A note on the distribution of short-beaked common dolphins, *Delphinus delphis*, observed during the 2007 T-NASS (Trans North Atlantic Sightings Survey)

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ABSTRACT

T-NASS was to estimate the abundance of cetacean populations in the Northern North Atlantic from survey data collected during summer 2007, under the auspices of NAMMCO, adding to the series of North Atlantic Sightings Surveys (NASS) thus forming a 20-year time series. T-NASS was coordinated with the European CODA survey and the American SNESSA survey. Line transect methods and/or cue counting, with when possible double platform design, were used to collect visual data. Passive acoustic data were also collected from five of the vessels. With the participation of Canada, Greenland, Iceland, the Faroes, Norway, and the Russian Federation, as well as observers on fishery surveys, a trans North Atlantic survey was achieved for the first time with 57,000 nm of transects in effort in an area of about 1.5 million nm², ranging from the Eastern Barents Sea to the east coast of Canada, and from 78ºN to 52ºN in the east and 61ºN to 42ºN in the west. Cetacean encounters totaled over 3.900 with 22 cetacean species identified. Short-beaked common dolphins came in 6th position in terms of sightings events (6%), with 90% made off Canada, where sighting conditions were very good. Off Canada, their distribution ranged from about 56.9º to 42.4ºN, but they were more frequent on the Scotian Shelf and then off Southern Newfoundland, with most sightings occurring in the mid- and outer-shelf areas, rather than near shore. In the North East Atlantic, where survey conditions were generally poor, common dolphins were not observed by dedicated surveys, even in areas where they used to be commonly observed in previous NASS. The few common dolphin sightings were made from the fishery survey MAR-ECO moving towards or on the mid-Atlantic ridge. Their distribution (55.2° to 48.8ºN and 8.1° to 31.2ºW) falls within the range previously described.

KEYWORDS: SHORT-BEAKED COMMON DOLPHIN; NORTHERN ATLANTIC; DISTRIBUTION.

INTRODUCTION

T-NASS, planned under the auspices of the Scientific Committee of NAMMCO, was to estimate the abundance of cetacean populations in the northern North Atlantic from survey data collected during summer 2007. T-NASS added to the series of North Atlantic Sightings Surveys (NASS) conducted in 1987, 1989, 1995 and 2001, thus forming a 20-year time series, providing a realistic opportunity for detecting changes in abundance over time for species with long life spans and slow reproductive rates.

With the participation of Canada, Greenland, Iceland, the Faroes, Norway, and the Russian Federation, T-NASS coverage ranged from the eastern coast of Canada to the eastern Barents Sea and extended between approximately 80°N and 42°N.

T-NASS was coordinated in timing, coverage (spatial contiguity) and methodology both with the European CODA survey (Cetacean Offshore Distribution and Abundance in the European Atlantic, coordinated by the Sea Mammal Research Unit, University of St. Andrews), and the American SNESSA survey (Southern New England to Scotian Shelf Abundance survey, coordinated by the National Marine Fisheries Service, NMFS, Woods Hole), conducted respectively to the southeast and southwest of the T-NASS core area (Fig. 1)

T-NASS was endorsed by the Scientific Committee of the International Whaling Commission (IWC SC) at its 2006 meeting. It was also a component project of the International Polar Year, as a sub-project of the umbrella project ESSAR - Ecosystem Studies of Sub-Arctic and Arctic Regions.

T-NASS was planned in a series of meetings between 2005 and 2007. The coordinators of CODA and SNESSA and a representative from the IWC SC were members of the T-NASS Planning Committee and are members of the NAMMCO Working Group on Abundance Estimation, which coordinates and reviews the analysis of the data.

GENERAL SURVEY METHODOLOGY

Dedicated cetacean shipboard sightings surveys were conducted from 7 vessels (1 Faroese, 3 Icelandic, 2 Norwegian) from June 25 to August 6, while dedicated aerial surveys were conducted from 5 planes (3

Canadian, 1 Greenlandic, 1 Icelandic) between June 20 and September 30, with a total a total of 79 observer positions.

To increase the area covered, especially with regards to mapping summer distribution, T-NASS also took advantage of other surveys occurring simultaneously in adjacent areas and placed 9 dedicated whale observers on the following fishery surveys: the ICES Redfish survey in the Irminger Sea (one Russian and one German vessels, two observers on each vessel), MarEco survey on the Mid Atlantic Ridge (one UK vessel, one observer) and the Norwegian Pelagic survey in the Norwegian sea (two Norwegian vessels, two observers on each vessel). This sub-project called " T-NASS extension" added about 400,000 nm^2 to the total area covered.

