

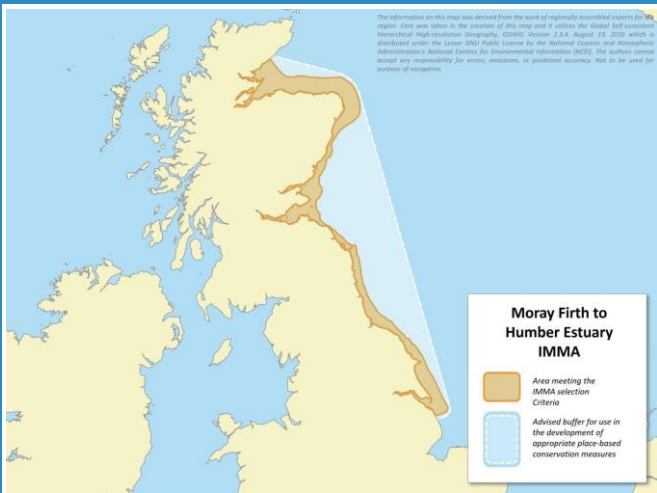
Moray Firth to Humber Estuary IMMA

Summary, continued.

present year-round, like harbour porpoises (*Phocoena phocoena*), and others with a seasonal presence, like white-beaked dolphins (*Lagenhoryncus albirostris*) and humpback whales (*Megaptera novaeangliae*). Around 7% of the world's grey seals (*Halichoerus grypus*) breed at sites in the IMMA (~14,000 individuals). It also encompasses haul out and breeding sites, and to a lesser extent foraging areas, for around 1,350 harbour seals (*Phoca vitulina*).

Description:

This IMMA is characterised by an indented coastline including the large embayments of the Moray Firth and Firth of Forth as well as extensive intertidal mudflats and salt marshes. These varied habitats provide important feeding and nursery grounds for a variety of fish and bird species which in turn draw in top predators. Numerous (18+) major rivers feed into these coastal waters, supporting populations of salmon and sea trout. The region is further characterised by strong tidal currents and winds, which can strongly influence the habitat structure and marine ecosystem.



Area Size

12 888 km²

Qualifying Species and Criteria

Common bottlenose dolphin – *Tursiops truncatus*

Criterion B (1)

Grey seal – *Halichoerus grypus*

Criterion C (1)

Harbour seal – *Phoca vitulina*

Criterion C (1)

Minke whale – *Balaenoptera acutorostrata*

Criterion C (2)

Summary

This IMMA encompasses the coastal waters of Scotland and England between Helmsdale and the Humber estuary. The IMMA is characterised by an indented coastline that includes large embayments, intertidal mudflats, salt marshes and estuaries as well as the open waters off the coast. The area hosts a resident population of bottlenose dolphins (*Tursiops truncatus*) which are regularly encountered in the nearshore waters, where they feed and breed. The Southern Trench in the Moray Firth also serves as a key foraging area for common minke whales (*Balaenoptera acutorostrata*) during the summer and autumn months. The IMMA also supports a diversity of other marine mammal species, some

Criterion B: Distribution and Abundance

Sub-criterion B1: Small and Resident Populations

The east coast of the UK contains a large proportion of the habitat and area consistently occupied by a discrete and resident population of common bottlenose dolphins (*Tursiops truncatus*) for which photo-ID data have been collected since 1989 (Arso Civil et al., 2019; Cheney et al., 2013; Robinson et al., 2017). Based on data from 2015 to 2019 the weighted mean population size is 224 (95% CI 214-234) individuals, and data show the population is increasing (Cheney et al., 2018; Arso Civil et al., 2019, 2021). The Moray Firth Special Area of Conservation (SAC) was originally designated in the 1990s to protect this population, but subsequent monitoring efforts demonstrate this spatial delineation no longer captures a high proportion of habitat that the population utilises year-round (Wilson et al., 2004; Culloch & Robinson, 2008; Cheney et al., 2013; Gutiérrez-Muñoz et al., 2021; Shorewatch Programme, unpublished data). Photo-ID data demonstrate that this population now extends along the coastal waters between the Moray Firth in Scotland and the Humber in England (Arso Civil et al., 2019; Sea Watch Foundation, 2021; Citizen Fins project, unpublished data). From 2010 there has been a marked increase in records of bottlenose dolphins in eastern England, first in the Northumbrian area and then since 2016, further south in Yorkshire, with occasional sightings even off Norfolk (Evans & Bertulli, 2021).

