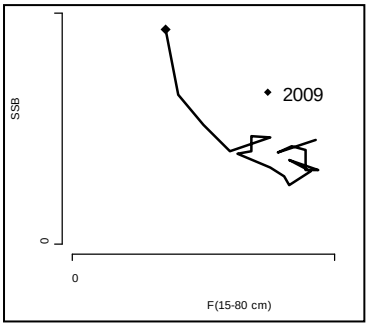
ECOREGION Widely Distributed and Migratory Stocks
STOCK Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d (Northern stock)

Advice Summary for 2011

Management Objective(s)	Landings in 2011
Transition to an **MSY approach** with caution at low stock size	Less than 50 600t
Cautiously avoid impaired recruitment (**Precautionary Approach**)	Less than 50 600t
Cautiously avoid impaired recruitment and achieve other objective(s) of a **management plan** (e.g. catch stability)	n/a

Stock status

Fishing mortality	2007	2008	2009
F_{MSY}	Unknown	Unknown	Unknown
F_{PA}/F_{lim}	Unknown	Unknown	Unknown
Spawning Stock Biomass (SSB)	2008	2009	2010
MSY $B_{trigger}$	Unknown	Unknown	Unknown
B_{PA}/B_{lim}	Unknown	Unknown	Unknown



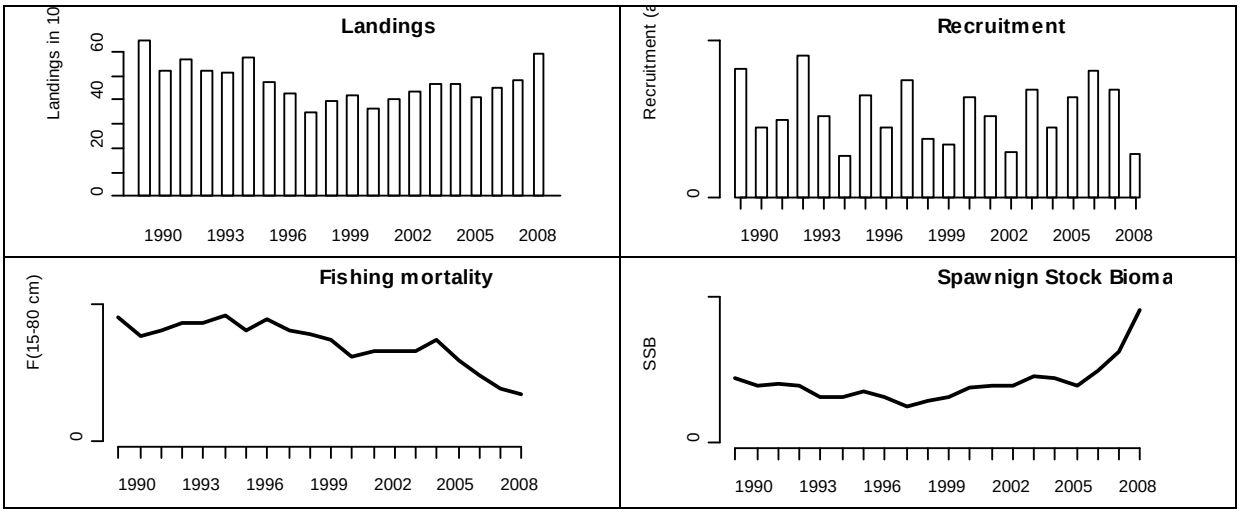


Figure 9.4.1.1 Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d. Summary of stock assessment (landing in thousands tones). Top right: SSB and F over the years.

The assessment is indicative of trends only. The spawning biomass has been increasing in recent years. There are also indications that fishing mortality has been decreasing in recent years. Recruitment fluctuations appear to be without substantial trend over the whole series.

Management plans

A recovery plan has been 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_{mgt}) of 0.25, constrained by a year-to-year change in TAC of 15% when SSB is above 100 000 t. ICES did not evaluate the plan.

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. ICES has evaluated the F_{MSY} candidate value proposed for this plan, and found the value to be inappropriate (see Section 9.3.2.1).

In light of the EU policy paper on fisheries management (17 May 2010, COM(2010) 241) this stock is classified under category 8, which implies a maximum TAC increase of 15%.

Biology

European hake is widely distributed over the Northeast Atlantic shelf. Although, there is no clear evidence of multiple populations in the Northeast Atlantic, ICES assumes two different stock units. The Northern stock is distributed over a wide area. There are two major nursery areas: in the Bay of Biscay and off southern Ireland. Hake growth is now known to be faster than previously estimated.

The 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. Since the introduction of the high vertical opening trawls in the mid-1990s, no significant changes in fishing technology have been introduced.