Line transect methods and/or cue counting, with when possible double platform designs, were used to collect visual data. Passive acoustic data were also collected from five of the vessels (the three Icelandic, the Faroese, and the MarEco vessels), with emphasis on recording of the sperm whale acoustic signals. More detail on the methodology applied can be found in NAMMCO (in press a and b) and Lawson and Gosselin (2008) for the Canadian survey. The only bird survey conducted in coordination with T-NASS was carried out from the MarEco vessel.

GENERAL SURVEY RESULTS

For the first time, a trans-North Atlantic survey was achieved, adding to the NASS area, areas to the west of Greenland and the eastern coast of Canada (Fig. 1). The 12 platforms of the core survey covered over 57,000 nm of transects in effort in an area of about 1.5 million nm^2, ranging from the Eastern Barents Sea to the east coast of Canada, and from 78ºN to 52ºN in the east and 61ºN to 42ºN in the west (NAMMCO, in press a and b). This represents one of the largest coordinated whale surveys to date. T-NASS observers placed on opportunistic survey platforms (MarEco, ICES Redfish and Norwegian pelagic) added a supplementary effort of 5,253 nm, in the Irminger Sea, the Norwegian Sea, and the Mid Atlantic Ridge.

Cetacean encounters totalled over 3,900 (NAMMCO, in press a), with variation in frequency between blocks and areas. Twenty two cetacean species were observed, with fin, common minke, and humpback whales, and white beaked dolphin and harbor porpoise as the five species accounting for the greatest proportion of the overall number of sightings (over 50% of sighting events), followed by common dolphins. Other marine megafauna like seals, leatherback sea turtles, and large shark and fish species were also recorded.

Abundance estimates have been finalized for some species and areas, while others are not yet complete.

COMMON DOLPHIN DISTRIBUTION AND ABUNDANCE

Short-beaked common dolphins were observed by the dedicated aerial Canadian surveys and the T-NASS extension observer placed on the R/V James Cook and covering the Mid Atlantic Ridge (Fig. 2).

Northwest Atlantic

Off Canada, common dolphins were observed most frequently in the Scotian Shelf strata (201); fewer sightings were made in the Newfoundland South stratum (25), the Labrador stratum (2), the Newfoundland East stratum (1), and the Cap Breton stratum (2). For the Scotian Shelf, most sightings tended to occur in the mid- and outer-shelf areas, rather than near shore. The same was true for southern Newfoundland.

The two sightings made on the Labrador coast (Table 1) were observed at approximately the same latitude as those reported in Murphy *et al.* (2009), in very good conditions, so the chances for identification error were low. The longitudinal positions reported also fit within the range reported by Murphy *et al.* (2009) for similar latitudes. The Canadian survey had generally very good weather conditions with in average 99% of the planned track line covered and an average Beaufort of 1.8. The Labrador stratum had proportionally lower survey coverage (98.1%) than the other Canadian blocks, but this was a function of logistical constraints due to the remoteness of the area rather than weather conditions. Therefore in the Canadian component of the T-NASS, it can be assumed that the distribution observed provides a good representation of the actual common dolphin distribution at the time of the survey.

Common dolphin abundance for the Canadian strata was estimated by Lawson and Gosselin (2008). Too few sightings were made in the Labrador stratum (2 sightings, 16 individuals) to estimate abundance. The abundance for the Newfoundland survey strata (26 sightings, 450 individuals) was estimated to be 576 (95% CI: 314-1,056). Common dolphins were the most abundant species in the Scotian shelf strata, with 203 sightings (3,097 individuals) providing an abundance estimate of 53,049 (95% CI: 34,865-80,717). Total abundance for the Canadian T-NASS survey was estimated to be 53,625 (95% CI: 35,179-81,773), without including corrections for availability or biases. The estimate therefore likely has a negative bias.

Northeast Atlantic

Few sightings were made in the eastern part of the T-NASS area and none by dedicated survey vessels. The 23 on-effort and 11 off-effort sightings were all made from the fishery survey MAR-ECO moving towards or on the mid-Atlantic ridge, with the on-effort sightings all situated on the same survey line thus preventing using

them for abundance estimation. Their distribution (55.2º to 48.8ºN and 8.11º to 31.2ºW) falls within the range previously described (e.g. Murphy *et al.*, 2009; Cañadas *et al.*, in press).

