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– the Jan Mayen area**

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Report of the Norwegian 2021 survey for minke whales in the *Small Management Area CM* – the Jan Mayen area

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ABSTRACT

As part of a six-year program over the period 2020-2025 with the aim to get a new estimate of minke whale abundance in the Northeast Atlantic in a timely manner regarding *RMP* requirements, the area around the island Jan Mayen, comprising the *Small Management Area CM*, was surveyed with one vessel during the summer 2021. Three blocks were surveyed and received a reasonable coverage. In addition, a survey for harbour porpoises was conducted within the Hardangerfjord in southern Norway. A total of 2,641 nautical miles of primary search effort was conducted within the surveyed *CM* blocks. The most common species sighted were minke whales, Northern bottlenose whales, fin whales, humpback whales and sperm whales. In addition, sightings were made of killer whales, blue whales, white-beaked dolphins, sei whales, pilot whales and harbour porpoises. Compared to the 2016 survey of *CM* fewer minke whales were recorded in the southern part of the survey area.

MONITORING, SURVEY - VESSEL, ATLANTIC OCEAN, COMMON MINKE WHALE

INTRODUCTION AND OBJECTIVES

The management of Norwegian minke whaling is based on the Revised Management Procedure (*RMP*) developed by the IWC Scientific Committee (IWC 1994). *RMP* requires a monitoring program, since input data for *RMP* include time series of annual catches and of absolute abundance estimates with associated variance statistics. Abundance estimates for use in this context have been based on sighting surveys. Large-scale synoptic sighting surveys to estimate the abundance of minke whales in the Northeast Atlantic were conducted in 1988, 1989 and 1995 (Schweder et al. 1997). Based on the experiences from the 1995 survey in which 11 vessels and 140 people were involved, it was chosen for the following years to cover the northeast Atlantic by small-scale mosaic annual surveys over six-year periods (Øien & Schweder 1996). One obvious problem associated with this approach is how to account for the additional variance introduced in multiyear sighting surveys relative to a synoptic survey (Skaug et al. 2004), a feature which they share in common with other surveys discussed in the Scientific Committee in recent years. The arguments for a multiyear sighting survey were that it would be more feasible to achieve common standards and better quality of data collection through more training of the observers and the scientists. Additional benefits were that the logistics would be simpler, and costs could be shared over more years. Our experience from the six-year survey periods 1996-2001, 2002-2007, 2008-2013 and 2014-2019 is that the program has been quite successful (Skaug et al. 2004, Bøthun et al. 2009, Solvang et al. 2015, 2021) in the mentioned respects. Norway decided to continue with a new series of sighting surveys in the northeast Atlantic over the period 2020-2025 (Øien 2020) with the aim of presenting a new estimate of minke whale abundance in 2026. The survey conducted in the summer 2021 was the second one in this survey series.

AREAS SURVEYED IN 2021

When the survey plans for 2020-2025 were presented in 2020 (Øien 2020), we suggested to follow the approach used in previous survey cycles, that is, to preferably cover one *Small Management Area* for one year's survey as the preferred approach. As planned, the survey cycle started in 2020 with the coverage of the Norwegian Sea - the *Small Management Area EW*. In 2021 we covered the *Small Management Area CM* – the Jan Mayen area. The most recent complete coverages of this area were in 2010 and 2016. A partial coverage of this area was made in 2015 as part of NASS2015.

In 2008 we made a change to the block (stratum) definitions we had been using previously, as the number of blocks had increased to a number which made it difficult to distribute survey effort in an efficient way. Changes in the *Small Management Area* structure in 2003 (IWC 2004) also led to modifications which were motivated of the wish to keep some consistency throughout a survey period and make comparisons with previous surveys easier. All survey cycles started after 2008 have followed the same stratum structure within the *Small Management Areas*. The three stratum blocks *CM1-CM3* used for the design in *SMA CM* are shown in Figure 1.

In recent years harbour porpoises have got much attention as a species vulnerable to bycatch. The Norwegian mosaic survey with minke whales as the target species is an offshore survey, however, we know that porpoises, at least at times of the year, are common inhabitants of the archipelagos and narrow fjord systems along the Norwegian coast lines. Therefore, we have conducted opportunistically additional feasibility surveys for porpoises within fjord systems along the Norwegian coast. During the 2021 summer survey period we were able to conduct a harbour porpoise survey within the Hardangerfjord in southern Norway.

SURVEY DESIGN, SIGHTING PROCEDURES AND DATA COLLECTION

The survey procedures followed were the same as in NILS-95 and the following survey cycles (Øien 1995, Schweder et al. 1997, Skaug et al. 2004, Bøthun et al. 2009, Solvang et al. 2015). The logistics were basically the same as were used in the NILS-95 survey, but some modifications and improvements have been made over the years both to software and equipment used. Digital recording of speech is made directly to disk. This system has proved useful and easy for transcription and checking. Double platform effort is used exclusively during primary search following the defined protocol (Øien 1995), and the observers are organised into teams of two persons. This has been consistent in all our surveys since 1997. Primary search effort is defined by the conditions Beaufort ≤ 4 and meteorological visibility ≥ 1000 m and this survey protocol requirements are determined by minke whales being the target species of these surveys.