Passive acoustic monitoring shows inter-annual and seasonal variation in the presence of bottlenose dolphins in parts of the range such as in the Moray Firth SAC, with a peak in presence during summer months but with animals frequently present during most winter months (Cheney et al., 2018). The area is used for breeding and foraging, with calves regularly



Figure 1: Moray Firth coastline. Photo credit: Dr Kevin Robinson (CRRU)



Figure 2: Troup Head, Aberdeenshire. Photo credit: K Hepworth / Sea Watch Foundation



Figure 3: Robin Hoods Bay, Yorkshire. Photo credit: PGH Evans



Figure 4: Flamborough Head, Yorkshire. Photo credit: PGH Evans

sighted across the distributional range (Arso Civil et al., 2017; Robinson et al., 2017; Cheney et al., 2019; Citizen Fins project, unpublished data; Shorewatch Programme, unpublished data). These coastal waters include a number of river estuaries which host year-round or seasonal migrations of prey species which make the mouths of the estuaries high usage areas by bottlenose dolphins for foraging (e.g. Hastie et al., 2004; Bailey et al., 2010).



Figure 8: Common bottlenose dolphins (*Tursiops truncatus*) off Scarborough, Yorkshire. Photo credit: S Baines



Figure 5: Common bottlenose dolphin (*Tursiops truncatus*) off Sutors of Cromarty. Photo credit: PGH Evans



Figure 9: Common bottlenose dolphins (*Tursiops truncatus*) mother and calf. Photo credit: Dr Kevin Robinson (CRRU)



Figure 6: Common bottlenose dolphin (*Tursiops truncatus*) in outer Moray Firth. Photo credit: Anais Bliault (CRRU)



Figure 10: White-beaked dolphin (*Lagenorhynchus albirostris*) off Stonehaven, Aberdeenshire. Photo credit: K Hepworth / Sea Watch Foundation



Figure 7: Common bottlenose dolphins (*Tursiops truncatus*) in St Andrews Bay. Photo credit: Emily Hague (SMRU)



Figure 11: Harbour porpoises (*Phocoena phocoena*). Photo credit: Dr Kevin Robinson (CRRU)

Criterion C: Key Life Cycle Activities

Sub-criterion C1: Reproductive Areas

Grey seals (*Halichoerus grypus*) breed in various sites along the coast in this area including colonies on the Isle of May (~1,900 pups) within the Isle of May SAC, Fast Castle (~4,500 pup) and the Farne Islands (~2800 pups) within the Berwickshire and North Northumberland Coast SAC, and Donna Nook (~2,200 pups) within the Humber Estuary SAC (Russell et al., 2022). In total around ~14,000 pups are born in this IMMA area annually, which is over 20% and 7% of the UK and world's grey seal pup production, respectively (SCOS, 2022). This IMMA also encompasses haul out sites for around 1,350 harbour seals (*Phoca vitulina*) (Russell et al., 2022; ~3% UK's total estimated harbour seal population), and includes breeding and to a lesser extent, foraging areas for this species.



Figure 14: Grey seals (*Halichoerus grypus*).
Photo credit: Dr Kevin Robinson (CRRU)



Figure 15: Harbour seals (*Phoca vitulina*) mother suckling a pup.
Photo credit: Dr Kevin Robinson (CRRU)



Figure 12: Harbour seals (*Phoca vitulina*) and grey seals (*Halichoerus grypus*) haul outs taken from aerial view within Moray Firth. Photo credit: Sea Mammal Research Unit (SMRU)



Figure 16: Harbour seals (*Phoca vitulina*) resting on skerries.
Photo credit: Emily Hague



Figure 13: Grey seal (*Halichoerus grypus*) surfacing.
Photo credit: Emily Hague



Figure 17: Harbour seals (*Phoca vitulina*) suckling.
Photo credit: Emily Hague



Figure 18: Grey seals (*Halichoerus grypus*) resting on the beach. Photo credit: Dr Kevin Robinson (CRRU)



