ECOREGION North Sea
STOCK Haddock in Subarea IV and Divisions IIIa West and VIa (North Sea, Skagerrak, and West of Scotland) (updated)

Please note: **The present advice replaces the advice given for this stock in June 2014.**

Advice for 2015

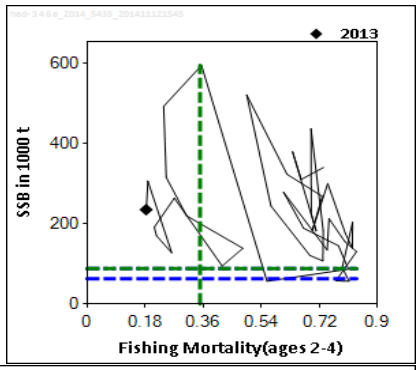
The Northern Shelf haddock stock was previously assessed as two separate stocks: Subarea IV and Division IIIaW (North Sea and Skagerrak), and Division VIa (West of Scotland).

ICES advises on the basis of the MSY approach that catches should be no more than 68 690 t for the whole assessment area. If rates of discards and industrial bycatch do not change from the average of the last three years (2011–2013), this implies human consumption landings of no more than 50 163 t. Measures to reduce discards should be taken in order to protect the incoming recruitment.

Stock status

Fishing pressure	2011	2012	2013	
MSY (F_{MSY})	✓	✓	✓	Appropriate
Precautionary approach (F_{pa},F_{lim})	?	?	?	Not defined

Stock size	2012	2013	2014	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	✓	✓	✓	Full reproductive capacity



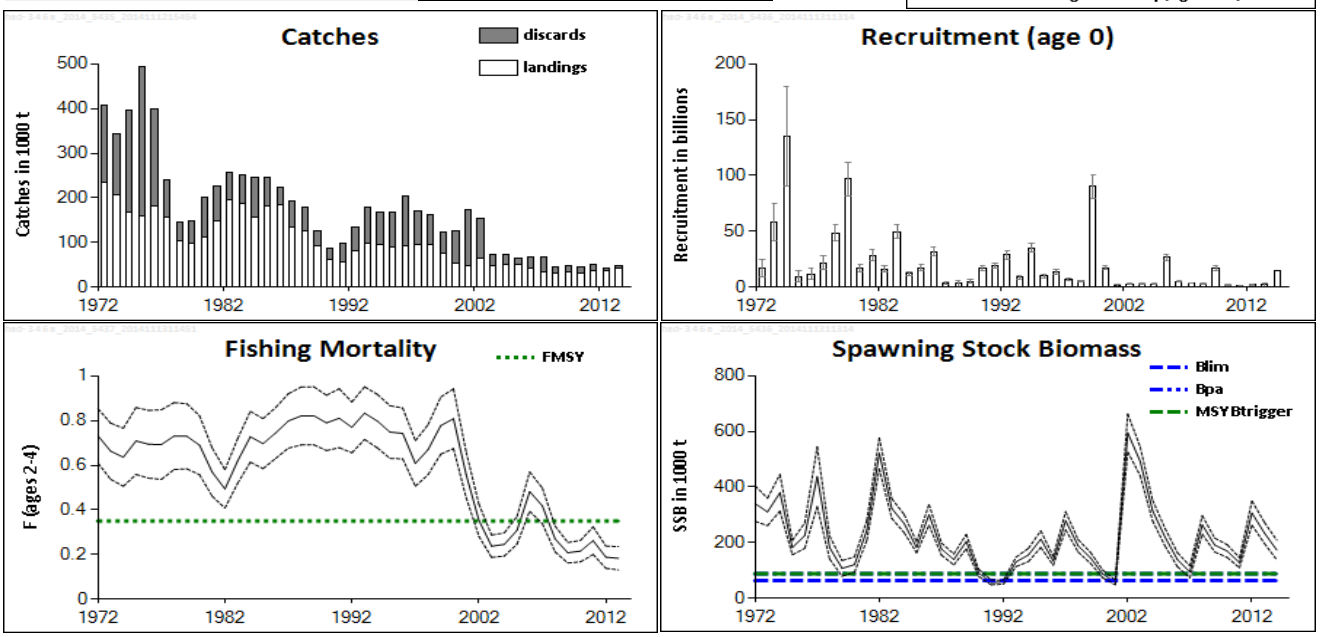


Figure 6.3.7.1 Haddock in Subarea IV and Divisions IIIa West and VIa (North Sea, Skagerrak, and West of Scotland). Summary of stock assessment (weights in thousand tonnes), last year's recruitment estimate is shaded. Top right: SSB and F over the time-series used in the assessment.

Fishing mortality has been below F_{MSY} since 2008 and SSB has been above the MSY $B_{trigger}$ since 2001. Recruitment is characterized by occasional large year classes, the last of which was the strong 1999 year class. The 2014 recruitment index is higher than recent poor recruitment years, but is still below the long-term average.

Management plans

There is no management plan for the whole area. A management plan for Subarea IV and Division IIIaW was agreed by EU and Norway in 2008 (see Annex 6.3.7.1). ICES has evaluated the plan and concludes that it can be accepted as precautionary. An EU management plan proposal for Division VIa (see Annex 6.3.7.2) was evaluated by ICES (Needle, 2010) and is considered to be precautionary.

Biology

The haddock exhibits sporadic high recruitment, leading to dominant year classes in the fishery. These large year classes often grow more slowly than less abundant year classes, possibly due to density-dependent effects. Recruitment appears poorly determined by either spawning-stock biomass or egg production. Haddock primarily preys on benthic and epibenthic invertebrates, sandeels, and herring eggs. Haddock is an important prey species, mainly for saithe and other large gadoids. The transport of eggs and larvae and otolith microchemistry studies, along with close correspondence between survey indices in Subarea IV and Divisions VIa and IIIa, support the conclusion that Northern Shelf haddock should be assessed as one stock. Adult haddock are relatively sedentary.

Environmental influence on the stock

Haddock growth may be linked to water temperature. Warmer waters may lead to faster growth in early life stages, but also a lower maximum size (possibly due to faster maturation). There are indications that parental stock size has little effect on subsequent haddock recruitment success, which is principally determined by the environment.