CRUISE SUMMARIES

The survey in 2021 was conducted onboard the vessel 'Stålbas' over the period 8 June to 2 August 2021. The survey period was divided into two parts: 8 June-5 July and 6 July-2 August. On board the vessel Deanna Leonard and Nils Øien acted as team leaders.

During the first survey period transects were conducted in all three blocks CM1, CM2 and CM3; in the second survey period the effort was focused on the blocks CM1 and CM3. The Hardangerfjord in western Norway was covered the last days (31 July-1 August) of the survey before going to port and end the survey in Bergen. The fjord survey was conducted as ordinary symmetrical double platform surveys without tracking since the target species was the harbour porpoise.

In total, "Stålbas" was able to survey 2,641 nautical miles on the planned CM transects. The realised effort is shown in the Figures. The effort seems to have been reasonably well distributed over the survey blocks CM1-3, with a somewhat lower coverage in CM1 than planned. The realised effort as a percentage of the planned was 65% in CM1, 97% in CM2 and 87% in CM3. In addition, harbour porpoise surveys were conducted with 292 nmi within the Vestfjord, and 717 nmi within several western Norway fjords. The shortage of coverage in CM1 was due to generally bad weather conditions. In CM2 drifting ice hampered the survey activity.

A summary of the number of groups of whales sighted during the ordinary 2021 survey when on primary search effort is shown in Table 1. The distribution of primary sightings of minke whales, fin whales, humpback whales, sperm whales, blue whales, harbour porpoise, white-beaked dolphin, pilot whale, killer whale and Northern bottlenose whale are given in Figures 1-8. The harbour porpoise survey in Hardangerfjord is shown in Figure 9.

Within the CM *Small Area*, the most important area for minke whales now appears to be east and south of Jan Mayen within the stratum CM3. In 2016 we observed considerable numbers of minke whales east of Iceland in stratum CM1, however in 2021 modest numbers were observed there. The species which was seen the second most in 2021 within CM was the Northern bottlenose whale. These new sightings make it possible to update previous estimates of abundance of this species in the area.

FUTURE SURVEY ACTIVITY

The survey in the Jan Mayen area in 2021 was the second one in the planned six-year cycle 2020-2025 of survey activity to provide a new minke whale abundance estimate in a timely manner (Øien 2020). In 2022, the plan is to survey the *Small Management Area* EB – the Barents Sea area. A large part of this area is within Russian EEZ and contains many important minke whale feeding grounds.

ACKNOWLEDGEMENTS

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Northern bottlenose whales in the Jan Mayen area (Photo: George McCallum).

Table 1

Number of groups of whales seen from the upper and lower platforms during primary search and realised primary search effort (nautical miles) by survey stratum, during the 2021 survey.

Species	Platform	Survey block			Total
		CM1	CM2	CM3	
<i>Minke whale</i>	<i>Upper</i>	13	15	27	55
	<i>Lower</i>	7	5	18	30
<i>Fin whale</i>	<i>Upper</i>	2	12	4	18
	<i>Lower</i>	4	7	2	13
<i>Blue whale</i>	<i>Upper</i>	0	2	3	5
	<i>Lower</i>	0	1	0	1
<i>Sei whale</i>	<i>Upper</i>	0	0	1	1
	<i>Lower</i>	1	1	0	2
<i>Humpback whale</i>	<i>Upper</i>	3	9	1	13
	<i>Lower</i>	0	10	1	11
<i>Harbour porpoise</i>	<i>Upper</i>	0	0	1	1
	<i>Lower</i>	0	0	1	1
<i>White-beaked dolphin</i>	<i>Upper</i>	0	5	0	5
	<i>Lower</i>	0	1	0	1
<i>White-sided dolphin</i>	<i>Upper</i>	0	0	0	0
	<i>Lower</i>	0	0	0	0
<i>Lagenorhynchus spp.</i>	<i>Upper</i>	0	0	0	0
	<i>Lower</i>	0	0	0	0
<i>Killer whale</i>	<i>Upper</i>	9	0	0	9
	<i>Lower</i>	9	0	0	9
<i>Pilot whale</i>	<i>Upper</i>	0	1	0	1
	<i>Lower</i>	0	1	0	1
<i>Northern bottlenose whale</i>	<i>Upper</i>	3	16	16	35
	<i>Lower</i>	1	18	13	32
<i>Sperm whale</i>	<i>Upper</i>	6	2	3	11
	<i>Lower</i>	9	3	2	14
<i>Large whales</i>	<i>Upper</i>	1	5	3	9
	<i>Lower</i>	2	11	4	17
Total, groups	<i>Upper</i>	37	67	59	163
	<i>Lower</i>	33	58	41	132
Realised primary effort	<i>Nmi, T</i>	897	764	980	2641

