicate that no overfishing is occurring, as catches are around 80% of the current estimate of MSY (478,000 t), as the stock is not overfished. Large uncertainties remain in this evaluation of stock status given the problems at interpreting the available indices of abundance. Independent analyses of tagging data indicate that current exploitation rates are moderate. Given that skipjack are highly productive and that Indian Ocean catches have essentially tracked the progression of fishing effort (catches have continued to increase as effort has increased), the Scientific Committee of IOTC has not been particularly concerned with the status of the stock. Furthermore, the majority of the catch comes from fish that are sexually mature (greater than 40 cm) and therefore likely to have already reproduced.

The Scientific Committee did note however the continued decline in skipjack catches, for both industrial purse seiners and Maldivian pole and line vessels, but indicated that the effects of piracy, in the first case, and a combination of fuel prices, live bait availability and operational considerations, in the second, are the main reasons behind the observed trends.

RECENT MANAGEMENT ADVICE: Given the stock status estimates, no management advice is provided for the stock. The Scientific Committee did recommend that catches should not exceed the average level for the 2005-2009 period of 512,000 t, given the available estimate of MSY. The projections carried out across a range

of catch scenarios, indicate that the risk of exceeding the MSY-based reference points will increase if catches were to increase. Also, the continuing decline of catches in the Maldivian fishery are of concern and suggest the stock should be closely monitored.

The Scientific Committee has noted that most tuna fleets operating in the Indian Ocean do not target or catch a single stock or species. The multi-species nature of the fishery, both industrial and artisanal, implies that management measures directed towards a single stock are very likely to have effect on other stocks as well. The direction and magnitude of these secondary effects cannot always be directly inferred given the adaptability of the various fleets.

The main binding conservation measure established by the IOTC for skipjack (indirectly) is IOTC Resolution 10/01, which affects vessels greater than 24 m as well as smaller vessels fishing on the high seas. This measure calls for a one month closure for purse seiners in an area 10°x20°. The effect of the closure in Resolution 10/01 on the status of Indian Ocean tuna stocks cannot be evaluated yet, but is likely to be insignifcant according to the analyses conducted by the Scientific Committee.

STECF COMMENTS: STECF notes that given the recent stock assessment results, no immediate management advice has been given.

STECF accepts while there is no scientific basis for urgent concern about the status this stock and recent catches are considered to be sustainable, it is clear that catches will not be able to grow at the rates observed in the past. Therefore, it agrees with the IOTC advice that skipjack be monitored appropriately and regularly. In addition it shares the concerns expressed by IOTC regarding the effect of the extensive and growing 'FAD' fisheries on juveniles of other tuna species. These should be strictly monitored and evaluated.

16.5 Swordfish (*Xiphias gladius*)

FISHERIES: Swordfish are taken as a target or by-catch of longline fisheries throughout the Indian Ocean and is likely to be a component of the unidentified billfish catch in gillnet fisheries in the central northern Indian Ocean. Exploitation of swordfish in the Indian Ocean was first recorded by the Japanese in the early 1950's as a by-catch in their tuna longline fisheries. Over the next thirty years, catches increased slowly as the level of coastal state and distant water fishing nation longline effort targeted at tunas increased. In the 1990's, exploitation of swordfish, especially in the western Indian Ocean, increased markedly, peaking in 1998 at 35,100 t. By 2002, twenty countries were reporting catches of swordfish. The average annual catch for the period from 2007 to 2011 was 21,900 t and catches in 2011 were reported at 19,600 t. The highest catches are taken in the South West Indian Ocean; however, in recent years the fishery has been extending eastward. Since the early 1990's Taiwan has been the dominant swordfish catching fleet in the Indian Ocean (41-60 % of total catch). Taiwanese longliners, particularly in the south western and equatorial western Indian Ocean, target swordfish using shallow longlines at night. These contrast with the daytime sets used by the Japanese and Taiwanese longline fleets when targeting tunas.

During the 1990's a number of coastal and island states, notably Australia, La Reunion/France, Seychelles and South Africa developed longline fisheries targeting swordfish, using monofilament gear and light sticks set at night. This gear achieves significantly higher catch rates than traditional Japanese and Taiwanese longlines. As a result, coastal and island fisheries have rapidly expanded to take over 10,000 t of swordfish per annum in the late 1990s.

SOURCE OF MANAGEMENT ADVICE: The advisory body is the Scientific Committee of the IOTC.

REFERENCE POINTS: MSY is estimated to be between 29,000 and 34,000 t.

STOCK STATUS: The overall stock size and fishing pressure are estimated to be within acceptable limits and the overall level of reduction in stock size probably does not represent a conservation risk. If the southwestern region is analysed as containing a separate stock, results indicate that a substantive decline took place in that area, although recent declines in catch and effort might have brought fishing pressure to sustainable levels.

A stock assessment for swordfish was undertaken in 2011, including a range of models and stock structure assumptions. The results of the assessment indicate that the stock status reference points from the range of models were generally consistent: $B>B_{MSY}$ and $F<F_{MSY}$ for all models, although there was a large range in the uncertainty estimates.

- All of the models suggest that depletion is moderate, within the range 0.30 – 0.53 (B_{2009}/B_0). MSY estimates varied from 29,900 t to 34,200 t.

- The annual average sizes of swordfish were variable but did not show a trend. While it was considered encouraging that there are not clear signals of declines in the size-based indices, these indices should be carefully monitored. It was also noted that since females mature at a relatively large size, a reduction in the biomass of large animals could potentially have a strong effect on the spawning biomass.
- The apparent fidelity of swordfish to particular areas is a potential concern, as this can lead to localised depletion of sub-populations. This seems to be the greatest concern in the south-west region. The stock appears to have been overfished in this area, although recent trends in catches have allow for stock rebuilding. Any increase in catches in this regions is likely to increase the risk of exceeding the MSY reference points.

RECENT MANAGEMENT ADVICE: MSY-related reference points are probably not being exceeded for the Indian Ocean population as a whole, and the overall level of depletion probably does not represent a conservation risk. If the recent declines in effort continue, and catch remains substantially below the estimated MSY of 29,000 t, then there is probably no urgent need to introduce restrictive management actions to the Indian Ocean as a whole. However, continued monitoring is required to manage the uncertainty.

It is recommended that catches in the SW should be maintained at levels at or below those observed in 2008 (6,426 t), until either i) there is clear evidence of recovery and biomass exceeds B_{MSY}

STECF COMMENTS: STECF agrees with the advice from the Scientific Committee of the IOTC, and in particular the concern raised in respect of the existence of a sub-population in the south-west that has experienced overfishing for several recent years. STECF agrees that it would be prudent to proceed under the assumption that this sub-population is heavily depleted, and may not be rebuilding.

17 Highly migratory fish (northeastern, eastern, southern and western-central Pacific Ocean)

As a general remark, the management of highly migratory species in the Pacific Ocean remains complex. The Inter-American Tropical Tuna Commission (IATTC) has managed stocks in the Eastern Pacific Ocean for many years and the Western Central Pacific Fishery Commission (WCPFC) manages stocks in the Western and Central Pacific Ocean, however, there is an overlapping area of competence at 150°W and cooperation between these two Commissions is improving. In the case of WCPFC the scientific advice is coming from science/assessment providers. The Ocean Fisheries Programme of the Secretariat of the Pacific Community (SPC-OFP) provides contracted scientific support to the WCPFC, through the Commission's Scientific Committee (SC), on southern stocks. On the other hand, the International Scientific Committee (ISC), which is a working group consisting of scientists from both the WCP and EPO regions, provides non-contracted research that is supplied to the Commission's Northern Committee (NC) on stocks occurring north of 20° N. SC and NC provide the scientific outcomes for consideration in the WCPFC Commission's annual meeting. The IATTC has scientific capacity within the secretariat and so do not require external providers of scientific advice. The commission does, however, receive advice on stocks occurring north of 20° N from the ISC. These Commissions faces a number of difficulties, some of which are related to the number of States taking part in these fisheries and the huge marine area concerned. Despite improvements, fishery statistics are still not available for all fisheries and particularly for several artisanal fisheries, a very important component for most countries in that area. Importantly, data reported to FAO Fishstat differ (sometimes significantly) from those reported to the various Commissions; these discrepancies should be addressed as a matter of priority.

Thus, the management of several stocks remains uncertain and/or undefined, without specific boundaries, sometimes with several overlapping competencies and, in some cases, with conflicting data published by different management bodies for the same stock. Many smaller tuna and tuna-like species are not currently monitored or assessed by these Commissions and data on those species are not available.

Eastern Pacific Ocean (EPO)

About 15 percent of the world production of tuna is from the eastern Pacific Ocean (EPO). Catches of skipjack, yellowfin, bigeye and albacore in 2011 were again around 500,000 tonnes (including dead discards), a as in 2010. There has been a general tendency for the total catch to decline since 2003, when a record 831,000 tonnes were caught.

Average catches for the five-year period 2006-2010 provide an indication of the recent performance of the fisheries: Skipjack accounts for 42% of the catches in weight, followed by yellowfin (37%), bigeye (18%), and

albacore (4%). Purse-seine vessels take the majority (89%) of the total catch, followed by longline (7%) and a variety of other gears.

Western Pacific Ocean (WPO)

About 55 percent of the world production of tuna is from the western and central Pacific Ocean (WCPO). Catches of skipjack, yellowfin, bigeye and albacore in 2011 were 2,250,000 tonnes, 12 % less than the record in 2009. There has been a general tendency for the total catch to increase since 1980. This increase has been particularly pronounced for skipjack tuna.

Average catches for the five year period 2005-2010 provide an indication of the recent performance of the fisheries: Skipjack accounts for 66% of the catches in weight, followed by yellowfin (24%), bigeye (6%), and albacore (5%). Purse-seine vessels take about 74% of the total catch, followed by pole-and-line vessels (8%), longliners (10%), and a variety of other gears (8%).

17.1 Eastern Pacific Yellowfin (*Thunnus albacares*)

FISHERIES: Yellowfin are distributed across the Pacific Ocean, with the bulk of the catch made in the eastern and western regions. While it is likely that there is a continuous stock throughout the Pacific Ocean (with exchange of individuals at a local level, although there is some genetic evidence for local isolation) the movements of tagged yellowfin are generally over hundreds, rather than thousands, of kilometers, and exchange between the eastern and western Pacific Ocean appears to be limited. This is consistent with the fact that longline catch-per-unit-of-effort (CPUE) trends differ among areas. Movement rates between the eastern and the western Pacific cannot be estimated with currently-available tagging data.

In the Eastern Pacific Ocean, the main fishing gear is purse seine, and recent catches by this gear are about 60% of the record high caught in 2002. The average annual catch in the EPO during the period 1991-2006 varied from 174,000 to 443,000 t (average 271,000). Catches in 2002 were the highest on record (443,000 t), while those in 2004, 2005 and 2006 decreased substantially with the catch in 2006 (180,000 t) the lowest since 1984. Catches in 2012 were about 191,000 tonnes, a 9% decrease from 2011 and 13% less than the most recent 5-year average catch (2007 – 2011) at 219 000t.

SOURCE OF MANAGEMENT ADVICE: The advisory body is the Scientific Advisory Committee (SAC) of IATTC.

REFERENCE POINTS: MSY is estimated to be 259,000. B/BMSY ≈ 0.83, SSB/SSBMSY ≈ 0.85, F/FMSY ≈ 1.01

STOCK STATUS:

- There is uncertainty about recent and future levels of recruitment and biomass. There have been two, and possibly three, different productivity regimes, and the MSY levels and the biomasses corresponding to the MSY may differ among the regimes. The population may have recently switched from a high to an intermediate productivity regime.

- The recent fishing mortality rates are at the MSY level, and the recent levels of spawning biomass are estimated to be below that level. As described in the most recent and previous assessments, these interpretations are uncertain, and highly sensitive to the assumptions made about the steepness parameter of the stock-recruitment relationship, the average size of the older fish, and the assumed levels of natural mortality. The results are more pessimistic if a stock-recruitment relationship is assumed, if a higher value is assumed for the average size of the older fish, and if lower rates of natural mortality are assumed for adult yellowfin;

- The recent levels of spawning biomass predicted by the current assessment are more pessimistic than those from the previous assessment. This result is due to a recent increase in the fishing mortality levels for middle-age yellowfin tuna since 2008 which is estimated by the current assessment.

- Increasing the average weight of the yellowfin caught could increase the MSY.

RECENT MANAGEMENT ADVICE:

SSB is currently equal to BMSY (B/BMSY = 0.83). Spawning biomass is projected to increase rapidly above BMSY at the current level of fishing mortality, but this should be corroborated by the next assessment.

F is currently less than FMSY (F/FMSY = 1.01). Although the point estimate of current F is below FMSY, it is highly unlikely that increased fishing effort will result in significantly increased sustained catches, but it will significantly reduce spawning biomass.

The main conservation measure established by IATTC for yellowfin is Resolution C-12-01, which includes an annual fishing closure for purse seine vessels greater than 182 t carrying capacity. This measure calls for:

- A 62 day closure for purse seiners greater than 182 tons capacity in since 2011;
- A seasonal closure of the purse seine fishery in an area known as "El Corralito", west of the Galapagos Islands, where catch rates of small bigeye are high;
- A full retention requirement for all purse seine vessels regarding bigeye, skipjack and yellowfin tunas during 2011 - 2014.
- An extension of the monthly reporting requirement for longline catches of bigeye in Resolution C-12-01 (paragraph 11) be extended to include longline catches of yellowfin. All CPCs with annual catches of yellowfin greater than 500 metric tons (t) should provide those reports to the Director.

STECF COMMENTS: STECF agrees with the stock status advice from IATTC. STECF notes that analyses (made using the base case assessment results) indicate that increasing fishing mortality to FMSY would change the long-term catches only marginally, while reducing the spawning biomass slightly from that with current effort. Because of this, and taking into account the more pessimistic estimates of stock status obtained when a stock-recruitment relationship is assumed, STECF considers that in order to prevent any further decline in spawning biomass, fishing mortality for yellowfin tuna in the EPO should not be allowed to increase. If it becomes apparent that recent recruitment levels are reduced compared to the peak period 1985-2003 fishing mortality will need to be reduced in order for the stock to recover to BMSY levels.

17.2 Western and Central Pacific Yellowfin (*Thunnus albacares*)

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Yellowfin are distributed across the Pacific Ocean, with the bulk of the catch made in the eastern and western regions. While it is likely that there is a continuous stock throughout the Pacific Ocean (with exchange of individuals at a local level, although there is some genetic evidence for local isolation) the movements of tagged yellowfin are generally over hundreds, rather than thousands, of kilometers, and exchange between the eastern and western Pacific Ocean appears to be limited. This is consistent with the fact that longline catch-per-unit-of-effort (CPUE) trends differ among areas. Movement rates between the eastern and the western Pacific cannot be estimated with currently-available tagging data.

Yellowfin catches in the WCPO in 2012 are the larges catches in the time series around 656,700 tonnes following a more or less steady increase since 1983. The main fishing gear is purse seine, which has been generally increasing. Catches are also taken by a number of mixed gears in the Philippines and Indonesia, and by longliners. Recent falling catch rates may be the result of reduced recruitment.

The development of this fishery is recent in comparison to many other tuna fisheries. Purse seiners harvest about 53% of the total catch, while longline and pole-and-line fleets comprise 16% and 3% respectively.

There is some indication of a negative effect of El Nino event on catches interannually, but these effects are small when considering the longterm increase in catches. It is unclear whether the reductions are linked to poor recruitment during these years, or whether the oceanographic events lead to a shift in the spatial distribution of the stock in relation to the fishery.

SOURCE OF MANAGEMENT ADVICE: The Western and Central Pacific Fisheries Commission (WCPFC) is responsible for the management of this stock.

The Secretariat of the Pacific Community's (SPC's) Oceanic Fisheries Programme serves as the Commission's Science Services Provider and Data Manager. As the SPC started collecting fisheries data and conducting biological studies and stock assessments before WCPFC was established, this relationship minimizes duplication of effort between the two organizations. The WCPFC has a Scientific Committee (SC) composed of representatives from each Commission member. The SC reviews the assessment results and related information prepared by SPC and by other SC experts and makes recommendations for management actions based on these assessments.

No new stock assessment was conducted and there is no new information to inform stock status for WCPO yellowfin in 2013; therefore, the a) Stock status and trends and b) Management advice and implications from SC8 are still current.

REFERENCE POINTS: The median value of MSY is estimated to be 538,800 tonnes (480 - 580,000 tonnes. SSBcurrent/BMSY = 1.47 (1.34 – 1.83) and Fcurrent/FMSY = 0.77 (0.58 - 0.9) based on the results of the base case scenario agreed by WCPFC with a steepness of the stock recruitment relationship of point 0.8.

STOCK STATUS:

The last yellowfin assessment was conducted in 2011. The results were generally more pessimistc than those from the previous assessment carried out in 2009 and the base case indicated that:

- The stock is not in an overfished state as spawning biomass is above the SSBMSY level (SSBcurrent/BMSY = = 1.47 (1.34 – 1.83). "Current" refers to the average over the period 2006-2009.

- The median ratio of Fcurrent/FMSY is estimated to be 0.77 with a range between 0.58 and 0.90, indicating that overfishing is not occurring.

- The mediam MSY is estimated to be 538,800 tonnes with a range between 480,000 and 580,000 tonnes.

The western equatorial region accounts for the most of the WCPO yellowfin catch. In previous assessments, there were concerns that the stock status in this region (region 3) might differ from the stock status estimated for the entire WCPO. A comparison between the results from the WCPO models and a model encompassing only region 3 in 2009, yielded very similar results particularly with respect to stock status. Nonetheless, there appear to be differences in the biological characteristics of yellowfin tuna in this region that warrant further investigation.

