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Report of the Norwegian 2014 survey for minke whales in the Small Management Area ES Svalbard.

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INTERNATIONAL
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ABSTRACT

As part of a six-year program over the period 2014-2019 with the aim to get a new estimate of minke whale abundance in the Northeast Atlantic in a timely manner with regard to *RMP*, waters within the Svalbard archipelago comprising the *Small Management Area* ES, was surveyed with one vessel during the summer 2014. Four blocks were surveyed and received a reasonable good coverage. About 3,390 nautical miles of primary search effort was conducted within the surveyed blocks. The most common species sighted were fin whales, minke whales and white-beaked dolphins. In addition sightings were made of sperm whales, humpback whales, killer whales, blue whales and one sei whale. Opportunistic collections were made of 5 biopsy samples from humpback and blue whales and 26 photo identifications of humpback whales as well as 2 of blue whales. Satellite tags were applied to two humpbacks, one blue whale and four minke whales.

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 and 2008-2013 is that the program has been quite successful (Skaug et al. 2004, Bøthun et al. 2009, Solvang et al. 2015) in the mentioned respects. Norway therefore decided to continue with a new series of sighting surveys in the northeast Atlantic over the period 2014-2019 (Øien 2013) with the aim of presenting a new estimate of minke whale abundance in 2020. The survey conducted in the summer 2014 was the first one in this survey series.

AREAS SURVEYED IN 2014

When the plans were presented in 2013 (Øien 2013), we suggested to preferably cover one *Small Management Area* during one year's survey as a rule. In 2014 we therefore started the survey cycle by covering the Svalbard area, *Small Management Area* ES. This area was last covered in 2008.

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. The implemented block structure as used also in 2008, comprising of four strata ES1-ES4, is shown in Figure 1.

SURVEY DESIGN, SIGHTING PROCEDURES AND DATA COLLECTION

The survey procedures followed were the same as in NILS-95 (Øien 1995, Schweder et al. 1997, Skaug et al. 2004). The equipment was basically the same as was used in the NILS-95 survey, but some modifications have been made through the years to the software to make relevant data recording of especially weather covariates easier. Digital recording of speech is made directly to disk. This system has proved very useful and easy for transcription and checking. Double platform effort is used exclusively for primary search, and the observers are organised into teams of two persons. This has been consistent in all our surveys since 1997.

Primary search effort requires that Beaufort ≤ 4 and meteorological visibility ≥ 1000 m and is mainly determined by minke whales being the target species of the surveys. Survey effort conducted in higher Beaufort is considered secondary and with only one platform (usually the lower one) manned.

The available survey effort has been used to construct a set of transects based on a continuous 18 hour run per day and setting the usual full watch (primary search effort) when sighting conditions are according to the survey protocol.

On an opportunistic basis, biopsy sampling and photo identification are conducted during the sighting surveys.

CRUISE SUMMARIES

The vessel which was chartered for the 2014 survey was F/F *Tromsøy (TRO).* The survey was conducted over the period 16 June to 24 August. On board the vessel, K.A. Fagerheim, L. Kleivane, George McCallum and N. Øien acted as team leaders.

The 2014 total survey area was divided into four survey blocks (Figure 1). The survey was divided into four parts of about 2 ½ weeks duration each. Parts I and II represent a first transect coverage of the area *ES* and parts III and IV represent a second transect coverage. The order of coverage was as follows: Part I substrata ES1 and ES2; part II substrata ES4 and ES3; part III substrata ES4 and ES3 and finally, part IV in substrata ES2 and ES1.

First transect coverage of the blocks

ES1 got its first coverage from 18 June to 24 June. About 83 % of the planned 606 nmi transect was covered in primary search mode while an additional 15 % was conducted in secondary search mode (single platform only, platform 2) with fresh to strong breeze. The coverage of this survey block was therefore quite good and left the impression of low densities of baleen whales and high densities of *Lagenorhynchus* spp., especially in the southern part of the block.

