

Movements and space-use patterns of bowhead whales in the Baffin Bay, 2009 and 2010

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A total of 78 bowhead whales have been instrumented with satellite-linked radio transmitters in Disko Bay in 2009 ($n = 28$) and 2010 ($n = 50$). Three types of transmitter configurations were used: cylindrical implantable SPOT 5 tags that provide only positions of the whales ($n = 33$), cylindrical implantable Mk10 tags that collect and transmit compressed and binned dive data ($n = 16$) and external SWING SPLASH tags secured with a spear with barbs that also collect dive data ($n = 29$). All tags were deployed in Disko Bay between 15 February and 5 June with most deployments in April. Data from the tags have been collected for as long as 14 months (Figure 1, 2, 3, 4 5) and seven tags are still transmitting at the time of the completion of this report.

Home ranges were calculated for 3 data subsets based on satellite telemetry collected from whales between spring 2009 and summer 2010. They were calculated using the kernel method. First, home ranges in autumn, winter, spring and summer were calculated only from whales tagged in 2009 (which had transmitted through 2010) (Figure 6). Second, home ranges for the spring and summer were calculated from whales tagged in 2010 (data for this report were available through August 2010) (Figure 7). Third, home ranges were calculated for the combined data sets for the spring and summer season using whales tagged in 2009 and 2010 (Figure 8). Currently, autumn home ranges are only available based on whales from 2009 because the tags from 2010 are still transmitting.

Winter: January – March

Two tags deployed on 27 April and one deployed on 17 May 2009 in Disko Bay provided positions in January-March 2010 and they were all located at the northern Labrador Coast at the entrance to Hudson Strait in January at a time when bowhead whales are not regularly seen in Disko Bay. In March-April two of the whales made a move towards Disko Bay where they were located in April in the very same areas where bowhead whales were located and tagged in 2010. The tracks of the two whales from Northern Labrador to Disko Bay in winter are the first actual demonstrations of the return migration of bowhead whales to West Greenland from the summer and fall grounds in Northern Canada. Although it was assumed that the route across Davis Strait constituted the most likely supply of bowhead whales to West Greenland it has also been proposed that whales could come from the north along the West Greenland coast or straight across from Baffin Island. The tracks of the two whales (one female and one unknown sex) that returned to Disko Bay also demonstrate that some whales return year after year to the bay and not necessarily follow a multi-annual cycle.

Spring: April – May

Most of the tagging effort on bowhead whales has taken place in April-May in Disko Bay. Generally the bowhead whales are concentrated in the western part of Disko Bay in April-May, but the northbound migration has been initiated in early May and bowhead whales can be found all along the West Greenland coast as far north as Melville Bay and the North Water, and they are also found in the eastern part of Disko Bay and in Vaigat.

The spring home ranges (Figure 6 and 7) demonstrate the concentration area of whales in the Disko Bay region during April and May (especially when compared to the expansive home range in summer). The combined spring area (Figure 8) was similarly concentrated in Disko Bay and only the 95 % region showed small pieces of area use as whales began their northbound migration.

Summer: June – August

June is the month when bowhead whales migrate across Baffin Bay. Bowhead whales can still be found in Disko Bay in June, but they occur in lower numbers as many whales have departed. Most whales are located in the eastern part of Baffin Bay from Disko Island and north to the North Water. Some whales have however already crossed or circumvented the deep basin of Baffin Bay to be found on the western side of the bay.

In July almost all of the whales are on the western side of Baffin Bay and along the east coast of Baffin Island. Also offshore areas in the northern part of Baffin Bay and southern part of the North Water attract a large number of bowhead whales in July.

August is typically spent in coastal areas in the Canadian high Arctic archipelago and in northern Hudson Bay and Foxe Basin. Some bowhead whales circumvent Baffin Island in August but the largest concentrations of whales have been found in Prince Regent Inlet in late August.

The summer home range demonstrated the vast area over which the bowhead whales range during these months (Figure 6, 7 and 8).

Autumn: September - December

Bowhead whales are generally not present in West Greenland or the eastern part of Baffin Bay in the fall and early winter. In the fall whales from Disko Bay can be located in the Canadian Arctic Archipelago as far west as 90° W, but are primarily concentrated in Prince Regent Inlet, Foxe Basin and in fjords along the east coast of Baffin Island (e.g. Isabella Bay and Cumberland Sound) and Hudson Strait. At this time of the year the whales are also concentrated in coastal areas or move between coastal locations.

The 95, 75, and 50 % autumn kernel home range was concentrated in multiple smaller focal areas which included the east coast of Baffin Island (Isabella Bay and offshore from Cumberland Sound), Prince Recent Inlet, Repulse Bay, and multiple areas within Hudson Strait (Figure 6).