It is noticeable that no common dolphins were sighted very far north on the European side, with the two northern sightings made off effort at approximately 55° and 54°N and on effort at 50°N (Table 1), while the distribution west off Norway extends to approximately 65ºN latitude (e.g., Murphy *et al.*, 2009). The northeastern surveys encountered generally much poorer weather conditions than off Canada, with only 54%, on average, of the planned track line covered on effort for the shipboard strata.

The less-than-ideal survey conditions are illustrated by the very poor on effort coverage realized in the southeastern block by the dedicated shipboard survey, with less than 20% coverage. There was no observation of common dolphins in that block in 2007, while the species was commonly sighted in this area during NASS 1995 (e.g. Cañadas *et al.*, in press).

Despite considerable survey effort under acceptable conditions, no common dolphins were sighted in the Central North Atlantic, in coastal areas of Iceland or off West Greenland. The species appears to be absent or a rare visitor during the summer in these areas.

The observations made in the eastern Atlantic during T-NASS 2007 match the picture provided by Cañadas *et al.* (in press) that in the summer, common dolphins appear uncommon north of around 57°N. However the T-NASS coverage does not provide further precision south of that latitude. It is however noticeable that no sightings of common dolphins were made south of 57°N in the central strata with the southern border at 52.5°N and 27° and 37°W, where coverage was good and sightings were made in previous NASS (e.g. Cañadas *et al.*, in press). The most westerly sighting observed at 31°W falls within distribution ranges previously described.

ACKNOWLEDGEMENTS

Thanks to all the crews and observers, and all the others, who contributed to T-NASS. Thanks also to the support of the NAMMCO Secretariat, Phil Hammond and the Sea Mammal research Unit, Greg Donovan and Debra Palka.

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Table 1. Most northerly and westerly or easterly *Delphinus delphis* sightings observed during T-NASS 2007

Stratum		Day	Month	Pod Size	Latitude	Longitude	Status
T-NASS Canada	Labrador	17	July	12	56.8637°N	58.2310°W	on effort
T-NASS Canada	Labrador	17	July	4	55.7602°N	56.9468°W	on effort
T-NASS Canada	Newfoundland East	11	August	7	47.3939°N	48.0049°W	on effort
T-NASS Extension	Mar-Eco	18	July	7	49.7089°N	22.8820°W	on effort
T-NASS Extension	Mar-Eco	29	July	3	50.2580°N	31.2100°W	off effort
T-NASS Extension	Mar-Eco	15	August	10	54.4101°N	21.5100°W	off effort
T-NASS Extension	Mar-Eco	16	August	7	55.1673°N	11.1233°W	off effort

Figure 1. Blocks and accomplished effort during T-NASS 2007. The red dots indicate fin whale sightings. The map also indicates the survey areas for CODA and SNESSA surveys.