The fisheries

Haddock in Subarea IV and Division IIIaW are primarily caught by demersal trawlers (single, twin, and pair), and (to a lesser extent) by seiners. Haddock is a specific target for some fleets, but is also caught as part of a mixed fishery catching cod, whiting, and *Nephrops*. The minimum mesh size for targeted fisheries was increased to 120 mm in 2002. Haddock bycatch in the industrial fishery is low. Haddock in Division VIa is caught mainly by Scottish and Irish bottom trawlers, which target mixed demersal fish assemblages.

Catch distribution	Total catch (2013): 46.800 kt, where 43.511 kt were estimated landings (of which 93% were demersal trawl and seine >100 mm, 5% were trawl 70–99 mm, and 2% were others), 3.235 kt discards, and 0.053 kt industrial bycatch.

Effects of the fisheries on the ecosystem

Trawling impacts the benthos, as summarized in the North Sea ecosystem overview. Trawl gear are also relatively non-selective in terms of species caught, and trawl fisheries have a bycatch of non-commercial species that are important components of the North Sea ecosystem. Reduced benthic biomass is found more often in areas of bottom trawl activity than in unfished areas. Since 2001, effort reductions in this fishery have likely led to a decrease in bycatches.

Quality considerations

The overall reporting (in particular through the fully documented fisheries (FDF) programme) of catch data provided to ICES is likely to have improved during 2012–2014. The previous North Sea and Skagerrak assessment showed strong consistency across the years. The previous West of Scotland assessment used landings data that had been corrected for misreporting between Division VIa and Subarea IV, but this source of uncertainty is removed as the areas are assessed together. The assessment is based on the North Sea (Subarea IV and Division IIIa) survey indices which is considered to be representative of the whole stock. No combined survey index for the whole area is available yet.

Scientific basis

Stock data category	1. (ICES, 2014a).
Assessment type	Age-based analytical assessment (TSA).
Input data	Commercial catches (international landings, ages from catch sampling), two survey indices: IBTS Q1, IBTS Q3. Maturity data are assumed fixed over time and knife-edged at age 3, while natural mortality data vary with age and over time.
Discards and bycatch	Included since the 2014 assessment, data series from the main fleets (covering around 90% of the landings).
Indicators	None.
Other information	Last benchmarked in 2014 (ICES, 2014e), at which it was decided that the previously separate stocks in the North Sea and Skagerrak, and West of Scotland, should be assessed as one stock. WKHAD also updated biological parameters and selected a new assessment model. The advice was reopened in November 2014 based on new recruitment information from the 3rd quarter North Sea IBTS survey.
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK), Working Group on Mixed Fisheries Advice (WGMIXFISH-NS).

6.3.7 (updated) Supporting information November 2014

ECOREGION **North Sea**

STOCK **Haddock in Subarea IV and Divisions IIIa West and VIa (North Sea, Skagerrak, and West of Scotland) (updated)**

Reference points

	Type	***Value***	***Technical basis***
Management plan (Subarea IV)	F_{MP}	0.3	Management strategy evaluation.
	SSB_{MP}	100 000 t 140 000 t	Trigger values B_{lim} and B_{pa}.
MSY approach (whole area)	MSY $B_{trigger}$	88 000 t	$1.4 \times B_{lim}$ from segmented regression changepoint estimate.
	F_{MSY}	0.35	Estimated by application of EqSIM evaluation.
Precautionary approach (whole area)	B_{lim}	63 000 t	Segmented regression changepoint estimate.
	B_{pa}	88 000 t	$B_{pa} \sim 1.4 \times B_{lim}$.
	F_{lim}	Not defined.	
	F_{pa}	Not defined.	

(Last changed in: 2014)

Outlook for 2015

Basis: F(2014) = F-trend model projection = 0.189; SSB (2015) = 164.257; Recruitment (2014) = RCT3 estimate = 14195 millions; Catches (2014) = 35.739; Human consumption (HC) landings (2014) = 32.236; Discards (2014) = 3.503; Industrial bycatches (IBC) (2014) < 0.001.

Rationale	Total catch 2015	Total Landings 2015	Total Discards 2015	Total IBC 2015	Basis	Total F 2015	F(land) 2015	F(disc) 2015	F(IBC) 2015	SSB 2016	% SSB change [1)]	% TAC change [2)]
MSY approach	68.690	50.163	18.528	0.000	F_{MSY}	0.350	0.287	0.063	< 0.001	117.476	−28%	12%
Management plan	59.123	43.222	15.901	0.000	MP target F	0.300	0.246	0.054	< 0.001	124.446	−24%	−3%
IBC only	0.000	0.000	0.000	0.000	No HC fishery	0.000	0.000	0.000	< 0.001	167.986	2%	−100%
Other options	28.890	21.291	7.599	0.000	0.75 × F(2014)	0.142	0.116	0.026	< 0.001	146.472	−11%	−52%
	38.907	28.742	10.165	0.000	F(2014)	0.189	0.155	0.034	< 0.001	138.916	−15%	−36%
	47.004	34.431	12.573	0.000	1.25 × F(2014)	0.237	0.194	0.043	< 0.001	133.275	−19%	−23%
	51.824	37.933	13.891	0.000	15% TAC decrease	0.262	0.215	0.047	< 0.001	129.756	−21%	−15%
	61.047	44.627	16.420	0.000	Rollover TAC	0.310	0.254	0.056	< 0.001	123.032	−25%	0%
	70.271	51.321	18.950	0.000	15% TAC increase	0.358	0.294	0.064	< 0.001	116.308	−29%	15%
Mixed-fisheries options – not updated in November												
Maximum	92.735	80.792	11.943	0	A	0.71	-	-	-	80.374	−51%	84%
Minimum	12.880	11.466	1.414	0	B	0.08	-	-	-	152.156	−7%	−74%
Cod MP	18.661	16.592	2.069	0	C	0.11	-	-	-	146.776	−11%	−62%
SQ effort	33.578	29.759	3.819	0	D	0.21	-	-	-	132.999	−19%	−32%
Effort_Mgt	15.811	14.066	1.745	0	E	0.09	-	-	-	149.426	−9%	−68%

Weights in thousand tonnes.

