as those closer to the coast of North America, as suggested by samples from the central and western North Atlantic (Gose *et al*. 2021).

From a genetic perspective, this recent evidence supports the present MU structure for this species within UK waters. Further research is required to provide more information on distribution, abundance and movement patterns to identify behavioural differentiation within the species which may warrant separate management.

There has been increasing evidence of a decrease in colder water species, including the white-sided dolphin, in UK waters (Evans *et al*. 2003; Macleod *et al*. 2005; Evans & Bjørge 2013; Evans & Waggit 2020; Williamson *et al*. 2021). Reports of sightings from the central North Sea are decreasing, yet the species appear to remain stable in the Northern Isles (Evans & Waggitt 2020). The distribution of white-sided dolphins is still poorly understood around the UK, but this suggests a northward range shift or contraction perhaps due to changing sea surface temperatures and prey availability.

At present the current literature does not provide evidence on population structure to change previous advice; as such, there is no proposal for amending the boundaries at this time.

2.6 Risso's dolphin (*Grampus griseus*)

Based on information available when the MUs were published in 2015, a single MU, comprising all UK waters and extending to the seaward boundary used by the European Commission for Habitats Directive reporting (the area known as 'Marine Atlantic', termed MATL) was deemed appropriate for Risso's dolphin (Figure 5).

A review of literature published since 2015 has provided further insight into possible sub-structuring of UK Risso's dolphins. Risso's dolphins are most commonly sighted in waters to the north and west of the UK where they are seen year-round. Around the coasts of the Western and Northern Isles, as well as the northern Scottish mainland, Risso's dolphins are repeatedly encountered in shallow water (less than 20 m) and in close proximity to the shore (Weir *et al.* 2019; WDC Shorewatch, unpublished data; Shetland Biological Records Centre, unpublished data; Shetland Sea Mammal Group, unpublished data, Hodgins *et al*. in press).

Risso's dolphins show evidence of site fidelity throughout their range (Paxton *et al.* 2014; Weir *et al.* 2019) and initial analysis of photo-identification catalogues from various areas of Scotland shows evidence of potential population sub-structuring in these waters (N Hodgins, personal communication, 12 December 2022). Photo-identification catalogues presently exist for Risso's dolphins in Shetland and Fair Isle, north coast of Scotland, Orkney and Caithness, the west coast of Scotland, Bardsey Island, Wales and the south-west of England, Bardsey Island and the Llyn Peninsula, and the Isle of Man/Irish Sea. At present the evidence is still emerging and with further research and analysis it is possible that multiple sub-populations may exist around the UK. Further research and analysis is required before any additional boundaries for Risso's dolphin are delineated.

2.7 Minke whale (*Balaenoptera acutorostrata*)

WGMME (2012, 2013) proposed that the Management Areas proposed by the IWC for minke whales in the North Atlantic should be retained, thus comprising a single MU for the European North Atlantic. This was confirmed in formal ICES advice to OSPAR (ICES 2014) and, based on this, a single MU was deemed appropriate for this species comprising all UK waters (Figure 5) (IAMMWG 2015).

The 2018 UK Marine Strategy Assessment (Pinn *et. al.* 2018) noted that while the range of minke whales had remained unchanged, the centre of their distribution shifted south

between 1994 and 2005 and has remained here since (Hammond *et al.* 2013; Hammond *et al.* 2021). A review of literature published since 2015 has not provided evidence on population structure to change previous advice. As such, there is no proposal for redefinition of the boundaries at this time.

3 Abundance Estimates

Abundance estimates were calculated for MUs upon their delineation in 2015 using the best available evidence at the time. These were then updated using the most recent dedicated surveys as of February 2021, namely SCANS-III (Hammond *et al*. 2021) and the ObSERVE Programme (Rogan *et al*. 2018). This report outlines updated abundance estimates for each species following the review of information published since 2015 and subsequent amendments of boundaries. The principles and data behind abundance estimates remain unchanged since IAMMWG (2022) which should be referred to in combination.

3.1 Harbour porpoise (*Phocoena phocoena*)

Table 1 shows the most recent estimates of harbour porpoise abundance for the three UK MUs. These remain unchanged from IAMMWG (2022).