ES2 was covered over the period 25 June to 30 June with 85 % of the planned 468 nmi in primary search mode. Fin whales were the species most often seen, distributed over the entire survey block. In the north difficult ice conditions hampered the survey but also exposed us for harp seals, ringed seals and polar bears.

ES4 was covered over the period 4 July to 12 July. Parts of this survey block were covered with ice and weather conditions were mostly marginal resulting in a coverage of 52 % of the planned 681 nmi transect conducted in primary search mode. The main impression was very few sightings of minke whales while more observations were made of fin whales, especially in the northern part of the block.

ES3 was surveyed in the period 13 July to 18 July. The coverage was quite good with 85 % of the planned 476 nmi conducted in primary search mode. Minke whales were seen in the southern part of the block while fin whales were recorded in the northern part, but the overall impression was low densities.

Second transect coverage of the blocks

During the second coverage of *ES4* 21 July to 27 July large parts of the transect were unavailable due to ice. About 64 % of the planned 682 nmi transect was conducted in primary search mode. Varying weather conditions were experienced but a significant portion of the transect were ran under optimal conditions with just seeing a few minke whales and some more fin whales, confirming the main impression got from the first transect in this survey block.

ES3 was covered over the period 29 July to 3 August. A complete coverage of the planned 437 nmi was made, and the main impression was the same as during the first coverage; few minke whales seen and some fin whales in the northern part of the survey block.

The second coverage of the block *ES2* was made from 8 August to 10 August. Parts of the transect were not available due to ice and 75 % of the planned 447 nmi was searched in primary mode. Minke whales were recorded in the area west of Prins Karl's Forland, otherwise only a few.

ES1 was covered from 15 August to 21 August and 93 % of the planned transect of 561 nmi was covered in primary search mode. Some fin whales were observed in the southern part of the block but few minke whales were seen.

Collected data

In total, "*Tromsøy*" was able to survey about 3,390 nautical miles, which was somewhat higher than we had anticipated at the planning stage based on earlier experience of weather and conditions. We were able to survey all the four blocks with a reasonable coverage. Realised primary search effort in the four blocks surveyed in 2014 is shown in Figure 1.

A summary of the number of groups of whales sighted during the 2014 survey when on primary search effort is given in Table 1. Distributions of primary sightings of minke whales, fin whales, humpback whales, blue whales, sei whales, sperm whales, killer whales and dolphin spp. are shown in Figures 2-6.

Distance and angle estimation training and tests were conducted on 12 July and 9 August 2014.

Biopsies were collected from 3 humpback whales (all with associated photo ID) and 2 blue whales, altogether 5 individual whales. In addition, tail fluke photos from 26 humpback whales were collected, and photo ID from 3 blue whales. Satellite tags were applied to two humpbacks, one blue whale (with associated photo ID) and four minke whales.

Summary

The survey achieved a good coverage of the Small Management Area *ES* which was partly covered by ice in the western and northern areas. The ice situation was very similar to that experienced in the previous survey of the area in 2008 (Øien 2009). Compared to that survey, the minke whale density was much lower in 2014, especially in the southern areas including the Bear Island area. In 2014 fin whales occurred westwards to the ice edge in addition to the usual distribution along the shelf slopes west of Spitsbergen. The number of humpbacks recorded in 2014 was much lower than in 2008, however, the records were from the same general area which is around Bear Island. There was a lot more sperm whales observed in 2014 than in 2008, mostly west of the shelf slopes all the way from the Bear Island to north of Spitsbergen. Finally, the distribution and occurrence of *Lagenorhynchus* dolphins seemed to be very similar between the two years 2008 and 2014.

FUTURE SURVEY ACTIVITY

The survey in the Svalbard area in 2014 was the first one in the planned six-year cycle 2014-2019 of survey activity to provide a new minke whale abundance estimate in a timely manner (Øien 2013). An estimate of minke whale abundance based on the previous series of partial surveys 2008-2013 is presented to this year's IWC/SC meeting (Solvang et al. 2015) as an update of a preliminary presentation presented to last year's meeting (Solvang et al. 2014). In 2015, the plan is to survey the *Small Management Area* CM – the Jan Mayen area.