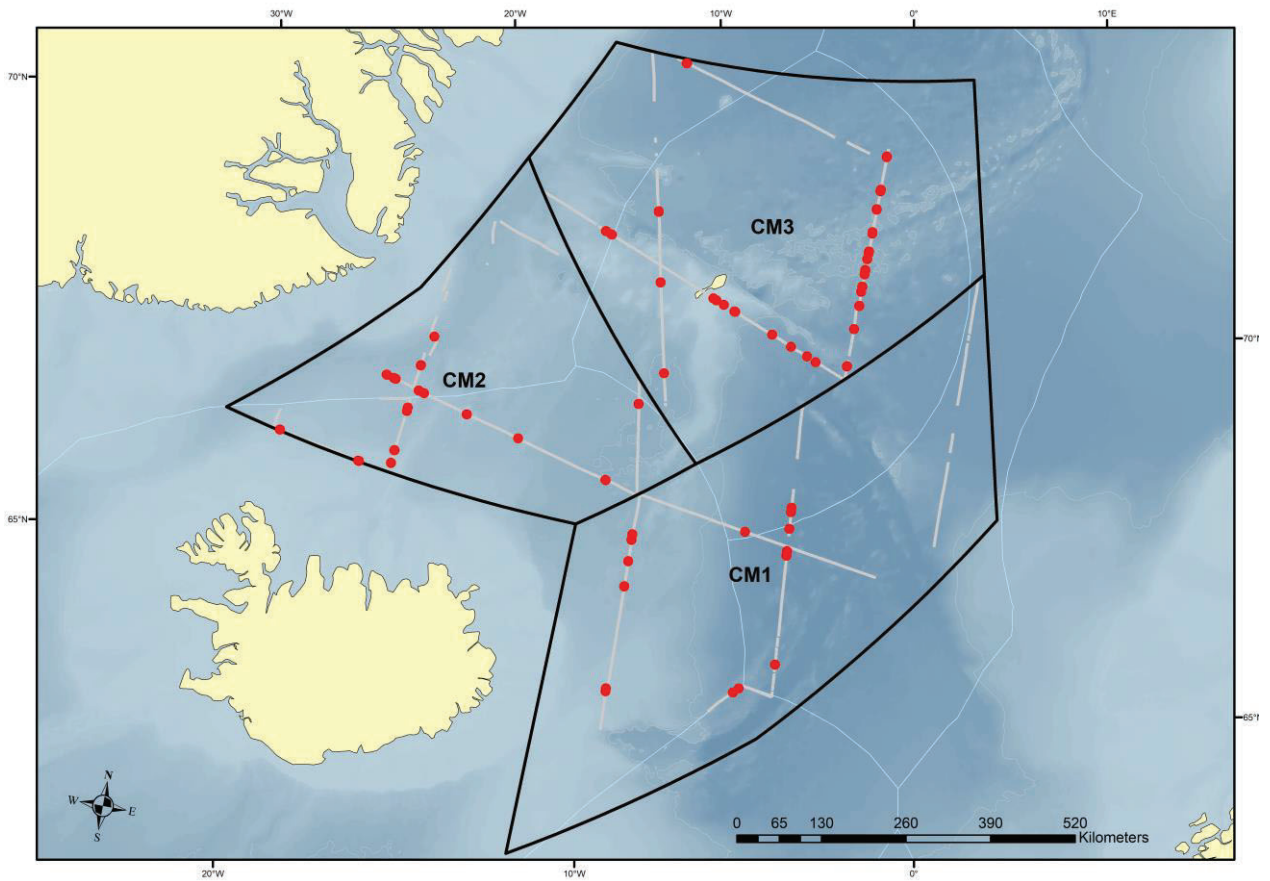


Figure 1. The CM *Small Management Area* with the block structure, CM1-CM3, adopted for the survey. Realised transects with primary search effort have been added as grey lines; the red circles are primary **minke whale** sightings.