Catch by fleet	Total landings (2009) 59 kt (33 % trawl, 23% gillnet, 21% longline, and 23% mixed gears); discards 2.0 kt (underestimated, only estimates from 1 trawl fleet available).

Quality considerations

This stock was benchmarked in 2010. This year assessment presents major revisions in relation to last year: (i) new assessment model, (ii) incorporation of discards, (iii) faster growth rate and (iv) higher natural mortality. The assessment is found to be limited in its ability to precisely estimate current stock abundance and mortality. Future work should attempt to extend the modelled time period back in time to improve the assessment.

Scientific basis

Assessment type	Length based model (SS3)
Input data	4 survey indices (EVHOE, SP-PGFS, IGFS, RESSGASC)
Discards and by-catch	Discards included in the assessment
Other information	This stock was benchmarked in 2010 (WKROUND) Assessment used for trends only.
Working group report	WGHMM

9.4.1 Supporting Information updated in November 2010

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Reference points

	Type	*Value*	*Technical basis*
MSY Approach	MSY $B_{trigger}$	Not defined	
	F_{MSY}	0.24	$F_{30\%SPR}$
Precautionary Approach	B_{lim}	Not defined	
	B_{pa}	Not defined	
	F_{lim}	Not defined	
	F_{pa}	Not defined	

(unchanged since: 2010)

New stock perception makes previous PA reference point inappropriate.

Yield and spawning biomass per Recruit F-reference points (2010):

	Fish Mort (Length 15-80cm)	**Yield/R**	**SSB/R**
$\mathbf{F}_{max}$	0.29	0.26	0.76
$\mathbf{F}_{0.1}$	0.20	0.25	1.12
$F_{35\%SPR}$	0.21	0.25	1.09
$F_{30\%SPR}$	0.24	0.26	0.94

Outlook for 2011

No reliable assessment can be presented for this stock. The main cause is uncertainty in recent years' estimates of SSB and F. Therefore, fishing possibilities cannot be projected.

MSY approach

According to ICES MSY approach, catches should be maintained at recent levels, corresponding to landings of 50 600 t (average of 2007–2009). Despite uncertainty in the rate of abundance increase in recent years, the stock trend is increasing and the exploitation status is unknown.

PA approach

There is no sign of impaired recruitment throughout the assessed period. Therefore, according to the PA approach catches should not exceed recent levels, corresponding to landings of 50 600 t (2007–2009).

Management plan(s)

The TAC corresponding to the current recovery plan (EC Reg. No. 811/2004) cannot be determined as the assessment is only considered as indicative of trends.

EU Policy paper

In light of the EU policy paper on fisheries management (17 May 2010, COM(2010) 241) this stock is classified under category 8. State of stock is unknown but trends based assessment indicates an increase in SSB. The resulting TAC increase should not exceed 15%.

Additional considerations

Discards of juvenile hake can be substantial in some areas and fleets. The spawning 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. It is of concern that the TAC in 2009 was overshot.

The application of a new assessment method has resulted in a change of historic stock perception. Thus, the previous defined precautionary reference points are no longer appropriate.

The new assessment is based on a length based assessment model. The assessment is considered indicative of trends only. Because the new assessment uses quarterly instead of annual data, a shorter assessment period had to be considered (1990–2009) due to data availability. This precludes comparison of SSB levels with those prior to 1990. Previous assessments covering the period starting in 1978 indicated a pronounced stock decline in the 1980s to historically low level of SSB in the early 1990s. While the current assessment suggests improvement from these low values, there is little information on large fish as a very small proportion of fish larger than 60 cm has been observed in the data since 1990 (landings and surveys). All this leads to large uncertainties associated with the population parameters (SSB, F and recruitment), particularly for the most recent years.

The basis for the advice is the same as last year but extended by MSY considerations.

Sources

ICES. 2010. Report of the Working Group on the Assessment of Southern Shelf Stocks of Hake, Monk and Megrim (WGHMM). Annex T, 5–11 May 2010, Bilbao, Spain. ICES CM 2010/ACOM:11.

Table 9.4.1.1 Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d. Single stock exploitation boundaries (advice), management and landings, discards, and catches.