ACKNOWLEDGEMENTS

We are very grateful to the vessel *'Tromsøy'*, the observers and the team leaders on the vessel for dedicated and pleasant cooperation in conducting the research. The hard work spent by K.A. Fagerheim and S. Hartvedt on validating and coding the survey data is much appreciated.

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Table 1

Number of groups of whales seen from the upper platform during primary search, and realised primary search effort (nautical miles) by survey stratum, during the 2014 survey.

Species	**ES1**	**ES2**	**ES3**	**ES4**	**Total**
Minke whale	19	15	19	8	**61**
Fin whale	17	37	25	33	**112**
Blue whale	-	2	-	1	**3**
Sei whale	-	-	-	1	**1**
Humpback whale	8	-	-	2	**10**
Dolphins, unsp.	3	-	16	-	**19**
Killer whale	-	-	10	-	**10**
White-beaked dolphin	83	50	24	1	**158**
Sperm whale	9	2	10	1	**22**
Large whale	5	7	2	2	**16**
Total, groups	144	113	106	49	**412**
Realised primary effort (nmi.)	1025	733	842	790	**3390**

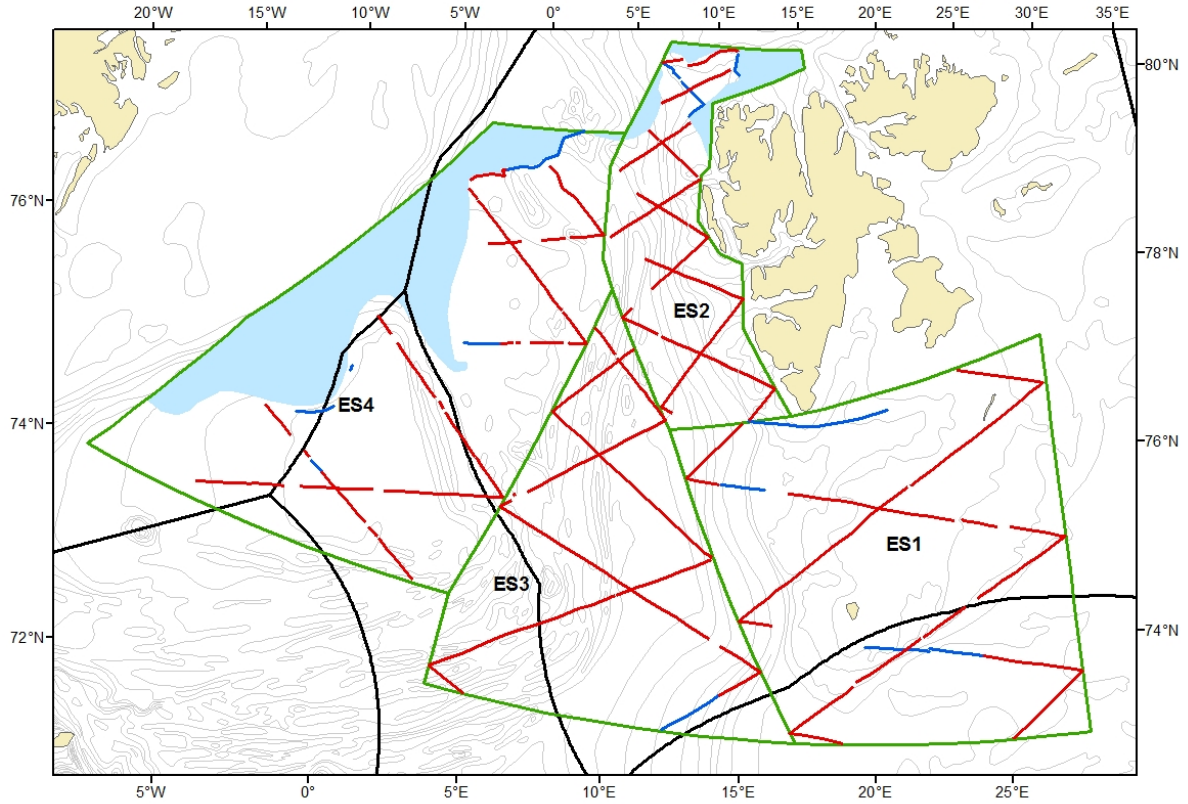

Figure 1. The ES *Small Management Area* with the block structure, ES1-ES4, adopted for the survey. Realised transects with primary search effort have been added as red lines; the blue lines represent secondary platform 2 effort. The areas with blue colour were covered by ice.