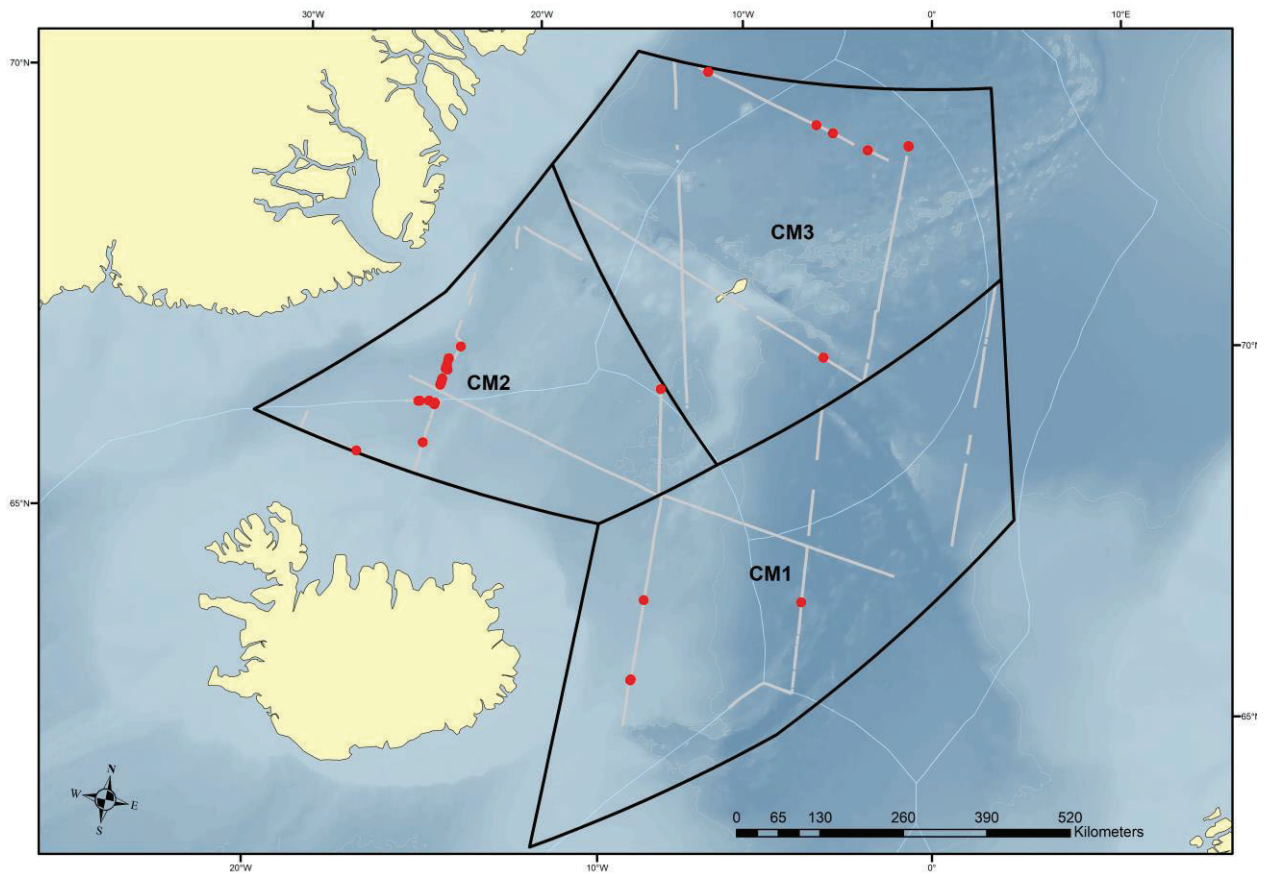


Figure 2. Primary sightings of **fin whales** (red circles).