RECENT MANAGEMENT ADVICE:

WCPFC SC determined that the WCPO yellowfin appears to be capable of producing MSY. The stock is not experiencing overfishing and is not in an overfished state. Projections to 2021 indicate that fishing mortality is projected to remain below FMSY and the spawning biomass will remain above SBMSYB.

Moreover, the estimates of MSY for the principal model options (480,000□580,000 mt) are comparable to the recent level of (estimated) catch from the fishery (550,000 mt). Further, under equilibrium conditions, the predicted yield estimates are very close to the estimates of MSY indicating that current yields are at or above the long-term yields available from the stock. Further, while estimates of current fishing mortality are generally below F , any increase in fishing mortality would most likely occur within region 3 — the region that accounts for most of the catch. This would further increase the levels of depletion that is occurring within that region.

The SC recommended that there be no increase in fishing mortality in the western equatorial region.

The main binding conservation measure for WCPO yellowfin established by the WCPFC is CMM 2008/01 which aims to ensure that yellowfin fishing mortality will not exceed the 2001-2004 or 2004 level. The measure calls for:

- A 3-month closure of fishing on FADs in EEZ waters of PNA countries and on the High Seas;

- A limitation in the number of vessel days in PNA EEZs;

- A closure of several high seas pockets;

- A requirement to submit FAD management plans;

- A full-retention requirement for all purse seine vessels regarding bigeye, skipjack and yellowfin tunas;

- 100% Regional observer coverage for all purse seine vessels fishing on the high seas, on the high seas and in waters under the jurisdiction of one or more coastal States, or vessels fishing in waters under the jurisdiction of two or more coastal States;

- A limitation of each Member's fishing capacity not to exceed the 2001-2004 or 2004 level.

- In addition, CMM 2009/02 provides more guidance on some elements of CMM 2008/01 that were ambiguous, particularly on the FAD closure and full retention requirements.

In 2009 and 2010, the WCPFC SC evaluated the efficacy of CMM/2008/01 and concluded that this measure is achieving its objective of limiting fishing mortality on yellowfin to sustainable levels.

In 2012 the SC added the following comment to the management advice:

The SC noted that the total yellowfin catch in 2012 was 655,668t which was a significant (26%) increase over 2011 and a 22% increase over 2007□11.

STECF COMMENTS: STECF agrees with the management advice of WCPFC.

17.3 Eastern Pacific Bigeye (*Thunnus obesus*)

FISHERIES: Bigeye catches in 2012 were about 89,000 tonnes, roughly in line with 2011 catches. Longline fishing dominated the catches in weight until the mid 1990s. Purse seine fishing accounts for the majority of catches in recent years; 2.5 times higher than longlining. Bigeye catches in the EPO by other gears are very minor.

Bigeye are distributed across the Pacific Ocean, with the bulk of the catch made to the east and the west of the mid-Pacific. The purse-seine catches of bigeye are substantially lower close to the western boundary (150ºW) of the EPO; the longline catches less sporadic, but at lower levels between 160ºW and 180º.

Bigeye are not often caught by purse seiners in the EPO north of 10ºN, but a substantial portion of the longline catches of bigeye in the EPO is made north of that parallel. Bigeye tuna do not move long distances (95% of tagged bigeye showed net movements of less than 1000 nautical miles), and current information indicates little exchange between the eastern and western Pacific Ocean. This is consistent with the fact that longline catch-per-unit-of-effort (CPUE) trends differ among areas. It is likely that there is a continuous stock throughout the Pacific Ocean, with exchange of individuals at local levels. Currently, there are not enough tagging data to provide adequate estimates of movement between the eastern and western Pacific Ocean.

There have been substantial changes in the bigeye tuna fishery in the eastern Pacific Ocean (EPO) over the last 15 years. Initially, the majority of the bigeye catch was taken by longline vessels, but with the expansion of the fishery on fish associated with fish aggregating devices (FADs) since 1993, the purse-seine fishery has taken an increasing proportion of the bigeye catch.

Overall, the catches in the EPO have increased, but with considerable fluctuation. The catches in the EPO reached 105,000 t in 1986, and have fluctuated between about 73,000 and 148,000 t since then, with the greatest catch in 2000.

Prior to 1994, the average annual retained catch of bigeye taken by purse-seine vessels in the EPO was about 8,000 t (range 1,000 to 22,000 t). Following the development of FADs, the annual retained purse-seine catches increased from 35,000 t in 1994 to between 44,000 and 95,000 t during 1995-2000. The average amount of bigeye discarded at sea during 1993-2006 was about 5% of the purse-seine catch of the species (range: 2 to 12%).

Prior to 1994, longliners caught an average of 94% of the bigeye in the EPO (average 80 thousand t; range; 46 to 104 thousand t). During 1997-2011 this percentage dropped to an average of 40%, with a low of 25% in 2008 (average: 44 thousand t; range: 26 to 74 thousand t). The preliminary estimate of the longline catch in the EPO in 2012 is 19 thousand t.

SOURCE OF MANAGEMENT ADVICE: The advisory body is the Scientific Advisory Committee (SAC) of IATTC.

REFERENCE POINTS: MSY is estimated to be 107,000 tonnes at current exploitation pattern, but could be over 200,000 if all catches were taken by longline . B/BMSY ≈ 1.02, SSB/SSBMSY ≈ 1.08, F/FMSY ≈ 0.95.

STOCK STATUS:

- The results of this assessment indicate a recent recovery trend for bigeye tuna in the EPO (2005-2010), subsequent to IATTC tuna conservation resolutions initiated in 2004. However, a decline of the spawning biomass began at the start of 2011, persisted through 2012 and reduced both summary and spawning biomasses to their lowest historic levels at the start of 2013. This decline may be related to a series of recent below-average recruitments which coincide with a series of strong la Niña events. However, at current levels of fishing mortality, and if recent levels of effort and catchability continue and average recruitment levels persist, the SBR is predicted to stabilize at about 0.21, very close to the level corresponding to MSY.
- There is uncertainty about recent and future recruitment and biomass levels.

• The recent fishing mortality rates are estimated to be slightly below the level corresponding to MSY, and the recent levels of spawning biomass are estimated to slightly above that level. These interpretations are uncertain and highly sensitive to the assumptions made about the steepness parameter of the stock-recruitment relationship, the assumed rates of natural mortality for adult bigeye, and the weighting assigned to the size-composition data, in particular to the longline size-composition data. The results are more pessimistic if a stock-recruitment relationship is assumed, if lower rates of natural mortality are assumed for adult bigeye, and if a greater weight is assigned to the size-composition data, in particular the longline fisheries.

RECENT MANAGEMENT ADVICE: Regarding bigeye tuna, the assessment results indicate a recovering trend during 2005-2010, subsequent to the adoption of the IATTC tuna conservation resolutions initiated in 2004. However, a reduction of the spawning biomass commenced at the beginning of 2011 and persisted through 2012, which reduced both the summary and spawning biomasses to their lowest historical levels at the beginning of 2013. At current levels of fishing mortality, and if the recent levels of catch and effort and average recruitment levels continue, it is predicted that the spawning biomass will stabilize at a level very close to that corresponding to the MSY.

The main conservation measure established by IATTC for yellowfin is Resolution C-12-01, which includes an annual fishing closure for purse seine vessels greater than 182 t carrying capacity. This measure calls for:

• A 62 day closure for purse seiners greater than 182 tons capacity in since 2011;

• A seasonal closure of the purse seine fishery in an area known as "El Corralito", west of the Galapagos Islands, where catch rates of small bigeye are high;

• A full retention requirement for all purse seine vessels regarding bigeye, skipjack and yellowfin tunas during 2011 - 2014.

STECF COMMENTS: STECF agrees with the advice on stock status, but given the uncertainty around the assessment is unable to determine if the management measures currently in place are sufficient to ensure sustainable exploitation of the stock.

17.4 Western Pacific Bigeye (*Thunnus obesus*)

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Bigeye tuna are an important component of tuna fisheries throughout the Pacific Ocean and are taken by both surface gears, mostly as juveniles, and longline gear, as valuable adult fish.

Bigeye catches in 2012 were about 162,000 tonnes (10% higher than the average of the previous 5 years and the 3rd highest since 1983). The main fishing gear is longline, although catches by this gear have been declining from a high in 2004. In contrast, catches from purse seine vessels have been relatively stable since 2005.

The catches of BET in the WCPO increased continuously from 1950 onwards. Longline catches increased continuously reaching a peak of about 84,000 t in 2004 and decreasing afterwards. Since about 1994, there has been a rapid increase in purse-seine catches; from less than 20,000 t up to 1996 and increasing to 55,000 t up to 2001, primarily as a result of increased use of fish aggregation devices (FADs). Since 2001 catches have averaged over 28,000 t annually. The bigeye catch in 2004 (1737,500 t) was the second highest on record (slightly lower than the record catch taken in 1974 – 176,706 t).

SOURCE OF MANAGEMENT ADVICE: The Western and Central Pacific Fisheries Commission (WCPFC) is responsible for the management of this stock.

The Secretariat of the Pacific Community's (SPC's) Oceanic Fisheries Programme serves as the Commission's Science Services Provider and Data Manager. As the SPC started collecting fisheries data and conducting biological studies and stock assessments before WCPFC was established, this relationship minimizes duplication of effort between the two organizations. The WCPFC has a Scientific Committee (SC) composed of representatives from each Commission member. The SC reviews the assessment results and related information prepared by SPC and by other SC experts and makes recommendations for management actions based on these assessments.

No new stock assessment was conducted and there is no new information to inform stock status for WCPO bigeye in 2013; therefore, the a) Stock status and trends and b) Management advice and implications from SC8 are still current.

REFERENCE POINTS: MSY is estimated to be 76,760 tonnes (68,360 – 83,720 t.) for the base case although different scenarios were also investigated. For the base case, SSBcurrent/ SSBMSY = 1.19 (0.86-1.49) and Fcurrent/FMSY =1.46 (1.16-2.10).

STOCK STATUS:

The 2011 assessment conducted by SC7 (the 7th meeting of the Scientific Committee) is comparable to the 2010 assessments, though there are differences in catch and effort data, size frequency and a few different structural assumptions. The updated assessment indicated the following:

- The ratio of Fcurrent/FMSY is estimated at 1.46 in the base case but also in all the sensitivity runs investigated, indicating that overfishing is occurring. In order to reduce fishing mortality to FMSY, a 32% reduction in fishing mortality is required from the 2006–2009 level. Considering historical levels of fishing mortality, a 39% reduction in fishing mortality from 2004 levels is required (consistent with the aim of CMM2008/01), and a 28% reduction from average 2001–2004 levels.

- The ratio of spawning biomass SSBcurrent/SSBMSY is estimated at 1.19 in the base case. However, the structural uncertainty or the results of different model scenarios investigated indicated that there is a 13 % that SSBcurrent < SSBMSY. Thus, the bigeye population is not overfished but it is approaching an overfished state.

- The estimate of MSY is 76,760 tonnes. MSY has been reduced to less than half its levels prior to 1970 through harvest of small bigeye. 2010 catches (125,000 tonnes) are higher than MSY level and average catches for the period 2006-2009 (140,000 t.) are approximately double the MSY. Much of this disparity is due to recent recruitment estimates being much higher than the long-term historical average, on which the MSY is based. For the higher level of recruitment estimated for the recent period the MSY is estimated to be 131,400 tonnes.

- As for all stock assessments that use MSY based reference points, the assessment of stock status is highly sensitive to the assumed relationship between spawning biomass and recruitment.

RECENT MANAGEMENT ADVICE:

This stock has been subjected to overfishing for more than a decade, but has not become overfished due to higher than average levels of recruitment in recent years; consequently $B \geq BMSY$.

The Scientific Committee has recommended a minimum of 32% reduction in bigeye tuna fishing mortality from the average levels 2006-2009 with the goal of reducing the fishing mortality rate to FMSY. . This recommended level of reduction is equivalent to a minimum 39% reduction of the 2004 level in fishing mortality, and a 28% reduction of the average 2001–2004 levels which are used as baseline in the WCPFC Conservation and Management Measure 08-01. This Management Measure indicates that, through the implementation of a package of measures, over a three-year period commencing in 2009, fishing mortality needs to be reduced by a minimum of 30% with respect to the annual average during the period 2001-2004 or 2004. WCPFC management measures currently in place may be insufficient to end overfishing and F > FMSY.

The main binding conservation measure for bigeye established by the WCPFC CMM2008-01 which aims to reduce fishing mortality by 30%. The measure calls for:

- A 3 month closure of fishing on FADs in EEZ waters of the PNA countries and on the High Seas;

- A limitation in the number of vessel days in PNA EEZs and equivalent measures for other EEZs;

- A high seas vessel day limit, allocated by flag;

- A closure of several high seas pockets;

- A requirement to submit FAD management plans, including information on strategies used to implement the closure and other measures for reducing small bigeye mortality;

- A full-retention requirement for all purse seine vessels regarding bigeye, skipjack and yellowfin tunas;

- 100% Regional observer coverage for all purse seine vessels fishing on the high seas, on the high seas and in waters under the jurisdiction of one or more coastal States, or vessels fishing in waters under the jurisdiction of two or more coastal States during the same trip;

- Gradual reductions in the bigeye catch by longliners of Members that caught more than 2,000 tonnes in 2004 (does not apply to Small Island Developing States);

- A limitation of each Member's fishing capacity not to exceed the 2001-2004 or 2004 level.

In addition, CMM 2009/02 provides more guidance on some elements of CMM 2008/01 that were ambiguous, particularly on the FAD closure and full retention requirements. In 2009 and 2010, the WCPFC SC evaluated the efficacy of CMM/2008/01 and concluded that this measure, even if fully implemented, is extremely unlikely to achieve the objective of reducing fishing mortality on bigeye tuna to at least 30% below the level experienced either in 2004 or the annual average of the period 2001–2004. This conclusion was corroborated in subsequent analyses by SPC/OFP (2010b). However, the measure in force was not possible to quantitatively addressed to check whether CMM2008-01 has reduced fishing mortality for bigeye tuna to the levels specified in the CMM.

In 2012 the SC added the following statement to the management advice in addition to maintaining previous advice:

The SC noted that the total yellowfin catch in 2012 was 655,668t which was a significant (26%) increase over 2011 and a 22% increase over 2007□11.

STECF COMMENTS: STECF agrees with the advice from WCPFC and notes that whereas the stock has not become overfished (due to higher than average levels of recruitment), it has been subjected to overfishing for more than a decade. STECF further notes that WCPFC management measures currently in place may be insufficient to end overfishing and that, at a minimum, a 32% reduction in bigeye tuna fishing mortality (from the average levels 2006-2009) is required to reduce the fishing mortality rate to FMSY.

17.5 Eastern Pacific Skipjack (*Katsuwonus pelamis*)

FISHERIES: Catches of Eastern Pacific Skipjack have varied between 52,000 and 310,000 t over the time series. Between 1990 and 2010 the annual retained catch from the EPO averaged 195,000 t however fishing zones 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 catches in the EPO are notoriously variable probably due to changing distributions of fish and fisheries. Skipjack is primarily caught by purse seiners (99,5% of total skipjack catches in the EPO) from Ecuadorian, Mexican, Panamanian and Venezuelan fleets along with the EU and other South American countries. Catches in the last five years vary between 152,000 and 310,000 t.

SOURCE OF MANAGEMENT ADVICE: The advisory body is the Scientific Advisory Committee (SAC) of IATTC.

REFERENCE POINTS: MSY n/a. F/FMSY ≥ 1. B/BMSY ~ 1

STOCK STATUS:

The 2005 assessment indicated that the estimation of MSY reference points was highly uncertain. A new assessment was developed in 2012, but found many of the same problems the conclusions from the analysis were:

- There is uncertainty about the status of skipjack tuna in the EPO.
- There may to be differences in the status of the stock among regions.
- There is no evidence that indicates a credible risk to the skipjack stock(s).

RECENT MANAGEMENT ADVICE: IATTC has provided no management advice.

The main concern with the skipjack stock is the constantly increasing exploitation rate. However, this appears to have leveled off in recent years, and the effort has declined. The data- and model-based indicators have yet to detect any adverse consequence of this increase. The average weight was below its lower reference level in 2009, which can be a consequence of overexploitation, but can also be caused by recent recruitments being greater than past recruitments or expansion of the fishery into areas occupied by smaller skipjack. Any continued decline in average length is a concern and, combined with leveling off of catch and CPUE, may indicate that the exploitation rate is approaching, or above, the level associated with MSY.

The main conservation measure established by IATTC for yellowfin is Resolution C-12-01, which bbincludes an annual fishing closure for purse seine vessels greater than 182 t carrying capacity. This measure calls for:

- A 62 day closure for purse seiners greater than 182 tons capacity in since 2011;
- A seasonal closure of the purse seine fishery in an area known as "El Corralito", west of the Galapagos Islands, where catch rates of small bigeye are high;

- A full retention requirement for all purse seine vessels regarding bigeye, skipjack and yellowfin tunas during 2011 - 2014.

STECF COMMENTS: STECF notes that the level of catches, together with the increased fishing effort and decreasing average weight are reasons for concern about the level of exploitation of this stock. However, the lowest average weight may also be a consequence of recent recruitments being greater than in the past, and more detailed analyses are necessary to inform future management measures. Resolution C-12-01 is intended to decrease F, but the relationship between effort and F is unlikely to be linear.

17.6 Western and central Pacific skipjack (*Katsuwonus pelamis*)

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: The WCPO Skipjack stock supports the largest tuna fishery in the World, accounting for 40% of worldwide tuna landings. Catches in 2012 are provisionally estimated at 1,600,000 t right around the average over the last five years, but about 60% higher than catches in the second half of the 90s. Purse seining, which accounts for 85% of the catches, has been increasing steadily for three decades. In contrast, pole-and-line fishing has been declining steadily.

