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Satellite telemetry results indicate an open-ocean population of sperm whales (*Physeter macrocephalus*) in Hawaiian waters

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At least 11 of the 18 species of odontocetes in Hawaiian waters have island-associated, resident populations. Sperm whales have been sighted throughout Hawaiian waters, including offshore areas, and around the northwestern and main Hawaiian Islands, and are primarily comprised of groups of females and juveniles. Around the main Hawaiian Islands, they make up less than 2% of odontocete sightings. In this study, we used satellite tag data to assess whether they were part of an island-associated or open-ocean population. Between 2009-2014, 12 adult female and sub-adult sperm whales from nine groups were tagged off Kaua'i (n=1) and Hawai'i (n=11) to examine fine-scale movements. Statistical analyses were restricted to one individual per group. Individuals were tracked for a period of 6.1 to 14d (median = 12.7d) with a mean distance travelled of 719km (range=406-983km) and a grand median depth of 4,476m (range of maximums=4,746-5,755m). With grand median distances from tagging locations and from shore of 133km (range of maximums=102-515km) and 82km (range of maximums=51-378km), respectively, individual movements appeared broad and with no particular association with the islands. The individual tagged off Kaua'i immediately headed northeast and spent the remainder of the tag duration offshore (median distance from shore=172km). One individual tagged off Hawai'i Island remained relatively close to shore during the 9d transmission (median distance from shore=18km), associated with seamounts to the southwest by the end of transmission. Three individuals (from two groups) travelled in a general westerly direction associated with seamounts along the way, while four individuals (from three groups) were associated with seamounts southwest of the island. One individual associated with seamounts southwest of Hawai'i, continued traveling north along the island and through the 'Alenuihāhā Channel between Maui and Hawai'i, and headed east-northeast. One individual immediately headed northwest, travelled between O'ahu and Kaua'i, and began heading to the northeast on final transmission. Although tag transmissions were relatively short, results indicate movements are wide-ranging with no consistent pattern, suggesting sperm whales around the main Hawaiian Islands are part of a broadly-ranging population that likely extends across much of the central tropical Pacific.

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