

Winter migration and diving behaviour of porbeagle shark (*Lamna nasus*) in the Northeast Atlantic

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Porbeagle shark is one of the top marine predators in the North Atlantic. Little is known about its biology, abundance, or spatial ecology in this region, however. Here we present results on the migration and behaviour of three porbeagles tagged with archival pop-up tags off the northwest coast of Ireland that reveal important information on winter diving and migratory behaviour. One shark migrated over 2400 km to the northwest of Morocco, residing around the Bay of Biscay for approximately 30 days. The other two sharks remained more localized in offshore regions around the Celtic Sea/Bay of Biscay and off western Ireland. The sharks occupied a broad vertical depth range (0–700 m) and temperature range (c. 9–17°C), with notable variations in diving behaviour between individuals. There were distinct day–night differences in depth distribution with each shark positioned predominantly higher in the water column during the night-time than during the day. Night-time depth distribution also appeared to be driven by the lunar cycle during broad-scale migration through oceanic waters. A 29.7-day cycle (a lunar “month”) in night-time depth distribution was observed for one shark, and moon phase and night-time depth distribution was negatively correlated. Our results demonstrate that porbeagle sharks occupy and traverse regions of high fishing activity where they are potentially vulnerable to population depletion. Such large-scale movement outside the ICES area underlines the need for international coordination in assessment and management.

Keywords: diving behaviour, lunar cycle, migration, porbeagle shark, satellite tag.

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