Stock Annex: Dab (*Limanda limanda*) in Subarea 4 and Division 3.a (North Sea, Skagerrak and Kattegat)

Stock specific documentation of standard assessment procedures used by ICES.

Stock:	Dab
Working Group:	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK)
Created:	
Authors:	
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Last updated by:	Holger Haslob

A General

A.1. Stock definition

Several spawning grounds and the wide distribution of dab indicate the presence of more than one stock. Meristic data (Lozán, 1988) corroborate the hypothesis of several stocks for dab, distinguishing significantly between populations from western British waters and the North Sea and the Baltic. However, no further scientific evidence is available for different stock units within the North Sea and consequently North Sea dab is defined to be a single-stock unit in the ICES Subareas 4 and 3.a.

A.2. Fishery

Dab is mainly a bycatch species in the demersal fisheries for North Sea plaice and sole. In recent years large effort reduction took place in these fisheries of about 60% in beam trawl and otter trawl fisheries in the period 2000–2012 (STECF-14-03).

A.3. Ecosystem aspects

Dab is a widespread demersal species on the Northeast Atlantic shelf and distributed from the Bay of Biscay to Iceland and Norway; including the Barents Sea and the Baltic. It is one of the most abundant species in the North Sea (Daan *et al.*, 1990).

B. Data

B.1. Commercial catch

Data available on official landings are incomplete for the years 1984–1997 due to the lack of Dutch data for this period. Due to the high amount of discards, the official landings data alone cannot be used to inform the stock status of dab. Total catch data (landings and discards) are available for some countries and fleets since 2002 and were imported into the InterCatch data portal. However, the amount of imported discard data was low for the earlier years of the time-series and is lacking for some cases. Further, the imported discard data are uncertain. Given the high discard rate for dab this makes the estimation of the total catch uncertain too. It seems that for the last three years data quality has improved (e.g. all countries provide discard estimates).

B.2. Biological

Weight–at–age

Weight-at-age data are available from surveys (Isis 2003–2014; Tridens 2002–2014; Solea 2013–2014). The weight-at-age time-series used in the SURBA model is based on the Dutch beam trawl surveys only, since no individual weights were available for the German survey before 2013.

Table 1. Overview of weight and age data (n observations) for dab (*Limanda limanda*) available in the DATRAS data portal.

	BTS Isis Q3		BTS Tridens Q3		BTS Solea Q3		IBTS Q1		IBTS Q3	
Year	IndWgt	Age	IndWgt	Age	IndWgt	Age	IndWgt	Age	IndWgt	Age
2002			474			434				
2003	301	286	482	473		494				
2004	276	274	522	504		977			366	
2005	391	373	549	534					391	
2006	345	341	496	482					374	
2007	400	394	544	517		620			387	
2008	312	285	529	515		585			388	
2009	272	269	549	538		975			384	2
2010	155	155	563	538		1022			419	
2011	485	476	620	613		1254			390	
2012	371	365	561	556		1074	452	445	364	13
2013	284	259	527	516	1994	1995	485	481	214	
2014	183	182	550	548	431	460	392	427	269	
2015	203		588						269	

Natural mortality

A natural mortality for dab of M=0.35 was estimated following the method of Then *et al*. (2014).

Maturity

Only very few maturity data are available from surveys. Based on these observations, and taking into account information from literature that dab mature early (Rijnsdorp *et al*., 1992), a fixed maturity ogive was constructed with age 1 being 60% mature, age 2 80% and age 3 and older 100% mature.

Surveys

There are several trawl surveys that could potentially be used as tuning indices for the assessment of North Sea dab.

- The BTS-ISIS (Beam trawl Survey)
- The BTS-Tridens (Beam trawl Survey)
- Belgium BTS survey
- German BTS survey
- The UK BTS survey

- The IBTS quarter 1 and quarter 3

The different beam trawl surveys are not fully standardized and operate with different gears (ICES, 2014). For the current dab assessment only, survey data available in the DATRAS data portal were used. For the construction of an age-based index only the Dutch and German beam trawl data were suitable and combined. A possible gear effect was taken into account applying the delta GAM method by Berg *et al*. (2014).

C. Historical stock development

WKNSEA 2016 decided that the SURBA model (Needle, 2015) was appropriate to the assessment of this stock. This model just takes survey data into account and estimates total mortality z and relative trends in biomass and recruitment. For the period from 2003 to 2014 the SURBA shows an increasing trend in stock biomass and recruitment while the total mortality is decreasing.

Model used as a basis for advice

The North Sea dab advice is based on a survey based assessment model (SURBA), the settings for the final assessment are given below:

Setting/Data	Values/source
Survey index	Combined beam trawl survey index 2003–current assessment year (BTS-Isis, BTS-Tridens, German BTS) . Delta GAM Method by Berg *et al*., 2014.
Ages	1–6
Lambda	3
zbar	1–6
Spawning time	0.4
Maturity ogive	Fixed ogive, age 1 = 60%, age 2 = 80%, age 3 and older 100%
Weight-at-age	Data from Dutch Beam trawl Surveys (2003–current assessment year)

D. Short-term projection

E. Medium-term projections

F. Long-term projections

G. Biological reference points

H. Other issues

I. References

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