[1)] SSB 2016 relative to SSB 2015.

[2)] Total landings 2015 relative to the combined TACs 2014: TAC IV = 38.285; TAC IIIa = 2.355; TAC VIa (2014) = 3.988; Total = 44.628.

Mixed-fisheries assumptions:

A. Maximum scenario: Fleets stop fishing when the last quota is exhausted.
B. Minimum scenario: Fleets stop fishing when the first quota is exhausted.
C. Cod management plan scenario: Fleets stop fishing when the cod quota is exhausted.
D. SQ effort scenario: Effort in 2014 and 2015 as in 2013.
E. Effort management scenario: Effort reductions according to cod and flatfish management plans.

Management plan

Management plans (or management plan proposals) for Subarea IV, Division IIIaN, and Division VIa are not relevant for the newly defined stock.

MSY approach

Following the ICES MSY approach implies fishing mortality to be increased to 0.35, which implies catches of no more than 68 690 t. If rates of discards and industrial bycatch do not change from the average of the last three years (2011–2013), this implies human consumption landings of no more than 50 163 t in 2015. This is expected to lead to an SSB of 117 476 t in 2016.

Mixed fisheries

Mixed-fisheries advice informs managers of the consequences of setting TACs for single species which are exploited in a mixed fishery (ICES, 2014c). In contrast to single-species advice there is no single recommendation because no management objectives have been defined for mixed fisheries. Mixed-fisheries forecasts explore a range of scenarios which provide insight on the overall balance between the various single-species TACs. Major differences between the outcomes of the various scenarios indicate the potential for underestimating or overestimating the advised landings corresponding to the single-species advice. The results indicate which of the species are globally limiting for the North Sea fisheries as a whole, but may not necessarily reflect the actual constraints on individual fishers.

Assuming fishing patterns and catchability in 2014 and 2015 are unchanged from those in 2013, cod and *Nephrops* in FU 6 are the limiting species (73% and 27%, respectively) for the effort of fleets in the North Sea demersal fisheries in 2015. All but the "Maximum" scenario of the mixed-fisheries analyses show an underestimate compared to the single-species advice for haddock. The mixed fisheries projections have not been updated in November. The revised advice for haddock, whiting, *Nephrops* in FU6, plaice and sole, based on the new survey information, does not change the general perception of which stocks are more likely to limit the North Sea fisheries in 2015.

Additional considerations

Advice considerations

Haddock in the Northern Shelf were previously assessed as two separate stocks: Subarea IV and Division IIIa (North Sea and Skagerrak), and Division VIa (West of Scotland). WKHAD (ICES, 2014e) concluded that there was strong evidence that the stocks were not biologically distinct and they should therefore be assessed as a single stock. The principal drivers for this conclusion were: a) evidence from otolith microchemistry of significant exchange of juveniles between areas; b) indications from particle tracking of transport of eggs and larvae from the West of Scotland into the North Sea; c) significantly similar length distributions in different areas; d) corresponding recruitment time-series; and e) indications from landings and surveys of an unbroken stock distribution between the West of Scotland and the Skagerrak.

Management should take into account protection of stock components in the different areas to avoid local depletion. ICES has not split the overall TAC between areas. To advise on a possible split ICES would need policy guidelines on the basis for the split, coupled with further analysis of stock distribution.

The advice for 2015 was updated in November based on new recruitment information from the 3rd quarter North Sea IBTS survey. The results of this survey indicate a substantial increase in recruitment which will lead to an increase in catches of undersized haddock in 2015 and may result in increased discards. Any measures to reduce discarding and to improve the fishing pattern should be actively encouraged to protect the incoming recruitment.

Management considerations

Adherence to the EU–Norway management plan in the North Sea and Skagerrak has contributed to lower fishing mortality levels and greatly improved stability of yield.

A management plan for the whole area needs to be developed, taking into account the need to protect local components of the stock.

Discards are highly variable without obvious long-term trend but appear to have been declining in recent years. Discard rates in 2012 and 2013 are the lowest observed in the time-series and appear to be linked to low recruitment. The estimates of discards in the West of Scotland for 2013 are based primarily on sampling by Marine Scotland Science

(MSS; covering around 16 trips), which indicates high discarding in the Scottish TR2 *Nephrops* fleet (both as a percentage of TR2 catches and as a percentage of total discards). A parallel sampling programme organized by the Scottish Fishermen's Federation (SFF; covering around 34 trips) indicates much lower discard rates, which may indicate more selective fishing practices. SFF sampling covers more vessels, but attempts to include the SFF estimates in the data used for ICES assessments are currently hindered by methodological issues. It was also noted that the SFF discard rates mentioned above had not been raised to the fleet level. These issues are to be addressed in time for next year's assessments.

Regulations and their effects

Subarea IV and Division IIIa

Effort restrictions in the EU were introduced in 2003 (annexes to the annual TAC regulations) for the protection of the North Sea cod stock. In addition, a long-term plan for the recovery of cod stocks was adopted in 2008 (EC regulation 1342/2008). In 2009, the effort management programme switched from a days-at-sea to a kW-day system (EC regulation 43/2009), in which different amounts of kW-days are allocated within each area by Member Country to different groups of vessels, depending on gear and mesh size. Effort ceilings are updated annually. However, for 2013 and 2014, the European Council decided upon a roll-over of the 2012 effort level into 2013 and 2014 for both the cod and the sole/plaice management plans.

Overall nominal effort (kW-days) by EU demersal trawls, seines, beam trawls, gill/trammelnets, and longlines (all mesh sizes included) in the North Sea, Skagerrak, and Eastern Channel had been substantially reduced since the implementation of the two successive effort management plans in 2003 and 2008 (−38% between 2003 and 2013, −17% between 2008 and 2013). Following the introduction of days-at-sea regulations in 2003, there was a substantial switch from the larger mesh (>100 mm, TR1) gear to the smaller mesh (70–99 mm, TR2) gear. Subsequently, effort by TR1 has been relatively stable, whereas effort in TR2 and in small-meshed beam trawl (80–120 mm, BT2), has shown a pronounced decline (0%, −52%, and −52%, respectively, between 2004 and 2013). Gill- and trammelnet fisheries have remained stable (ICES, 2014c). Effort in large mesh size beam trawl (≥120 mm, BT1) has increased significantly in 2012 and 2013 after a decade of continuous decline. Nominal effort reported by Norway has increased since 2011 due to the generalization of electronic logbooks.