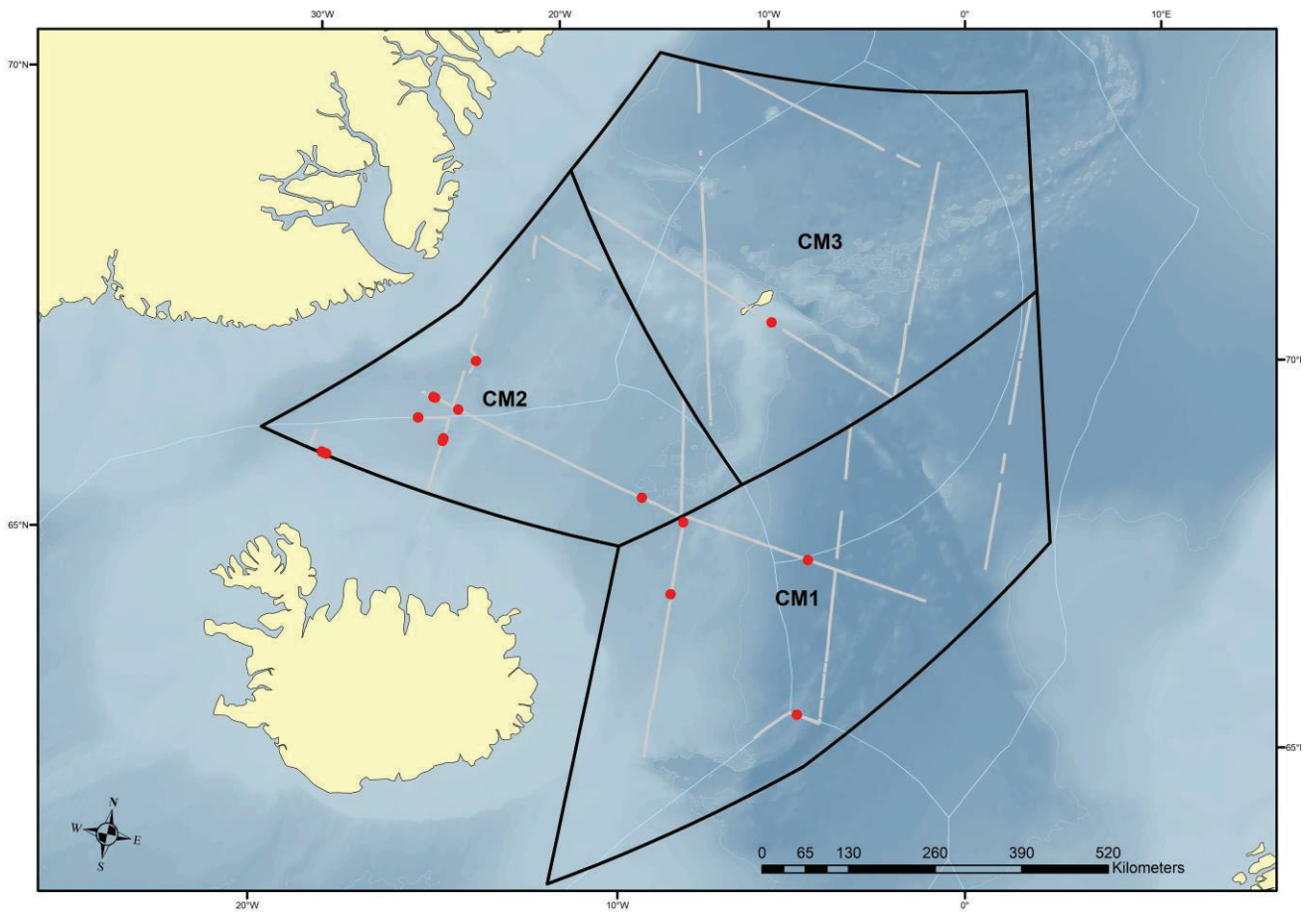


Figure 3. Primary sightings of humpback whales (red circles).

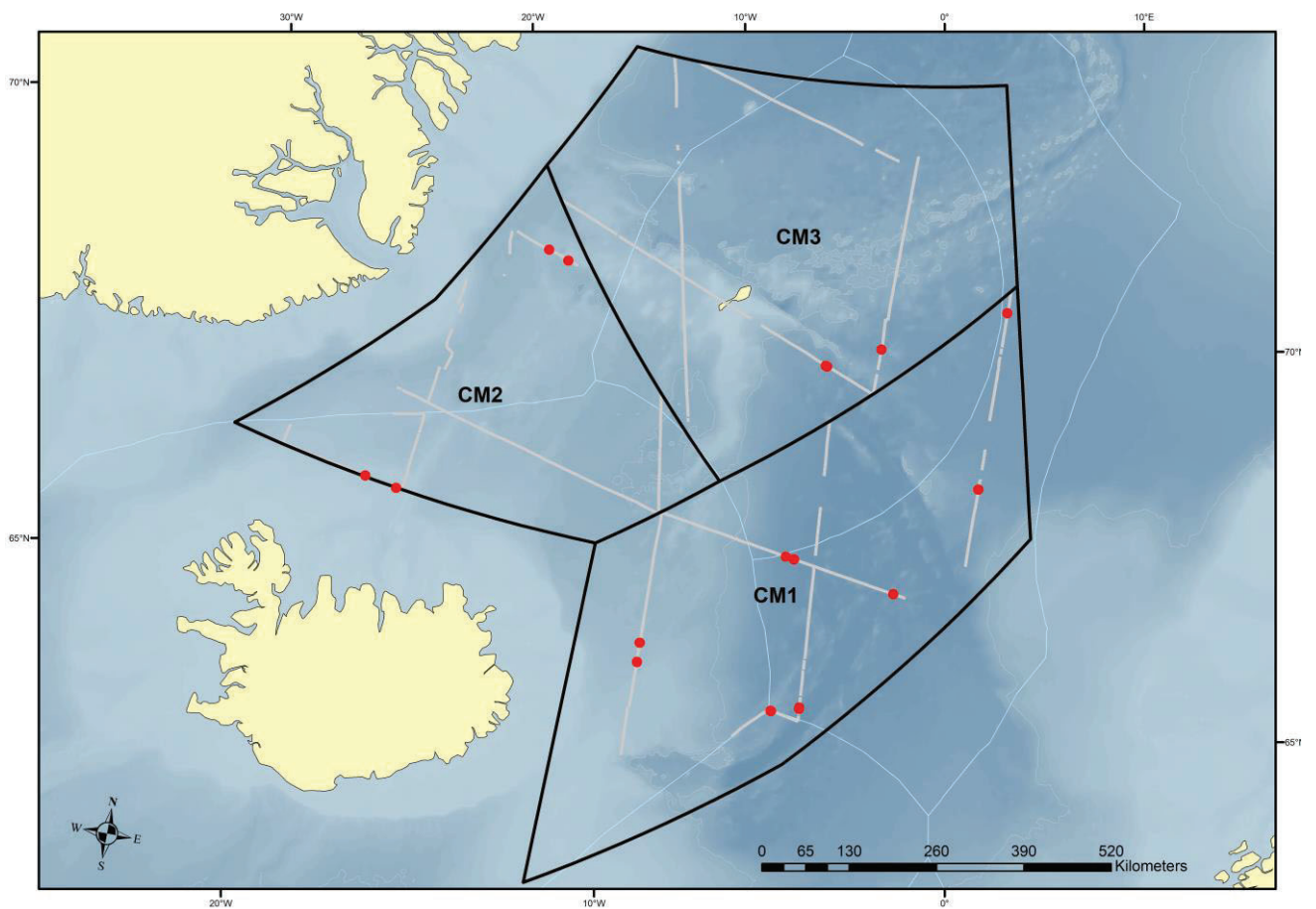


Figure 4. Primary sightings of sperm whales (red circles).