Figure 19: Grey seals (*Halichoerus grypus*) on skerries. Photo credit: Emily Hague

Sub-criterion C2: Feeding Areas

The highly productive waters of the Moray Firth attract above-average densities of common minke whales (*Balaenoptera acutorostrata*) relative to adjacent waters (Tetley et al., 2008; Paxton et al., 2014; Robinson et al., 2023), with sightings of minke whales occurring primarily inshore in shelf waters less than 200 m deep. A total of 56,263 kms of boat survey effort conducted between 2001 and 2022 resulted in 964 sightings of confirmed age-class common minke whales (471 juveniles and 493 adults; Robinson et al., 2023). Effort-corrected encounter rates of minke whales were higher in offshore waters compared to more coastal waters, with a peak in sightings from July to August, and a progressive inshore movement of animals across the summer and autumn (Robinson & Tetley, 2009). The area provides rich feeding grounds for minke whales during the summer and autumn months (Robinson et al., 2007, 2009; Robinson & Tetley, 2009). Adult

whales target larger prey than their juvenile counterparts, with juveniles almost exclusively targeting year 0-1 sandeels, whilst adults demonstrate greater dietary plasticity, with seasonal prey-switching between sandeels (year 0-3), herring and sprat (Robinson et al., 2023). The Southern Trench lies along the southern coastline of the outer Moray Firth, and has been designated as a Marine Protected Area (MPA) for the protection of minke whales (NatureScot, 2020).

The importance of this area as a feeding ground for minke whales is further supported by sighting distribution and predicted density maps that show the waters off Whitby in NE England are important for a number of baleen whale species including minke whales and humpback whales, in late summer and autumn, coinciding with the spawning herring migration in the area (Evans & Bertulli, 2020; Evans & Waggitt 2020; Waggitt et al., 2020).



Figure 20: Minke whale (*Balaenoptera acutorostrata*). Photo credit: Dr Kevin Robinson (CRRU)



Figure 21: Lunge feeding minke whale (*Balaenoptera acutorostrata*). Photo credit: Dr Kevin Robinson (CRRU)

Supporting Information

Arso Civil, M., Cheney, B., Quick, N.J., Thompson, P.M., and Hammond, P.S. 2017. A new approach to estimate fecundity rate from inter-birth intervals. *Ecosphere*, 8(4), p.e01796.
<https://doi.org/10.1002/ecs2.1796>.

Arso Civil, M., Quick, N.J., Cheney, B., Pirotta, E., Thompson, P.M., and Hammond, P.S. 2019. Changing distribution of the east coast of Scotland bottlenose dolphin population and the challenges of area-based management. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 29, pp.178-196.
<https://doi.org/10.1002/aqc.3102>.

Arso Civil, M., Quick, N.J., Mews, S., Hague, E., Cheney, B.J., Thompson, P.M., and Hammond, P.S. 2021. Improving understanding of bottlenose dolphin

movements along the east coast of Scotland. Final Report. Report number SMRUC-VAT-2020-10 provided to European Offshore Wind Deployment Centre (EOWDC), March 2021 (unpublished). Available at <https://group.vattenfall.com/uk/contentassets/c65a13553f864f599431d69c8c6a57b4/bottlenose-dolphin-monitoring—final-report-2021.pdf>.

Bailey, H. and Thompson, P. 2010. Effect of oceanographic features on the fine-scale foraging movements of bottlenose dolphins. *Marine Ecology Progress Series*, 418: 223-233.
<https://doi.org/10.3354/meps08789>.

Brereton, T., Kitching, M., Davies, R., McKnie, F., and Walker, R. 2016. Photo-identification Analysis of White-beaked Dolphins off South west and North east England 2007-2014. Report for Natural England,

number EPR03082.

<https://publications.naturalengland.org.uk/publication/5149990171705344>.