In February 2008 Scotland implemented a national scheme known as the "Conservation Credits Scheme". The principle of this two-part scheme involves additional time at sea in return for the adoption of measures which aim to reduce mortality on cod and lead to a reduction in discard numbers (real-time closures and technical measures). In 2010 there were 165 closures, and from July 2010 the area of each closure increased (from 50 square nautical miles to 225 square nautical miles). During 2011 there were 185 of these larger closures, while there were 173 in 2012 and 166 in 2013. The effects of this regulation on the behaviour of the fleet and on the haddock stock have been investigated, but do not show a consistent pattern.

Division VIa

Effort data from 1998 onwards from UK vessels (one of the main countries fishing in the area) suggests that overall, effort has declined in recent years in Division VIa, and that declines in particular fleets have not been compensated for by rises in other fleets. Larger-meshed whitefish demersal trawls were the most important gears in Division VIa prior to 2002, but since then there has been a marked decline in kW-days by this category. Single-rig *Nephrops* trawls in the 70–99 mm mesh category are the other major gears in use, but unlike TR1 vessels the effort seems to have been maintained at a fairly stable level throughout the time-series. However, since the start of the fully documented fisheries (FDF) trials in 2009 and because vessels in the trial are exempt of effort control, an increase in effort from those vessels in the West of Scotland has been noted.

Changes in fishing technology and fishing patterns

The introduction of closed-circuit TV (CCTV, 20% of landings in 2013) and fully documented fisheries (FDF) programmes starting in 2010 in Scotland, Denmark, Germany, the Netherlands, and England is expected to have contributed to the reduction of cod mortality. Under this scheme, UK vessels are not permitted to discard any cod, while Danish and German vessels are still permitted to discard undersized cod. For all vessels taking part, all cod caught are counted against the quota. Vessels carrying CCTV systems may preferentially target haddock to prevent exhausting the cod quota and having to tie up. The uptake of the Scottish haddock quota in 2012 and 2013 was very close to 100%, which contrasts with historical underutilization of the quota and supports the hypothesis of increased targeting combined with a quota that was predicted to be restrictive.

Information from the fishing industry

Results of the 2013 North Sea Fishers' stock survey were not available.

Effect of the environment on the stock

The North Sea is characterized by episodic changes in productivity of key components of the ecosystem. Phytoplankton, zooplankton, and demersal and pelagic fish have all exhibited such cycles in variability. The gadoid outburst during the 1970s and 1980s in which cod, haddock, and whiting stock abundances increased substantially was considered to result from such effects. The low recruitment abundance observed in cod in recent years is thought to be the result of the combined effects of low spawning biomass and environmental factors (e.g., sea temperature, changes in the prey field, predation on juveniles).

Baudron *et al.* (2011) has suggested that haddock growth may be linked to temperature. Warmer waters lead to faster growth in early life stages, but also (potentially) faster maturation and hence a lower maximum size. Water temperature in the North Sea has increased and Wright *et al.* (2011) also shows that smaller size at maturity was partly linked to temperature rises and a greater proportion of haddock maturing at a younger age. Other ongoing work (Marine Scotland, unpublished) has indicated that haddock recruitment is only weakly linked to spawning-stock biomass, being more obviously determined by ecosystem factors.

Uncertainties in assessment and forecast

The assessment is based on the North Sea (Subarea IV and Division IIIa) survey indices which are considered to be representative of the whole stock. No combined survey index for the whole area is available yet.

Comparison of the basis of previous assessment and advice

In 2013, two separate assessments were carried out for the stock in the West of Scotland and the North Sea/Skagerrak stock. This year, the two were combined into one assessment.

Last year's advice was based on the EU–Norway management plan (Subarea IV and Division IIIa) and the MSY approach (Division VIa). This year´s advice is based on the MSY approach. The advice for 2015 was updated in November based on new recruitment information from the 3rd quarter North Sea IBTS survey.

Assessment and management area

The advice for this stock is given for Subarea IV (North Sea), Division IIIaW (Skagerrak), and Division VIa (West of Scotland), while the TACs for this stock are set for Division IIa (EU waters) and Subarea IV, the whole of Subarea III, and Division VIa, respectively.

Sources

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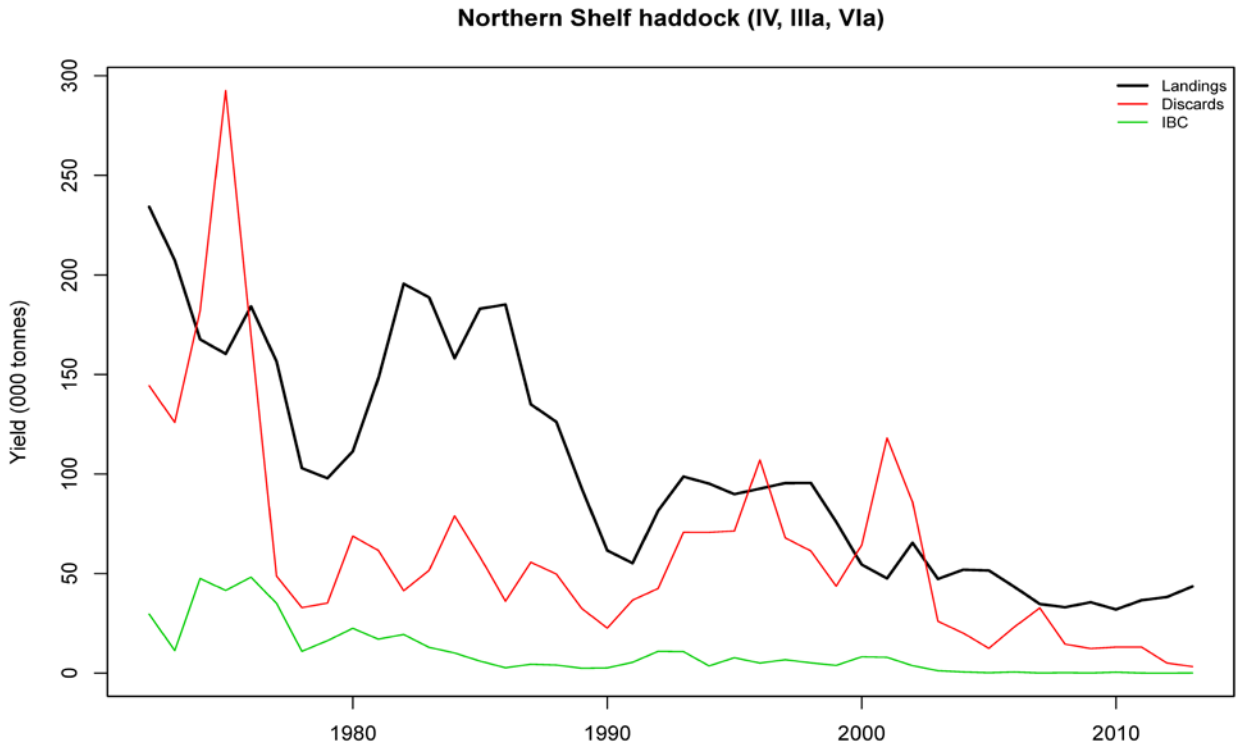

