

Density, seasonal distribution and habitat preferences of harbour porpoises from the southern bight of the North Sea and Dover Strait

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The harbour porpoise (*Phocoena phocoena*) has made a significant return along the coasts of western Europe due to a shift of its distribution, particularly in the southern North Sea, English Channel and Bay of Biscay. However, very little is known on the seasonal occurrence and habitat preferences of harbour porpoises in these regions, except during summer as ship-based line transect surveys (SCANS-II) and few aerial surveys (PACOMM) were recently conducted. Here, we aimed to assess the seasonal occurrence (or encounter rates) and habitat preferences of harbour porpoises in the Dover Strait and adjacent waters (southern North Sea, eastern English Channel). Dedicated ferry surveys (DFDS Seaways) were conducted between November 2011 and December 2012. Based on 44 ferry surveys and more than 350 sightings data collected under on-effort conditions, our results revealed significant monthly variations of encounter rates of harbour porpoises, with a peak of sightings between January and March, ranging between 3 to 7 sightings per hour. The lowest encounter rates were recorded between April and June. During summer, harbour porpoises occurred significantly closer to shore (6.5km in summer vs. 10km in winter and early spring), in shallower waters (less than 20m deep, $p < 0.0001$). In addition, mother-calf pairs were observed during this season (in 11% of groups). Finally, sighting density was significantly higher off the North Sea coast than along the eastern Channel. The seasonal change of habitat preferences of harbour porpoises may be attributed to a dietary shift or a shift of prey distribution. This first dedicated study highlighted that harbour porpoises are densely distributed in the southern bight of the North Sea (particularly during late winter and early spring), where the maritime traffic is important and gillnet fishing effort intense. Given the increasing levels of bycatch recorded during the recent years (primary cause of death) in this region, this study provides strong baseline information to mitigate this threat.