

NEAFC request on the efficacy of the Rockall haddock closure in protection of juvenile haddock

Advice summary

The Rockall Haddock Box does coincide with areas of high juvenile and adult haddock densities, with high densities also observed outside the box to the northeast. For most years since the closure, haddock densities of age classes 1+ have been higher inside than outside the box. The overall impact of the current closure area on the Rockall haddock stock continues to be difficult to assess.

Request

ICES is requested to review the efficacy of the Rockall haddock closure in protection of juvenile haddock (Rec 04:2020/xx:2021), covering both NEAFC RA and outside NEAFC RA. The original management decision to close the Rockall haddock box was to protect juvenile haddock; this decision was taken in 2001 for NEAFC RA area of statistical rectangle 42D5, and extended in 2002 to include all of 42D5. NEAFC requests ICES to provide all available new information in the evaluation of the haddock box in terms of protection of juvenile haddock in the area.

Elaboration on the advice

Juveniles are considered to be individuals of less than 25 cm, which includes individuals of ages 0 and 1 and 5% of age 2.

Analyses of survey data shows complex patterns in densities of haddock inside and outside the Haddock Box over the time-series both before and after the box's implementation.

There is evidence from analyses of the survey data of high interannual variability in distributions and densities of juvenile haddock over the Rockall Bank in proximity to the Haddock Box. Spatial analyses indicate that the Haddock Box coincides with areas of high juvenile and adult haddock densities, with high densities also observed outside the box to the northeast.

Densities for all 1+ age groups have been higher inside the box than outside since the closure. There are no consistent differences in densities of the 0 age group inside or outside the box.

Basis of the advice

Background

Following a North-East Atlantic Fisheries Commission (NEAFC) March 2001 meeting, a moratorium for all types of fisheries except long-lines was introduced as a regulatory measure in the international waters at Rockall of ICES statistical rectangle 42D5. The EU set a similar restriction for an adjacent area in the 200 nautical mile zone of the coastal EU countries, extending the area to cover all of 42D5, with the aim of protecting juvenile haddock (EC, 2001a, 2001b) and generally known as the 'Rockall Haddock Box'.

The Rockall haddock stock has shown high variability in recruitment and stock size since the early 1990s. Recruitment has shown some recovery since an extremely low period between 2007 and 2012. Spawning-stock biomass has increased since an all-time low in 2014. Estimated fishing mortality is highly variable from year to year but shows a generally declining trend over the assessment time period. A review of the efficacy of the Haddock Box in protecting juvenile haddock has this extremely varied stock status as its background.

Data and results

Survey data covering 1989 to 2020 are available and show high spatial variability of juvenile and mature haddock between years (figures 1 and 2).

Spatially, the haddock box covers an area of high juvenile and mature haddock densities (figures 3 and 4). There is also evidence of high juvenile density to the north of the box (Figure 3)

Since its implementation in 2001, the Haddock Box has had a higher density of haddock for all age classes except the 0 age class (Figure 6).

When haddock are classified as “juveniles” by size, higher densities are evident inside as compared to outside of the box between 2005 and 2009 when numbers of this group declined both inside and outside the box (Figure 5). Size defined “adult” haddock (≥ 25 cm) have in most years had a higher density inside the box.

Methods

Distribution maps from the Rockall Haddock Survey (1989–2021 held in Q3; missing 1998, 2000, 2004, and 2010) and the Scottish Irish Anglerfish Megrin Industry Science Survey (SIAMISS; 2005–2021 [missing 2020] run in Q4 2005–2007 and in Q2 from 2008–2021 [except 2013 in Q4]) were examined for juvenile and adult haddock. Spatial analyses based on kriging were used to produce maps of the density of juvenile and adult haddock. In addition mean densities per standard survey tow by age and size in and outside of the box were examined.

Sexual maturity was taken at body lengths ≥ 25 cm, at which approximately 75% of haddock mature (Filina *et al*, 2009).

