

## Stock Annex– Four spot megrim (*Lepidorhombus boscii*) in Divisions 7.b–k and 8.a,b,d

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<b>Quality Handbook</b>	Stock specific documentation of standard assessment procedures used by ICES.
<b>Stock</b>	Four-spot megrim ( <i>Lepidorhombus boscii</i> ) in Divisions 27.7.b–k and 27.8.a,b,d
<b>Working Group</b>	WGBIE
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### General

#### A.1. Stock definition

The genus *Lepidorhombus* is represented in eastern Atlantic waters by two species, megrim (*L. whiffiagonis*) and four-spot megrim (*L. boscii*). Until 2016, three stocks of megrims were assessed by ICES: megrim in ICES Subareas 4 and 6, megrim in Divisions 7 b-k and 8 abd and megrim in Divisions 8c and 9a. In 2017 four-spot megrim in Divisions 7 b–k and 8 abd was assessed as a separate stock.

Four-spot megrim (*L. boscii*) is distributed in ICES Divisions VIIb–k and VIIIa,b,d, being more southerly present than megrim (Sánchez *et al.*, 2002). There is a certain bathymetric segregation between the two species of megrim. *L. boscii* has a preferential depth range of 100 to 450 m and *L. whiffiagonis* of 50 to 300 m (Sanchez *et al.*, 1998).

The stock under this Annex is called northern four-spot Megrim and defined as four-spot megrim in Divisions 7 b–k and 8 abd.

#### A.2. Fishery

Management of megrim is both by TAC and technical measures. The two species (*L. whiffiagonis* and *L. boscii*) are managed under a common TAC. They are caught and recorded together in the landings statistics. It is impossible to manage each species separately under a common TAC. The spatial distribution of the two stocks shows some differences that could be utilized for separate management of the two stocks.

Four-spot megrim in the Celtic Sea, west of Ireland, and in the Bay of Biscay are caught in a mixed fishery predominantly by French followed by Spanish, UK and Irish demersal vessels. In 2014, the four countries together reported around 96% of the total landings for both megrim species.

French benthic trawlers operating in the Celtic Sea and targeting benthic and demersal species catch four-spot megrim as a bycatch.

Spanish fleets target both megrim species in mixed fisheries for hake, anglerfish, *Nephrops* and others. Otter trawlers account for the majority of Spanish landings from Subarea 7, the remainder, very low quantities, being taken by netters prosecuting a mixed fishery for anglerfish, hake and megrim on the shelf edge around the 200 m contour to the south and west of Ireland. The catches made by otter trawlers from the port of Vigo comprise around 50% of the total megrim catches.

Most UK landings of megrim species are made by beam trawlers fishing in ICES Divisions 7 efgh.

Irish megrim landings are largely made by multi-purpose vessels fishing in Divisions 7 b-c for gadoids as well as plaice, sole and anglerfish.

### A.3. Ecosystem aspects

There are two megrim species in the North eastern Atlantic: megrim (*Lepidorhombus whiffiagonis*) and four spot megrim (*Lepidorhombus boscii*).

Megrim (*L. whiffiagonis*, Walbaum, 1792) is a pleuronectiform fish distributed from the Faroe Islands to Mauritania (from 70°N to 26°N) and the Mediterranean Sea, at depths ranging from 50 to 800 metres but more precisely around 100–300 metres (Aubin-Ottenheimer, 1986). Four spot megrim (*L. boscii*, Risso 1810) is distributed from the Faroe Islands (63°N) to Cape Bojador and all around the Mediterranean Sea. It is found between 150–650 m, but mostly between 200–600 m.

Although, there is no evidence of multiple populations in the Northeast Atlantic, since the end of the 1970s ICES has assumed three different stocks for assessment and management purposes: megrim in Subarea 6, megrim in Divisions 7 b-c-k and 8 abd and megrim in Divisions 8.c and 9.a. In 2017 it was furthermore decided to consider four-spot megrim in Divisions 7 b-k and 8 abd as a separate stock.

Spawning period of these stocks goes from January to March. Megrim spawning peak occurs in February (8abd) and March (7b-k) along the shelf edge. Males reach the first maturity at a lower length and age than females. For both sexes combined, fifty percent of the individuals mature at about 20 cm and about 2.5 year old (BIOSDEF, 1998; Santurtún *et al.*, 2004). Their eggs are spherical, pelagic, with a furrow (stria) in the internal part of the membrane and with a fat globule.

Megrim are demersal species of small-medium size with a maximum size about 60 cm. It is believed that they have a medium-large lifespan, with a maximum age of about 14–15 years. They mainly live in muddy bottoms, showing a gradual expansion in bathymetric distribution throughout their lifetimes. Mature males and juveniles tend to occupy deep waters while immature females shallower waters. The dynamics of mature females are uncertain.