Catches of western and central Pacific skipjack tuna increased steadily from 1970, and more than doubled during the 1980s. The yields were relatively stable during the 1990s and ranged from 870,000 to 1,300,000 tonnes. A Japanese pole-and-line fleet previously dominated the fishery; however this has now been superseded by purse seiners. Over the past 5 years the catch has been near record high levels (exceeding 1.2 Million t annually) and accounting around 65% of the total annual catch of principal tuna species landed from the region. The geographic distribution of fishing activities shows some recent changes.

SOURCE OF MANAGEMENT ADVICE: The Western and Central Pacific Fisheries Commission (WCPFC) is responsible for the management of this stock.

The Secretariat of the Pacific Community's (SPC's) Oceanic Fisheries Programme serves as the Commission's Science Services Provider and Data Manager. As the SPC started collecting fisheries data and conducting biological studies and stock assessments before WCPFC was established, this relationship minimizes duplication of effort between the two organizations. The WCPFC has a Scientific Committee (SC) composed of representatives from each Commission member. The SC reviews the assessment results and related information prepared by SPC and by other SC experts and makes recommendations for management actions based on these assessments.

No stock assessment was conducted and there is no new information to inform stock status for WCPO skipjack in 2013; therefore, the a) Stock status and trends and b) Management advice and implications from SC8 are still current.

REFERENCE POINTS: Base case assessment model estimated the MSY in1,503,600 tonnes (1274000 – 1818000), Fcurrent/FMSY = 0.37 (0.22-0.53), andSSBcurrent/SSBMSY = 2.94 (2.45-3.69).

STOCK STATUS:

The 2011 updated assessment gave similar results to the previous (2008) assessment, and indicated the following:

- The principal conclusions are that skipjack is currently exploited at a moderate level relative to its biological potential. Furthermore, the estimates of SSBcurrent/SSBMSY and Fcurrent/FMSY indicate that overfishing of skipjack is not occurring in the WCPO, nor is the stock in an overfished state. These conclusions appear relatively robust since the different model scenarios investigated gave the same results.

- Although the current (2006-2009) level of exploitation is below that which would provide the maximum sustainable yield, recent catches have increased strongly and the mean catch for 2006-2009 of 1.5 million tonnes is equivalent to the estimated MSY at an assumed steepness of 0.8, but below the median estimate of 1.9 million tonnes from the sensitivity runs investigated. Maintenance of this level of catch would be expected to decrease the spawning stock size towards MSY levels if recruitment remains near its long-term average level.

- Fishing pressure and recruitment variability, influenced by environmental conditions, will continue to be the primary influences on stock size and fishery performance.

The Scientific Committee noted that this assessment indicates fishing is now having a significant effect on stock size, especially in the western equatorial region. Although the stock may not be experiencing overfishing or be in an overfished state, it was likely that significant increases in effort would result in only minor increases in catch.

RECENT MANAGEMENT ADVICE:

Catches in 2010 were around 1.6 million mt, the second highest recorded and below the record high catch of 1.68 million mt in 2009. Equilibrium yield at the current F is about 1.14 million mt which is about 76% of the MSY level. The assessment continues to show that the stock is currently only moderately exploited and fishing mortality levels are sustainable. However, there is concern that high catches in the equatorial region could result in range contractions of the stock, thus reducing skipjack availability to higher latitude.

Due to the rapid change of the fishing mortality and biomass indicators relative to MSY in recent years, increases of fishing effort should be monitored. The Commission should consider developing limits on fishing for skipjack to limit the declines in catch rate associated with further declines in biomass.

The main binding conservation measure for WCPO skipjack established by the WCPFC is CMM 2008/01 which is targeted at conserving yellowfin and bigeye. However, the measure also affects skipjack fisheries. The measure calls for:

- A 3 month closure of fishing on FADs in EEZ waters of PNA countries and on the High Seas;
- A limitation in the number of vessel days in PNA EEZs;
- A closure of several high seas pockets;
- A requirement to submit FAD management plans;
- A full retention requirement for all purse seine vessels regarding bigeye, skipjack and yellowfin tunas;
- 100% Regional observer coverage for all purse seine vessels fishing on the high seas, on the high seas and in waters under the jurisdiction of one or more coastal States, or vessels fishing in waters under the jurisdiction of two or more coastal States;
- A limitation of each Member's fishing capacity not to exceed the 2001-2004 or 2004 level.

In addition, CMM 2009/02 provides more guidance on some elements of CMM 2008/01 that were ambiguous, particularly on the FAD closure and full retention requirements.

In 2012 the SC added the following statement to the management advice in addition to maintaining previous advice:

The SC noted that the total skipjack catch in 2012 was 1,664,309mt which was a significant (9%) increase over 2011 but the same as the average over 2007□11.

STECF COMMENTS: Although the outlook of this stock seems positive, STECF is concerned at the very high catch rates in recent years and notes particularly the comments of the WCPFC Scientific Committee in relation to limiting the maximum catches of skipjack.

17.7 Northern Pacific Albacore (*Thunnus alalunga*)

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: North Pacific albacore extends beyond the WCPFC Convention Area. It is managed jointly by WCPFC and IATTC, and it is assessed by the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC).

The main fishing gears are longline and pole and line, which together account for accounting for 73% of the catch, followed by troll. Catches by longlining have shown a decreasing trend since 1997.

Albacore are caught by longliners (from Taiwan, Japan and USA) in most of the North Pacific; by trolling gear in the eastern and central North Pacific, and by pole-and-line gear in the western North Pacific. About 60% of the fish are taken in pole-and-line and troll fisheries that catch smaller, younger albacore. EU vessels have never reported fishing on this stock.

The total annual catches of North Pacific albacore peaked in 1976 at about 125,000 t, declined to about 38,000 t in 1991, and then increased to about 122,000 t in 1999. Landings in 201 175,640 t, a 7% increase compared to 2010 (70,693 t).

SOURCE OF MANAGEMENT ADVICE: North Pacific albacore are managed by the Western and Central Pacific Fisheries Commission (WCPFC) west of 150° W longitude, and by the Inter-American Tropical Tuna Commission (IATTC) east of 150° W longitude, and, in both cases, management is based on the scientific advice of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC)

No new stock assessment and management advice was provided. The ALBWG recommended no changes to its stock status determination in 2011, i.e., the stock is considered healthy and neither overfished nor experiencing overfishing.

REFERENCE POINTS: MSY = n/a, F/FMSY ≤ 1, B/BMSY > 1.

STOCK STATUS:

The most recent assessment of north Pacific albacore was in 2011, using data through 2009 (ISC 2011). The assessment concluded that:

- That overfishing is not occurring and that the stock likely is not in an overfished condition, (e.g., F20-50% < 1.0), although biomass-based reference points have not been established for this stock.

RECENT MANAGEMENT ADVICE:

The most recent advice was issues by ISC in 2011. It noted that F2006-2008 is significantly below F2002-2004 and provided the following recommendations on conservation advice. This advice has not been updated since then:

i. The stock is considered to be healthy at average historical recruitment levels and fishing mortality (F2006-2008).

ii. Sustainability is not threatened by overfishing as the F2006-2008 level (current F) is about 71% of FSSB-ATHL and the stock is expected to fluctuate around the long-term median SSB (~400,000 t) in the short- and long-term future.

iii. If future recruitment declines by about 25% below average historical recruitment levels, then the risk of SSB falling below the SSB-ATHL threshold with 2006-2008 F levels increases to 54% indicating that the impact on the stock is unlikely to be sustainable.

iv. Increasing F beyond F2006-2008 levels (current F) will not result in proportional increases in yield as a result of the population dynamics of this stock.

v. The current assessment results confirm that F has declined relative to the 2006 assessment, which is consistent with the intent of the previous (2006) WG recommendation."

Both the IATTC and the WCPFC currently have resolutions on albacore conservation and management stating that the total level of fishing effort should not be increased beyond current levels for North Pacific albacore in the Eastern Pacific Ocean (IATTC) and the Western and Central Pacific Ocean, north of the equator (WCPFC). The two organizations also require member countries to take necessary measures to ensure that the level of fishing effort by their vessels fishing for North Pacific albacore is not increased.

STECF COMMENTS: STECF agrees with the advice of IATTC and WCPFC. STECF further notes that while the current F is below various FMSY proxies, it is highly unlikely that increased fishing effort will result in significantly increased sustained catches. Conversely it is more likely to significantly reduce spawning biomass. STECF notes that IATTC and WCPFC have measures in place to limit fishing effort or fishing capacity targeted on this stock.

17.8 Southern Pacific albacore (*Thunnus alalunga*)

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Total south Pacific catch in 2012 (89,258t) was a 24% increase over 2011 and a 22% increase over 2007-2011. Longline catches (86,064t) increased 25% from 2011 and 22% on 2007-2011. Troll and other catches (3,158t) were down 8% on 2011, but up 15% on 2007-2011

The development of this fishery is recent in comparison to many other tuna fisheries. Catches from Pacific Island countries have increased in recent years and accounted for 50% of the total longline catches in 2002. After an initial period of small-scale fisheries development, annual catches of South Pacific albacore varied considerably and have recently been between about 60,000–70,000 t. The longline fishery harvested most of the catch, about 25,000–30,000 t per year on average, prior to about 1998. The increase in longline catch to approximately 70,000 t in 2005 is largely due to the development of small-scale longline fisheries in Pacific Island countries. Catches from the troll fishery are relatively small, generally less than 10,000 t per year. The driftnet catch reached 22,000 t in 1989, but has since declined to zero following a United Nations moratorium on industrial-scale drift-netting.

Prior to 2001, south Pacific albacore catches were generally in the range 25,000–44,000 mt, although a significant peak was attained in 1989 (49,076 mt), when driftnet fishing was in existence. Since 2001, catches have greatly exceeded this range, primarily as a result of the growth in several Pacific Islands domestic longline fisheries. The south Pacific albacore catch in 2011 (75,258 mt) was the third highest on record (about 12,000 mt lower than the record catch in 2010 of 87,048 mt).Note: The boundary of this stock was recently moved from 30°S to 25°S.

SOURCE OF MANAGEMENT ADVICE:

South Pacific albacore extends beyond the WCPFC Convention Area. However, the stock is assessed by WCPFC.

REFERENCE POINTS: MSY ≈ 85,200 tonnes. Fcurrent/FMSY = 0.26, and SSB/SSBMSY = 2,25.

STOCK STATUS: The current view of the stock is based on the assessment (of albacore tuna in the South Pacific Ocean) conducted in 2011. The results of the 2011 assessment are similar to 2009 assessment results and concluded that overfishing is not occurring (Fcurrent < FMSY) and that the stock is not overfished (SB2009 >SSBMSY)

RECENT MANAGEMENT ADVICE: WCPFC advises that at the time of their meeting no new assessment was available and the advice issued the previous year was still applicable. This suggests that the recent expansion of the fishery and recent declines in exploitable biomass available to longline fisheries, and given the importance of maintaining catch rates, the SC recommends that longline fishing mortality be reduced if the Commission wishes to maintain economically viable catch rates.

STECF COMMENTS: STECF agrees with the advice of WCPFC; it also notes that a more recent assessment has been conducted which IATTC has incorporated into their advice which is as follows:

The assessment of South Pacific albacore, which was carried out in 2012 with MULTIFAN-CL by scientists of the Secretariat of the Pacific Community, incorporated catch and effort data, length-frequency data, tagging data, and information on biological parameters. Although there were sources of structural uncertainty, in particular growth, it was concluded that the stock was above the level corresponding to the maximum sustainable yield (MSY). Specifically, the biomass-based reference points Bcurrent/BMSY and SBcurrent/SBMSY were estimated to be above 1.0, and therefore the stock was not in an overfished state. In addition, it was concluded that the risk for overfishing to be occuring was low (fishing mortality reference point Fcurrent/FMSY with a median estimate of 0.21). There appeared to be no need to restrict the fisheries for albacore in the South Pacific Ocean, but additional research to attempt to resolve the uncertainties in the data was recommended.

17.9 Black skipjack (*Euthynnus alletteratus*)

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Black skipjack are caught incidentally by fishermen who direct their effort toward yellowfin, skipjack, and bigeye tuna. The demand for this species is low, so most of the catches are discarded at sea, but small amounts, mixed with the more desirable species, are sometimes retained.

Total catch in the EPO typically ranged between 1,000 and 3,000 t over the period 1979 – 2004. In the past 5 years, however, the recorded catches of this species have increased significantly: from 2,160t in 2004, to more than 5,000 t in 2008 and 9. Preliminary landings for 2012 are 4,800 t of which roughly 10% are discarded. Data from other are Pacific Ocean areas are not available.

SOURCE OF MANAGEMENT ADVICE: IATTC provides management advice for this species in the EPO.

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

STOCK STATUS: No data.

RECENT MANAGEMENT ADVICE: No management advice.

STECF COMMENTS: STECF notes that catches have been between 3,000 and 5,000 t since purse seine discard information became available in 1993. Substantial increases in recent landings are mainly due to the retention of a greater proportion of catches as opposed to changes in targeting or effort.

17.10 Pacific bonito (*Sarda sp*)

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: This genus in the Pacific includes three species (Sarda australis, S. chilensis and S. orientalis), having different distributions and fisheries. Available fishery data however, probably only relate to two of these species and then only for a partial range of their distribution. Historical catch in the EPO ranged from about 26 to 14,227 t, with a previous peak in 1990. The catch in 2007 at 16,641 t, was an historic high and almost 5 times higher than the average catch (3,622 t) in the previous 20 years (1987-2006). Recent catches have continued to be highly variable in general,with 2011 and 12 catches being close to 8,000 t.

Almost all the catches (about 93%) are provided by purse-seiners (7,063 t retained and 65 t discarded in 2008), however IATTC have noted that this species is also caught by artisanal fisheries and these catches are not reported.

SOURCE OF MANAGEMENT ADVICE: IATTC provides management for this species in the EPO.

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

STOCK STATUS: no data.

RECENT MANAGEMENT ADVICE: No management advice.

STECF COMMENTS: STECF notes the need for robust fishery data to support the provision of management advice for bonito in the Pacific. There is a need to collect data on catches from the WCPO and from artisanal fisheries throughout the whole pacific and to investigate and explain the reasons behind the recently observed catches reported from the Pacific. STECF considers that the limited distribution of some species of bonito together with the growing demand for bonito for high quality canned products may require that the fishery for bonito in the Pacific is closely monitored.

17.11 Eastern Pacific swordfish (*Xiphias gladius*)

The stock status and advice for this stock for 2014 remains unchanged from that given for 2013. The text below therefore remains largely unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERIES: Swordfish occur throughout the Pacific Ocean between about 50°N and 50°S. They are caught mostly by longliners with lesser amounts taken in gillnet and harpoon fisheries. Recent catches in the eastern Pacific Ocean (EPO) have been taken by vessels of Spain, Chile, and Japan, which together harvest about 70% of the total catch. While all three nations have fisheries that target swordfish, most of the swordfish taken in the Japanese fishery are incidental catches in a fishery that targets bigeye tuna. Swordfish tend to inhabit deeper water during the day, and are also associated with frontal zones. Several of these occur in the EPO: off California and Baja California, Ecuador, Peru, and Chile.

The best available scientific information (genetic and fishery data) indicate that the swordfish of the northeastern Pacific Ocean and the southeastern Pacific Ocean (south of 5°S) constitute two distinct stocks. Also, there may be movement of a northwestern Pacific stock of swordfish into the EPO at various times.

The average annual catch from this stock during 1993-2000 was about 7,000 t (range ~ 4,800-8,700 t). Since 2000, annual catches have averaged about 13,000 t, with catch in the most recent years on the order of 11,000-12,000 t, which is about the estimated MSY catch. There have been indications of increasing efficiency at targeting of swordfish in the southern EPO, which has resulted in increased catches. However, some of the increased catch may have resulted from above average recruitment. It is not expected that further increases in the catch levels observed in recent years would be sustainable. Recent catches have increased dramatically to well over 20,000 t.

NOTE: IATTC report that the best available scientific information from genetic and fishery data indicate that the swordfish of the northeastern Pacific Ocean and the southeastern Pacific Ocean (south of 5°S) constitute two distinct stocks. ISC Define geographic areas used for the ISC stock assessment of North Pacific swordfish stocks (as shown in figure). For ISC assessments Sub-Area 1 corresponds to the Western and Central North Pacific (WCPO) swordfish stock which was assessed in 2009. Sub-Area 2 corresponds to the Eastern North Pacific (EPO) swordfish stock which had a stock assessment update conducted for ISC 11 in 2011.

SOURCE OF MANAGEMENT ADVICE: Eastern Pacific swordfish are managed by the Inter-American Tropical Tuna Commission (IATTC). No stock assessment was conducted and there is no new information to inform stock status for Eastern Pacific swordfish in 2013; therefore, the a) Stock status and trends and b) Management advice and implications from SC7 are still current.

REFERENCE POINTS: No precautionary reference points have been proposed for this stock. MSY = 25,000 t., SSB/ SSBmsy = 1.45 and F> Fmsy.

STOCK STATUS: Based on the 2011 stock assessment results, the population is not overfished and overfishing is not occurring.

RECENT MANAGEMENT ADVICE: IATTC has not provided any management recommendations.

STECF COMMENTS: STECF advises that fisheries exploiting for swordfish in the Pacific should be closely monitored and all attempts to undertake more comprehensive assessments should be encouraged by the various Commissions concerned. The 2011 assessment only covers the southwestern part of the stock and it is unknown whether the stock status report is applicable to the eastern stock as a whole. STECF further notes that revisions to catches in recent years are substantially greater than those used in the 2011 assessment suggesting that the management advice may not be robust.