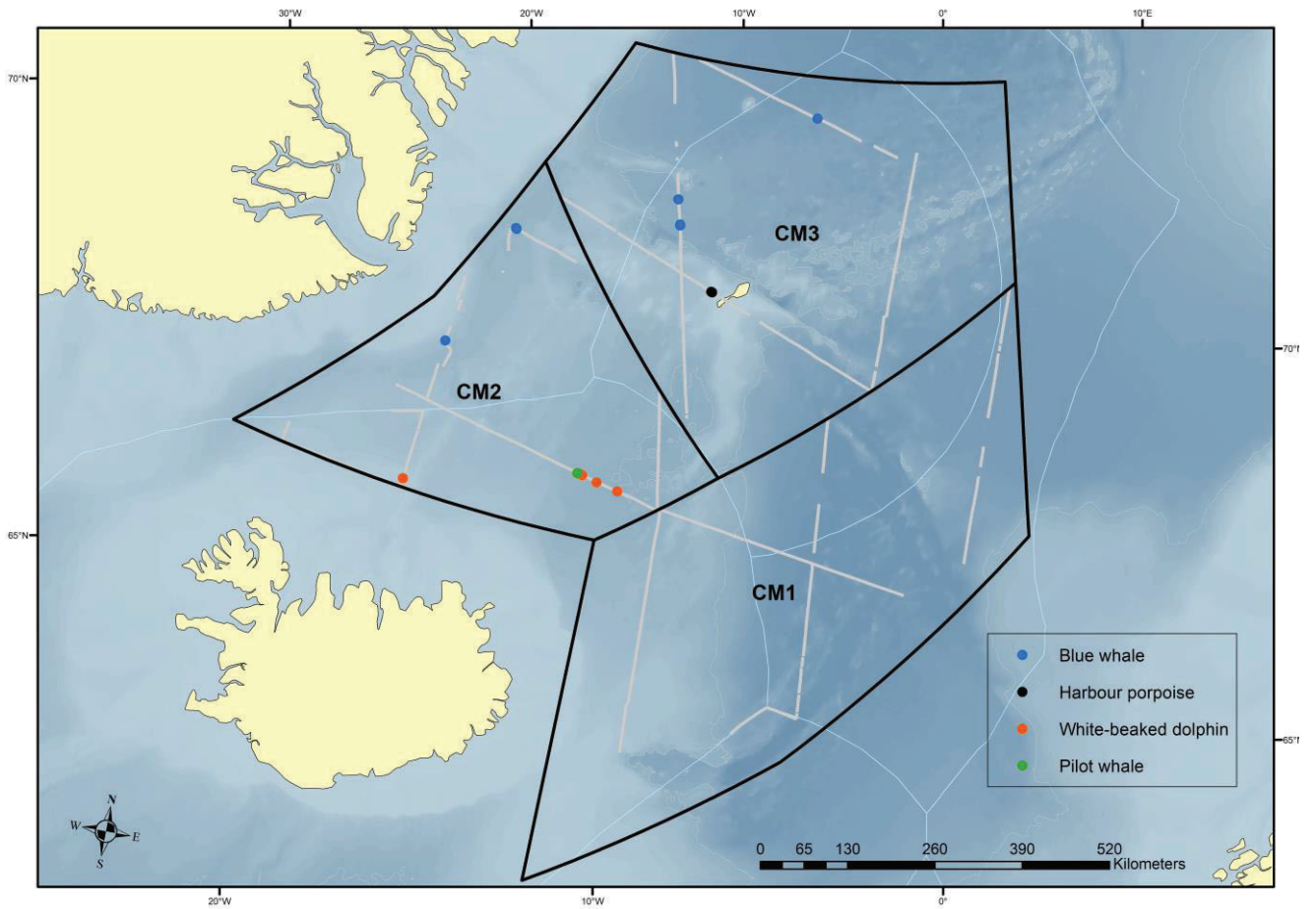


Figure 5. Primary sightings of blue whales, harbour porpoises, white-beaked dolphins and pilot whales (see legend).