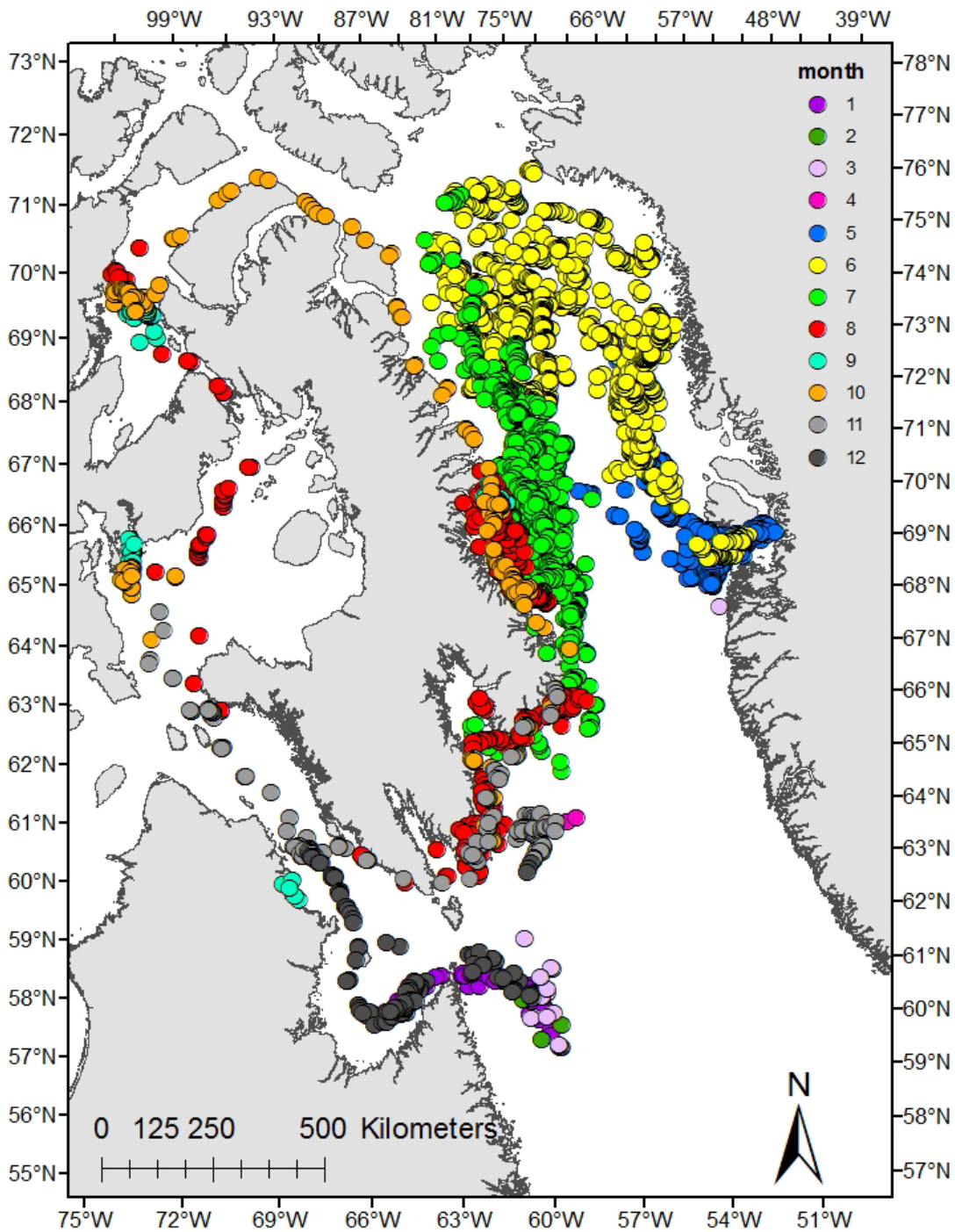


Figure 1. Locations of all bowhead whales tagged in 2009 in Disko Bay and tracked through December 2009 ($n = 28$).