Figure 6.3.7.2 Haddock in Subarea IV and Divisions IIIa West and VIa (North Sea, Skagerrak, and West of Scotland). Catch components (in thousand tonnes) subdivided by landings, discards, and industrial bycatches (IBC).

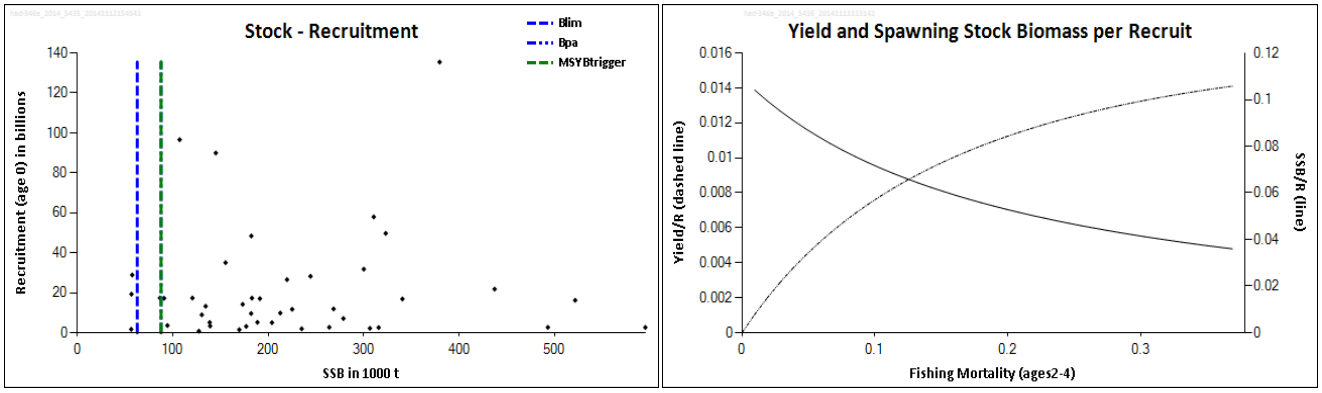

Figure 6.3.7.3 Haddock in Subarea IV and Divisions IIIa West and VIa (North Sea, Skagerrak, and West of Scotland). Stock–recruitment (left) and yield-per-recruit plot (right).

Table 6.3.7.1 Haddock in **Subarea IV (North Sea)**. ICES advice, management, and catch. Before 2014, the landings in Subarea IV are calculated as 94% of the combined (Subarea IV and Division IIIa) area total.

Year	ICES Advice	Predicted landings corresp. to advice	Agreed TAC	Off. lndgs.	ICES estimates			
					Hum. cons.	Disc. Slip.	Indust. bycatch	Total
1987	80% of F(85)	105	140	109	108	59	4	172
1988	77% of F(86); TAC	185	185	105	105	62	4	171
1989	Reduce decline in SSB; TAC; protect juveniles	68	68	64	76	26	2	104
1990	80% of F(88); TAC	50	50	43	51	33	3	87
1991	70% of effort (89)		50	45	45	40	5	90
1992	70% of effort (89)		60	51	70	48	11	129
1993	70% of effort (89)		133	80	80	80	11	170
1994	Significant reduction in effort; mixed fishery		160	87	81	65	4	150
1995	Significant reduction in effort; mixed fishery		120	75	75	57	8	140
1996	Mixed fishery to be taken into account		120	75	76	73	5	154
1997	Mixed fishery to be taken into account		114	73	79	52	7	138
1998	No increase in F	100.3	115	72	77	45	5	128
1999	Reduction of 10% F(95–97)	72	88.6	64	64	43	4	111
2000	F less than F_{pa}	< 51.7	73.0	47	45	47	8	100
2001	F less than F_{pa}	< 58.0	61	40	39	118	8	165
2002	F less than F_{pa}	< 94.0	104.0	54	53	45	4	101
2003	No cod catches	-	52	42	42	23	1	76
2004	Mixed-fisheries considerations / F should be below F_{pa}	No forecast [b]	85	48	47	17	1	65
2005	Mixed-fisheries considerations / F should be below F_{pa}	92 [b]	66	31	48	10	0	57
2006	Mixed-fisheries considerations / F < 0.3	39 [b]	52	36	36	17	0	55
2007	Mixed-fisheries considerations / F < 0.3	55.4 [b]	55	31	31	30	0	61
2008	Mixed-fisheries considerations / 15% TAC reduction	49.3 [a,b]	46	30	29	13	0	42
2009	Mixed-fisheries considerations / Apply management plan	44.7 [a,b]	42	31	31	10	0	41
2010	Mixed-fisheries considerations / Apply management plan	38 [a,b]	36	28	28	10	0	38
2011	See scenarios	-	34	26	34	11	0	46
2012	Apply management plan	41.575 [a,b]	39	30	30	4	1	35
2013	Apply management plan	47.811 [a,b]	45.041	37 [c]	39 [c]	2 [c]	0 [c]	41 [c]
2014	Apply management plan	38.201 [b]	38.284					
2015	(November update) MSY approach (landings for whole stock)	< 50.163 [a]						

Weights in thousand tonnes.
[a] Including industrial bycatch.
[b] The exploitation of this stock should be conducted in the context of mixed fisheries, protecting stocks outside safe biological limits.
[c] Subarea IV and Division IIIaW combined.