Cheney, B., Thompson, P.M., Ingram, S.N., Hammond, P.S., Stevick, P.T., Durban, J.W., Culloch, R.M., Elwen, S.H., Mandleberg, L., Janik, V.M., Quick, N.J., Islas-Villanueva, V., Robinson, K.P., Costa, M., Eisfeld, S.M., Walters, A., Phillips, C., Weir, C.R., Evans, P.G.H., Anderwald, P., Reid, R.J., Reid, J.B., and Wilson, B. 2013. Integrating multiple data sources to assess the distribution and abundance of bottlenose dolphins *Tursiops truncatus* in Scottish waters. *Mammal Review*, 43(1), pp.71-88. <https://doi.org/10.1111/j.1365-2907.2011.00208.x>.

Cheney, B., Graham, I.M., Barton, T.R., Hammond, P.S., and Thompson, P.M. 2018. Site Conditioning Monitoring of bottlenose dolphins within the Moray Firth Special Area of Conservation: 2014-2016. Scottish Natural Heritage Research Report No. 1021.

Cheney, B.J., Thompson, P.M. and Cordes, L.S. 2019. Increasing trends in fecundity and calf survival of bottlenose dolphins in a marine protected area. *Scientific Reports* 9:1767. <https://doi.org/10.1038/s41598-018-38278-9>.

Citizen Fins project, Sea Mammal Research Unit <https://citizenfins.wp.st-andrews.ac.uk/>.

Culloch, R.M. and Robinson, K.P. 2008. Bottlenose dolphins using coastal regions adjacent to a Special Area of Conservation (SAC) in north-east Scotland. *Journal of the Marine Biological Association UK*, 88, 1237-1243. <https://doi.org/10.1017/S0025315408000210>.

Evans, P.G.H. and Bertulli, C.G. 2020. Cetaceans in the Yorkshire region and adjacent sea areas. Sea Watch Foundation, Anglesey.

Evans, P.G.H. and Bertulli, C.G. 2021. Bottlenose dolphins in North-east England. Sea Watch Foundation, Anglesey (report to Shell UK).

Evans, P.G.H. and Waggitt, J.J. 2020. Cetaceans. Pp. 134-184. In: Crawley, D., Coomber, F., Kubasiewicz, L., Harrower, C., Evans, P., Waggitt, J., Smith, B., and Mathews, F. (Editors) *Atlas of the Mammals of Great Britain and Northern Ireland*. Published for The Mammal Society by Pelagic Publishing, Exeter. 205pp.

Gutiérrez-Muñoz, P., Walters, A.E.M., Dolman, S.J., and Pierce, G.J. 2021. Patterns and Trends in Cetacean Occurrence Revealed by Shorewatch, a Land-Based Citizen Science Program in Scotland (United Kingdom). *Front. Mar. Sci.* 8:642386. <https://doi.org/10.3389/fmars.2021.642386>.

Hastie, G.D., Wilson, B., Wilson, L.J., Parsons, K.M., and Thompson, P.M. 2004. Functional mechanisms underlying cetacean distribution patterns: hotspots for bottlenose dolphins are linked to foraging. *Marine Biology*, 144, 397-403. <https://doi.org/10.1007/s00227-003-1195-4>.

IJsseldijk, L.L., Brownlow, A., Davison, N.J., Deaville, R., Haelters, J., Keijl, G., Siebert, U. and ten Doeschate, M.T. 2018. Spatio-temporal trends in white-beaked dolphin strandings along the North Sea coast from 1991-2017. *Lutra*, 61(1), pp.153-164. [https://zoogdierwinkel.nl/sites/default/files/imce/nieuwewebsite/Winkel/pdf%20download/Lutra%2061\(1\)_IJsseldijk%20et%20al_2018.pdf](https://zoogdierwinkel.nl/sites/default/files/imce/nieuwewebsite/Winkel/pdf%20download/Lutra%2061(1)_IJsseldijk%20et%20al_2018.pdf).

NatureScot. 2020. Southern Trench Marine Protected Area Site Summary. <https://sitelink.nature.scot/site/10477>.

Paxton, C.G., Scott-Hayward, L.A.S. and Rexstad, E.A. 2014. Statistical approaches to aid the identification of

Marine Protected Areas for minke whale, Risso's dolphin, white-beaked dolphin and basking shark. Scottish Natural Heritage, Policy and Advice Directorate. Available at: <https://www.nature.scot/sites/default/files/2017-11/Publication%202014%20-%20SNH%20Commissioned%20Report%20594%20-%20Statistical%20approaches%20to%20aid%20identification%20of%20Marine%20Protected%20Areas%20for%20Minke%20whale%2C%20Risso%27s%20dolphin%2C%20White-beaked%20dolphin%20and%20Basking%20shark.pdf>.