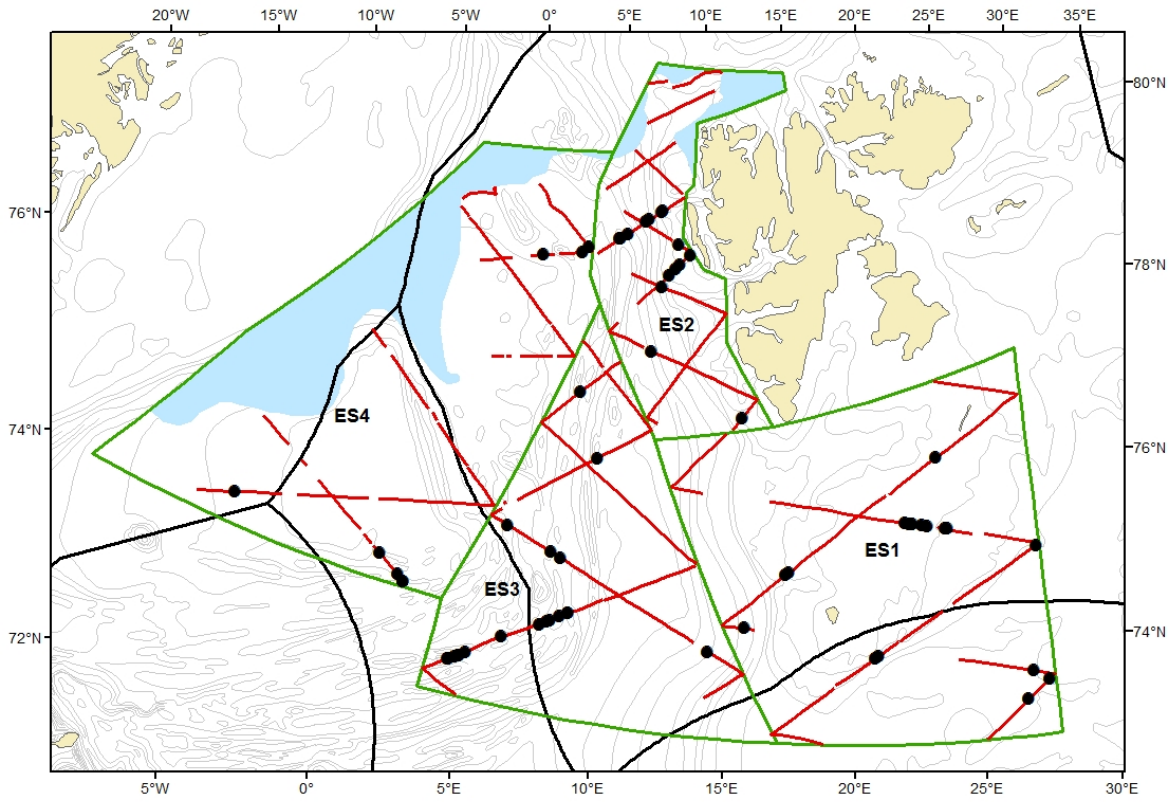

Figure 2. Primary sightings of minke whales (filled black circles).