Table 6.3.7.2 Haddock in **Division IIIaW (Skagerrak)**. ICES advice, management, and landings. Before 2014, the landings in Division IIIa are calculated as 6% of the combined (Subarea IV and Division IIIa) area total.

Year	ICES Advice	Predicted landings corresp. to advice	Agreed TAC	Official landings	ICES estimates			
					Hum. cons.	Disc. Slip.	Indust. bycatch	Total
1987	Precautionary TAC	-	11.5		3.8		1.4	5.3
1988	Precautionary TAC	-	10.0		2.9		1.5	4.3
1989	Precautionary TAC	-	10.0		4.1		0.4	4.5
1990	Precautionary TAC	-	10.0		4.1		2.0	6.1
1991	Precautionary TAC	4.6	4.6		4.1		2.6	6.7
1992	TAC	4.6	4.6		4.4		4.6	9.0
1993	Precautionary TAC	-	4.6		2.0		2.4	4.4
1994	Precautionary TAC	-	10.0		1.8		2.2	4.0
1995	If required, precautionary TAC; link to North Sea	-	10.0		2.2		2.2	4.4
1996	If required, precautionary TAC; link to North Sea	-	10.0		3.1		2.9	6.1
1997	Combined advice with North Sea	-	7.0		3.4		0.6	4.0
1998	Combined advice with North Sea	4.7	7.0		3.8		0.3	4.0
1999	Combined advice with North Sea	3.4	5.4		1.4		0.3	1.7
2000	Combined advice with North Sea	< 1.8	4.5		1.5		0.6	2.1
2001	Combined advice with North Sea	< 2.0	4.0		1.9		0.2	2.1
2002	Combined advice with North Sea	< 3.0	6.3		4.1		0.06	4.1
2003	Combined advice with North Sea	-	3.2		1.8	0.2	n/a	1.8
2004	Combined advice with North Sea / F should be below F_{pa}	No forecast	4.9		1.4	0.1	n/a	1.4
2005	Combined advice with North Sea / F should be below F_{pa}	-	4.0		0.8	0.2	0	0.8
2006	Combined advice with North Sea / F < 0.3	-	3.2		1.5	1.0	0	1.5
2007	Combined advice with North Sea / F < 0.3	-	3.4		1.6	0.8	0	2.5
2008	Combined advice with North Sea / 15% TAC reduction	2.9	2.9		1.4	0.6	0	2.0
2009	Combined advice with North Sea / Apply management plan	-	2.6		1.5	0.6	0	2.1
2010	Combined advice with North Sea / Apply management plan	-	2.2		1.3	0.6	0	1.9
2011	See scenarios	-	2.1		9.9	1.7	0	11.6
2012	Apply management plan North Sea	-	2.095	2.5	2.6	0.7	0	3.3
2013	Apply management plan North Sea	-	2.770	2	[b]	[b]	[b]	[b]
2014	Apply management plan North Sea	2.438	2.355					
2015	(November update) MSY approach (landings for whole stock)	< 50.163 [a]						

Weights in thousand tonnes.
[a] Including industrial bycatch.
[b] Combined in table 6.3.7.2
n/a = not available.

Table 6.3.7.3 Haddock in **Division VIa (West of Scotland)**. ICES advice, management, landings, and catches.

Year	ICES Advice/ Single-stock exploitation boundaries from 2004 onwards *	Predicted landings corresp. to advice	Agreed TAC **	Official landings	ICES estimates		
					Landings	Discard	Total
1987	Reduce F towards F_{max}	20.0	32.0	27	27.0	16.2	43.2
1988	No increase in F; TAC	25.0	35.0	21	21.2	9.5	30.7
1989	80% of F(87); TAC	15.0	35.0	24	16.7	3.0	19.7
1990	80% of F(88); TAC	14.0	24.0	13	10.1	5.4	15.5
1991	70% of effort (89)	-	15.2	10	10.6	8.7	19.2
1992	70% of effort (89)	-	12.5	7	11.4 [a]	9.3 [a]	20.5 [a]
1993	70% of effort (89)	-	17.6	13	19.1 [a]	16.8 [a]	35.9 [a]
1994	30% reduction in effort	-	16.0	9	14.2 [a]	11.1 [a]	25.3 [a]
1995	Significant reduction in effort	-	21.0	13	12.4	8.6	20.9
1996	Significant reduction in effort	-	22.9	13	13.5	11.4	24.8
1997	Significant reduction in effort	-	20.0	13	12.9	6.5	19.3
1998	No increase in F	20.8 [b]	25.7	14	14.4	5.5	19.9
1999	F reduced to F_{pa}	14.3 [b]	19.0	11	10.5	4.9	15.3
2000	Maintain F below F_{pa}	< 14.9 [b]	19.0	7	7.0	7.9	14.9
2001	Reduce F below F_{pa}	< 11.2 [b]	13.9	7	687	6.6	13.4
2002	Reduce F below F_{pa}	< 14.1 [b]	14.1	7	7.1	8.9	16.0
2003	No cod catches	-	8.7	4.9	5.3	4.1	9.4
2004	F_{pa}*	12.2	6.5	3.0	3.9	3.7	7.6
2005	¾ × F_{pa}*	7.6	7.6	3.2	3.8	2.9	6.7
2006	0.7 × F_{pa}*	8.0	7.81	5.7	6.3	4.6	10.9
2007	0.87 × F_{pa}*	7.2	7.2	3.7	3.8	4.0	7.7
2008	SSB >B_{pa}*	4.2	6.12	2.8	2.8	1.2	4.1
2009	No fishing and recovery plan*	0	3.52	2.8	2.9	1.6	4.5
2010	No fishing and recovery plan	0	2.67	2.9	3.0	2.8	5.8
2011	See scenarios	0	2.005	1.7	1.7	1.5	3.3
2012	MSY framework [c]	5.6 [c]	6.015	5.0	5.1	0.5	5.6
2013	MSY framework	3.1	4.211	4.7	4.6	1.0	5.6
2014	MSY approach	6.432 [d]	3.988				
2015	(November update) MSY approach (landings for whole stock)	< 50.163 [e]					

Weights in thousand tonnes.