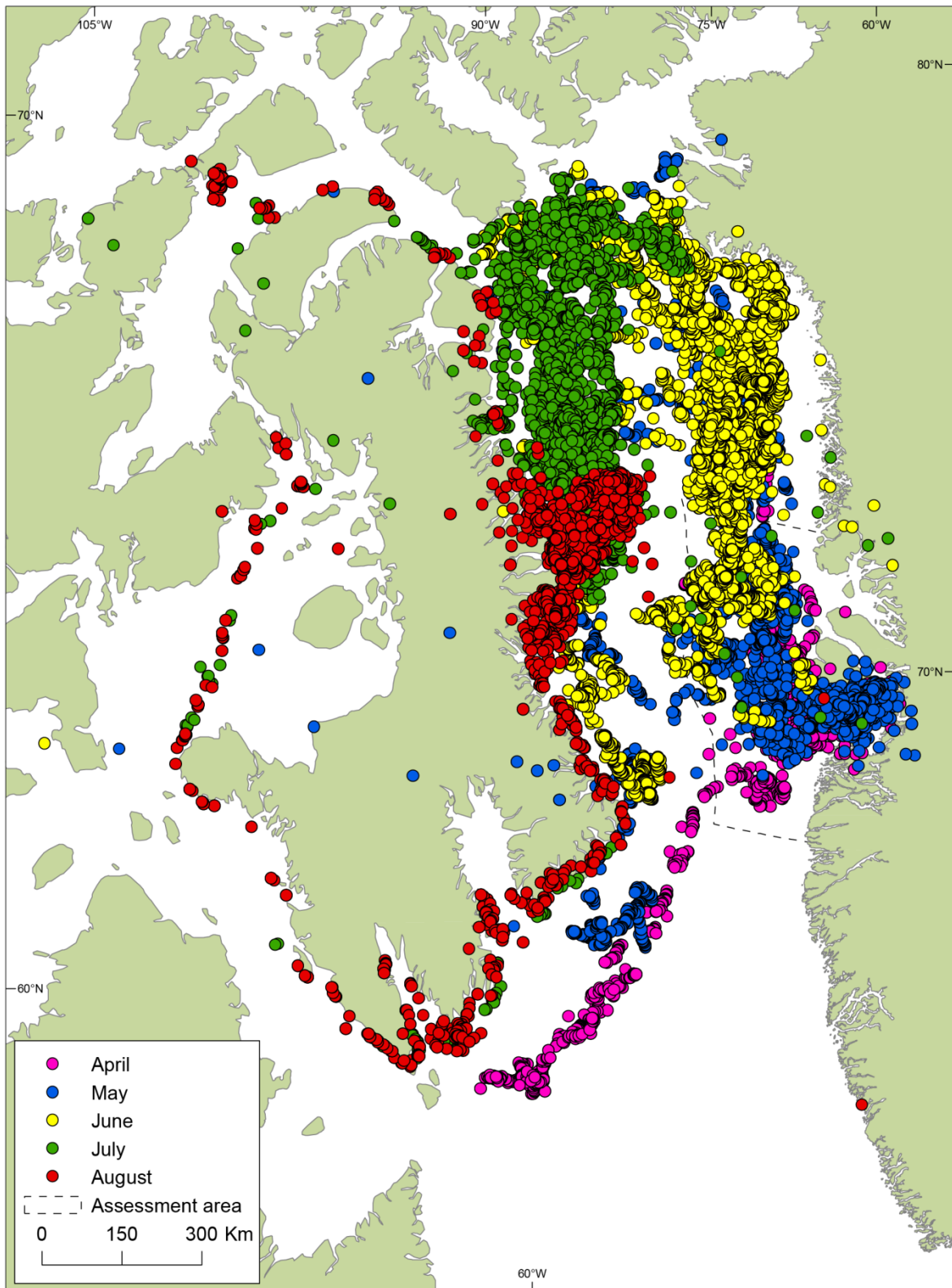


Figure 2. Locations of all bowhead whales tagged in Disko Bay in 2010 and tracked through August 2010 ($n = 50$).