17.12 Western and central Pacific swordfish (*Xiyphias gladius*) WECAF south of 20S.

FISHERIES: The Southern region of the WCPFC convention area (0-50S; 140E -130W) comprising both the South-West Pacific (SWP) with an eastern bound of 175W and the South-Central Pacific (SCP).

In the South-West Pacific (SWP) swordfish have been taken primarily as by-catch in the Japanese tuna longline fisheries since the 1950s, with reported annual catches fluctuating around 2000 t over the period 1970-1996. Japanese catches declined since the late 1990s, when the targeted Australian and New Zealand longline fisheries rapidly developed, with total annual catches averaging around 4000 t from 1997-2002. Catches have declined from 2002-2007, with total catches in 2006-7 now around the levels observed prior to 1997. Fiji, Papua New Guinea, Vanuatu and New Caledonia have reported the largest catches among the Pacific Island nations. Standardized catch rates declined substantially for all the major fleets during the period from around 1999-2004. Since 2004, there has been a substantial increase in the Australian and New Zealand catch rates, however, the increase is not as evident in the Japanese fleet. Mean size composition has declined in the well-sampled Australian fishery since the mid 1990s. Most of the swordfish catch in the SWP is taken in the region between 20-40S.

The magnitude of the SCP swordfish catches has been comparable to the SWP since around 2000. Unlike the SWP, the majority of the swordfish in the SCP have been taken as by-catch in the equatorial tuna longline fisheries. Japanese SCP swordfish have been primarily a by-catch species since the early 1950s, and Korean catches began in the mid-1970s. Taiwanese fleets have taken substantial catches since ~2000. Beginning in 2004, the Spanish fleet has rapidly expanded, and this targeted fishery recorded the largest catches of all nations in the SWP-SCP in 2006. French Polynesia, Cook Islands and Vanuatu represent the majority of the SCP Pacific Island catches. There is no compelling evidence for changes in size composition in the SCP catches, however, size data are limited. Swordfish catch rates observed in the SCP suggest that swordfish abundance is stable or

increasing in recent years. However, the operational level data available for conducting catch rate standardization analyses are limited, and some conflicting trends suggest that targeting changes are affecting CPUE trends for at least some of the fleets.

SOURCE OF MANAGEMENT ADVICE: WCPFC. Scientific advice is provided by the scientific committee of WCPFC.

REFERENCE POINTS: The median reference point estimates from the two assessments using different growth curves suggest SBcurrent/SBMSY = 2.07 Fcurrent/FMSY = 0.74 with an estimate of MSY around 8,000t.

STOCK STATUS: The main conclusions of the current assessment (based upon the median of the uncertainty grid estimates, and the plausible range of key model runs) are as follows.

• The relatively steep decline in biomass over the period 1997 to 2011 over all key model runs, despite the no concurrent temporal change in recruitment, is a notable feature of the current assessment. It is concurrent with large increases in catch particularly in region 2, and declines in CPUE and median fish sizes in the main fisheries. The recent increase in the AU_1 CPUE index is best described by the Ref.case model for which the faster Hawai'ian growth schedule is made; whereas no increase is predicted when the slower Australian growth schedule is assumed.

• Estimates of absolute biomass and equilibrium yield were sensitive to including the NZ_2 standardized CPUE time series in the model fit (key model run cpopt_TW_NZ). The recent declines in the Ref.case model indices for region 2 appear to be consistent with declines in median size over the same period, whereas the NZ_2 index is in conflict with this trend, and is derived from a limited spatial distribution. On this basis, the cpopt_TW_NZ model is considered unreliable, or at least highly uncertain, and this model estimate is excluded from the ranges of the key model runs provided below.

• The key source of uncertainty in this assessment is the assumed growth/maturity/mortality at age schedule. Estimates of stock status are highly uncertain with respect to this assumption. Across the uncertainty grid, where the Hawai'ian schedule was assumed, the probability of Fcurrent/FMSY being less than 1 was less than 2%, while where the slower Australian schedule was assumed, this increased to 51%.

• Total and spawning biomass are estimated to have declined most notably since the late 1990s, with more gradual declines before that time. Current levels of total biomass Bcurrent/B0 = 44 – 68 % and spawning biomass SBcurrent/SB0 = 27 - 55% (range of key model runs).

• When the non-equilibrium nature of recent recruitment is taken into account, we can estimate the level of depletion that has occurred. It is estimated that, for the current period, spawning potential is at 26 - 60% (range of key model runs) of the level predicted to exist in the absence of fishing while assuming the historical estimated annual recruitments.

• Recent catches are between 82% of the MSY level and 102% above the MSY level of between 5299 and 12,730 mt (range of key model runs). Within this range,

  O assuming the Hawai'ian schedule produces estimates between 82% of the MSY level and 24% above the MSY level, while,

  O assuming the Australian schedule produces estimates that are between 53 and 102% above the MSY level.

• Based on these results, we conclude that under the Hawai'ian schedule current catches are around the MSY level, while under the Australian schedule current levels of catch are above the MSY level.

• Fishing mortality for adult and juvenile swordfish is estimated to have increased sharply in the mid 1990s following the significant increases in catches at that time. Fcurrent/FMSY was estimated to be between 0.33 and 1.77 (range of key model runs). Within this range:

  O assuming the Hawai'ian schedule produces estimates between 0.40 to 0.70, while,

  O assuming the Australian schedule produces estimates that are between 1.06 to 1.77.

• Based on these results, we conclude that under the Hawai'ian schedule overfishing is not occurring, while under the Australian schedule overfishing is occurring.

• Current stock status compared to the BMSY-related reference points indicates that the current total and spawning biomass are: Bcurrent/BMSY from 1.15 to 1.85 and SBcurrent/SBMSY from 1.15 to 3.53, (range of key model runs). Within this range:

O assuming the Hawai'ian schedule produces estimates between 1.51 to 1.58, and 1.86 to 2.54, respectively, while,

O assuming the Australian schedule produces estimates are between 1.15 to 1.37, and 1.15 to 1.80, respectively.

• Under either growth/maturity/mortality schedule, current stock status is predicted to be above the level supporting MSY. Based on these results, we conclude that the stock is not in an overfished state.

• Based on these results above, and the recent trend in fishing mortality, we conclude that under the Hawai'ian schedule overfishing is not occurring, but under the Australian schedule, overfishing is occurring, the stock is not in an overfished state.

• Other assumptions tested in the key model runs that notably affected the estimates of stock status included: lower steepness equating to higher Fcurr/FMSY and lower SBcurr/SBMSY, and higher steepness producing the opposite effect; and where no movement was assumed, more optimistic estimates of stock status were obtained.

RECENT MANAGEMENT ADVICE:

SC9 recommended that given the current uncertainty in the assessment that the Commission adopt a precautionary approach when considering future management arrangements. Given this, SC9 recommended that there be no increase in fishing mortality over current (2007-2010) levels.

Noting that recent catches between the equator and 20°S now represent the largest component of the catch in Region 2 (equator to 50°S, 165°E to 130°W), SC9 recommended that the Commission consider developing appropriate management measures for this Region which is not covered by CMM 2009-03.

STECF COMMENTS: STECF aggreess with the advice of the WCPFC

17.13 Pacific Blue Marlin (*Makaira nigricans*)

FISHERY: The best knowledge currently available indicates that blue marlin constitutes a single world-wide species, and that there is a single stock of blue marlin in the Pacific Ocean. For this reason, statistics on catches are compiled, and analyses of stock status are made, for the entire Pacific Ocean.

Blue marlin are taken mostly by longline vessels of many nations that fish for tunas and billfishes between about 50°N and 50°S. Lesser amounts are taken by recreational fisheries and by various other commercial fisheries. Small numbers of blue marlin have been tagged, mostly by recreational fishermen, with conventional tags. A few of these fish have been recaptured long distances from the locations of release. In addition, blue marlin has been tagged with electronic tags and their activities monitored for short periods of time. Blue marlin usually inhabit regions where the sea-surface temperatures (SSTs) are greater than 24°C, and they spend about 90% of their time at depths in which the temperatures are within 1° to 2° of the SSTs.

The fisheries in the EPO have historically captured about 10 to 18% of the total harvest of blue marlin from the Pacific Ocean (42,000 t in 2002), with captures in the most recent 5-year period averaging about 10% of the total harvest.

Blue marlin is the most common non-tuna bycatch in Belize's long line fishery. Similarly, for Korean catches 2003 – 2008, billfish (swordfish, blue marlin, striped marlin, black marlin and sailfish) comprise 12.6% of the total catch; blue marlin was the dominant billfish species caught, making up 44.5% of the billfish catch.

The reported total catches in the EPO were 3,937 t in 2004, about 3,676 t in 2005 and 2,093 t in 2006. The preliminary catch estimate in 2007 is only about 136 t. Spain reported catches of 16.7 t in the WCP and 1.1 t in EPO in 2007.

SOURCE OF MANAGEMENT ADVICE: The advisory body is IATTC, but WCPFC and ISC also share competence.

REFERENCE POINTS: FMSY = 0.32.

STOCK STATUS: Based on the finding of the ISC blue marlin stock assessment, the following information on stock status and trends is provided:

- Estimates of total stock biomass show a long term decline.
- Current fishing mortality on the stock (average F, ages 2 and older) averaged F = 0.26 during 2009-2011 and was below F_{MSY}. (F_{MSY} (age 2+)=0.32)
- The predicted value of the spawning potential ratio (SPR, the predicted spawning output at current F as a fraction of unfished spawning output) is currently $SPR_{2009\text{-}2011}$ = 23%.
- The overall trends in spawning stock biomass and recruitment indicate a long-term decline in spawning stock biomass and suggest a fluctuating pattern without trend for recruitment.
- Pacific blue marlin spawning stock biomass decreased to the MSY level in the mid-2000's, and since then has increased slightly.
- The base case assessment model indicates that the Pacific blue marlin stock is currently not overfished and is not subject to overfishing relative to MSY-based reference points.

RECENT MANAGEMENT ADVICE: Based on the results of the stock assessment, the stock is not currently overfished and is not experiencing overfishing. The stock is nearly fully exploited. Stock biomass has declined since the 1970's and has been stable since the mid- 2000's with a slight recent increase. The fishing mortality rate should not be increased from the 2009-2011 level to avoid overfishing.

STECF COMMENTS: STECF agrees with the assessment of the status of the stock and the advice from the IATTC.

17.14 Pacific Striped Marlin (*Kajikia audax formerly Tetrapturus audax*)

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERY: Striped marlin occurs throughout the Pacific Ocean between about 45°N and 45°S. They are caught mostly by the longline fisheries of Far East and Western Hemisphere nations. Lesser amounts are caught by recreational, gillnet, and other fisheries. Catches in the WPO showed an increasing trend up to 1970, then a decreasing trend in recent years. Catches in WPO were 5,998 t in 2000, while incomplete reported catches dropped to 2,225 t in 2004 and 492 t in 2005; more recent catches are not available. Spain reported 0.27 t of striped marlin caught in the WCPO in 2007.

During recent years the greatest catches in the eastern Pacific Ocean (EPO) have been taken by fisheries of Costa Rica, Japan, and the Republic of Korea. Landings of striped marlin decreased in the EPO from 1990-1991 through 1998, and this decline has continued, with an average annual catch during 2004 to 2008 of about 2,100). The reported catches in the EPO in 2009 and 10 were considerably lower (879 and 1,349 t) but these data may still be incomplete.

The principal recreational fisheries for striped marlin in the EPO operate within about 50 to 100 miles of the shores of Mexico. These are generally characterized as catch-and-release for all marlin species. Sport-fishing trips increasing from about 32,500 trips in the early 1990s to about 55,500 trips in recent years, with annual catches of striped marlin increasing from about 13,300 fish to about 30,000 fish over this period. A record high catch of about 58,000 individuals was taken in 2007, the most recent year for which complete data are available, and the preliminary estimate for 2008 is of the same magnitude.

Average release rate for the 1999-2007 period was about 77.4 percent (range: 72.4 to 82.5). Assuming 100 percent mortality of fish released, and the reported annual median weight of fish sampled, then the conservative estimate of average annual mortality resulting from the recreational fishery during 1990-2006 was about 195 t (range: 115 to 310), and the mortality associated with the record high catch in 2007 was about 545 t. At a mortality rate of about 25 percent (Domeier et al., 2003), the mortality in 2007 was about 140 t.

SOURCE OF MANAGEMENT ADVICE: Traditionally, the advisory body was IATTC, but currently both ISC and the WCPFC also deal with this species

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

STOCK STATUS:

The stock structure of striped marlin is uncertain. Analyses of catch rates using generalized additive models suggest that in the north Pacific there appear to be at least two stocks, distributed principally east and west of

about 145º-150ºW, with the distribution of the stock in the east extending as far south as 10°-15°S. Genetic studies provide a more detailed picture of stock structure. McDowell and Graves (2008) suggest that there are separate stocks in the northern, north-eastern, and south-eastern, and south-western Pacific. Preliminary reports of more recent genetic studies indicate that the striped marlin in the EPO off Mexico, Central America, and Ecuador are of a single stock and that there may be juveniles from an identified Hawaiian-stock present seasonally in regions of the northern EPO. In 2011 stock assessments were presented for two of these stock units with divergent stock status estimates, in addition to which, the sum of the assessments cover significantly less than the total striped marlin in the Pacific. Stock status for the entire population therefore remains uncertain.

North Pacific Striped Marlin:

The WCNPSTR stock is overfished and experiencing overfishing. The current (2010) spawning biomass is 65% below SB_{MSY}=2,713 mt and the current fishing mortality (2007-2009) exceeds F_{MSY}=0.61 by 24%.

The SC8 recommends that the ISC conduct an additional set of projections of the WCNPO striped marlin based on the 2012 stock assessment results. The projections should be based on resampling only recruitment from the most recent 5 year period (2004-2008). Recruitment during that period is below the average of the 1994-2008 and may represent a different and more pessimistic recruitment regime than assumed in the current projections. The 8 harvest scenarios examined in the 2012 stock assessment should be evaluated with this more pessimistic assumption, and an additional run using this recruitment scenario and constant catch at the 2011 level should also be included. Probabilities of stock recovery as well as trajectories of spawning biomass and catch should be documented and presented to WCPFC9.

Northeast Pacific Striped Marlin:

The results of the latest IATTC (2009) assessment (Status and trends of striped marlin in the northeast pacific ocean in 2009, Michael G. Hinton and Mark N. Maunder) indicate that the striped marlin stock in the northeast Pacific Ocean is not overfished or being overfished.

- Stock biomass has increased from a low of about 2,600 metric tons (t) in 2003, and was estimated to be about 5,100 t in 2009.
- There has been an increasing trend in the estimated ratio of the observed annual spawning biomasses.
- The results of the assessment indicate that the striped marlin stock in the northeast Pacific Ocean is not overfished or being overfished.
- Stock biomass has increased from a low of about 2,600 metric tons (t) in 2003, and was estimated to be about 5,100 t in 2009.
- There has been an increasing trend in the estimated ratio of the observed annual spawning biomasses

Conversely: The Scientific Committee of the WCPFC whilst noting that no stock assessment was conducted for North Pacific striped marlin in 2011 has recommended an immediate reduction in fishing mortality for this stock.

Southwest Pacific Striped Marlin:

The southwest Pacific striped marlin assessment results indicate that the stock is fully exploited, is not experiencing overfishing but may be overfished. The SC noted that recent catches are close to MSY, and that recent fishing mortality is slightly below F_{MSY}, and that recent spawning biomass is slightly below SB_{MSY}. The recent catch increase is driven in part by increases in catch in the northern area of the stock area that is not subject to the current CMM for this stock.

SC8 recommends measures to reduce overall catch of this stock, through the expansion of the geographical scope of CMM 2006-04 to cover the distribution range of the stock. In designing such a measure to implement this recommendation from SC8, the Commission may need to consider the historic trends in the fishery, including the catch declines in the traditional central and southern areas and the recent catch increases in the northern areas. SC8 recognizes that striped marlin is often caught as a non-target species. SC8 therefore recommends data analysis be conducted to identify areas of high catch concentration that could be subject to targeted management.

Southeast Pacific striped marlin: The no assessment is available for this portion of the stock, but it is not clear to which extent the catches are considered in the SW stock.

RECENT MANAGEMENT ADVICE:

North Pacific Striped Marlin:

Reducing fishing mortality would likely increase spawning stock biomass and may improve the chances of higher recruitment.

- Fishing at a constant catch of 2,500 mt was estimated to increase spawning biomass by 133% to 223% by 2017.
- Fishing at a constant catch of 3,600 mt was estimated to increase spawning biomass by 48% to 120% by 2017.

In comparison, fishing at the current (2007-2009) fishing mortality rate was estimated to increase spawning biomass by 14% to 29% by 2017, and fishing at the average 2001-2003 fishing mortality rate would lead to a spawning biomass decrease of 2% under recent recruitment to an increase of 6% under the stock-recruitment curve assumption by 2017.

Northeast Pacific Striped Marlin: There is no management advice with respect to this stock component

Southwest Pacific Striped Marlin:

SC8 recommends measures to reduce overall catch of this stock, through the expansion of the geographical scope of CMM 2006-04 to cover the distribution range of the stock. In designing such a measure to implement this recommendation from SC8, the Commission may need to consider the historic trends in the fishery, including the catch declines in the traditional central and southern areas and the recent catch increases in the northern areas. SC8 recognizes that striped marlin is often caught as a non-target species. SC8 therefore recommends data analysis be conducted to identify areas of high catch concentration that could be subject to targeted management.

Southeast Pacific striped marlin: There is no management advice with respect to this stock component

STECF COMMENTS: STECF agrees with the advice.

