

# Stock Annex

Stock specific documentation of standard assessment procedures used by ICES.

A. Stock ... Tusk (*Brosme Brosme*) in VIb

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Working Group: WGDEEP.....

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Revised by (WGDEEP /Kristin Helle).....

## A. General

### A.1. Stock definition

In 2007, WGDEEP examined the available evidence of stock discrimination in this species. Based on the genetic investigation, the Group suggested that Tusk in VIb should be treated as one unit.

### A.2. Fishery

Tusk is a bycatch species in the trawl, gillnet and longline fisheries in Subarea VIb. Norway has traditionally landed the largest percentage of the total catch. Longliners catch about 90% of the Norwegian landings. Since the 12th of January 2007 parts of the Rockall bank has been closed to fishing with bottom trawls, gillnets and longlines. The areas closed are traditional areas fished by the Norwegian longline fleet.

In 2004 Russia started longline fishery of ling with bycatch of tusk in international waters of the Rockall Bank. Maximum catch (137 t) was taken in 2005. In recent years intensity of Russian longline fishery decreased. Small bycatches of tusk were also taken in the area by trawlers on haddock fishery.

### A.3. Ecosystem aspects

## B. Data

Full landings data are available from 1988 to present but it is thought that fisheries in some of these areas pre-date the time series. Incomplete landings data are available from Norwegian longline fisheries from 1889 onwards. Additional landings data from other areas may be available from 1950 onwards.

### B.2. Biological

Length data for the Norwegian reference fleet in Subarea IIa have been routinely collected since 2002.

Considerable general information is available on the life history characteristics of this species.

### B.3. Surveys (use the ICES surveys acronym)

No data available

#### B.4. Commercial CPUE

Norway started in 2003 to collect and enter data from official logbooks into an electronic database and data are now available for the period 2000–2009. Vessels were selected that had a total landed catch of ling, tusk and blue ling exceeding 8 tonnes in a given year. The logbooks contain records of the daily catch, date, position, and number of hooks used per day. Cpue were calculated as the average total catch of ling per vessel ( $C$ ), and the average number of hooks per set and per vessel ( $N$ ) associated with these catches. Then, for each year and catch category, the estimated cpue for the entire fleet was determined as  $C/N$ . Thus the estimated cpue for each year and Subarea was the mean catch in kg per hook for the entire fleet.

The boats that provided logbooks are the primary sampling units, and  $C$  and  $N$  are both random variables. It follows that this is a ratio-type estimator, therefore the standard errors of the cpue estimates could be calculated as described in Cochran (1977, page 32). This cpue estimator is a weighted average, that is the more hooks a boat sets, the more influence it has on the estimate (Cochran, 1977). For comparison, an unweighted cpue series was also constructed (i.e. the average cpue per boat).

A standardised series will be developed in preparation for WGDEEP 2012.

#### B.5. Other relevant data

### C. Assessment: data and method

Model used:

Software used:

Model Options chosen:

Input data types and characteristics: (table below is just an example; adapt the description of input accordingly)

Type	Name	Year range	Age range	Variable from year to year Yes/No
Caton	Catch in tonnes			
Canum	Catch at age in numbers			
Weca	Weight at age in the commercial catch			
West	Weight at age of the spawning stock at spawning time.			
Mprop	Proportion of natural mortality before spawning			
Fprop	Proportion of fishing mortality before spawning			
Matprop	Proportion mature at age			
Natmor	Natural mortality			

Tuning data:

Type	Name	Year range	Age range
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Tuning fleet 1			
Tuning fleet 2			
Tuning fleet 3			
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#### **D. Short-Term Projection**

Model used:

Software used:

Initial stock size:

Maturity:

F and M before spawning:

Weight at age in the stock:

Weight at age in the catch:

Exploitation pattern:

Intermediate year assumptions:

Stock recruitment model used:

Procedures used for splitting projected catches:

#### **E. Medium-Term Projections**

Model used:

Software used:

Initial stock size:

Natural mortality:

Maturity:

F and M before spawning:

Weight at age in the stock:

Weight at age in the catch:

Exploitation pattern:

Intermediate year assumptions:

Stock recruitment model used:

Uncertainty models used:

1. Initial stock size:
2. Natural mortality:
3. Maturity:
4. F and M before spawning:
5. Weight at age in the stock:
6. Weight at age in the catch:
7. Exploitation pattern:
8. Intermediate year assumptions:
9. Stock recruitment model used:

## F. Long-Term Projections

Model used:

Software used:

Maturity:

F and M before spawning:

Weight at age in the stock:

Weight at age in the catch:

Exploitation pattern:

Procedures used for splitting projected catches:

## G. Biological Reference Points

	<i>Type</i>	<i>Value</i>	<i>Technical basis</i>
<b>MSY Approach</b>	<b>MSY B<sub>trigger</sub></b>	<b>xxx t</b>	<b>Explain</b>
	<b>F<sub>MSY</sub></b>	<b>Xxx</b>	<b>Explain</b>
<b>Precautionary Approach</b>	<b>B<sub>lim</sub></b>	<b>xxx t</b>	<b>Explain</b>
	<b>B<sub>pa</sub></b>	<b>xxx t</b>	<b>Explain</b>
	<b>F<sub>lim</sub></b>	<b>Xxx</b>	<b>Explain</b>

	<b>F<sub>pa</sub></b>	<b>X<sub>xx</sub></b>	<b>Explain</b>
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No biological reference points have been defined.

## H. Other Issues

**H.1.** Historical overview of previous assessment methods (this subsection is optional. See example below.)

Summary of data ranges used in recent assessments:

Data	2006 assessment	2007 assessment	2008 assessment	2009 assessment
Catch data	Years: 1978–(AY-1) Ages: 1–8+	Years: 1978–(AY-1) Ages: 1–8+	Years: 1978–(AY-1) Ages: 1–8+	Years: 1978–(AY-1) Ages: 1–8+
Survey: A_Q1	Years: 1985–AY Ages: 1–7	Years: 1985–AY Ages: 1–7	Years: 1985–AY Ages: 1–7	Years: 1985–AY Ages: 1–7
Survey: B_Q4	Years: 1996–(AY-1) Ages: 1–5	Years: 1996–AY-1 Ages: 1–7	Years: 1996–AY-1 Ages: 1–7	Years: 1996–AY-1 Ages: 1–7
Survey: C	Not used	Not used	Not used	Not used

AY – Assessment year

(The historic perspective, as well as all the other section on the stock annex, should only update in a benchmark workshop. If there is any reason to deviate from the stocks annex, this should be explain in the Working Group report and only update this deviation in the historic perspective after consultation with ICES Secretariat and WG Chair).

## I. References