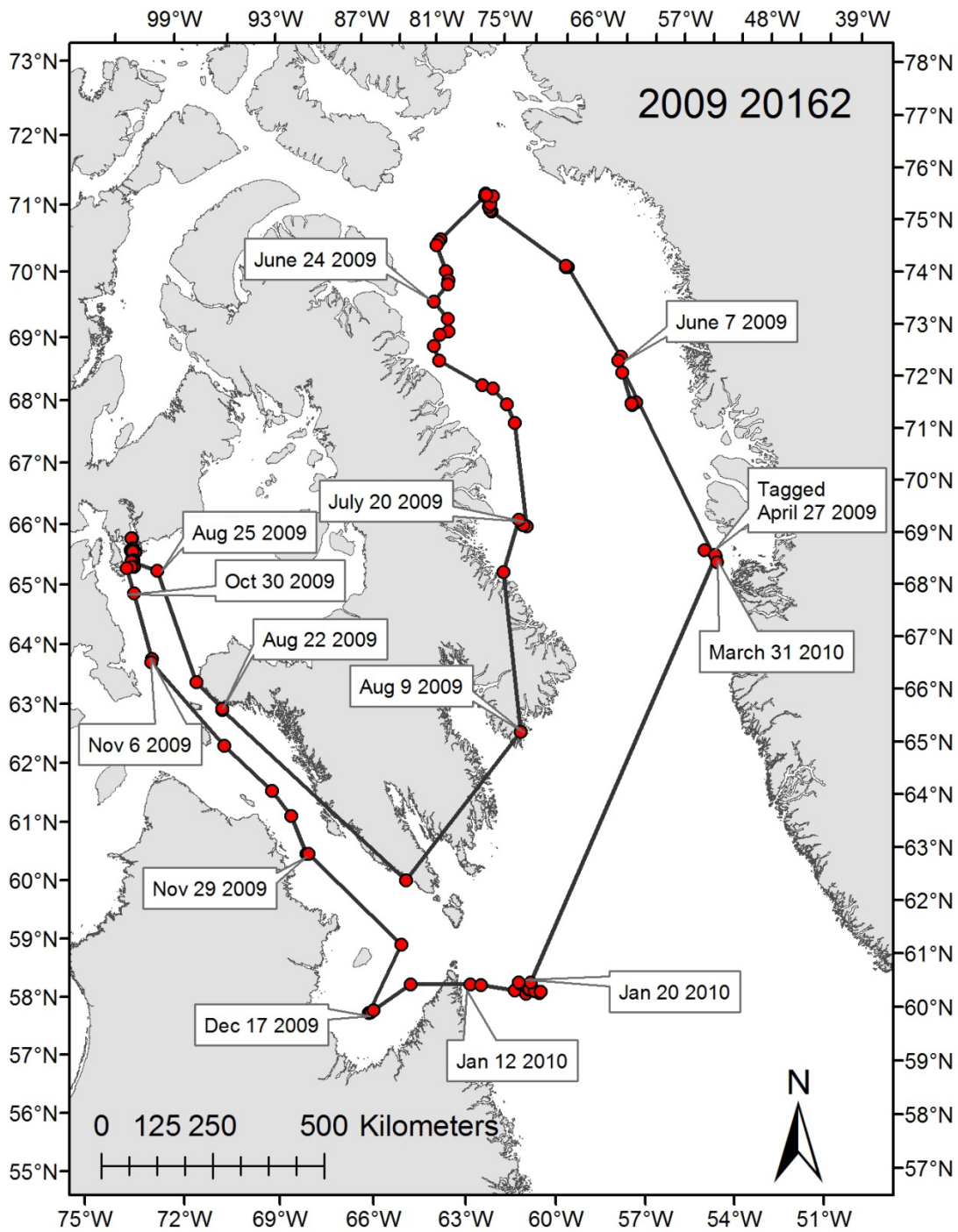


Figure 3. Track of a female bowhead whale (Id. no. 20162) tagged on 27 April 2009 in Disko Bay and tracked through March 2010.