17.15 Pacific Black Marlin (*Makaira indica*)

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERY: The Pacific Black Marlin is a by-catch mostly from the long-line fishery, but is a target species in some artisanal and recreational fisheries. Catches reached a peak of about 905 tons in 1973, decreasing in the following years. Total catch in the EPO from 1982 to 2010 ranged between 108 t to 358 t; the average catch in the last five years was about 165 t and the 2010 estimate (189t) suggests little change compared to recent years

SOURCE OF MANAGEMENT ADVICE: Traditionally, the advisory body was IATTC, but WCPFC, ISC and SPC are also competent.

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

STOCK STATUS: No recent stock assessments have been made for this species, although there are some data presented in the IATTC Bulletin series published jointly by scientists of the National Research Institute of Far Seas Fisheries (NRIFSF) of Japan and the IATTC that show trends in catches, effort, and CPUEs.

RECENT MANAGEMENT ADVICE: No management advice.

STECF COMMENTS: STECF notes that quantities of billfish caught in the Pacific Ocean are still not reported by species and many catches known to occur are not reported at all. The lack of reliable catch data is affecting the understanding of this stock and the management advice.

17.16 Pacific Shortbill Spearfish (*Tetrapturus angustirostris*)

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERY: The shortbill spearfish is occasionally taken as a by-catch in various fisheries or is as a target species in some artisanal or recreational fisheries. Reported catches in the EPO appear to have an episodic

nature. In 94-97 catches were around a 150t doubling sharply between 98 and 03 before declining to around 225 t in 04-08. Recent catches in 09 and 10 are greater than 450t. This may be a reporting issue as this species has been given relatively low priority by both fishery and management.

SOURCE OF MANAGEMENT ADVICE: The advisory bodies are IATTC, WCPFC, ISC and SPC**REFERENCE POINTS**: No precautionary reference points have been proposed for this stock.

STOCK STATUS: No recent stock assessments have been made for this species, although there are some data published jointly by scientists of the National Research Institute of Far Seas Fisheries (NRIFSF) of Japan and the IATTC in the IATTC Bulletin series that show trends in catches, effort, and CPUEs.

RECENT MANAGEMENT ADVICE: No management advice.

STECF COMMENTS: STECF agrees with this advicec.

17.17 Indo-Pacific Sailfish (*Istiophorus platypterus*)

No additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).**FISHERY**: Indo-Pacific sailfish is not uncommon among longline catches in the Pacific Ocean. Reported catches fluctuate considerably, reaching a peak of 2,323 tons in 1993. Between 1994 and 2004 catches in the EPO averaged around 1,400t, but catches have shown a continued steep decline since then to 95t in 2010 although it is not clear how complete the rececnt years' information is.

SOURCE OF MANAGEMENT ADVICE: The advisory bodies are IATTC, WCPFC, ISC and SPC.

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

STOCK STATUS: No recent stock assessments have been made for this species, although there are some data published jointly by scientists of the National Research Institute of Far Seas Fisheries (NRIFSF) of Japan and the IATTC in the IATTC Bulletin series that show trends in catches, effort, and CPUEs.

STECF COMMENTS: STECF notes that quantities of billfish and sailfish caught in the Pacific Ocean are still not reported by species and many catches known to occur are not reported at all. The lack of reliable catch data is affecting the understanding of stock status and the management advice.

17.18 Pacific jack mackerel (*Trachurus symmetricus*)

This stock now falls under the remit of SPRFMO which will meet in the last week of October 2013. Therefore no additional information on this stock was available to the STECF since 2012, hence the text below remains unchanged from the Consolidated STECF review of advice for 2013 (STECF-12-22).

FISHERY: The Pacific jack mackerel, *Trachurus symmetricus* (also known as the Californian jack mackerel or simply jack mackerel), is an abundant species of pelagic marine fish in the jack family, Carangidae. The species is distributed along the western coast of North America, ranging from Alaska in the north to the Gulf of California in the south, inhabiting both offshore and inshore environments. The Pacific jack mackerel is a moderately large fish, growing to a maximum recorded length of 81 cm, although commonly seen below 55 cm. It is very similar in appearance to other members of its genus, *Trachurus*, especially *Trachurus murphyi*, which was once thought to be a subspecies of *T. symmetricus*, and inhabits waters further south. Pacific jack mackerel travel in large schools, ranging up to 600 miles offshore and to depths of 400 m, generally moving through the upper part of the water column. Chilean (also known as Peruvian) jack mackerel (*Trachurus symmetricus murphyi*) is widespread throughout the South Pacific, from the shelf adjacent to Ecuador, Peru, and Chile; throughout the oceanic waters along the Subtropical Convergence Zone; in the New Zealand EEZ south of about 34S; and, in south-eastern waters of the Australian EEZ. From genetic studies it has been identified as a distinct species and supports one of the largest single-species fisheries in the world, with annual landings approaching 2.5 million tonnes (FAO, 2004). The fish aggregate in dense schools and layers, exhibit daily vertical migration, and feed on zooplankton associated with the upwelling areas off central-south Chile.

All species can be caught by bottom trawl, midwater trawl, or by purse seine targeting surface schools. Reported catches of Chilean jack mackerel (for FAO area 87) were 1.28 million tonnes in 1980, grew year-on-year to reach a peak of 4.96 million tonnes in 1995 and decreased thereafter to 1.5 million tonnes in 2000. Since then

catches have averaged 1.7 million tonnes. Jack mackerel catches by all but one of the fleets continued to decline in 2011, with overall 2011 catches being 69% of 2010 catches.

SOURCE OF MANAGEMENT ADVICE: The advisory body for the Chilean jack mackerel is the South Pacific Regional Fisheries Management Organisation (SPRFMO). The stock status and management advice below are based on the scientific working group of the SPRFMO.

REFERENCE POINTS: The South Pacific Regional Fisheries Management Organisation[6] has determined that, for the Chilean stock in 2005, a fishing mortality reference point of $F40\%_{BDR}$, F/Fref was 1.25. No precautionary reference points have been proposed for the other stocks. Reference points have not yet been revised, but the new assessment suggests a a biomass reference point of around 30% of virgin biomass with and F_{MSY} of around 0.25.

STOCK STATUS: The ratio of estimated total biomass to the biomass that would have existed had no fishing occurred has declined steadily throughout most of the history of this fishery. Under the JJM assessment model base case, the 2011 ratio of total biomass relative to the potential unfished biomass is estimated to be 14%, ranging from 10% (model 3) to 19% (model 2) in sensitivity analyses.

The 2011 assessments results indicate a continuing decrease in fishing mortality and a slight increase in estimated total biomass over 2010, but a continuing decrease in spawning biomass. There continue to be indications of slightly improved recruitment in recent years, although the updated assessment indicates that the apparently strong recruitment observed by a number of fleets in 2010 was actually lower than the recruitment in 2009, and well below longterm average levels.

With respect of the currently accepted reference points the stock status cannot be evaluated. According to the projections of the new assessment the stock is overfished and overfishing is occurring.

RECENT MANAGEMENT ADVICE:

Projection results under the assumption of average recruitment at the levels estimated for the recent five year period 2006 – 2010 indicate that catches should be maintained below 520,000 t to maintain spawning biomass at least at current levels. Catches below 390,000 t are projected to have a high probability of resulting in spawning stock rebuilding under most projections.

In 2007, the South Pacific Regional Fisheries Management Organisation noted that with the exception of Chilean vessels, there are no management measures in place for jack mackerel fisheries in the high seas (New Zealand and Australian vessels that may take this species as an occasional by-catch are regulated by a high seas permitting regime).

Due to the nature of the straddling Chilean stock, the same regulatory controls that apply within the Chilean EEZ also apply on the high seas: these controls include maximum catch limits per vessel owner and size limits.

STECF COMMENTS: STECF agrees with the advice provided by scientific working group of SPRFO and hopes that the reference point issue caused by the change in the assessment can be resolved at the first commission meeting.

18 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). The 2012/13 fishing season started on 1 December 2012 and ended on 30 November 2013. Members' fishing vessels operated in the fisheries targeting mackerel icefish (*Champsocephalus gunnari*), toothfish (*Dissostichus eleginoides* and/or *D. mawsoni*) and krill (*Euphausia superba*) during the fishing season. The reported data are the totals up to 20 September 2013, but some fisheries were at that time fishing still in progress in some areas.

The WG-FSA 2013 focused on the assessment of finfish fisheries in the Convention Area, including the biennial assessments for the fisheries for Patagonian toothfish (*D. eleginoides*) in Subareas 48.3, 48.4, and 48.6 and Divisions 58.4.1, 58.4.2, 58.4.3a&b and 58.5.2, and the fisheries for *Dissostichus* spp. in Subareas 88.1 and 88.2, the annual assessments for mackerel icefish (*C. gunnari*) in Subarea 48.3 and Division 58.5.2, and the

[6] SPRFMO-III-SWG-16

development of advice on precautionary catch limits and other issues relevant to management of CCAMLR fisheries. The Fishery Reports will be made available on the CCAMLR website by 20 February 2014.

18.1 Toothfish (*Dissostichus* spp.)

The reported total catch of toothfish (Dissostichus spp.) for the fishing season 2012/13 to 20 September was 12,565 tonnes.

18.1.1 Patagonian tootfish (Dissostichus eleginoides) in Subarea 48.3, South Georgia

FISHERIES: Longline fishing for Patagonian toothfish (*Dissostichus eleginoides*) in Subarea 48.3 began in the late 1980s and expanded rapidly during the 1990s. Annual catches are in generally in the range of 3,000 to 5,000 tonnes, with a peak in 2002/03 at 7,500 tonnes. In the mid to late 1990s there was significant illegal fishing, exceeding the catch of the legal fishery in some years. In 2004, the Commission agreed to subdivide Subarea 48.3 into one area containing the South Georgia–Shag Rocks (SGSR) stock and other areas, to the north and west, that do not include the SGSR stock. Within the SGSR area, the Commission defined three Management Areas (A, B and C) (CM 41-02/A).

The fishery in 2012/13 for *D. eleginoides* in Subarea 48.3 operated in accordance with CM 41-02 and associated measures, with a catch limit of 2,600 tonnes. Six vessels, using longlines, reported a total catch of 2,098 tonnes up to 20 September 2013. There has been no significant IUU catch since the 2000/01 season.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. A preliminary assessment based on an integrated assessment (CASAL) was used with catch-at-length, CPUE, tagging and survey abundance data. The assessment results were consistent with those of 2011. The 2-fleet model estimated B_0 at 87,665 tonnes, with the spawning stock biomass status in 2013 at 0.52 of B_0. The average recruitment and CV from 1992 to 2006 were used for the stock projections with a lognormal empirical randomisation method of recruitment. Cetacean depredation on longlines was estimated in 2011/12 and 2012/13 to be 4.2% and 5.4% respectively. The stock assessment was based on estimates of total removals that were determined from the reported catches adjusted by the depredation correction factor. The precautionary catch limit was set at 2,400 tonnes.

REFERENCE POINTS: $SSB_{t+35years}$ >= 50% SSB_0; probability of SSB dropping below 20% of SSB_0 <0.1.

STOCK STATUS: There is genetic separation between Subarea 48.3 and the Patagonian Shelf (FAO Area 41). The SGSR stock, occurring within management areas A, B and C is genetically separate from fish taken in the extreme north and west of Subarea 48.3. All assessments consider only the SGSR stock. The stock in Subarea 48.3 is considered fully exploited.

RECENT MANAGEMENT ADVICE: The catch limit for *D. eleginoides* in Subarea 48.3 was set at 2,400 tonnes for 2013/14 and 2014/15, subdivided for the Management Areas: 0 tonnes in A, 720 tonnes in B and 1,680 tonnes in C, in each season. By-catch limits and move-on rules are included in the annual conservation measure established for this fishery (CM 41-02).

STECF COMMENTS: STECF has no comments.

18.1.2 Patagonian toothfish (Dissostichus eleginoides) in Subarea 48.4, South Sandwich Islands

The assessment and management of *Dissostichus* spp. fisheries in Subarea 48.4 has always been based on separate assessments for the northern and southern management area, in which the assessment for the Northern Area was carried out for *D. eleginoides*, using CASAL, whilst for the Southern Area a Petersen biomass estimate was calculated for *D. eleginoides* and *D. mawsoni* combined. In 2012 it was decided that species-specific assessments should be developed for the subarea to provide more appropriate assessments and management of the fisheries.

FISHERIES: The fishery for *Dissostichus eleginoides* in Subarea 48.4 was initiated as a new fishery in 1992/93 following notifications from Chile and the USA, and the adoption of CM 44/XI, which set a precautionary catch limit for *D. eleginoides* of 240 tonnes for that season. Subsequently, the USA withdrew from the fishery and the Chilean longline vessel abandoned fishing after one week due to poor catches. In addition, a Bulgarian-flagged longliner fished in November and December 1992 and reported a catch of 39 tonnes of *D. eleginoides*. Haul-by-haul data from the Chilean and Bulgarian vessels were submitted to

CCAMLR and on basis of these data the Commission adopted a precautionary catch limit for *D. eleginoides* of 28 tonnes per season. In addition, targeting of *D. mawsoni* was prohibited, other than for scientific research purposes. These limits remained in force until 2004. In 2004/05, the UK conducted a pilot tagging program using a fishing vessel. This tagging program was carried forward till 2007/08. The experiment resulted in a CASAL assessment of toothfish in the northern part of Subarea 48.4 in 2009. In 2008, the Commission agreed to a continuation of the tagging experiment initiated in 2004/05 and to dividing Subarea 48.4 into a northern area (Subarea 48.4 North) and a southern area (Subarea 48.4 South), with a directed longline fishery on *D. eleginoides* in Subarea 48.4 North and *Dissostichus* spp. in Subarea 48.4 South. The fishery for *Dissostichus* spp. in Subarea 48.4 in 2012/13 operated in accordance with CM 41-03 and associated measures. The catch limit for *D. eleginoides* in the Northern Area was 63 tonnes and in the Southern Area 52 tonnes. Two vessels using longlines in the Northern Area reported a total reported catch of 62 tonnes, after which the management area was closed on 4 April 2013. The total reported catch up in the Southern Area to 20 September 2013 was 50 tonnes.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. A preliminary age based CASAL assessment for *D. eleginoides* was performed and incorporated catch-at-length data from 2004/05 to 2012/13, with the exception of catch-at-age data of 2008/09.

REFERENCE POINTS: $SSB_{t+35years}$ >= 50% SSB_0; probability of SSB dropping below 20% of SSB_0 <0.1.

STOCK STATUS: *D. eleginoides* biomass was estimated using CASAL with 1,600 tonnes and the Petersen method with 1,400 tonnes. The resulting long-term catch that satisfied the CCAMLR harvest control rules was 45 tonnes.

RECENT MANAGEMENT ADVICE: The area open to fishing are defined as that portion of Statistical Subarea 48.4 that lies within the area bounded by latitudes 55°30'S and 57°20'S and by longitudes 25°30'W and 29°30'W, and by latitudes 57°20'S and 60°00'S and by longitudes 24°30'W and 29°00'W. For the portion of Statistical Subarea 48.4 open for fishing a catch limit of 45 tonnes for *D. eleginoides* was set for 2013/14, with a limit on by-catch for macrourids of 11 tonnes and a limit for rajids of 3.5 tonnes and the maintenance of a move-on rule for by-catch species (CM 41-03). If the catch limit of *D. eleginoides* is reached prior to the closure of the fishery, the area north of 58°00'S shall be closed. The portion of Statistical Subarea 48.4 outside the defined area open to fishing (see above) is closed to directed fishing for *Dissostichus* spp.

STECF COMMENTS: STECF has no comments.

18.1.3 *Antarctic toothfish (Dissostichus mawsoni) in Subarea 48.4, South Sandwich Islands*

The assessment and management of *Dissostichus* spp. fisheries in Subarea 48.4 has always been based on separate assessments for the northern and southern management area, in which the assessment for the Northern Area was carried out for *D. eleginoides*, using CASAL, whilst for the Southern Area a Petersen biomass estimate was calculated for both *D. eleginoides* and *D. mawsoni* combined. In 2012 it was decided that species-specific assessments should be developed for the subarea to provide more appropriate assessment and management of the fisheries.

FISHERIES: The fishery for *Dissostichus eleginoides* in Subarea 48.4 was initiated as a new fishery in 1992/93 following notifications from Chile and the USA, and the adoption of CM 44/XI, which set a precautionary catch limit for *D. eleginoides* of 240 tonnes for that season. Subsequently, the USA withdrew from the fishery and the Chilean longline vessel abandoned fishing after one week due to poor catches. In addition, a Bulgarian-flagged longliner fished in November and December 1992 and reported a catch of 39 tonnes of *D. eleginoides*. Haul-by-haul data from the Chilean and Bulgarian vessels were submitted to CCAMLR and on basis of these data the Commission adopted a precautionary catch limit for *D. eleginoides* of 28 tonnes per season. In addition, targeting of *D. mawsoni* was prohibited, other than for scientific research purposes. These limits remained in force until 2004. In 2004/05, the UK conducted a pilot tagging program using a fishing vessel. This tagging program was carried forward till 2007/08. The experiment resulted in a CASAL assessment of toothfish in the northern part of Subarea 48.4 in 2009. In 2008, the Commission agreed to a continuation of the tagging experiment initiated in 2004/05 and to dividing Subarea 48.4 into a northern area (Subarea 48.4 North) and a southern area (Subarea 48.4 South), with a directed longline fishery on *D. eleginoides* in Subarea 48.4 North and *Dissostichus* spp. in Subarea 48.4 South. The fishery for *Dissostichus* spp. in Subarea 48.4 in 2012/13 operated in accordance with CM 41-03 and associated measures. The catch limit for *D. eleginoides* in the Northern Area was 63 tonnes and in the Southern Area 52 tonnes. Two vessels using longlines in the Northern Area reported a total reported catch of 62 tonnes, after which the management

area was closed on 4 April 2013. The total reported catch up in the Southern Area to 20 September 2013 was 50 tonnes.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. The first species-specific biomass estimates for *D. mawsoni* in Subarea 48.4. were performed using a tag-based Petersen estimator.