* Single-stock boundary and the exploitation of this stock should be conducted in the context of mixed fisheries, protecting stocks outside safe biological limits.

** TAC is set for Divisions VIa and VIb (plus Subdivision Vb_1 and Subareas XII and XIV), combined with restrictions on the quantity that can be taken in Division VIa from 1990.

[a] Adjusted for misreporting.

[b] For Division VIa only.

[c] An error in this advice was detected in 2012 (the previous value of 10.2 thousand tonnes was incorrect).

[d] This value (6.432) refers to total catch, including discards. Therefore, it is not directly comparable to the value advised for 2013 (3.1), which referred only to landings.

[e] Including industrial bycatch.

Table 6.3.7.4 Haddock in Subarea IV and Divisions IIIa West and VIa (North Sea, Skagerrak, and West of Scotland). Official landings and estimated catches by country and area.

Division IIIa								
Country	2006	2007	2008	2009	2010	2011	2012	2013
DE	186	206	87	105	65	102	120	90
DK	1001	1054	1052	1263	1139	1661	1916	1456
NL	0	0	0	0	1	0	0	5
NO	113	152	170	121	81	125	239	223
PT	30	37	0	0	0	0	0	0
SE	246	278	276	166	126	198	210	217
UK	0	0	0	0	0	0	0	3

Subarea IV								
Country	2006	2007	2008	2009	2010	2011	2012	2013
BE	106	178	112	108	78	106	78	78
DE	726	727	393	657	634	575	548	677
DK	759	645	501	552	725	697	947	1283
ES	0	0	0	0	0	0	0	0
FO	4	0	3	32	5	0	0	0
FR	444	498	448	135	276	320	175	177
GL	5	8	0	4	0	0	0	0
IE	0	0	0	0	0	0	0	0
IS	0	0	0	0	0	0	0	0
NL	33	55	29	24	41	71	191	172
NO	1798	1706	1482	1278	1126	1195	1069	1661
PL	8	8	16	0	0	0	0	0
PT	76	0	0	0	0	0	0	0
SE	100	130	83	141	90	128	103	113
UK	32390	26717	27365	28393	24983	23343	0	32993

Division VIa								
Country	2006	2007	2008	2009	2010	2011	2012	2013
DE	7	0	1	0	1	0	0	
ES	44	5	10	21	28	36	15	
FO	1	2	0	0	0	0	0	
FR	291	211	151	136	89	73	32	51
IE	526	759	879	297	396	290	845	746
NO	17	16	28	18	9	4	0	6
UK	4947	2780	1776	2380	2415	1364	0	3878

Northern Shelf								
	2006	2007	2008	2009	2010	2011	2012	2013
Official landings	43858	36172	34862	35831	32308	30288	6488	43830
ICES landings	43334	34672	33058	35590	31940	36570	38162	43681
ICES discards	23094	32651	14503	12326	13071	13067	5032	3038
ICES IBC	535	48	199	52	431	24	1	54
ICES total catch	66962	67371	47759	47968	45442	49661	43195	46772
TAC IV	51850	54640	46444	42110	35794	34057	39000	45041
TAC IIIa	3189	3360	2856	2590	2201	2100	2095	2770
TAC Via	7810	7200	6120	3520	2670	2005	6015	4211
Total TAC	62849	65200	55420	48220	40665	38162	47110	52022
ICES quota uptake	69%	53%	60%	74%	79%	96%	81%	84%

Table 6.3.7.5 Haddock in Subarea IV and Divisions IIIa West and VIa (North Sea, Skagerrak, and West of Scotland). Summary of stock assessment, actual values = median, High = higher limit and Low = lower limit of 95% confidence interval.