The Bay of Biscay and Iberian shelf are considered as a single biogeographic ecotone (a zone of transition between two different ecosystems) where southern species at the northern edge of their range meet northern species at the southern edge of their range as well as for some other Mediterranean species. Since species at the edge of their range may react faster to climate changes, this area is of particular interest in accounting for effects of climate change scenarios, for instance, in the food-web models (BECAUSE, 2004).

Megrim belong to a very extended and diverse community of commercial species and they are caught in mixed fisheries by different gears and in different sea areas. Some of the commercial species that exist in the same ecosystem are hake and anglerfish, however many other species are also found. From the northern to southern areas of the extent of the stock these species include: Octopus, *Rajidae*, *Ommastrephidae*, *Nephrops norvegicus*, *Phycis blennoides*, *Molva molva*, *Pollachius virens*, *Trisopterus* spp (mainly *Trisopterus luscus*), *Trachurus* spp, *Sepia officinalis*, *Loligidae*, *Micromesistius poutassou*, *Merlangius merlangus*, *Scylliorhynchus canicula* and *Pollachius pollachius*.

Demersal fish prey on megrim. Megrim are in turn voracious predators. Prey species include flatfish, sprat, sandeels, dragonets, gobies, haddock, whiting, pout and several squid species.

Adult megrim feed on small bottom dwelling fish, cephalopods and small benthic crustaceans; juvenile megrim feed on small fish and detritivore crustaceans inhabiting deep-lying muddy bottoms (Rodríguez-Marín and Olaso, 1993).

Fisheries modify ecosystems through more impacts on the target resource itself, the species associated to or dependent on it (predators or preys), on the trophic relationships within the ecosystem in which the fishery operates, and on the habitat.

At present, both the multi species aspect of the fishery and the ecological factors or environmental conditions affecting four-spot megrim population dynamics are not taken into account in assessment and management. This is due to the lack of knowledge of these issues.

## Data

Data are supplied from databases maintained by national Government Departments and research institutions. The figures used in assessment are considered as the best available data at the Working Group time of the year. From year to year, and before the Working Group, small revisions of data could occur. In that case, revised data are explained and incorporated into the historical data series for assessment.

Data are supplied on electronic files to a stock coordinator nominated by the ICES Working Group for the Bay of Biscay and the Iberian Waters Ecoregion (formerly Hake, Monk and Megrim Working Group), who compiles the international landings, discards and catch-at-age data, and maintains the time-series of such data with the amendments proposed by countries.

### B.1. Commercial catch

Four-spot megrim was not included in the 2017 data call and consequently no commercial catch information was been made available to the working group. Furthermore, landings data of megrim are not separated by species therefore if commercial catches are to be included in the assessment they will have to be split based on data from port sampling and observer trips.