Table 1. Abundance estimates of harbour porpoise by Management Unit (MU) and the UK portion of the MU (defined by the EEZ).

MU	Abundance of animals in MU (CV)	95% Confidence interval for MU	Abundance of animals in the UK portion of MU (CV)	95% Confidence interval for UK portion of MU	Source
NS	346,601 (0.09)	289,498 – 419,967	159,632 (0.12)	127,442 – 199,954	Hammond *et al*. 2021; Rogan *et al*. 2018
WS	28,936 (0.16)	21,140 – 39,608	24,305 (0.18)	17,121 – 34,505	Hammond *et al*. 2021; Rogan *et al*. 2018
CIS	62,517 (0.13)	48,324 – 80,877	16,777 (0.2)	11,216 – 25,096	Hammond *et al*. 2021; Rogan *et al*. 2018

3.2 Bottlenose dolphin (*Tursiops truncatus*)

An updated abundance estimate for bottlenose dolphin MUs OCSW, in line with the CWC boundary change outlined above, are described in Table 2. Abundance estimate for all other bottlenose dolphin MUs remain unchanged from IAMMWG (2022). More information on the different data sources used to calculate abundance estimates can be found in IAMMWG (2022).

Table 2. Abundance estimates of bottlenose dolphins by Management Units. Estimates of inshore populations from regional line-transect (identified with [a]) and photo-identification (identified with [b]) studies.

MU	Abundance of animals in MU (CV)	95% Confidence interval for MU	Abundance of animals in the UK portion of MU (CV)	95% Confidence interval for UK portion of MU	Source
CWSH	-	-	45 [b]	33 – 66	Cheney *et al.* 2013
CES	-	-	224 (0.02) [b]	214 – 234	Arso Civil *et al.* 2021
GNS	2,022 (0.75)	548 – 7,453	1,885 (0.8) [a]	476 – 7,461	Hammond *et al.* 2021; Rogan *et al.* 2018
OCSW	10,653 (0.25)	6,533 – 17,372	3,573 (0.35) [a]	1,851 – 6,898	Hammond *et al.* 2021; Rogan *et al.* 2018
CWC	-	-	40 (0.18) [b]	30 – 59	Corr 2020
IS	293 (0.54)	108 – 793	186 (0.52) [a & b]	70 – 492	Hammond *et al.* 2021; Rogan *et al.* 2018
OW	70,249 (0.17)	49,720 – 99,255	1,299 (0.41) [a]	597 – 2,826	Hammond *et al.* 2021; Rogan *et al.* 2018

3.3 Other species

The most recent abundance estimates for common dolphin, white-beaked dolphin, Atlantic white-sided dolphin, Risso's dolphin and minke whale are detailed in Table 3. These remain unchanged from IAMMWG (2022).

Table 3. Abundance estimates of common dolphin (CD), white-beaked dolphin (WBD), white-sided dolphin (WSD), Risso's dolphin (RD), and minke whale (MW) of the Celtic and Greater North Seas (CGNS) MU.

Species	Abundance of animals in MU (CV)	95% Confidence interval for MU	Abundance of animals in the UK portion of MU (CV)	95% Confidence interval for UK portion of MU	Source
CD	102,656 (0.29)	58,932 – 178,822	57,417 (0.32)	30,850 – 106,863	Hammond *et al.* 2021; Rogan *et al.* 2018
WBD	43,951 (0.22)	28,439 – 67,924	34,025 (0.28)	20,026 – 57,807	Hammond *et al.* 2021; Rogan *et al.* 2018
WSD	18,128 (0.61)	6,049 – 54,323	12,293 (0.64)	3,891 – 38,841	Hammond *et al.* 2021; Rogan *et al.* 2018
RD	12,262 (0.46)	5,227 – 28,764	8,687 (0.63)	2,810 – 26,852	Hammond *et al.* 2021; Rogan *et al.* 2018
MW	20,118 (0.18)	14,061 – 28,786	10,288 (0.26)	6,210 – 17,042	Hammond *et al.* 2021; Rogan *et al.* 2018

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