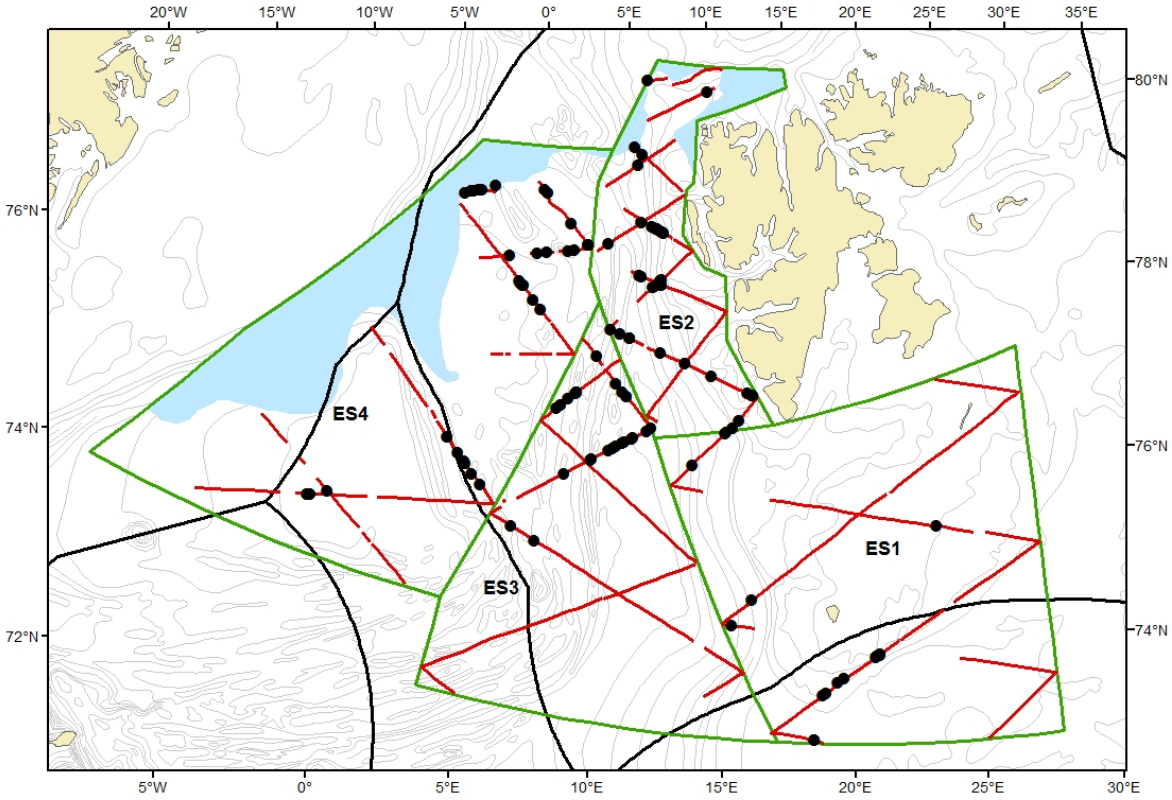

Figure 3. Primary sightings of fin whales (filled black circles).