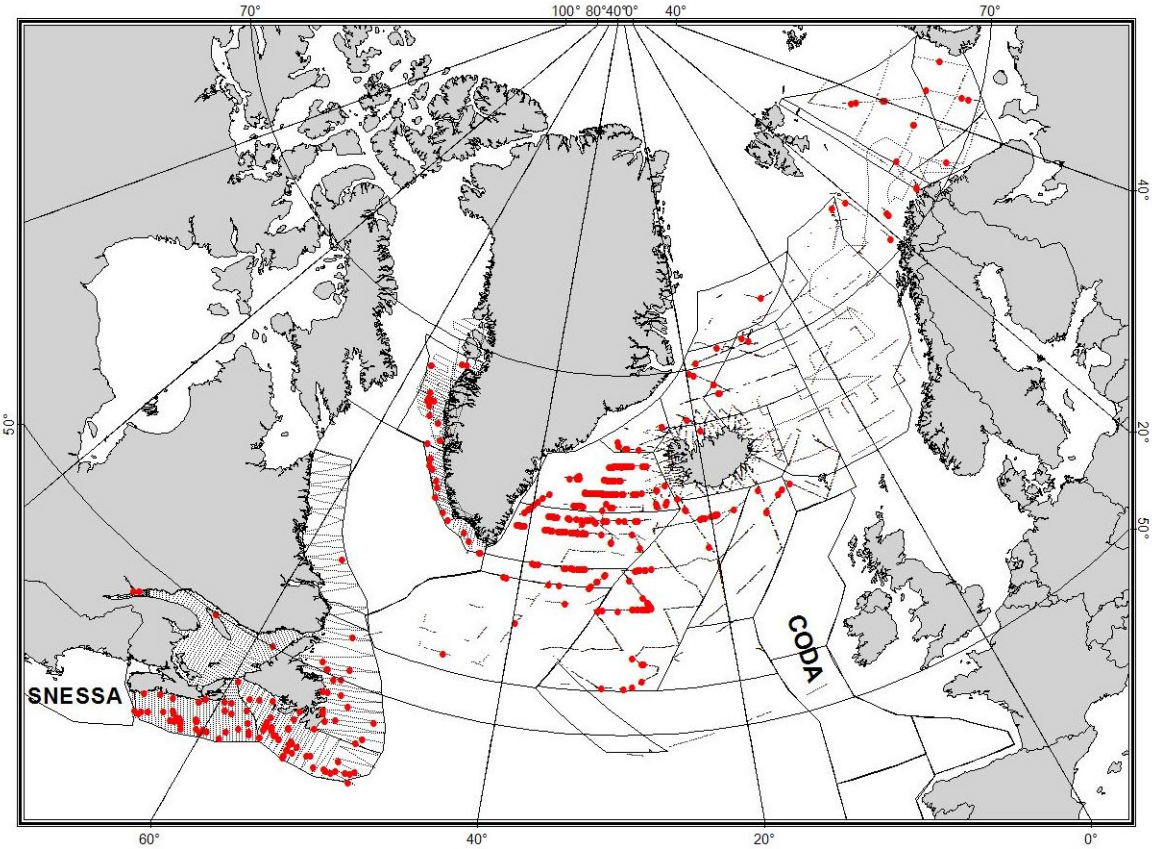
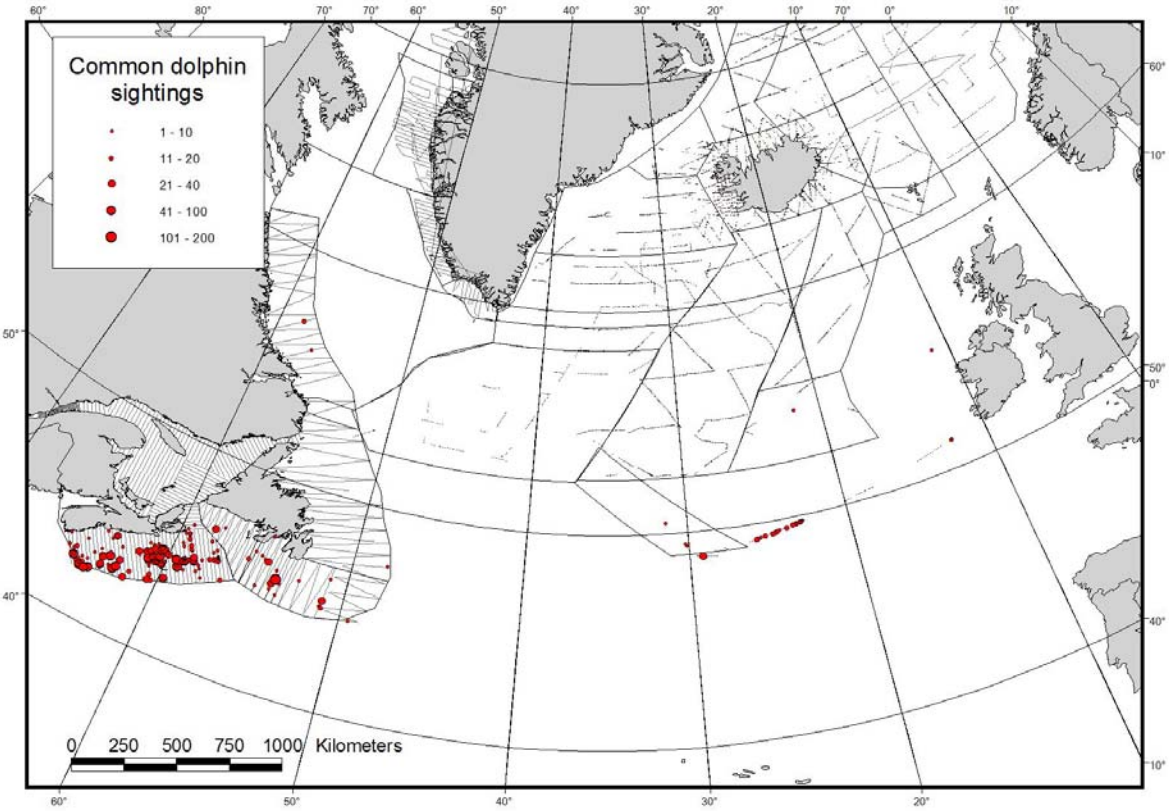
Figure 2. Sightings of short-beaked common dolphins, *Delphinus delphis*, made during T-NASS