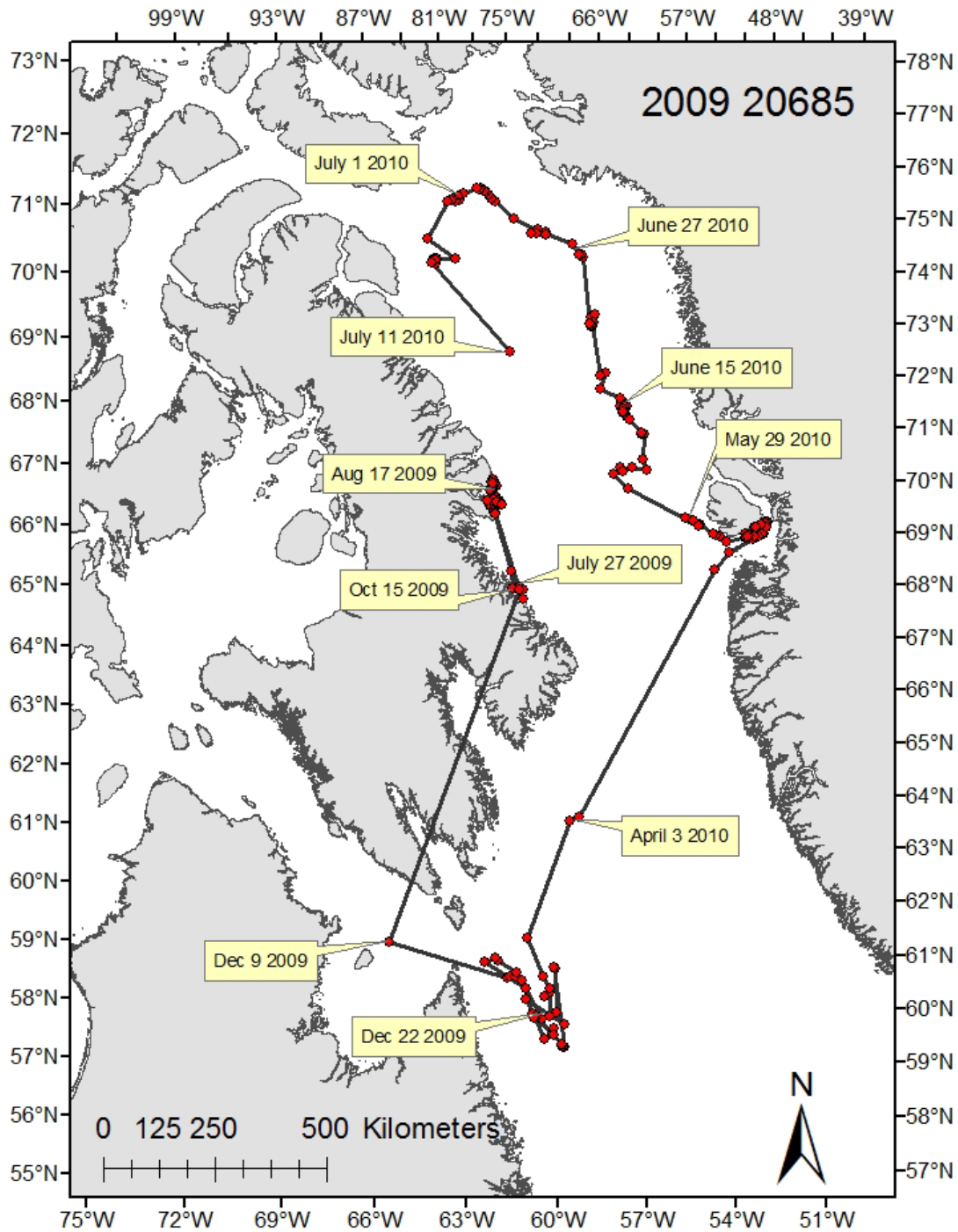


Figure 4. Track of a female bowhead whale (Id. no. 20167) tagged 17 May 2009 in Disko Bay and tracked through 11 July 2010.

