5.1.2 Haddock – *Melanogrammus aeglefinus* L. - hyse

General stock features

Haddock, in relation to biomass, is a very important gadoid species in the North Sea. In recent years the difference between the stock found to the west of Scotland and the one found in the North Sea has been questioned. Since 2014, ICES assess both stocks as one (ICES WGNSSK 2016) and are now termed the Northern Shelf haddock stock. The spawning-stock biomass has varied considerably over the years ranging from 50 000 to 500 000 during the period since 1972 (ICES WGNSSK 2015). Haddock populations characteristically vary considerably in biomass with the underlying reason being occasional very large recruitments with periods of very poor early life history survival (Dickey-Collas et al. 2003). Similar to the cod, the North Sea haddock was influenced by the "gadoid outburst" (Cushing 1984) showing a peak in spawning-stock biomass in 1970 (Hislop 1996). The subsequent decline was, however, more rapid than for cod. While adult cod are found in all the six sub regions of the North Sea the haddock has a more northerly distribution (Daan et al. 1990). Although haddock are found in the entire North Sea the major catches are confined to the Northern and Central sub region, and also along the southern slope of the Norwegian Trench in the Skagerrak and along the western slope of the Norwegian Trench off western Norway (Hislop et al. 2015). A description of the changes in biomass of the stock is reported by Cook and Armstrong (1986) and Hislop (1996), however, there is little information linking any distributional changes as a response to climate change.

Spawning areas

Little is known about possible changes over time in spawning areas in the North Sea. A cursory overview of haddock spawning sites by Rogers and Stocks (2001) indicates that haddock spawning is confined to the northernmost part of the North Sea, particularly from Viking Bank to Shetland. Wright et al. (2011) also highlight a separate western sub-population spawning along the east coast of Scotland from the Orkney islands southward. The more detailed and recent egg surveys (Munk et al. 2009; ICES et al. 2010) also show that extensive spawning occuring east of the Orkneys and east of the Scottish east coast, in addition to a lesser spawning area near the western slope of the Norwegian Trench from Ling Bank to Eigersund Bank. Albert (1994) did not find spawning further east into the Norwegian Trench proper and concluded that the distributions of adult and maturing haddock moved out of the trench to spawn. This is in agreement with the eggs distributions found by Munk et al. (2009). However, distributions of eggs, larvae and pelagic juveniles (Munk et al. 1999) indicate that the offspring haddock drift southeastward back into the Norwegian Trench and Skagerrak. Figure 5.1.2-1 shows the synthesis of spawning areas from the above literature.

Spawning period

Spawning extends from February through May and the first-time spawners (two-year-old) spawn much later than the older age classes (Wright and Gibb 2005; Morgan et al. 2013). González-Irusta & Wright (2016) indicated peak spawning in March, while Morgan et al. (2013) reported that 50% of the total spawning had occurred by early April.

Spawning Table North Sea Haddock

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

Yellow: Total spawning period Green: Peak spawning

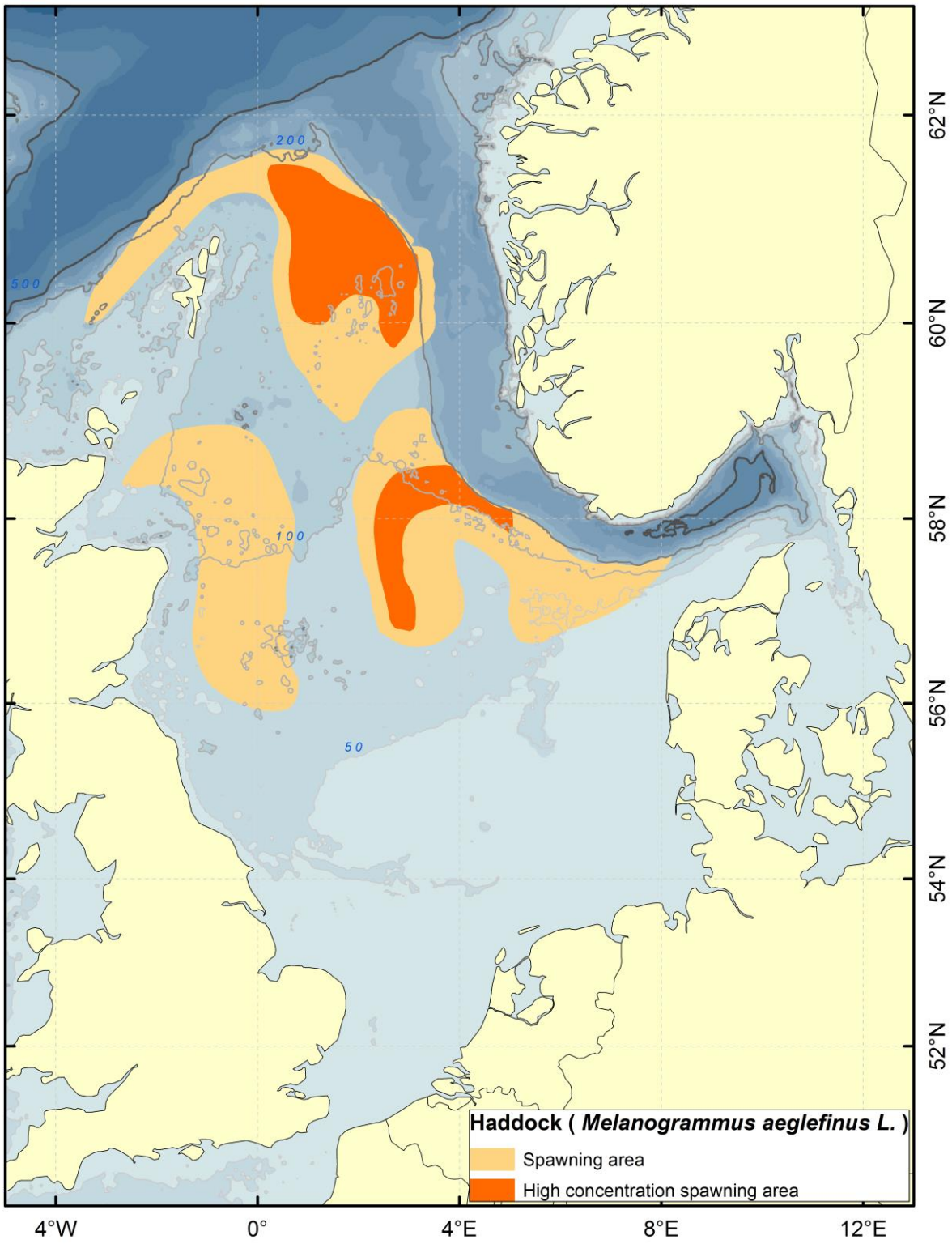

Figure 5.1.2-1. Haddock spawning areas in the North Sea.

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