Previous studies have found some changes in the bank-wide exploitation pattern following the closure, with apparently lower relative exploitation rates on age groups 1 and 2, but the changes were deemed uncertain owing to unreliable discard estimates (STECF, 2008). A similar analysis using the results of the stock assessment (ICES, 2021a) was conducted but thought to be inconclusive.

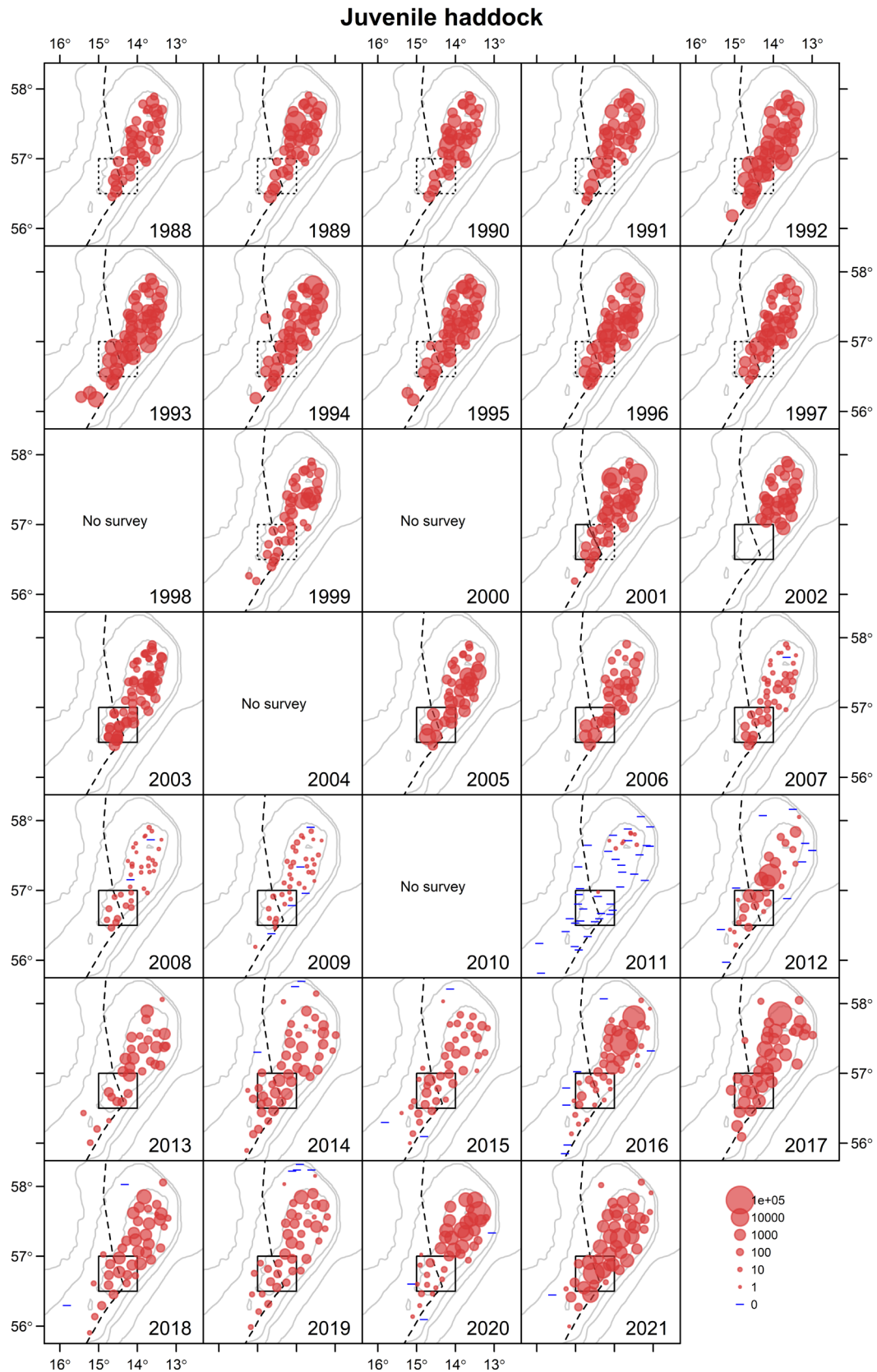


Figure 1 Distribution and densities of juvenile haddock (< 25 cm; numbers per standard tow). Rockall Haddock Survey 1989–2021 (Anon, 2009; ICES, 2013, 2020). Grey lines: isobaths; black polygon: Haddock Box; dashed black north-south line: NEAFC Regulatory Area. The bubble sizes used in the plot are in logarithm scale.