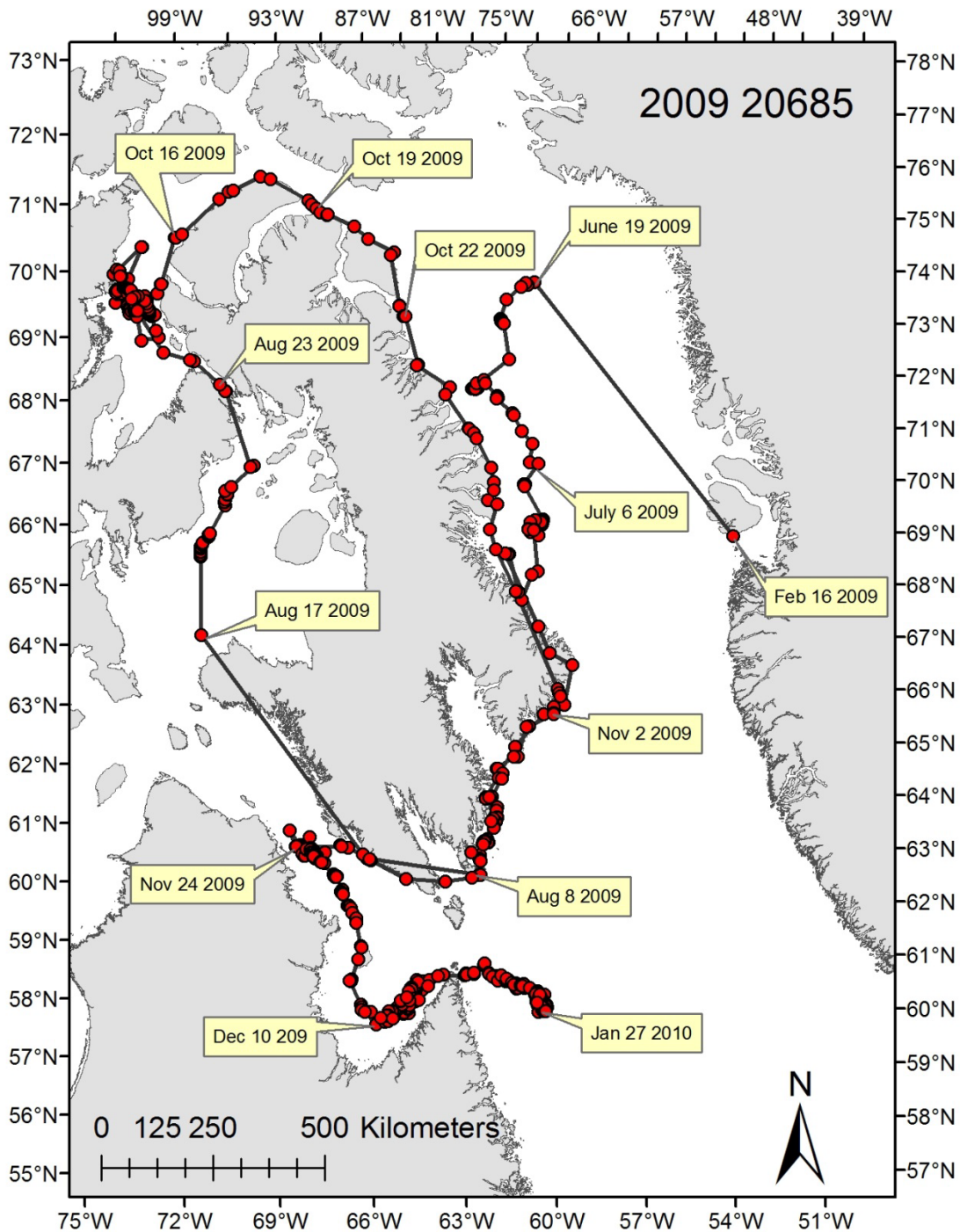


Figure 5. Track of a bowhead whale (sex unknown, Id. no 20685) tagged 27 April 2009 in Disko Bay and tracked through 27 January 2010.