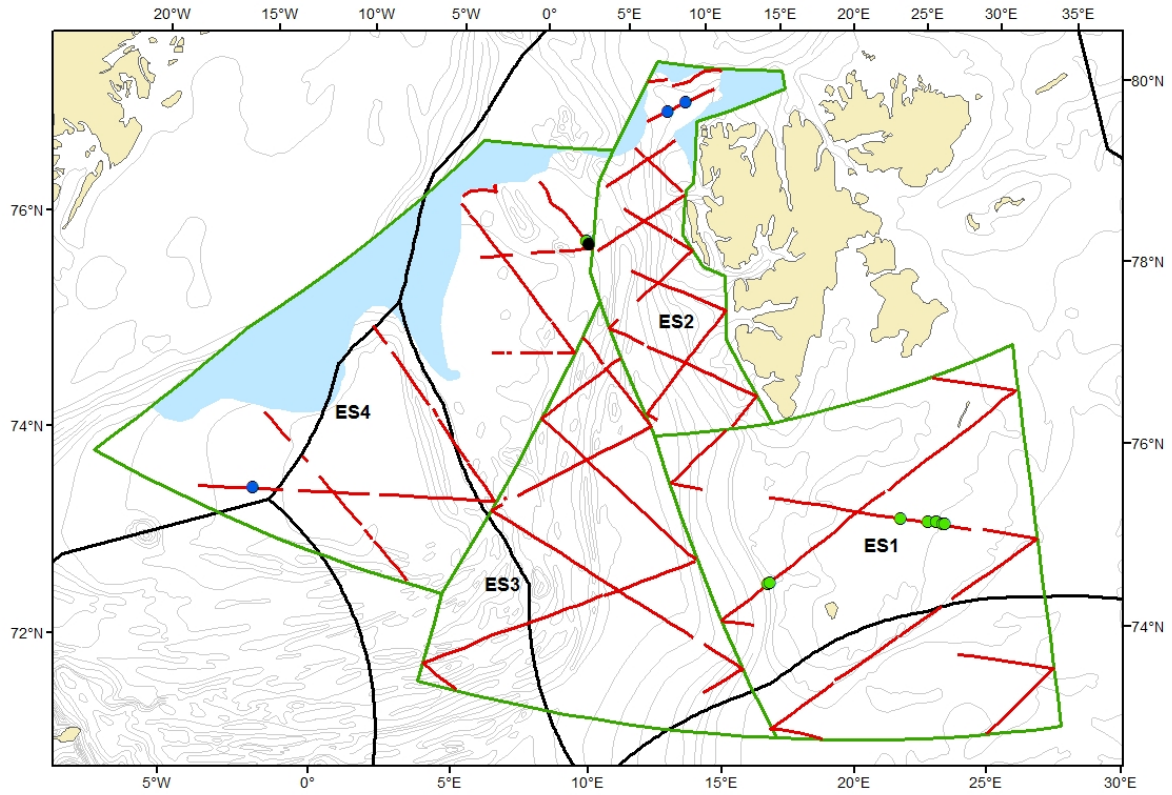

Figure 4. Primary sightings of humpback whales (filled green circles), blue whales (filled blue circles) and a sei whale (filled black circle).