REFERENCE POINTS: $SSB_{t+35years}$ >= 50% SSB_0; probability of SSB dropping below 20% of SSB_0 <0.1.

STOCK STATUS: The biomass of Antarctic toothfish (*D. mawsoni*) in Subarea 48.4 was estimated using as Petersen method as 640 tonnes. The catch limit for 2013/14 was estimated by applying the same catch rate as in previous years which is based on the harvest rate of *D. eleginoides* in Subarea 48.3 ($\gamma = 0.038$).

RECENT MANAGEMENT ADVICE: The area open to fishing are defined as that portion of Statistical Subarea 48.4 that lies within the area bounded by latitudes 55°30'S and 57°20'S and by longitudes 25°30'W and 29°30'W, and by latitudes 57°20'S and 60°00'S and by longitudes 24°30'W and 29°00'W. For the portion of Statistical Subarea 48.4 open for fishing a catch limit of 24 tonnes for *D. mawsoni* was set for 2013/14, with a limit on by-catch for macrourids of 11 tonnes and a limit for rajids of 3.5 tonnes and the maintenance of a move-on rule for by-catch species (CM 41-03). If the catch limit for *D. mawsoni* is reached prior to the closure of the fishery, the area south of latitude 57°20'S shall be closed. The portion of Statistical Subarea 48.4 outside the defined area open to fishing (see above) is closed to directed fishing for *Dissostichus* spp.

STECF COMMENTS: STECF has no comments.

18.1.4 *Patagonian tootfish (Dissostichus eleginoides) in Division 58.5.1., Kerguelen Islands*

FISHERIES: The fishery for *Dissostichus eleginoides* operates in the French EEZ around the Kerguelen Islands in Division 58.5.1. The fishery began in 1984/85 as a trawl fishery targeting *D. eleginoides*, however, trawling targeting other species between 1979 and 1984 caught small amounts of toothfish as by-catch. Trawling continued to 2000/01; a longline fishery began in 1991/92 and continues to the present. The fishery is active throughout most of the year and only longlining is currently permitted in this fishery and operates in the French EEZ around the Kerguelen Islands (outside the 12 n mile zone and down to the 500 m isobath) in Division 58.5.1. The catch limit of *D. eleginoides* set by France in its EEZ in Division 58.5.1 for 2012/13 was 5,100 tonnes, and this was allocated to seven longliners. The catch for the current season reported to October 2013 was 3,239 tonnes. The estimated IUU catch for the 2012/13 season was zero inside the French EEZ. Some IUU fishing may have occurred outside the EEZ.

SCOURCE OF MANAGEMENT ADVICE: The fishery inside the EEZ of the Kerguelen Islands is managed by France. CCAMLR provides general management advice for Division 58.5.1. France informed that the development of a stock assessment model using CASAL is ongoing, and it intends to present the model to a future meeting of WG-FSA. It reviewed a preliminary assessment (CASAL, with catch, CPUE and length-frequency data from the commercial fishery from 1979 onwards). In 2013 France finished the POKER 3 survey and is in process of updating the stock assessment in the coming year.

REFERENCE POINTS: Assessment of appropriate levels of future catch has not been based on the CCAMLR decision rules.

STOCK STATUS: *D. eleginoides* occurs throughout the Kerguelen Islands shelf, from shallow waters (<10 m) to at least 2,000 m depth. As fish grow, they move to deeper waters, and are recruited to the trawl fishery on the slopes of the shelf and subsequently to the longline fishery in deeper waters. A general east–west deep-sea movement of adult fish occurs and spawning is restricted to the westerly zone early in winter each year. Tagging experiments at Heard Island (Division 58.5.2) show long-distance movements of sub-adult/adult fish between zones (Heard to Kerguelen and also Crozet), but the proportion of exchange between stocks is unknown.

RECENT MANAGEMENT ADVICE: Due to the absence of new data, no stock assessment could be carried out, therefore the Scientific Committee recalled last year's advice: "5,100 tonnes of *D. eleginoides* in the French EEZ in Division 58.5.1 could be used as management advice for 2012/13". No new information was available on the state of fish stocks in Division 58.5.1 outside areas of national jurisdiction and it was therefore recommended that the prohibition of directed fishing for *D. eleginoides*, described in CM 32-13, remains in force.

STECF COMMENTS: STECF has no comments.

18.1.5 Patagonian tootfish (Dissostichus eleginoides) in Subarea 58.5.2., Heard and McDonald Islands

FISHERIES: From 1996/97 to 2001/02 the fishery was a trawl fishery, only in recent seasons the fishery has been prosecuted by trawl, longline and pot. The fishery in 2012/13 for *D. eleginoides* in Division 58.5.2 operated in accordance with CM 41-08 and associated measures. The catch limit was 2,730 tonnes and fishing was conducted by four vessels using bottom trawls, longlines and pots. The total reported catch up to 20 September 2013 was 2,413 tonnes. There has been no evidence of IUU fishing in Division 58.5.2 since 2006/07.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. There is also a 200 mile EEZ around Heard and McDonald Islands administered by Australia. An updated assessment for *D. eleginoides* in Division 58.5.2 was performed with data until the start of August 2013 and based on a CASAL model, with catches, tag releases/recaptures data, commercial catch-at-length data and orca depredation. This assessment resulted in an update of the growth model and compared the effects of a range of alternative fishery structures and model assumptions for year-class strength (YCS) on stock assessment estimates and projected catch limits that satisfy the CCAMLR decision rules.

REFERENCE POINTS: $SSB_{t+35years}$ >= 50% SSB_0; probability of SSB dropping below 20% of SSB_0

STOCK STATUS: *D. eleginoides* occurs throughout the Heard Island and McDonald Islands Plateau, from shallow depths near Heard Island to at least 1,800 m depth around the periphery of the plateau. Genetic studies have demonstrated that the population at Heard Island and McDonald Islands is distinct from those at distant locations such as South Georgia and Macquarie Island, but that within the Indian Ocean sector there appears to be no distinction between fish at Heard, Kerguelen, Crozet or Marion/Prince Edward Islands. This, combined with results from tagging data which show movement of some fish from Heard Island to Kerguelen and Crozet Islands suggests that a metapopulation of *D. eleginoides* may exist in the Indian Ocean sector. Preliminary results show different estimates for the initial and current biomass.

RECENT MANAGEMENT ADVICE: The catch limit for *D. eleginoides* in Division 58.5.2 west of 79°20'E was set at 2,730 tonnes for 2013/14 (CM 41-08).

STECF COMMENTS: STECF has no comments.

18.1.6 Patagonian tootfish (Dissostichus eleginoides) in Subarea 58.6, Crozet Islands inside French EEZ

FISHERIES: The fishery for *Dissostichus eleginoides* operated in the French EEZ around the Crozet Islands in Subarea 58.6. The fishery has been conducted using longlines from 1996/97 to the present. The catch limit set by France in its EEZ in Subarea 58.6 for 2010/11 was 700 tonnes, and this was allocated to six longliners. The catch for the current season reported to 20 September 2013 was 504 tonnes. A high level of depredation on *D. eleginoides* catches from killer whales (*Orcinus orca*) is the main reason why fishers avoid the area. There was no evidence of IUU fishing in 2012/13.

SCOURCE OF MANAGEMENT ADVICE: The fishery inside the EEZ of the Crozet Islands is managed by France, which performed a first stock assessment for this species.

REFERENCE POINTS: Assessment of appropriate levels of future catch are based on the CCAMLR decision rules.

STOCK STATUS: Tagging has been carried out since 2006, so far 4 353 fish have been tagged from commercial longliners at Crozet. Of the tagged fish, 197 were recaptured; 182 from French tagging and 15 from tagging at Heard Island. A range of 55,000 to 115,000 tonnes was observed for B_0 and SSB never falls below 70% of the initial biomass considering the actual level of catches.

RECENT MANAGEMENT ADVICE: The catch limit for *D. eleginoides* in Subarea 58.6 (French EEZ) was set at 2,500 tonnes (including 10% orca depredation). No new information was available on the state of fish stocks in Subarea 58.6 outside areas of national jurisdiction. Therefore the prohibition of directed fishing for *D. eleginoides*, described in CM 32-11, remains in force.

STECF COMMENTS: STECF has no comments.

18.1.7 Patagonian tootfish (Dissostichus eleginoides) in Subarea 58.6 and 58.7, Prince Edward and Marion Islands inside South Africa EEZ

FISHERIES: A licensed fishery within the South African EEZ at the Prince Edward Islands started in October 1996. Part of the South African EEZ is outside the CCAMLR Convention Area (Area 51) and part falls within Subareas 58.6 and 58.7 and Division 58.4.4. Most fishing in the South African EEZ takes place to the north and the east of the Prince Edward Islands in Subareas 58.6 and 58.7 and Area 51, and this Fishery Report focuses on Subareas 58.6 and 58.7. An interim catch limit of *D. eleginoides* in the South African EEZ for 2011/12 was 320 tonnes, of which 200 tonnes were set aside to conduct an experiment to calibrate CPUE between and was retained for 2012/13. The total reported catch of two vessels was 234 tonnes up to 15 October 2013 and were still operating. There was no evidence of IUU catch in recent seasons.

SCOURCE OF MANAGEMENT ADVICE: The fishery in the waters adjacent to Prince Edward and Marion Islands is managed by the Republic of South Africa. Subarea 58.6 also includes the Crozet Islands to the east of the Prince Edward Islands. The assessment was reviewed in 2007. The adoption of the operational management procedure (OMP) as a basis for management is currently being considered by South Africa, but is being hampered by the fact that the fishery has moved from Spanish to trott gear since 2009 and only trot-line gear was used in 2011. A revised operational management procedure to form the basis for a management advice is under development by South Africa, with CPUE comparisons between Spanish and trotlines and the continuation of historic CPUE series that is based on Spanish longline gear.

REFERENCE POINTS: Assessment of appropriate levels of future catch has not been based on the CCAMLR decision rules.

STOCK STATUS: The South African EEZ around the Prince Edward Islands is mainly in Subarea 58.7, but extends east into Subarea 58.6, south into Division 58.4.4, and north of the Convention Area into Area 51. However, there are currently no fishing grounds in the southern half of the South African EEZ. The majority of the fishery occurs down to about 1,500 m, but fishing depths in excess of 2,000 m have been recorded. Subarea 58.6 also includes the Crozet Islands to the east of the Prince Edward Islands. The current stock assessments did not consider the possibility that these island groups share the same toothfish stock.

RECENT MANAGEMENT ADVICE: The catch limit of *D. eleginoides* in the South African EEZ for 2013/14 was not yet determined at the time of the meeting, but is likely to be higher than 400 tonnes. No new information was available on the state of fish stocks in Subareas 58.6 and 58.7 and Division 58.4.4 outside areas of national jurisdiction. Therefore, the prohibition of directed fishing for *D. eleginoides*, described in CM 32-02 remains in force.

STECF COMMENTS: STECF has no comments.

18.1.8 Patagonian tootfish (Dissostichus eleginoides) and Antarctic toothfish (D. mawsoni) exploratory fishery in Subarea 48.5, Weddell Sea

FISHERIES: Directed fishing on Patagonian tootfish (*D. eleginoides*) and Antarctic toothfish (*D. mawsoni*) in Subarea 48.5 was prohibited in 1997. Russia had performed research in Subarea 48.5 in 2012/13 and has notified for research fisheries in 2013/14.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

REFERENCE POINTS: None available for this fishery.

STOCK STATUS: No data are available on the stock structure of fish in this fishery.

RECENT MANAGEMENT ADVICE: The fishery is currently conducted as a CCAMLR Exploratory Fishery. Catch limits are therefore set at a level not substantially above that necessary to obtain the information specified in the Exploratory Fishery's Data Collection Plan. The Commission agreed that it could provide no new advice on catch limits for this subarea. Directed fishing for *Dissostichus* spp. in Subarea 48.5 is prohibited in 2013/14 (CM 32-09). Russia is allowed to conduct research that depending on the ice condition, the order of priority was the completion of this research in 2014 was first the research block in Option 1 (inside research block a maximum catch of 60 tonnes with 50% of lines separated by a minimum of 3 n miles), then the prospecting sets in Option 1 (ouside the research block a maximum of 213 tonnes and 40 longline sets with no more than 3,600 hooks per set and separated by a minimum of 5 n miles), and last the completion of Options 2 (a maximum catch of 48 tonnes and 40 longline sets with no more than 3,600 hooks per set and separated by a

minimum of 5 n miles) and 3 (a maximum catch of 112 tonnes and 80 longline sets with no more than 3,600 hooks per set and separated by a minimum of 5 n miles), when possible.

STECF COMMENTS: STECF has no comments.

18.1.9 Patagonian tootfish (Dissostichus eleginoides) and Antarctic toothfish (D. mawsoni) exploratory fishery in Subarea 48.6

FISHERIES: The longline fishery for *Dissostichus* spp. in Subarea 48.6 began as a new fishery in 1996/97 (CM 114/XV). In 1999, the Commission agreed that high levels of IUU fishing for *Dissostichus* spp. in the Convention Area had rendered it unrealistic to consider this fishery as 'new', and the fishery was re-classified as exploratory. Licensed longline vessels have fished the exploratory fishery for *Dissostichus* spp. in Subarea 48.6 since 2003/04, and the dominant species in the catches in recent seasons was *D. mawsoni*. For the season 2013/14, a combined research notification from Japan and South Africa was received.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

REFERENCE POINTS: None available for this fishery.

STOCK STATUS: No data are available on the stock structure of fish in this fishery.

RECENT MANAGEMENT ADVICE: The fishery is currently conducted as a CCAMLR Exploratory Fishery. Catch limits are therefore set at a level not substantially above that necessary to obtain the information specified in the Exploratory Fishery's Data Collection Plan. The Commission agreed that it could provide no new advice on catch limits for this subarea and noted the recommendations for increasing the research requirements in this fishery. It therefore recalled the continuation of the research by Japan and South Africa using longlines only. Catch limits for research in 2013/14 in Subarea 48.6 was set at 28 tonnes in SSRUs A and G for *D. eleginoides* and 170 tonnes for *D. mawsoni*, 190 tonnes in SSRUs B and C, 50 tonnes in SSRU D, 100 tonnes in SSRU E and 0 tonnes in SSRU F all for *Dissostichus* spp. (CM 41-04).

STECF COMMENTS: STECF has no comments.

18.1.10 Patagonian tootfish (Dissostichus eleginoides) and Antarctic toothfish (D. mawsoni) exploratory fishery Division 58.4.1.

FISHERIES: The exploratory longline fishery for Dissostichus spp. in Division 58.4.1 was first agreed by the Commission in 1998/99 (CM 166/XVII), and licensed longline vessels first operated in this fishery in 2004/05. In 2012, the fishery was limited to Japanese, Korean, New Zealand, Russian, South African and Spanish vessel using longlines only. Spain performed a combined depletion experiment and tag recapture approach in Division 58.4.1 in 2013. Also Japan and South Korea performed research in 2013. Total reported catch for 2012/13 was 48 tonnes. IUU fishing in Division 58.4.1 was first detected in 2005/06, and high levels of IUU fishing in 2005/06, 2006/07 and 2009/10 resulted in the total removals being well in excess of the catch limits.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

REFERENCE POINTS: None available for this fishery.

STOCK STATUS: Data show that juvenile fish inhabit mostly the shelf, while larger fish live on the slope and pre-spawning fish are found either on their northward spawning migration or inhabit the deeper slope. Further unkown.

RECENT MANAGEMENT ADVICE: The fishery is currently conducted as a CCAMLR Exploratory Fishery. Catch limits are therefore set at a level not substantially above that necessary to obtain the information specified in the Exploratory Fishery's Data Collection Plan. The Commission agreed that it could provide no new advice on catch limits for this subarea and noted the recommendations for increasing the research requirements in this fishery. It therefore recalled the continuation of the research by Japan and Spain using longlines only. The precautionary catch limit for *Dissostichus* spp. in 2013/14 set at 724 tonnes: 0 tonnes in SSRUs A-B, 257 tonnes in SSRU C, 42 tonnes in SSRU D, 315 tonnes in SSRU E, 0 tonnes SSRU F, 68 tonnes in SSRU G and 42 tonnes in SSRU H. The exploratory fishery shall be conducted by Japan (one vessel), Republic of Korea (one vessel) and Spain (one vessel) using longlines only (CM 41-11).

STECF COMMENTS: STECF has no comments.

18.1.11 Patagonian tootfish (Dissostichus eleginoides) and Antarctic toothfish (D. mawsoni) exploratory fishery in Division 58.4.2.

FISHERIES: The exploratory fishery for Dissostichus spp. In Division 58.4.2 was first agreed by the Commission in 2000, with a trawling fishery which was permitted in association with a new fishery for *Chaenodraco wilsoni, Lepidonothen kempi, Trematomus eulepidotus* and *Pleurogramma antarcticum*. The exploratory trawl fishery was also permitted in 2001/02 in association with a new fishery for *Macrourus* spp. Licensed longline vessels have fished the exploratory fishery for *Dissostichus* spp. in Division 58.4.2 since 2003/04, and the target species is *D. mawsoni*. Total reported catch for 2012/13 was 4 tonnes.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. In 2010, the Commission required each vessel catching more than 2 tonnes of *Dissostichus* spp. in an exploratory fishery to achieve a minimum tag overlap statistic of 50% in 2010/11 and of 60% from 2011/12 onwards (Annex 41-01/C).

REFERENCE POINTS: None available for this fishery.