### B.2. Discard data

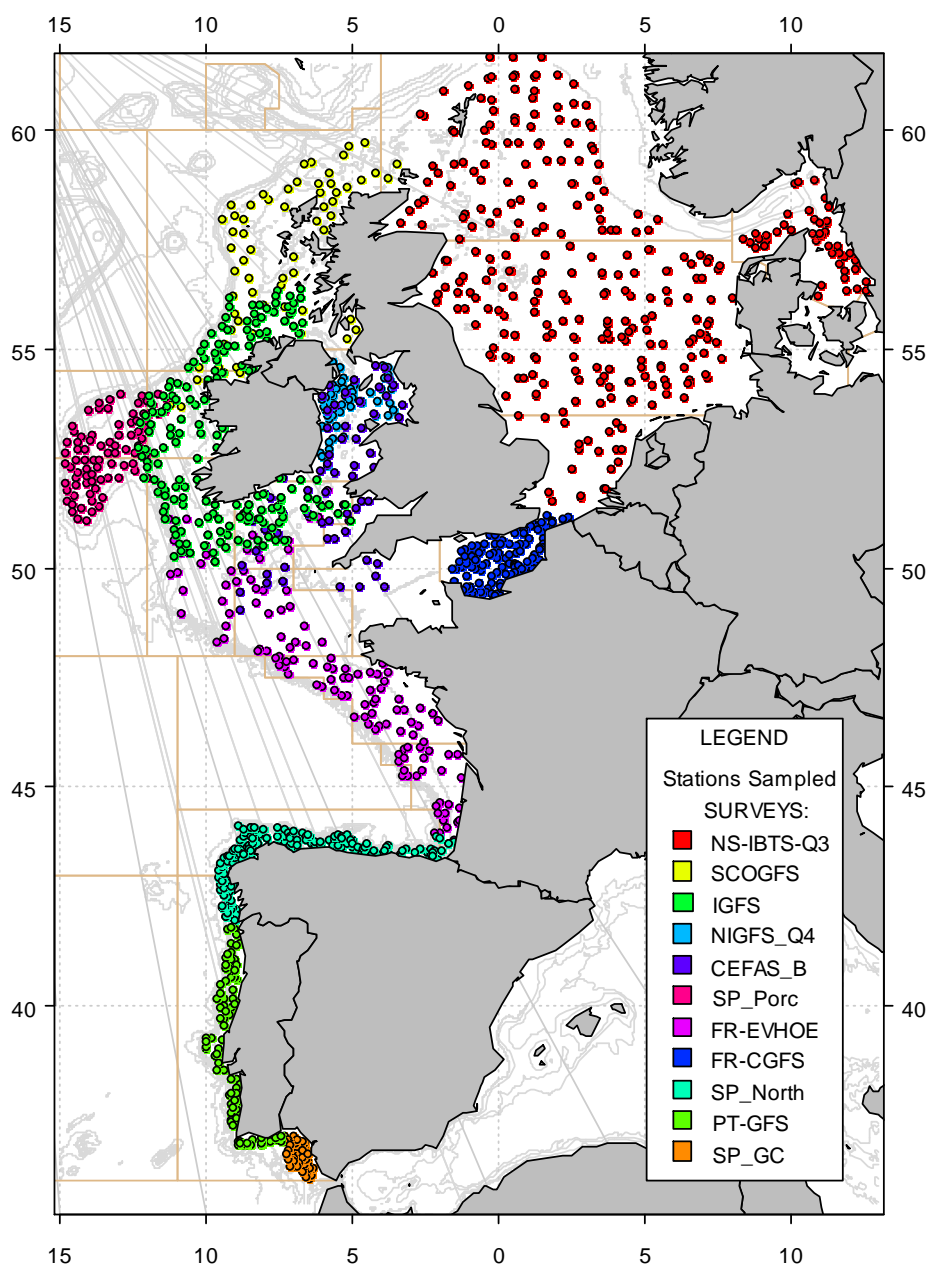
Four-spot megrim was not included in the 2017 data call and consequently no commercial discard information has been made available to the working group. France, Spain, Ireland and the UK provide discard data on megrim (*L. whiffiagonis*). Four-spot megrim is a small (<5%) but consistent proportion of megrim catches and discard information should be also be available from these sources.

### B.3. Biological

Four-spot megrim was not included in the 2017 data call and consequently no biological information was been made available to the working group.

### B.4 Surveys

Survey data was extracted from DATRAS for Spanish Porcupine (SpPorc), Irish Groundfish Survey (IE-IGFS) and French EVHOE surveys. The following quality control measures were carried out: sample weights were checked against expected weights (as estimated from length-weight parameters). Excessive raising factors (from sample to catch weight) were checked. Abundance indices (numbers per hour) were calculated for each survey series using all valid hauls and ignoring the spatial stratification. The Spanish Porcupine index was down weighted by an arbitrary factor of 10 because the Baka trawl used was highly more efficient at catching megrim than the GOV trawl used in the Irish and French surveys. Due to the large differences in catchability between Baka and GOV gears it was decided not to include the Spanish Porcupine index in the assessment. Inter-calibration correction will be required based on comparison of Four-spot catches in the area where the Spanish and Irish surveys overlap. No difference was found between the Irish and the French surveys in the area where they overlap.



Map B.4. Station positions for the IBTS Surveys carried out in the Western and North Sea area in the autumn/winter of 2008. (From IBTSWG 2009 Report). Just to be used as general location of the Surveys used in the assessment (IGFS, SP\_Porc and FR-EVHOE).

### B.5 Commercial CPUE

Four-spot megrim was not included in the 2017 data call and consequently no commercial catch rate information was been made available to the working group.

### B.6 Other relevant data

No other relevant information was included in the assessment.

### C. Assessment: data and methods

The proportion of *Lepidorhombus boscii* averaged over the period 2007-2016 in the EVHOE and IGFS surveys was used to estimate the split of the two species in the 2017 advice for *Lepidorhombus whiffiagonis*. The stock status relative to candidate reference points is unknown. The precautionary buffer was never applied. Therefore, the precautionary buffer will be applied in 2017. Discarding is likely to be >5% of the catch but the information is uncertain, therefore no catch advice can be given.

### D. Short-term projection

No short-term projections are proposed for this stock.

### E. Medium-term projections

No medium-term projections are proposed for this stock.

### F. Long-term Projections (until 2006)

No long-term projections are proposed for this stock.

### G. Biological reference points

No biological reference points are proposed for this stock.

### H. Other issues

The quality of the assessment in 2017 was hampered by the lack of commercial landings, discards and catch rate data. The inclusion of this stock in the 2018 data call should resolve this issue although substantial port sampling will be required to provide an accurate species split for the landings.

### I. References

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