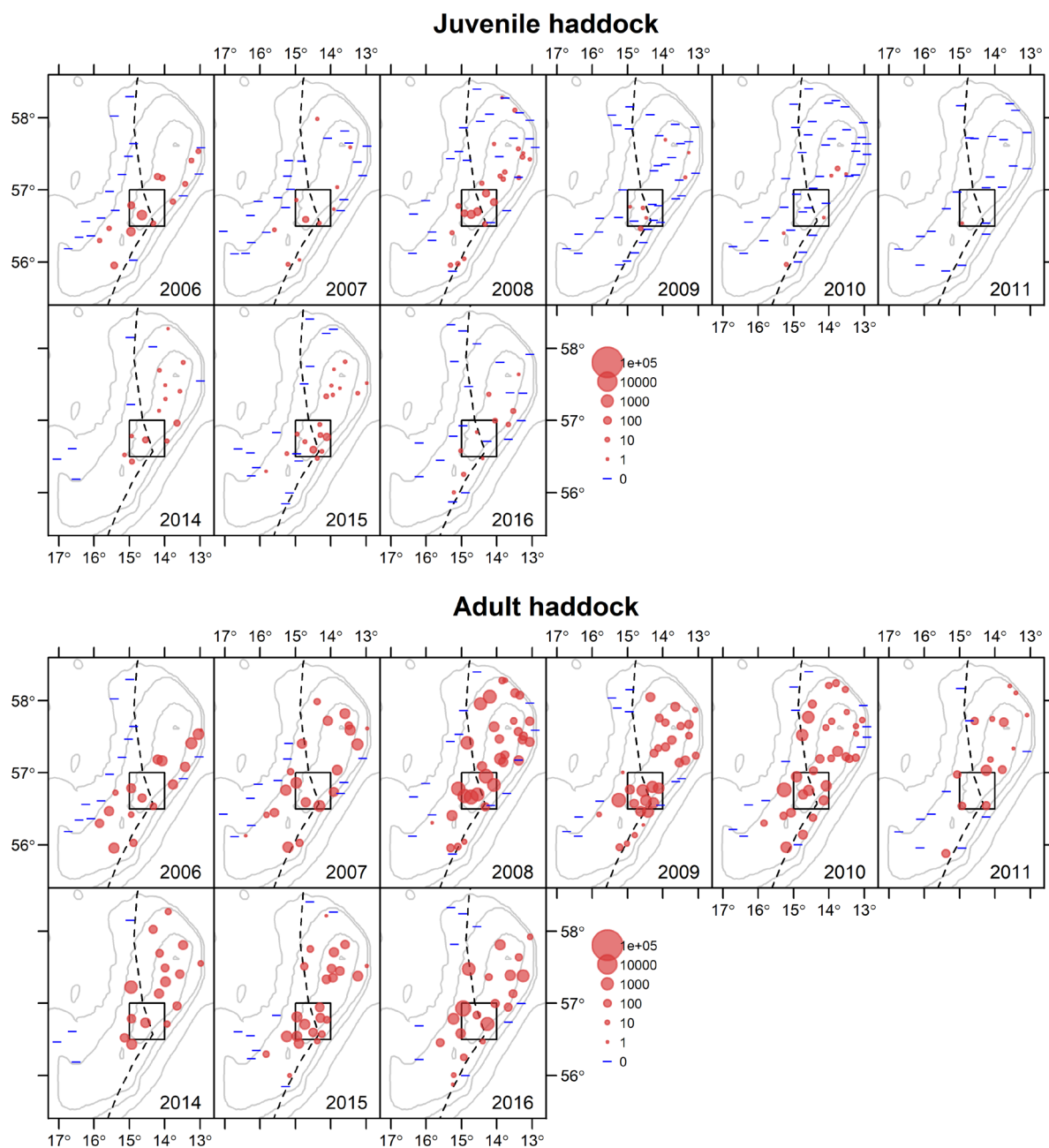


Figure 2 Distribution and densities of juvenile (upper) and adult (lower) haddock (numbers per standard tow). SIAMISS survey 2006–2011 and 2014–2019. Grey lines: isobaths; black polygon: Haddock Box; dashed black north-south line: NEAFC Regulatory Area. The bubble sizes used in the plot are in logarithm scale.

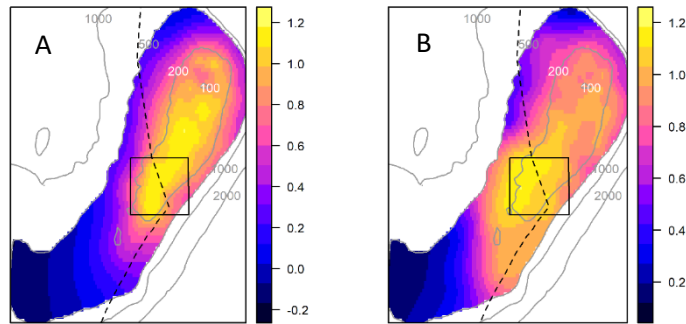


Figure 3

Ordinary kriging: spatial prediction haddock distribution in the Rockall Haddock Survey in the post-closure period (2001–2021, no survey 2004 and 2010). Juvenile (A) and adult (B). Values within 500 m isobath. Grey lines: isobaths; black polygon: Haddock Box; black dashed north-south line: NEAFC Regulatory Area.

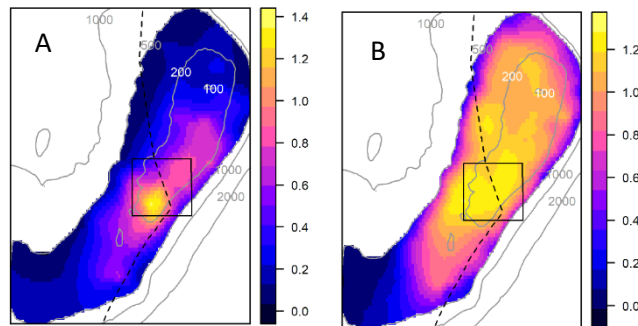


Figure 4

Ordinary kriging spatial prediction for haddock distribution in the SIAMISS at Rockall in the post-closure period (2006–2011 and 2014–2016). Juvenile (A) and adult (B). Values within 500 m isobath. Grey lines; isobaths; black polygon: Haddock Box; dashed black north-south line: NEAFC Regulatory Area.