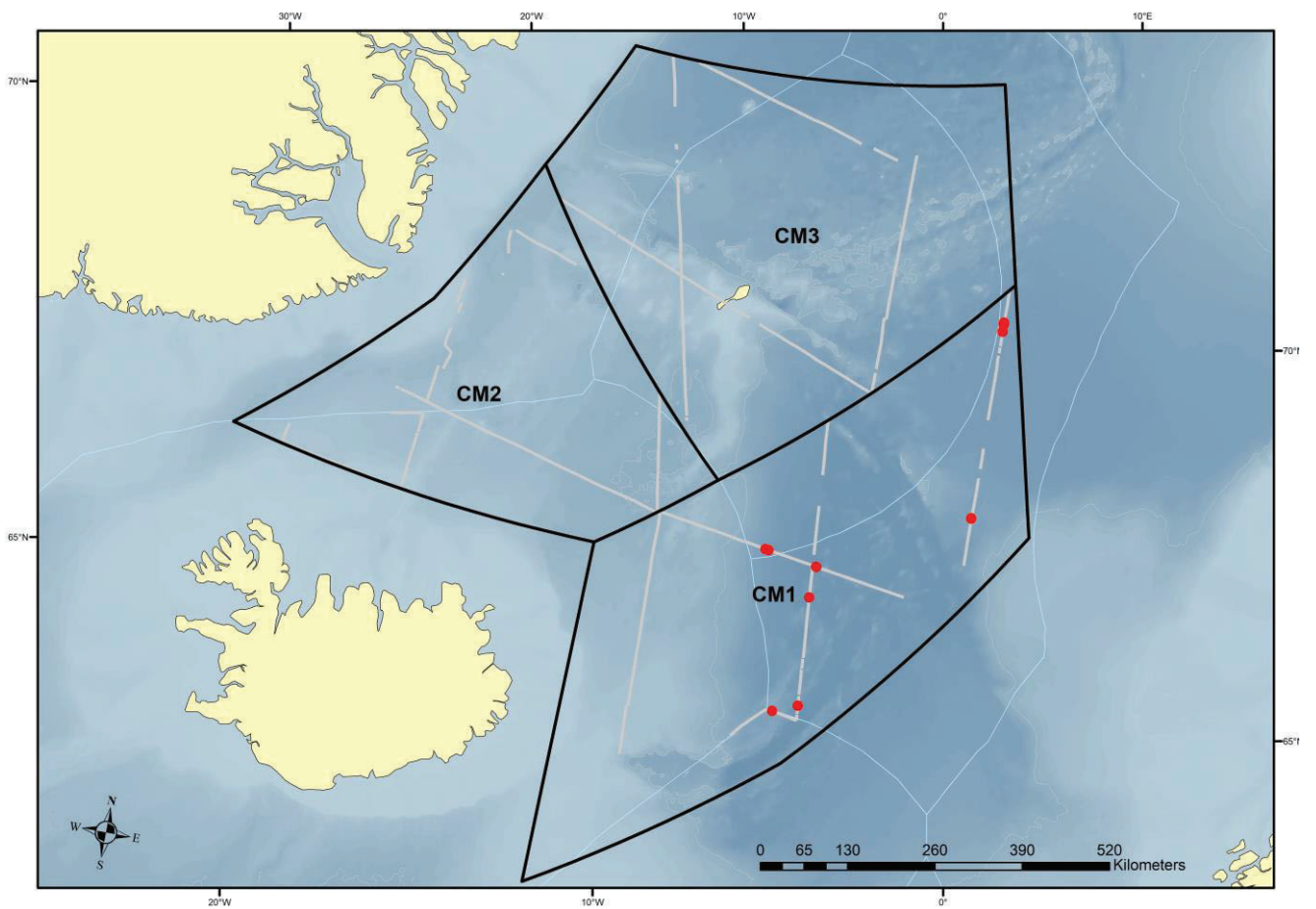


Figure 6. Primary sightings of killer whales (red circles).