STOCK STATUS: Data show that juvenile fish inhabit mostly the shelf, while larger fish live on the slope and pre-spawning fish are found either on their northward spawning migration or inhabit the deeper slope. Further unknown.

RECENT MANAGEMENT ADVICE: The fishery is currently conducted as a CCAMLR Exploratory Fishery. Catch limits are therefore set at a level not substantially above that necessary to obtain the information specified in the Exploratory Fishery's Data Collection Plan. The precautionary catch limit for *Dissostichus* spp. in 2013/14 for research by Japan (one vessel) and Spain (one vessel) was set at is set at 30 tonnes for SSRU A and 35 tonnes in SSRU E (CM 41-05).

STECF COMMENTS: STECF has no comments.

18.1.12 Patagonian tootfish (Dissostichus eleginoides) and Antarctic toothfish (D. mawsoni) exploratory fishery in Division 58.4.3a, Elan Bank outside areas of national juridiction

FISHERIES: Longline fishery for *Dissostichus* spp. In Division 58.4.3 began as a new fishery in 1997, but was reclassified as exploratory in 2000. In 2001, the boundaries of Division 58.4.3 were rearranged on the basis of ecological considerations, and two new divisions were formed: Division 58.4.3a (Elan Bank) and Division 58.4.3b (BANZARE Bank). The Commission agreed to exploratory fisheries for *Dissostichus* spp. in each of these new divisions, outside areas of national jurisdiction. During 2013/13 France and Japan carried out exploratory fisheries using longlines only, with a total reported catch of 16 tonnes.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

REFERENCE POINTS: None available for this fishery.

STOCK STATUS: No data are available on the stock structure of fish in this fishery.

RECENT MANAGEMENT ADVICE: The fishery is currently conducted as a CCAMLR Exploratory Fishery. Catch limits are therefore set at a level not substantially above that necessary to obtain the information specified in the Exploratory Fishery's Data Collection Plan. No new advice could be provided on catch limits for this division for 2013/14 and the Commission endorsed the continuation of research with the requirement that each vessel set a minimum of five research sets, separated by at least 3 n miles, east of the 70°E meridian, after which research sets (CM 41-01) can continue within the research block defined in 2012. The precautionary catch limit for *Dissostichus* spp. outside areas of national jurisdiction was set at 32 tonnes in 2013/14, with a minimum for each vessel of 10 tonnes. The exploratory fisheries shall be conducted by France (one vessel) and Japan (one vessel), using longlines only (CM 41-06).

STECF COMMENTS: STECF has no comments.

18.1.13 Patagonian tootfish (Dissostichus eleginoides) and Antarctic toothfish (D. mawsoni) exploratory fishery in Division 58.4.3b, Banzare Bank outside areas of national juridiction

FISHERIES: Longline fishery for Dissostichus spp. In Division 58.4.3 began as a new fishery in 1997, but was reclassified as exploratory in 2000. In 2001, the boundaries of Division 58.4.3 were rearranged on the basis of ecological considerations, and two new divisions were formed: Division 58.4.3a (Elan Bank) and Division 58.4.3b (BANZARE Bank). The Commission agreed to exploratory fisheries for *Dissostichus* spp. in each of these new divisions, outside areas of national jurisdiction. In 2007, the division was subdivided into small-scale research units (SSRUs) A (north of 60°S) and B (south of 60°S). In 2008, SSRU A was further subdivided into SSRUs A,C,D and E. Since 2009/10, operations in this fishery have been limited to research fishing only, in accordance with CM 24-01. In 2010/11, there was limited to research fishing for *Dissostichus* spp. in Division 58.4.3b and was conducted by one Japanese vessel using longlines only, in accordance with CM 24-01 (CM 41-07), and reported a total catch of 11 tonnes of *Dissostichus* spp (2 tonnes of *D. eleginoides* and 9 tonnes of *D. mawsoni*). The IUU catch of *Dissostichus* spp. in 2010/11 was not estimated

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

REFERENCE POINTS: None available for this fishery.

STOCK STATUS: No data are available on the stock structure of fish in this fishery.

RECENT MANAGEMENT ADVICE: The fishery is currently conducted as a CCAMLR Exploratory Fishery. Catch limits are therefore set at a level not substantially above that necessary to obtain the information specified in the Exploratory Fishery's Data Collection Plan. No new advice could be provided on catch limits outside areas of national jurisdiction on Banzare Bank, SSRUs A-E is set at 0 tonnes for 2013/14 and (CM 41-07).

STECF COMMENTS: STECF has no comments.

18.1.14 Patagonian tootfish (Dissostichus eleginoides) and Antarctic toothfish (D. mawsoni) exploratory fisheries in Subareas 88.1and 88.2, Ross Sea

FISHERIES: In 2005 the Subareas 88.1 and 88.2 were split into two areas for the purposes of stock assessment: (i) the Ross Sea (Subarea 88.1 and SSRUs 882A–B), and (ii) SSRU 882E. The catch limits for the Subarea 88.1 and 88.2 SSRUs in the Ross Sea were changed as part of a three-year experiment starting in 2005/06. The SSRUs between 150°E and 170°E (881A, D, E, F) and between 170°W and 150°W (882A–B) were closed to fishing to ensure that effort was retained in the area of the experiment. To assist administration of the SSRUs, the catch limits for SSRUs 881B, C and G were amalgamated into a 'north' region and those for SSRUs 881H, I and K were amalgamated into a 'slope' region. Within Subarea 88.2, SSRU 882E was treated as a separate SSRU with its own catch limit, whilst SSRUs 882C, D, F and G were amalgamated with a single catch limit. However, in each of the closed SSRUs and prior to 2008/09, a nominal catch of up to 10 tonnes of *Dissostichus* spp. remained permissible under the research fishing exemption; these fishing research catch limits were removed in 2008. SSRU J was subdivided into two SSRUs (SSRU J and SSRU M) in 2008, and the catch limits for SSRUs 881J and L were amalgamated to assist administration. New Zealand, Norway, Republic of Korea, Russia, Spain, UK and Ukraine carried out exploratory fisheries in 2012/13 using longlines only, with a reported catch of 3,185 tonnes of Antarctic tootfish (*D. mawsoni*) in Subarea 88.1. New Zealand, Norway, Republic of Korea, Russia, UK and Ukraine conducted exploratory fisheries in 2012/13 using longlines only, with a reported catch of 476 tonnes of Antarctic tootfish (*D. mawsoni*) in Subarea 88.2.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. The assessment is based on an integrated assessment (CASAL) that uses catch at age by sex, CPUE and tagging data. CASAL model structure and assumptions are detailed in the WG-FSA Report 2011.

REFERENCE POINTS: SSB_t+35years >= 50% SSB_0; probability of SSB dropping below 20% of SSB_0 <0.1.

STOCK STATUS: The stocks in Subarea 88.1 is considered fully exploited. A new stock assessment was undertaken in 2012. MCMC estimates of initial (equilibrium) spawning stock abundance (B_0) were 73,870 tonnes (95% credible interval (CI) 69,070–78,880 tonnes), and current biomass ($B_{current}$) was estimated as 80% B_0 (95% CI 76.8–81.3%). The projected biomass trajectory assumes a future constant catch of 3,282 tonnes. For Subarea 88.2 (SSRUs 882C–H) the MCMC estimates of initial (equilibrium) spawning stock abundance (B_0)

were 11,720 tonnes (95% CI 9,960–13,720 tonnes), and current ($B_{current}$) biomass was estimated as 84% B_0 (95% CI 80–86%). The projected biomass trajectory assumes a future constant catch of 530 tonnes

RECENT MANAGEMENT ADVICE: The precautionary catch limits for *Dissostichus* spp. in Subarea 88.1 is 3,044 tonnes and that the allocation used to set the 2009/10 catch limits for SSRUs in Subarea 88.1 be continued for 2013/2014. The exploratory fisheries shall be conducted by Japan (1 vessel), Republic of Korea (4 vessels), New Zealand (4 vessels), Norway (1 vessel), Russia (6 vessels), Spain (1 vessel), Ukraine (3 vessels) and UK (2 vessels) using longlines only. The total catch of *Dissostichus* spp. in Subarea 88.1 in 2013/14 was devided over the SSRUs: 0 tonnes in SSRUs A,D-F&M, 397 tonnes in SSRUs B,C&G (total), 2,247 tonnes in SSRUs H-J (total) and 357 tonnes in SSRUs in J&L (total) (CM 41-09). A discrete research catch of 43 tonnes was set aside for the prerecruit research survey by New Zealand. The total catch of *Dissostichus* spp. in Subarea 88.2 in 2013/14 shall not exceed a precautionary catch limit of 390 tonnes, devided over the SSRUs: 0 tonnes in SSRUs A, B& I, 124 tonnes in SSRUs C, D, E, F & G (total) and 266 tonnes and (CM 41-10). The exploratory fisheries shall be conducted by Republic of Korea (4 vessels), New Zealand (4 vessels), Norway (1 vessel), Russia (6 vessels), Spain (1 vessel), Ukraine (3 vessels) and UK (2 vessels) using longlines only.

STECF COMMENTS: STECF has no comments.

18.1.15 Patagonian tootfish (Dissostichus eleginoides) and Antarctic toothfish (D. mawsoni) closed fisheries in Divisions 58.4.4a and 58.4.4b, Ob and Lena Bank

FISHERIES: The longline fishery for *Dissostichus* spp. in Divisions 58.4.4a and 58.4.4b began as a new fishery in 1997/98 (CM 138/XVI). These divisions were managed as a single area and a catch limit for *Dissostichus* spp. applied to fishing north of 60°S, and in waters outside areas of national jurisdiction. Following the Commission's recognition that high levels of IUU fishing for *Dissostichus* spp. in the Convention Area had rendered it unrealistic to consider this fishery as 'new', the fishery was reclassified as exploratory in 1999. In 1999, the divisions were subdivided into SSRUs A, B, C and D. In 2002, the Commission expressed concern regarding the low levels of stocks of *Dissostichus* spp. in Divisions 58.4.4a and 58.4.4b and the high levels of IUU fishing in that region. Consequently, the Commission prohibited directed fishing for *Dissostichus* spp. in these divisions and the fishery for *Dissostichus* spp. was closed (CM 32-10). In 2012/13, a Japanese-flagged longliner conducted research fishing in accordance with a research plan submitted under CM 24-01. The vessel caught 31 tonnes of *D. eleginoides*.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

REFERENCE POINTS: The fishery is currently conducted as part of exploratory fisheries with overall catch limits greater than zero.

STOCK STATUS: Unknown

RECENT MANAGEMENT ADVICE: The Japanese research on BANZARE Bank may proceed in 2013/14 with a total catch limit of 60 tonnes: 25 tonnes in SSRU C and 35 tonnes in SSRU D.

STECF COMMENTS: STECF has no comments.

18.1.16 Patagonian tootfish (Dissostichus eleginoides) and Antarctic toothfish (D. mawsoni) closed fisheries in Subarea 88.3.

FISHERIES: There is a prohibition of directed fisheries on toothfish (*Dissostichus* spp.) in Subarea 88.3 (CM 32-16), other than for scientific research purposes in accordance with Conservation Measure 24-01, from 1 December 2003 until the fishery is reopened by the Commission based on the advice of the Scientific Committee. In 2010/11, a Russian-flagged longliner conducted research fishing in accordance with a research plan submitted under CM 24-01. The vessel caught 5 tonnes of *D. mawsoni*. No research was conducted in 2012/13.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

REFERENCE POINTS: The fishery is currently conducted as part of exploratory fisheries with overall catch limits greater than zero.

STOCK STATUS: No data are available on the stock structure of fish in this fishery.

RECENT MANAGEMENT ADVICE: The fishery is closed (CM 32-02).

STECF COMMENTS: STECF has no comments.

18.1.17 Patagonian tootfish (Dissostichus eleginoides) in other closed fisheries

FISHERIES: There is a prohibition of directed fisheries Patagonia toothfish (*Dissostichus eleginoides*) in:

- Division 58.6 except for waters adjacent to the Prince Edward Islands and the Crozet Islands (CM 32-11), other than for scientific research purposes in accordance with Conservation Measure 24-01, from 1 December 2002 until the fishery is reopened by the Commission based on the advice of the Scientific Committee.
- Division 58.7 except for waters adjacent to the Prince Edward Islands (CM 32-12), other than for scientific research purposes in accordance with Conservation Measure 24-01, from 7 November 1998 until the fishery is reopened by the Commission based on the advice of the Scientific Committee.
- Division 58.5.1 outside areas of national jurisdiction (CM 32-13), other than for scientific research purposes in accordance with Conservation Measure 24-01, from 1 December 2003 until the fishery is reopened by the Commission based on the advice of the Scientific Committee.
- Division 58.5.2 east of 79°20'E and outside the EEZ to the west of 79°20'E (CM 32-14), other than for scientific research purposes in accordance with Conservation Measure 24-01, from 1 December 2003 until the fishery is reopened by the Commission based on the advice of the Scientific Committee.
- Subarea 88.2 north of 65°S (CM 32-15), other than for scientific research (10 tonnes of *Dissostichus* spp. in 2011/12 by Russia) purposes in accordance with Conservation Measure 24-01, from 1 December 2003 until the fishery is reopened by the Commission based on the advice of the Scientific Committee.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

REFERENCE POINTS: None available for this fishery.

STOCK STATUS: No data are available on the stock structure of fish in this fishery.

RECENT MANAGEMENT ADVICE: For these fish species and subsequent areas there was no new advice.

STECF COMMENTS: STECF has no comments

18.2 Mackerel icefish (*Champsocephalus gunnari*)

In 2012/13, four Members fished for icefish by trawling in Subarea 48.3 and Division 58.5.2 with a total reported catch on 20 September of 2003 tonnes (1011 tonnes in 2011/12, 11 tonnes in 2010/11, 378 tonnes in 2009/2010 and 1,916 tonnes in 2008/09).

18.2.1 Icefish (Champsocephalus gunnari) in Division 58.5.2, Heard and McDonald Islands

FISHERIES: The fishery for *C. gunnari* in Division 58.5.2 was operated in accordance with CM 42-02 and associated measures. In 2012/13, the catch limit for *C. gunnari* was 679 tonnes. Fishing was conducted by one vessel using a semipelagic trawl and the total reported catch up to 20 September 2013 was 644 tonnes. There has been no evidence of IUU activity in this fishery.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. A short-term assessment was conducted in the generalised yield model (GYM), using the one-sided bootstrap lower 95% confidence bound of total biomass of 6,098 tonnes from the 2013 survey and fixed model parameters. The length–weight relationship was updated using the 2013 survey data, other parameters were unchanged from previous assessments. The best fit of CMIX to the data was achieved when the population was estimated to consist of four year classes from 1+ to 4+, with a large 3+ cohort.

REFERENCE POINTS: $SSB_{t+3years} >= 75\% SSB_{current}$.

STOCK STATUS: Stock level is highly variable and dependent on recruitment. A responsive management strategy, using a short term (2 year) assessment approach based on the results of groundfish surveys has been used since 2000. There is evidence of cyclic behaviour in adult population size, with a peak in the fishery every

three years. Because the abundant 3+ year class (5,610 tonnes, 92% of the initial biomass of 6,098 tonnes) is unlikely to be present in 2014/15, a catch of 1,267 tonnes could be taken in 2013/14 (less than the aggregate catch across the two-year projection of 1,335 tonnes), ensuring 75% escapement of the 3+ cohort prior to them disappearing, with the expectation that there will be no commercial fishery in 2014/15. Fishery catches of 400 tonnes after the survey were also included in the model, assumed to have been taken from the 2+ and 3+ cohort in proportion to their relative abundance in the survey.

RECENT MANAGEMENT ADVICE: The catch limit for *C. gunnari* in 2013/14 was set at 1,267 tonnes (CM 42-02).

STECF COMMENTS: STECF has no comments.

18.2.2 Icefish (Champsocephalus gunnari) in Subarea 48.3, South Georgia

FISHERIES: The fishery for *C. gunnari* in Subarea 48.3 operated in accordance with CM 42-01 and associated measures. For the fishing season from 1 December 2012 to 30 November 2013, the catch limit for *C. gunnari* was 2,933 tonnes. Early in the season fishing was conducted by two vessels using midwater trawls and the total reported catch was 1,354 tonnes as of 20 September 2013. The fishery resumed in October 2013. There has been no evidence of IUU activity in this fishery.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. In 2013 a preliminary assessment was performed, based on a random stratified bottom trawl survey (January 2013) of the South Georgia and Shag Rocks shelves by the UK. A total catch of 42.9 tonnes was reported from the research survey, with an exceptionally large catch of 22 tonnes of *C. gunnari* taken in a single haul in the northwest stratum. A bootstrap procedure was applied to the survey data to estimate the demersal biomass, but the station with the exceptionally large catch was omitted from the analysis as a precautionary approach to biomass estimation.

REFERENCE POINTS: $SSB_{t+2years} >= 75\% SSB_{current}$.

STOCK STATUS: The procedure for the length-based assessment estimated the median demersal biomass at 106,548 tonnes, with a one-sided lower 95% confidence interval of 49,640 tonnes. The harvest control rule, which ensures 75% biomass escapement after a two-year projection period, was applied to determine catch limits for *C. gunnari* in Subarea 48.3.

RECENT MANAGEMENT ADVICE: The catch limit for *C. gunnari* in Subarea 48.3 was set at 4,635 tonnes for 2013/14 and should be carried out in operated in accordance with CM 42-01 (move-on-rule and others) and associated measures.

STECF COMMENTS: STECF has no comments.