Year	Recruitment			SSB			Landings	Discards	Mean F		
	Age 0								Ages 2-4		
	thousands	High	Low	tonnes	High	Low	tonnes	tonnes		High	Low
1972	16853440	24710320	8996560	340580	404400	276760	233290	173900	0.732	0.854	0.61
1973	57969960	74470120	41469800	310570	360030	261110	206810	137200	0.663	0.789	0.537
1974	135494090	180170490	90817690	379590	445610	313570	167410	229500	0.636	0.766	0.506
1975	9590780	14976460	4205100	182240	208240	156240	159640	334010	0.709	0.859	0.559
1976	11725710	16644330	6807090	225280	271040	179520	181760	217730	0.694	0.846	0.542
1977	21794550	27952850	15636250	437180	544620	329740	155750	83730	0.693	0.849	0.537
1978	48413020	55927260	40898780	182410	223650	141170	102220	43760	0.731	0.881	0.581
1979	96634060	111759120	81509000	107430	135430	79430	97390	51380	0.73	0.876	0.584
1980	17337280	20728200	13946360	120820	148500	93140	110830	91260	0.69	0.822	0.558
1981	28241050	33110930	23371170	244470	280430	208510	147670	78660	0.569	0.677	0.461
1982	16209680	18917160	13502200	521490	577490	465490	195360	60730	0.494	0.58	0.408
1983	49725060	55793780	43656340	323090	358570	287610	187960	64450	0.619	0.719	0.519
1984	11889570	13968770	9810370	268590	301350	235830	157630	89060	0.728	0.842	0.614
1985	17319710	20191730	14447690	183060	202740	163380	182550	64380	0.697	0.809	0.585
1986	31801640	35540000	28063280	300170	337290	263050	184520	38740	0.745	0.859	0.631
1987	3134450	4180450	2088450	177130	198830	155430	133890	60050	0.799	0.921	0.677
1988	3313210	6248730	377690	139360	159120	119600	124800	53730	0.821	0.951	0.691
1989	5003850	6379410	3628290	204010	229770	178250	91930	34870	0.822	0.952	0.692
1990	17195990	19257290	15134690	91070	103890	78250	61190	25160	0.79	0.914	0.666
1991	19251480	21864260	16638700	56920	65540	48300	54730	41990	0.811	0.943	0.679
1992	28886970	32922570	24851370	57740	64980	50500	80480	53420	0.77	0.884	0.656
1993	8919390	10493470	7345310	130630	147510	113750	97870	81510	0.834	0.952	0.716
1994	35073270	39308030	30838510	155410	179170	131650	94710	74300	0.798	0.918	0.678
1995	9811160	11305020	8317300	212710	242650	182770	89580	79040	0.749	0.867	0.631
1996	13212210	15358130	11066290	134600	150440	118760	92420	112060	0.743	0.857	0.629
1997	7094640	8384140	5805140	278820	311320	246320	95340	74600	0.608	0.71	0.506
1998	5198250	6181830	4214670	188860	211160	166560	95390	66460	0.67	0.782	0.558
1999	89946200	100632720	79259680	145240	165080	125400	75870	47450	0.778	0.906	0.65
2000	17351340	19323900	15378780	86830	100710	72950	54360	72390	0.809	0.943	0.675
2001	1704390	2794010	614770	56680	65260	48100	47380	125980	0.557	0.659	0.455
2002	2606050	3017610	2194490	594920	663240	526600	64780	89750	0.354	0.426	0.282
2003	2639580	3275460	2003700	492880	544640	441120	46990	27150	0.237	0.287	0.187
2004	2551260	2960600	2141920	315700	352880	278520	51760	20590	0.245	0.297	0.193
2005	26541350	29606450	23476250	219850	251750	187950	51440	12570	0.308	0.37	0.246
2006	5131980	5719260	4544700	138850	163910	113790	43190	23620	0.482	0.57	0.394
2007	3577430	4009630	3145230	94650	116290	73010	34570	32750	0.418	0.498	0.338
2008	2674990	3049550	2300430	264020	297240	230800	30750	14690	0.27	0.328	0.212
2009	17020330	19428770	14611890	191360	216440	166280	34610	12370	0.208	0.254	0.162
2010	1497170	1922010	1072330	169870	192730	147010	31460	13470	0.215	0.263	0.167
2011	777160	1066080	488240	127550	145850	109250	36390	13080	0.262	0.324	0.2
2012	2181750	2821550	1541950	306560	349940	263180	37620	5030	0.188	0.238	0.138
2013	1918990	3396670	441310	235240	273220	197260	43430	3290	0.183	0.235	0.131
2014	14195000*			173360	208760	137960					
Average	**21381615**	**25946884**	**17158566**	**222507**	**255156**	**189857**	**101612**	**72140**	**0.592**	0.697	0.487

* RCT3 November 2014.

Annex 6.3.7.1 EU and Norway management plan

"The plan shall consist of the following elements:

1. *Every effort shall be made to maintain a minimum level of Spawning Stock Biomass greater than 100,000 tonnes (Blim).*
2. *For 2009 and subsequent years the Parties agreed to restrict their fishing on the basis of a TAC consistent with a fishing mortality rate of no more than 0.3 for appropriate age-groups, when the SSB in the end of the year in which the TAC is applied is estimated above 140,000 tonnes (Bpa).*
3. *Where the rule in paragraph 2 would lead to a TAC, which deviates by more than 15 % from the TAC of the preceding year, the Parties shall establish a TAC that is no more than 15 % greater or 15 % less than the TAC of the preceding year.*
4. *Where the SSB referred to in paragraph 2 is estimated to be below Bpa but above Blim the TAC shall not exceed a level which will result in a fishing mortality rate equal to 0.3-0.2*(Bpa-SSB)/(Bpa-Blim). This consideration overrides paragraph 3.*
5. *Where the SSB referred to in paragraph 2 is estimated to be below Blim the TAC shall be set at a level corresponding to a total fishing mortality rate of no more than 0.1. This consideration overrides paragraph 3.*
6. *In the event that ICES advises that changes are required to the precautionary reference points Bpa (140,000t) or Blim, (100,000t) the Parties shall meet to review paragraphs 1-5.*
7. *In order to reduce discarding and to increase the spawning stock biomass and the yield of haddock, the Parties agreed that the exploitation pattern shall, while recalling that other demersal species are harvested in these fisheries, be improved in the light of new scientific advice from inter alia ICES.*
8. *No later than 31 December 2013, the parties shall review the arrangements in paragraphs 1 to 7 in order to ensure that they are consistent with the objective of the plan. This review shall be conducted after obtaining inter alia advice from ICES concerning the performance of the plan in relation to its objective.*
9. *This arrangement enters into force on 1 January 2009."*

Annex 6.3.7.2 EU management proposal

Option for a harvest control rule for the management of haddock in Division VIa and EU waters of Division Vb:

1. *For 2010 and subsequent years the TAC will be set consistent with a fishing mortality rate of no more than 0.3 for appropriate age-groups, when the SSB in the end of the year in which the TAC is applied is estimated to be above 30,000 tonnes (B_{pa}).*
2. *Where the SSB referred to in paragraph 1 is estimated to be below B_{pa} but above 22,000 tonnes (B_{lim}) the TAC shall not exceed a level which will result in a fishing mortality rate equal to $0.3-0.2*(B_{pa}-SSB)/(B_{pa}-B_{lim})$.*
3. *Where the SSB referred to in paragraph 2 is estimated to be below B_{lim} the TAC shall be set at a level corresponding to a total fishing mortality rate of no more than 0.1.*
4. *Where the rules in paragraphs 1-3 would lead to a TAC which deviates by more than 25 % from the TAC of the preceding year, the TAC will be set that is no more than 25 % greater or 25 % less than the TAC of the preceding year. This consideration overrides paragraphs 1-3.*
5. *In the event that STECF advises that changes are required to the precautionary reference points B_{pa} (30,000t) or B_{lim}, (22,000t) paragraphs 1-4 shall be reviewed.*