Year	ICES Advice	Predicted landings corresp. to advice	Agreed TAC[1]	ICES landings	Discards[2]	ICES catch
1987	Precautionary TAC; juvenile protection	-	63.5	63.4		
1988	Precautionary TAC; juvenile protection	54	66.2	64.8		
1989	Precautionary TAC; juvenile protection	54	59.7	66.5		
1990	Precautionary TAC; juvenile protection	59	65.1	59.9		
1991	Precautionary TAC; juvenile protection	59	67.0	57.6		
1992	If required, precautionary TAC	61.5	69.0	56.6		
1993	Enforce juvenile protection legislation	-	71.5	52.1		
1994	F significantly reduced	<46	60.0	51.3	*	
1995	30% reduction in F	31	55.1	57.6		
1996	30% reduction in F	39	51.1	47.2		
1997	20% reduction in F	54	60.1	42.6		
1998	20% reduction in F	45	59.1	35.0		
1999	Reduce F below F_{pa}	<36	55.1	39.8	*	
2000	50% reduction in F	<20	42.1	42.0	*	
2001	Lowest possible catch, recovery plan	-	22.6	36.7		
2002	Lowest possible catch / recovery plan	-	27.0	40.0		
2003	Lowest possible catch / recovery plan	-	30.0	43.1	*	
2004	70% reduction in F or recovery plan*	<13.8	39.1	46.4	*	
2005	F=0.19	33	42.6	46. 6	4.0	50.6
2006	F=0.25	44	43.9	41.5	*	
2007	Recovery plan limits	50.5	52.7	45.1	2.1	47.2
2008	Recovery plan limits	54	54	47.8	3.5	51.3
2009	F =0.25 = F_{pa}	51.5	51.5	59.0		
2010	F =0.25 = F_{pa}	55.2	55.1			
2011	See scenarios	50.6				

(weights in ‘000)

[1]Sum of area TACs corresponding to northern stock plus Division IIa (EC zone only).

[3]2010 new discard estimates. In years marked with *, partial discard estimates are available and used in the assessment. For remaining years for which no values are presented, some estimates are available but not considered valid and thus not used in the assessment.

Table 9.4.1.2 Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d. Estimated landings (in thousand tonnes), by ICES area.

Year	IVa+VI	VII	VIIIa,b	Unallocated	Total
1961	-	-	-	95.6	95.6
1962	-	-	-	86.3	86.3
1963	-	-	-	86.2	86.2
1964	-	-	-	76.8	76.8
1965	-	-	-	64.7	64.7
1966	-	-	-	60.9	60.9
1967	-	-	-	62.1	62.1
1968	-	-	-	62.0	62.0
1969	-	-	-	54.9	54.9
1970	-	-	-	64.9	64.9
1971	8.5	19.4	23.4	0	51.3
1972	9.4	14.9	41.2	0	65.5
1973	9.5	31.2	37.6	0	78.3
1974	9.7	28.9	34.5	0	73.1
1975	11.0	29.2	32.5	0	72.7
1976	12.9	26.7	28.5	0	68.1
1977	8.5	21.0	24.7	0	54.2
1978	8.0	20.3	24.5	-3.3	49.5
1979	8.7	17.6	27.2	-2.4	51.1
1980	9.7	22.0	28.4	-3.6	56.5
1981	8.8	25.6	22.3	-2.8	53.9
1982	5.9	25.2	26.2	-2.3	55.0
1983	6.2	26.3	27.1	-2.1	57.5
1984	9.5	33.0	22.9	-2.1	63.3
1985	9.2	27.5	21.0	-1.6	56.1
1986	7.3	27.4	23.9	-1.5	57.1
1987	7.8	32.9	24.7	-2.0	63.4
1988	8.8	30.9	26.6	-1.5	64.8
1989	7.4	26.9	32.0	0.2	66.5
1990	6.7	23.0	34.4	0.2	64.3
1991	8.3	21.5	31.6	-9.1	52.4
1992	8.6	22.5	23.5	2.1	56.6
1993	8.5	20.5	19.8	3.3	52.1
1994	5.4	21.1	24.7	0	51.3
1995	5.3	24.1	28.1	0	57.6
1996	4.4	24.7	18.0	0	47.2
1997	3.3	18.9	20.3	0	42.6
1998	3.2	18.7	13.1	0	35.0
1999	4.3	24.0	11.6	0	39.8
2000	4.0	26.0	12.0	0	42.0
2001	4.4	23.1	9.2	0	36.7
2002	2.9	21.2	15.9	0	40.1
2003*	3.3	25.4	14.4	0	43.2
2004*	4.4	27.5	14.5	0	46.4
2005*	5.5	26.6	14.5	0	46.6
2006*	6.1	24.7	10.6	0	41.5
2007*	7.0	27.5	10.6	0	45.1
2008*	10.7	22.8	14.3	0	47.8
2009*	13.1	25.5	20.4	0	59.0

Spanish data for 1961–1972 not revised, data for Subarea VIII for 1973–1978 include data for Divisions VIIIa,b only. Data for 1979–1981 are revised based on French surveillance data. Includes Divisions IIIa, IVb,c from 1976. * - inadequate for discard estimates.
There are some unallocated landings (moreover for the period 1961–1970).