18.3 Other finfish species in the Convention Area

18.3.1 Other finfish species closed fisheries

FISHERIES: There is a prohibition of directed fisheries on finfish, other than toothfish (*Dissostichus* spp.) and mackerel icefish (*Champsocephalus gunnari*):

- for finfish in Subarea 48.1, the Peninsula area (CM 32-02), other than for scientific research purposes, from 7 November 1998 until the fishery is by the Commission based on the advice of the Scientific Committee.
- for finfish in Subarea 48.2, around South Orkneys (CM 32-03), other than for scientific research purposes, from 7 November 1998 until the fishery is reopened by the Commission based on the advice of the Scientific Committee.
- on *Notothenia rossii* in Subarea 48.1, the Peninsula area (CM 32-04), by-catches in fisheries directed to other species shall be kept to the level allowing the optimum recruitment to the stock.
- on *Notothenia rossii* in Subarea 48.2, around South Orkneys (CM 32-05), by-catches in fisheries directed to other species shall be kept to the level allowing the optimum recruitment to the stock.
- on *Notothenia rossii* around Subarea 48.3, South Georgia Islands (32-06), by-catches in fisheries directed to other species shall be kept to the level allowing the optimum recruitment to the stock.

- on *Gobionotothen gibberifrons, Chaenocephalus aceratus, Pseudochaenichthys georgianus, Lepidonotothen squamifrons* and *Patagonotothen guntheri* in Subarea 48.3, South Georgia Islands (CM 32-07) until the fishery is reopened by the Commission based on the advice of the Scientific Committee.
- for *Lepidonotothen squamifrons* in Division 58.4.4, Ob and Lena Banks (CM 32-08), other than for scientific research purposes, from 8 November 1997 until the fishery is reopened by the Commission based on the advice of the Scientific Committee.
- for *Electrona carlsbergi* in Subarea 48.3, South Georgia Islands (CM 32-17), other than for scientific research purposes, from 1 December 2003 until the fishery is reopened by the Commission based on the advice of the Scientific Committee; or a research plan for an exploratory fishery is submitted and approved by the Scientific Committee consistent with Conservation Measure 24-01.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

REFERENCE POINTS: Not applicable.

STOCK STATUS: Not applicable.

RECENT MANAGEMENT ADVICE: For these fish species and subsequent areas there was no new advice.

STECF COMMENTS: STECF has no comments.

18.4 Elasmobranchs

18.4.1 Skates and Rays (Rajidae) in Subarea 48.3, South Georgia

FISHERIES: No data on bycatch of skates and rays were provided at the Scientific Committee 2011 for the fishing season 2011/12. STATLANT data shows that bycatch of skates and rays in Subarea 48.3 during fishing season was less than 10 tonnes.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. A preliminary assessment of rajid populations in Subarea 48.3 using a surplus production model implemented in a Bayesian framework was presented in 2007. A rajid tagging program has been under way in Subarea 48.3. The Working Group noted that there were currently insufficient data to inform the assessment and that the results were strongly dependent on the informative priors for the two catchability parameters, and the intrinsic rate of increase, r.

REFERENCE POINTS: None available for this fishery.

STOCK STATUS: No data are available on the stock structure of fish in this fishery.

RECENT MANAGEMENT ADVICE: No new advise on skates and rays in Subarea 48.3 due to insufficient information.

STECF COMMENTS: STECF has no comments.

18.4.2 Skates and Rays (Rajidae) in Division 58.5.2, Heard and McDonald Islands

FISHERIES: There was no directed fishing allowed for any species other than *Dissostichus eleginoides* and *Champsocephalus gunnari* in Statistical Division 58.5.2 in the 2010/11 fishing season. No data on bycatch of skates and rays were provided at the Scientific Committee 2011 for the fishing season 2012/13. STATLANT data shows that bycatch of skates and rays in Division 58.5.2 during fishing season 2011/12 was less than 15 tonnes.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

REFERENCE POINTS: None available for this fishery.

STOCK STATUS: No data are available on the stock structure of fish in this fishery.

RECENT MANAGEMENT ADVICE: No new information and no new advise for skates and rays in Division 58.5.2.

STECF COMMENTS: STECF has no comments.

18.4.3 Sharks in the Convention Area

FISHERIES: Directed fishing on shark species in the Convention Area, for purposes other than scientific research, is prohibited (32-18). This prohibition shall apply until such time as the Scientific Committee has investigated and reported on the potential impacts of this fishing activity and the Commission has agreed on the basis of advice from the Scientific Committee that such fishing may occur in the Convention Area. Any by-catch of shark, especially juveniles and gravid females, taken accidentally in other fisheries, shall, as far as possible, be released alive. No data on bycatch of sharks were provided at the Scientific Committee for the fishing season 2010/11. STATLANT data show that bycatch of sharks during 2011/12 was less than 3 tonnes.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

REFERENCE POINTS: None available for this fishery.

STOCK STATUS: No data are available on the stock structure of fish in this fishery.

RECENT MANAGEMENT ADVICE: For these fish species and subsequent areas there was no new advice and CM 32-18 is retained until sufficient information is acquired for its revision.

STECF COMMENTS: STECF has no comments.

18.5 Crabs (*Paralomis* spp.)

During the fishing season 2012/13 there were no directed fisheries on crabs within the Convention Area, and no notifications of intention to fish for crabs in 2013/14 have been received by CCAMLR.

18.5.1 Crabs (Paralomis spp.) Subarea 48.3

FISHERIES: Crabs were not harvested during 2012/13 in Subarea 48.3, and no notifications of intention to fish for crabs in 2013/14 have been received by CCAMLR.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. The WG-FSA 2011 reviewed the information currently available on the biology and ecology of the lithodid crabs at South Georgia and provided an overview of the development of a management regime for them. Considerable gaps in knowledge of the biology, ecology and demography of the lithodid species at South Georgia are highlighted with uncertainty surrounding estimates of biomass, growth rates and survivorship of discards of the targeted species. The review reported that recent analyses suggest that the current precautionary catch limit of 1,600 tonnes may not be sustainable in the long term if it were reached consistently. It was noted that apart from 2009/10, there has been very little commercial interest in the fishery. Low market value and interest, coupled with the very high level of discarding, are likely to render the fishery commercially unviable.

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

STOCK STATUS: Unknown; unexploited.

RECENT MANAGEMENT ADVICE: Reflecting on the high level of discarding and uncertainty surrounding discard mortality, it was decided that the crab fishery in Subarea 48.3 be closed.

STECF COMMENTS: STECF has no comments.

18.5.2 Crabs (Paralomis spp.) exploratory fishery in Subarea 48.2

FISHERIES: An exploratory fishery for crabs in Subarea 48.2 was carried out for the first time during the 2009/10 season. The fishery was prosecuted in accordance with the requirements of CM 52-02, and a total of 79,140 pot hours and 17 sets were completed. Only three *Paralomis formosa* were captured, and it was concluded that the crab fishery in Subarea 48.2 was not likely to be viable. Crabs were not harvested during 2012/13 in Subarea 48.2, and no notifications of intention to fish for crabs in 2013/14 have been received by CCAMLR.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

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

STOCK STATUS: Unknown; unexploited.

RECENT MANAGEMENT ADVICE: CM 52-02 stays in force with a catch limit of 250 tonnes.

STECF COMMENTS: STECF has no comments.

18.6 Krill (*Euphausia superba*)

The krill fishery operated only in Area 48 during the 2012/13 season. Different fishing gears were used: conventional trawls and continuously pumped trawls. The reported total catch to the end of October was 212,000 tonnes.

18.6.1 Krill (Euphausia superba) Area 48

FISHERIES: In 2012/13, five Members with a total of 12 vessels fished for krill in Area 48. The final reported catch was not available, since the fishing season for krill was still under way. The reported total catch to 20 September 2013 was 154,000 tonnes in Subarea 48.1, 30,000 tonnes in Subarea 48.2 and 28,000 tonnes in Subarea 48.3. In accordance with CM 51-07, the krill fishery was closed in 48.1 on 14 June 2013.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. Advice on the overall catch limit is based on a long term (10 year) Generalised Yield Model (GYM) projection using survey-derived estimates of current biomass and recruitment variability. An integrated assessment method has been proposed as alternative assessment method.

REFERENCE POINTS: The probability of SSB dropping below 20% of SSB_0 > 0.1 (even in the absence of fishing). This would result in a γ being equal to 0 and hence a modification of this part of the decision rule may be required provided that the objectives in Article II can still be met. Given also the potential impact of climate change on recruitment variability, that both the recruitment variability and the specification of the current decision rule relating to the maintenance of stable recruitment should be investigated.

STOCK STATUS: The B_0 estimate using the full SDWBA model for Subareas 48.1, 48.2, 48.3 and 48.4 was 60.3 million tonnes with a sampling CV of 12.8%, and this represented the best estimate of krill biomass derived from the CCAMLR-2000 Survey.

RECENT MANAGEMENT ADVICE: In the absence of additional information, the advice remains to be consistent with the precautionary approach and to void concentration of the catch as the trigger level is approached, a spatial allocation of the trigger level (620,000 tonnes) by subarea is required. Until new information is available CM 51-01 and CM 51-07 are retained until sufficient information is acquired for their revisions.

STECF COMMENTS: STECF has no comments.

18.6.2 Krill (Euphausia superba) Area 58.4.1

FISHERIES: The total catch limit for *Euphausia superba* in Division 58.4.1 is 440 000 tonnes in any fishing season. The total catch is further subdivided into two subdivisions within Division 58.4.1 as follows: west of 115°E, 277 000 tonnes; and east of 115°E, 163 000 tonnes. There was no directed fishing on krill in Division 58.4.1 in 2012/13.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

REFERENCE POINTS: None available for this fishery.

STOCK STATUS: Unknown.

RECENT MANAGEMENT ADVICE: There was no new advice for *Euphausia superba* in Division 58.4.1 and CM 51-02 is retained until sufficient information is acquired for its revision.

STECF COMMENTS: STECF has no comments.

18.6.3 Krill (Euphausia superba) Area 58.4.2

FISHERIES: The total catch limit for *Euphausia superba* in Division 58.4.2 is 2,645 million tonnes in any fishing season. The total catch limit is further subdivided into two subdivisions within Statistical Division 58.4.2 as follows: west of 55°E, 1.448 million tonnes; and east of 55°E, 1.080 million tonnes. Until the Commission has defined an allocation of this total catch limit between smaller management units, as the Scientific Committee may advise, the total catch in Division 58.4.2 is limited to 260,000 tonnes west of 55°E and 192 000 tonnes east of 55°E in any fishing season (CM 51-03). The fishing season begins on 1 December and finishes on 30 November of the following year. There was no directed fishing on krill in Division 58.4.2 in 2012/13.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

REFERENCE POINTS: None available for this fishery.

STOCK STATUS: In 2012 an update of the estimates of krill biomass for Division 58.4.2 was made and was estimated at 24.48 million tonnes (CV 0.20), with 14.87 million tonnes (CV 0.22) in the western area, and 8.05 million tonnes (CV 0.33) in the eastern area.

RECENT MANAGEMENT ADVICE: There was no new advice formed for *Euphausia superba* in Division 58.4.2 and CM 51-03 is retained until sufficient information is acquired for its revision. Until the Commission has defined an allocation of this total catch limit between smaller management units, shall be limited to 260,000 tonnes west of 55°E and 192,000 tonnes east of 55°E in any fishing season.

STECF COMMENTS: STECF has no comments.

18.6.4 Krill (Euphausia superba) Area 88

FISHERIES: There was no directed fishing on krill in Area 88 in 2012/13.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

REFERENCE POINTS: None available for this fishery.

STOCK STATUS: Catch limits have not been set in Area 88 and the Scientific Committee recommended that the development of krill fishing in Area 88 should be considered exploratory fisheries, since only limited information exists on the distribution and abundance of krill or predators.

RECENT MANAGEMENT ADVICE: There was no new advice formed for *Euphausia superba* in Area 88 and CM 51-04 is retained until sufficient information is acquired for its revision.

STECF COMMENTS: STECF has no comments.

18.7 Squid (*Martialia hyadesi*)

During the fishing season 2012/13 there were no directed fisheries on squid within the Convention Area, and no notifications of intention to fish for squid in 2013/14 have been received by CCAMLR.

18.7.1 Squid (Martialia hyadesi) Subarea 48.3

FISHERIES: No target fishery for squid (*Martialia hyadesi*) was carried out in the last seasons and no new request has been submitted to CCAMLR for exploratory fishing in the 2012/13 season.

SCOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

REFERENCE POINTS: None available for this fishery.

STOCK STATUS: No data are available on the stock structure of fish in this fishery.

RECENT MANAGEMENT ADVICE: The CCAMLR advice is that the existing Conservation Measure 61-01 on *M. hyadesi* should remain in force.

STECF COMMENTS: STECF has no comments

List of Acronyms

ACOM	The Advisiory Committee of ICES
ACFM	The Advisory Committee on Fishery Management
ALADYM	Age-Length Based Dynamic Model
ASPM	Age structured population model
B_{MSY}	The spawning stock biomass that can support MSY
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
CITES	Convention on International Trade on Endangered Species
CNR	National Council of Research (Italy)
CPFD	Catch per fishing day
CPS	Commission du Pacifique Sud
CPUE	Catch per unit effort
CTMFM	Comisión Técnica Mixta del Frente Marítimo
DEPM	Daily egg production method
DFO	Department of Fisheries and Oceans
EIAA	Economic Interpretation of the ACFM Advice
EIFAC	European Inland Fishery Advisory Committee
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
FISHSTAT	FAO Fisheries Statistics
F_{MSY}	The fishing mortality rate that is expected to deliver MSY
FOCZ	Falkland Island Outer Conservation Zone
FRCC	Fisheries Resources Conservation Committee
FU	Functional Units
GFCM	General Fisheries Commission for the Mediterranean
GRUND	GRUppo Nazionale Demersali (Italy)
GSA	Geographical Sub Area
HCMR	Hellenic Centre for Marine Research

IATTC	Inter American Tropical Tuna Commission
IBSFC	International Baltic Sea Fisheries Commission
ICA	Integrated catch at age analysis
ICCAT	International Commission for Conservation of Atlantic Tuna
ICES	International Council for the Exploration of the Sea
ICS	International Scientific Committee for Tuna and Tuna-like species in the North Pacific Ocean
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
ISMAR	Institute of Marine Science (Italy)
IUCN	International Union for Conservation of Nature
IUU	Illegal, Unregulated and Unreported
JRC	Joint Research Centre of the European 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
MEY	Maximum Economic Yield
MSY	Maximum sustainable yield
MSVPA	Multi Species VPA
NAFO	Northwest Atlantic Fisheries Organisation
NEA	North East Atlantic
NEI	Not Elsewhere Included
NEMED	*Nephrops* in Mediterranean Sea
NRIFSF	National Research Institute for Far Seas Fisheries - Japan
PA	Precautionary Approach
PICTs	Pacific Islands Countries and Territories
PO	Pacific Ocean
RRAG	Renewable Resources Assessment Group
SAC	Scientific Advisory Committee (GFCM)
SAFC	South Atlantic Fisheries Commission
SAGP&A	Secretaria de Agricultura, Ganadería, Pesca y Alimentos (Argentine)
SEAFO	Southeast Atlantic Fisheries Organisation
SCRS	ICCAT Standing Committee on Research and Statistics
SCSA	Sub-Committee on Stock Assessment (GFCM)
SCTB	Standing Committee on Tuna and Billfish (western and central Pacific Ocean)

STECF-SGMED	Subgroup on the Mediterranean
SGRST	STECF Subgroup on Resource Status
SPC	Southern Pacific Commission
SPRFMO	South Pacific Regional Fisheries Management Organisation
SSB	Spawning stock biomass
SSB/R	Spawning stock biomass per recruit
STECF	Scientific, Technical and Economic Committee for Fisheries
SURBA	Survey Based Assessment (software)
TAC	Total Allowable Catch
WCPO	Western Central Pacific Organisation
WCPFC	Western Central Pacific Fishery Organisation
WECAF	Committee for Western Central Atlantic Fisheries
WGEF	Working Group on Elasmobranch Fishes
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

19 EWG-13-14 LIST OF PARTICIPANTS

1 - Information on STECF members and invited experts' affiliations is displayed for information only. In some instances the details given below for STECF members may differ from that provided in Commission COMMISSION DECISION of 27 October 2010 on the appointment of members of the STECF (2010/C 292/04) as some members' employment details may have changed or have been subject to organisational changes in their main place of employment. In any case, as outlined in Article 13 of the Commission Decision (2005/629/EU and 2010/74/EU) on STECF, Members of the STECF, invited experts, and JRC experts shall act independently of Member States or stakeholders. In the context of the STECF work, the committee members and other experts do not represent the institutions/bodies they are affiliated to in their daily jobs. STECF members and invited experts make declarations of commitment (yearly for STECF members) to act independently in the public interest of the European Union. STECF members and experts also declare at each meeting of the STECF and of its Expert Working Groups any specific interest which might be considered prejudicial to their independence in relation to specific items on the agenda. These declarations are displayed on the public meeting's website if experts explicitly authorized the JRC to do so in accordance with EU legislation on the protection of personnel data. For more information: http://stecf.jrc.ec.europa.eu/adm-declarations

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20 List of Background Documents

Background documents are published on the meeting's web site on:
http://stecf.jrc.ec.europa.eu/web/stecf/ewg1314

List of background documents:

1. EWG-13-14 – Doc 1 - Declarations of invited and JRC experts.

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Abstract

The STECF review of scientific advice for 2014 Part 3 was drafted by the STECF-EWG 13-14 Expert Working Group held in Barza d'Ispra, Italy, from 14-18 October 2013. The Report was reviewed and adopted by the STECF at its 44th plenary session held in Brussels from 4-8 November 2013.

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The Scientific, Technical and Economic Committee for Fisheries (STECF) has been established by the European Commission. The STECF is being consulted at regular intervals on matters pertaining to the conservation and management of living aquatic resources, including biological, economic, environmental, social and technical considerations.

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