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Life on the edge: Short-finned pilot whales (*Globicephala macrorhynchus*) target shelf break waters in the U.S. Mid-Atlantic Bight

[Lesley Thorne](#) [Heather Foley](#) [Daniel Webster](#) [Robin Baird](#) [Zach Swaim](#) [Joel Bell](#) [Andrew Read](#)

Short-finned pilot whales (*Globicephala macrorhynchus*) interact with pelagic longlines by depredating bait and catch and becoming hooked or entangled in gear. Serious injury and mortality of short-finned pilot whales in the U.S. pelagic longline fishery will likely exceed the Potential Biological Removal level for the U.S. Western North Atlantic stock in 2015. However, detailed information on the habitat use of this species is lacking, which complicates management efforts to mitigate bycatch and depredation. To address this limitation, we tracked the movements of 18 short-finned pilot whales tagged with LIMPET satellite-linked transmitters off Cape Hatteras, North Carolina, between May and December, 2014 and quantified their habitat use relative to environmental variables (distance to shelf break, sea surface temperature, bathymetric slope, and depth) using randomly-generated temporally-matched pseudo-absences with modeled distance constraints and mixed-effects generalized additive models (GAMMs). Tag deployments lasted from 2 to 194 days (mean=57 days) and pilot whales traveled 24 to 7,564 km (mean=2,435 km) in total, reaching distances of 7 to 1190 km (mean = 315 km) from their tagging locations. Whales showed a strong affinity for the shelf break, with more than 90% of locations occurring within 20 km of the shelf break (1,000 m depth contour) and more than 65% occurring within 5 km of the shelf break. Slope, distance to shelf break, and SST were significant predictors of habitat use ($p < 0.001$ for all variables, $R^2=0.40$). Pilot whales demonstrated a preference for waters close to the shelf break, with warmer SST values (peak preference $\sim 25^\circ\text{C}$) and medium to high bathymetric slopes (peak preference ~ 40 percent rise), although two groups spent substantial periods of time far offshore, and moved into international waters. A comparison of pilot whale habitat use with density grids of longline effort generated over a 10-year period demonstrated considerable overlap with the pelagic longline fishery. Our results highlight the importance of static habitat features to this species, information which will be useful for predicting spatial and temporal overlap with pelagic longline fisheries.

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