Robinson, K.P. and Tetley, M.J. 2009. Behavioural observations of foraging minke whales (*Balaenoptera acutorostrata*) in the outer Moray Firth, north-east Scotland. *Journal of the Marine Biological Association UK*, 87, 85-86. <https://doi.org/10.1007/s11852-009-0050-2>.

Robinson, K.P., Baumgartner, N., Eisfeld, S.M., Clark, N.M., Culloch, R.M., Haskins, G.N., Zapponi, L., Whaley, A.R., Weare, J.S., and Tetley, M.J. 2007. The summer distribution and occurrence of cetaceans in the coastal waters of the outer southern Moray Firth in northeast Scotland (UK). *Lutra*, 50, 19-30. https://www.zoogdiervereniging.nl/sites/default/files/imce/nieuwewite/Winkel/pdf%20download/Lutra%2050%281%29_Robinson%20et%20al_2007.pdf.

Robinson, K.P., Sim, T.M.C., Culloch, R.M., Bean, T.S., Cordoba Aguilar, I., Eisfeld, S.M., Filan, M., Haskins, G.N., Williams, G., and Pierce, G.J. 2017. Female reproductive success and calf survival in a North Sea coastal bottlenose dolphin (*Tursiops truncatus*) population. *PLoS ONE* 12: e0185000. <https://doi.org/10.1371/journal.pone.0185000>.

Robinson, K.P., MacDougall, D.A.I., Bamford, C.C.G., Brown, W.J., Dolan, C.J., Hall, R., Haskins, G.N., Russell,

G., Sidiropoulos, T., Sim, T.M.C., Spinou, E., Stroud, E., Williams, G., and Culloch, R.M. 2023. Ecological habitat partitioning and feeding specialisations of coastal minke whales (*Balaenoptera acutorostrata*) using a recently designated MPA in northeast Scotland. *PLOS ONE* 18(7): e0246617. <https://doi.org/10.1371/journal.pone.0246617>.

Russell, D.J.F. et al. 2022. Trends in seal abundance and grey seal pup production. Special Committee on Seals Briefing Paper. SCOS-BP 22/02.

SCOS. 2022. Scientific Advice on Matters Related to the Management of Seal Populations: 2022. Natural Environment Research Council Special Committee on Seals, UK. www.smru.st-andrews.ac.uk/scos/scos-reports/.

Sea Watch Foundation. 2021. National Whale and Dolphin Watch 2021 report. Available at https://www.seawatchfoundation.org.uk/wp-content/uploads/2022/01/NWDW-2021-Report_FINAL-2.pdf.

Shorewatch Programme, Whale and Dolphin Conservation (WDC), <https://whales.org/Shorewatch>.

Tetley, M.J., Mitchelson-Jacob, E.G. and Robinson, K.P. 2008. The summer distribution of coastal minke whales (*Balaenoptera acutorostrata*) in the southern Moray Firth, NE Scotland in relation to co-occurring meso-scale oceanographic features. *Remote Sensing of Environment. Special Issue on Earth Observation for Biodiversity and Ecology*, 112(8), 3449-3454. <http://doi.org/10.1016/j.rse.2007.10.01>.

Waggitt, J.J., Evans, P.G.H., Andrade, J., Banks, A.N., Boisseau, O., Bolton, M., Bradbury, G., et al. 2020. Distribution maps of cetacean and seabird populations in the North-East Atlantic. *Journal of*

Applied Ecology, 57: 253-269. doi:
<https://doi.org/10.1111/1365-2664.13525>.

Wilson, B., Reid, R.J., Grellier, K., Thompson, P.M., and Hammond, P.S. 2004. Considering the temporal when managing the spatial: a population range expansion impacts protected areas-based management for bottlenose dolphins. Animal Conservation forum, 7(4) 331-338.
<https://doi.org/10.1017/S1367943004001581>.

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