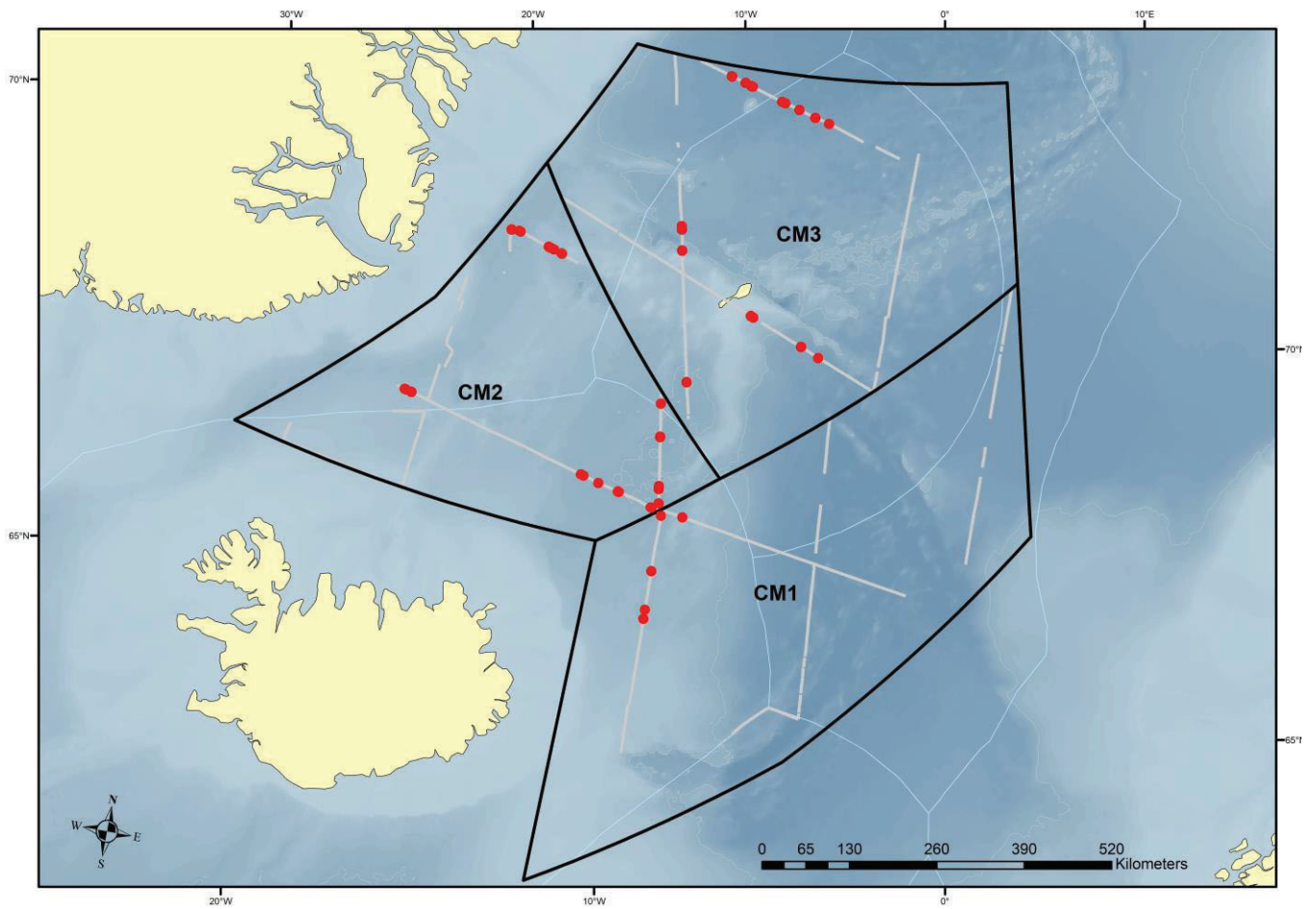


Figure 7. Primary sightings of Northern bottlenose whales are shown as red circles.

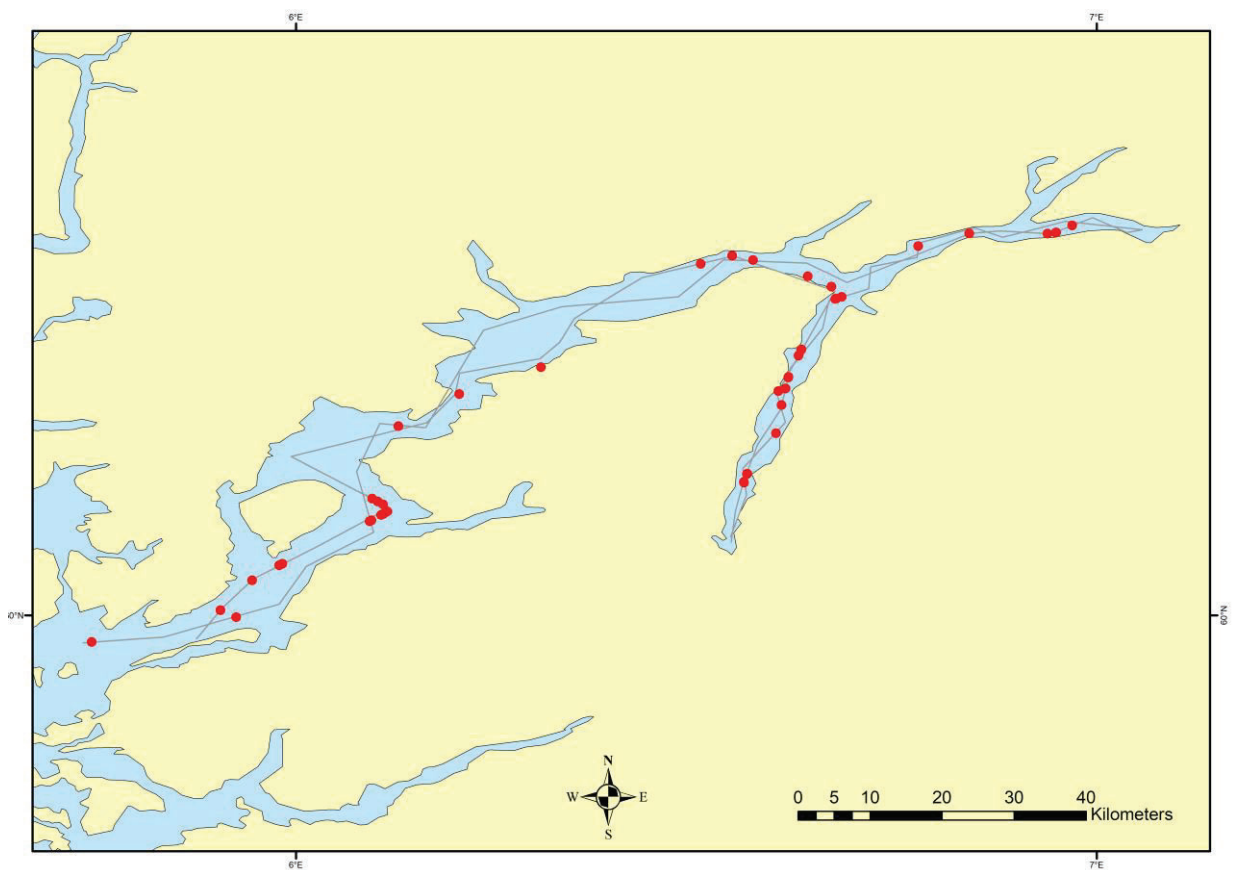


Figure 8. Primary sightings of harbour porpoises (red circles) within the Hardangerfjord, southern Norway.