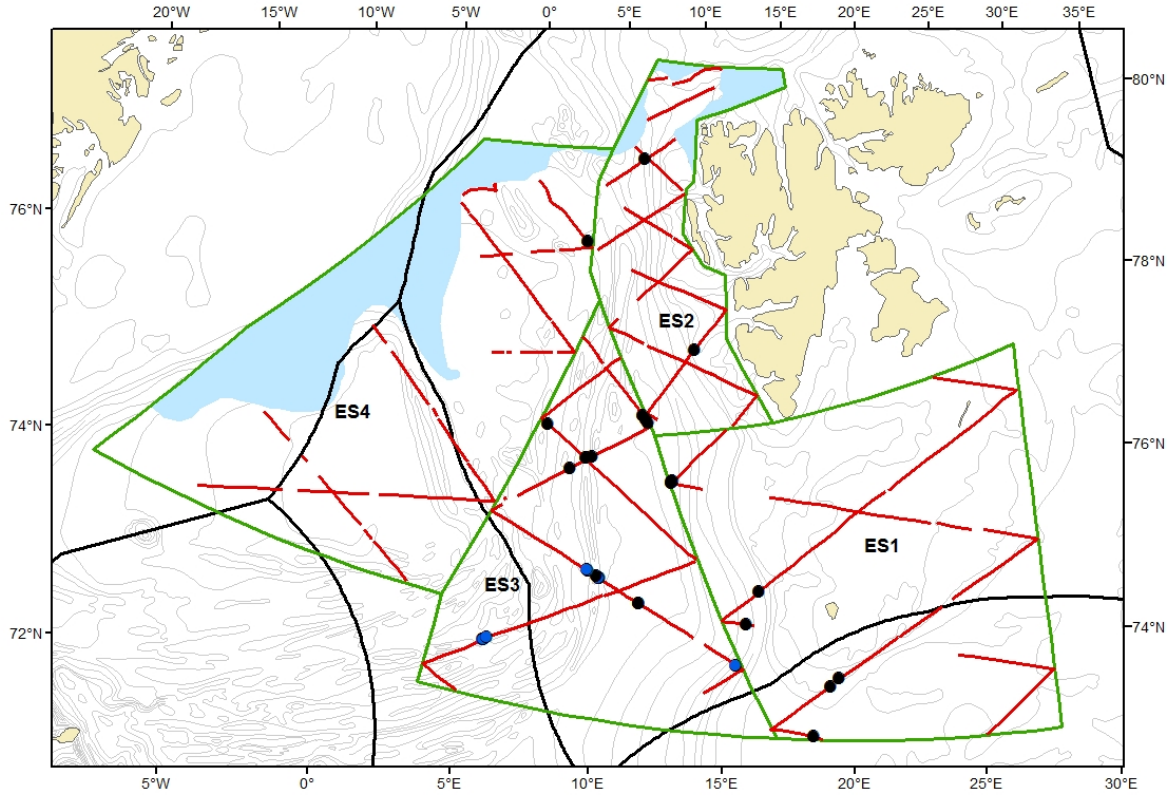

Figure 5. Primary sightings of sperm whales (filled black circles) and killer whales (filled blue circles).

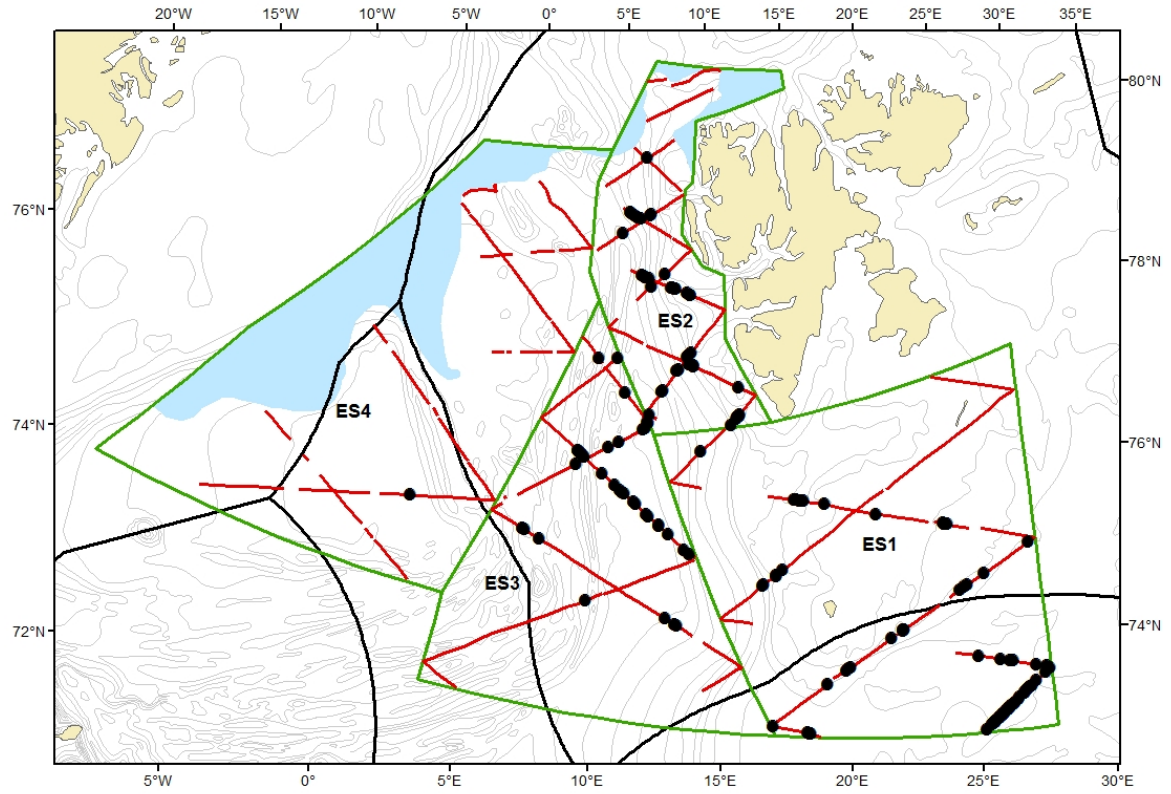

Figure 6. Primary sightings of *Lagenorhynchus* spp. (filled black circles).