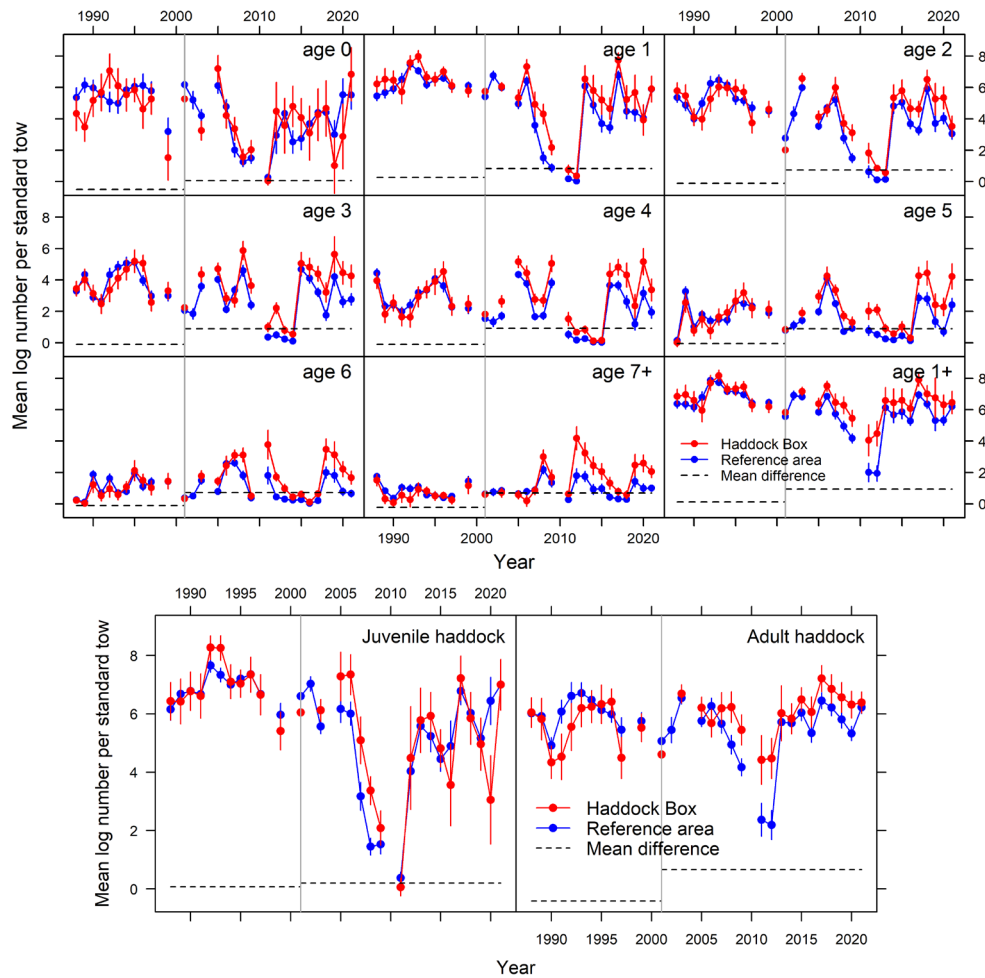


Figure 5 Haddock densities by age (upper) and size class (lower) defined as juvenile (< 25 cm) and adult (≥ 25 cm) in the Haddock Box (red) and outside the Haddock Box (blue) in 1988–2021. Data from the Rockall Haddock Survey (no survey conducted in 1998, 2000, 2004, or 2010; no samples in the box in 2002). Error bars: 95% confidence limits. The grey vertical line marks the box closure in 2001. Dashed lines show mean differences between areas before and after the closure.

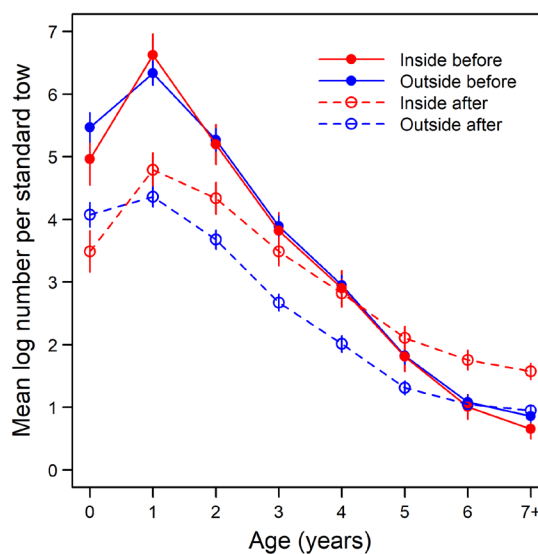


Figure 6 Haddock densities in the Haddock Box, and outside in the reference area, by age, before and after the closure, for all years combined. Data from the Rockall Haddock Survey (no survey conducted in 1998, 2000, 2004, or 2010; no samples in the box in 2002). Errors are 95 % confidence limits.

Sources and references

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