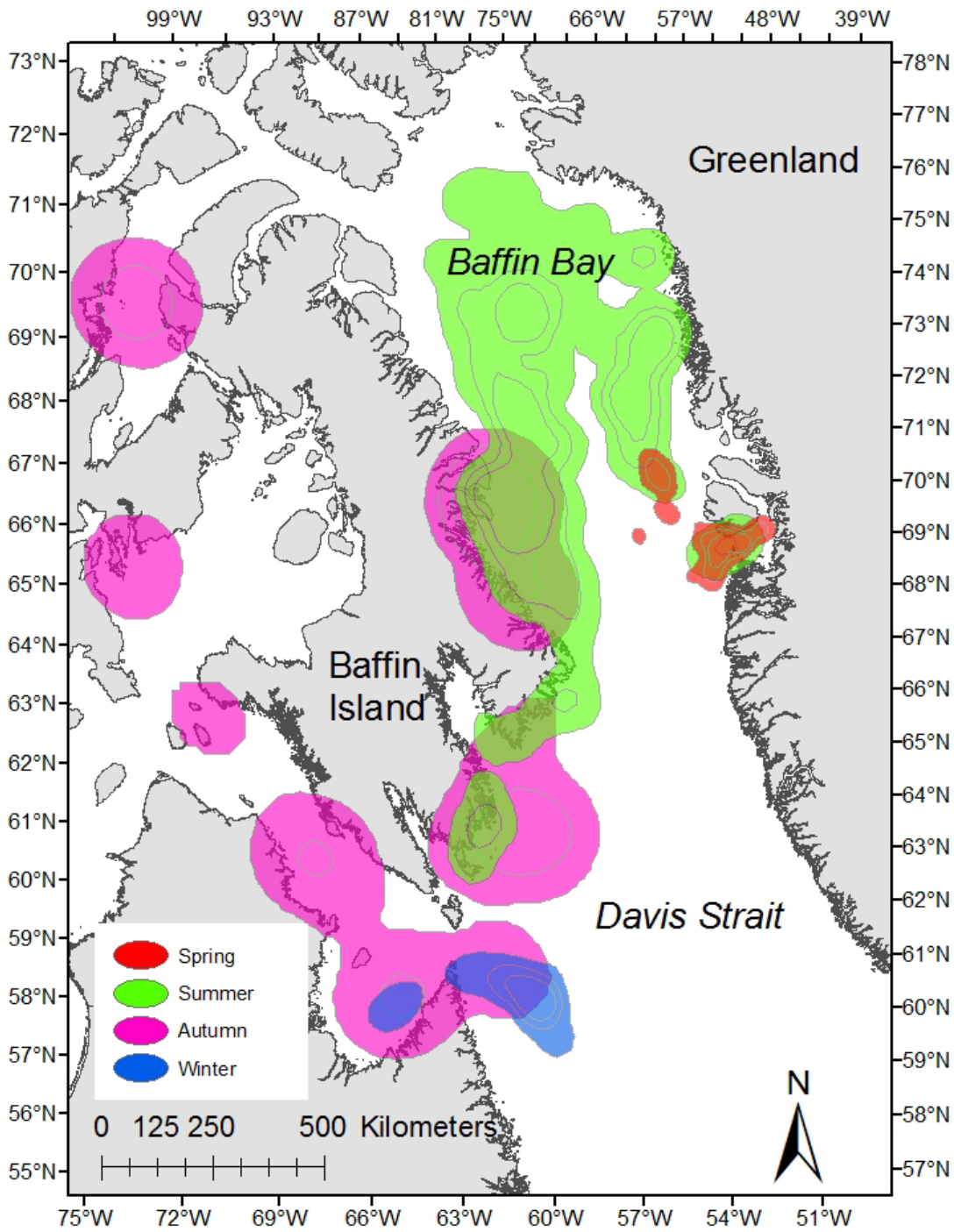


Figure 6. Seasonal home range distributions (calculated by the kernel method) of bowhead whales from 2009 ($n = 28$).

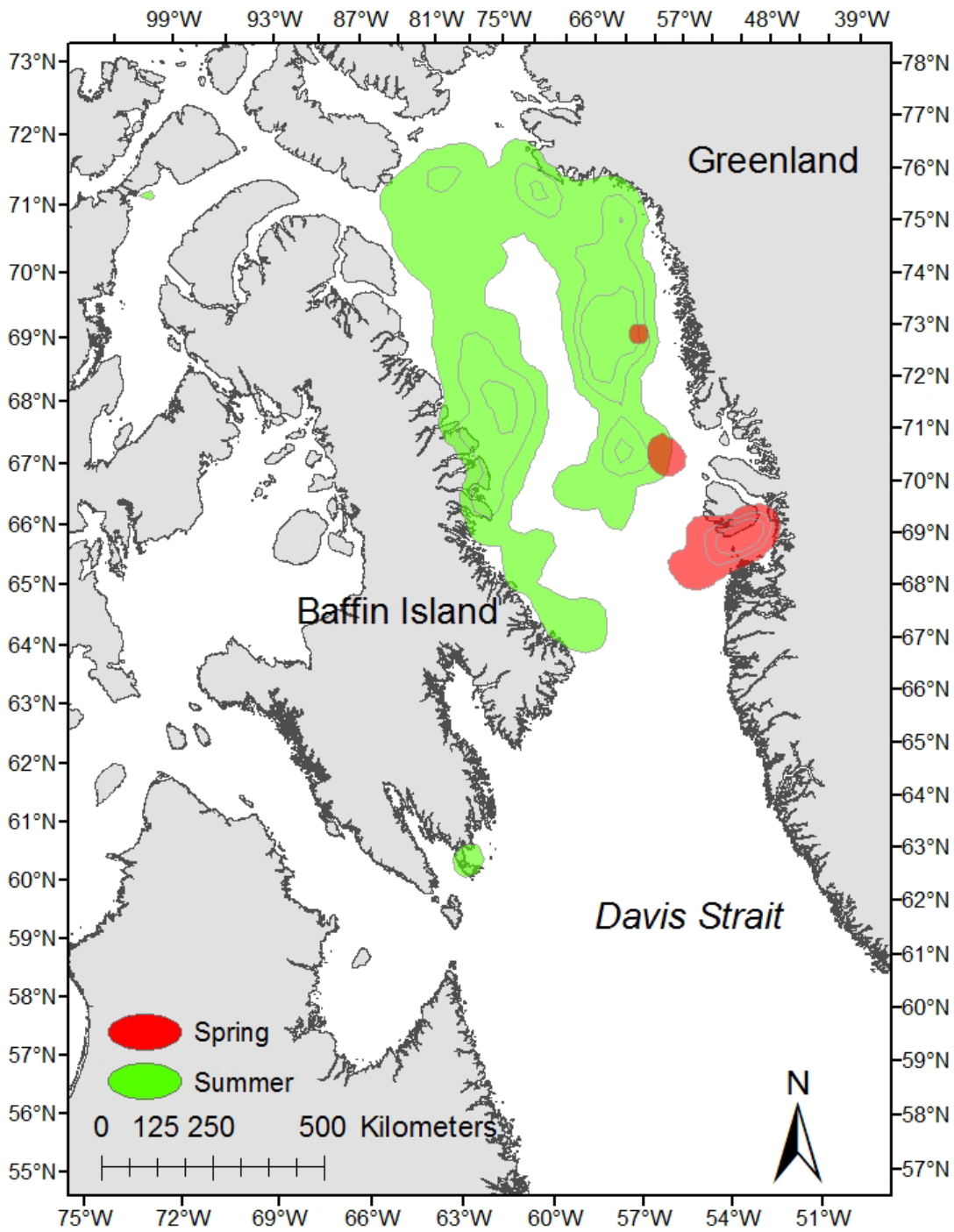


Figure 7. Seasonal home range distributions (calculated by the kernel method) of bowhead whales from 2010 ($n = 50$).

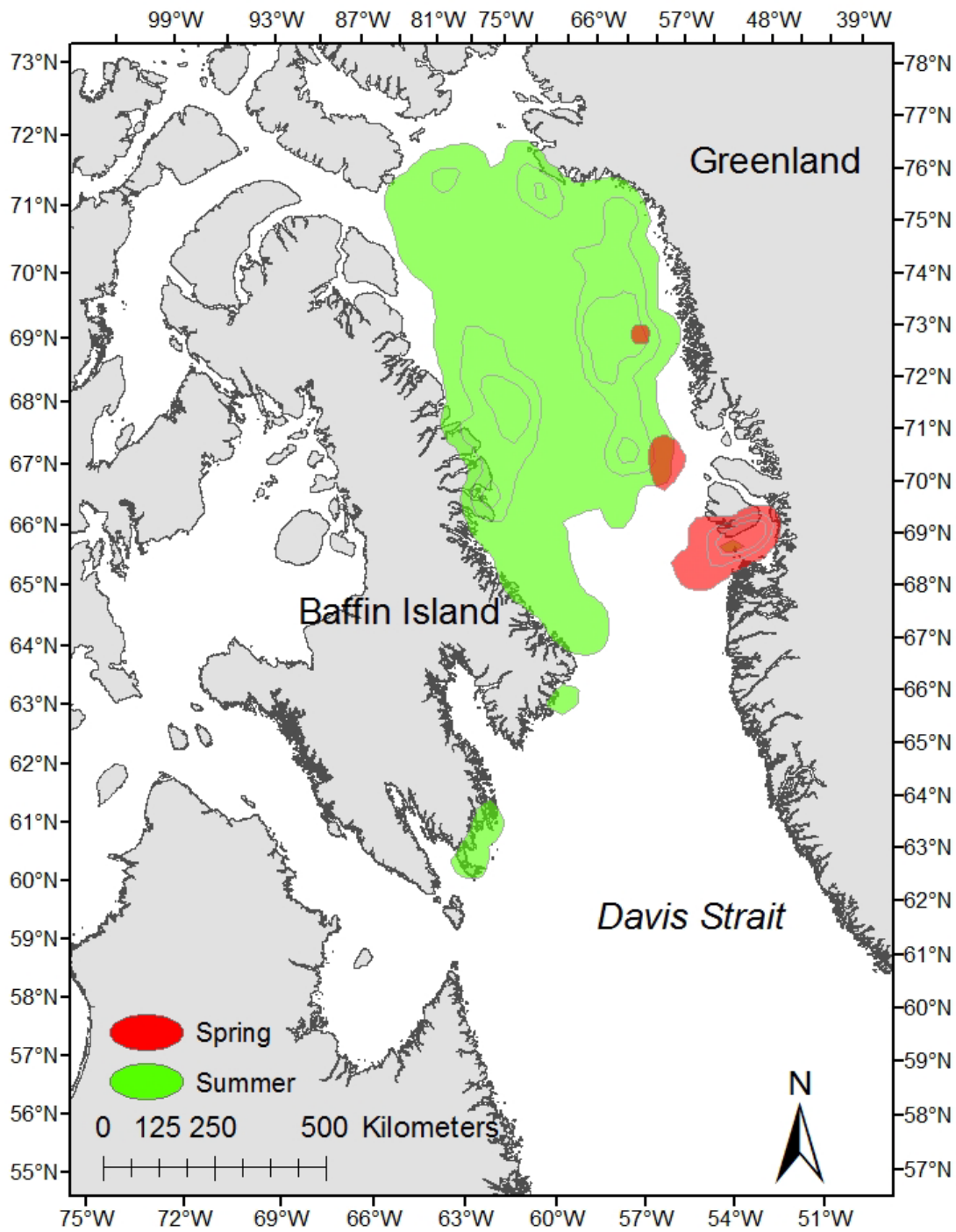


Figure 8. Combined spring and summer home ranges (calculated by the kernel method) for bowhead whales tracked in 2009 and 2010 ($n = 78$).