The Role of Environmental and Social Contexts on Space Use of Endangered Hawaiian False Killer Whales

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Examining individual-level differences in space use can shed light on important ecological processes and population-level patterns that may inform conservation efforts. For highly social species, both environmental and social contexts play a role in individual movement decisions, but are rarely studied in tandem. We evaluate the role of both environmental and social contexts on the space use of endangered Hawaiian false killer whales (*Pseudorca crassidens*) through an individual-level assessment of ranging behavior, habitat selection, and isotopic niche space in relation to social cluster membership (C1-C4). Satellite tag data (2007-2023; C1, n=30; C2, n=9; C3, n=20; C4, n=9) were used to derive home ranges and to fit Bayesian hierarchical habitat selection models. Isotopic niche space was estimated through Bayesian standard ellipse area (SEA-B) analysis with carbon and nitrogen isotopes (biopsy samples, 2008-2020; C1, n=27; C2, n=22; C3, n=12; C4, n=21). Pairwise home range overlap was highest between individuals with the same social cluster membership (median Bhattacharyya coefficient > 0.75 for each cluster); between-cluster overlap was greatest among C1, C2, and C3, and most disparate with C4. Habitat selection models indicate that individuals select for some, but not all, habitat features similarly to individuals in the same cluster. Isotopic niche width was similar between C1 and C2, narrowest for C3, and widest for C4 (mode of SEA-B = 0.50, 0.47, 0.27, and 1.05, respectively), suggesting C4 may be more generalist. Clusters had high overlap in d15N and less overlap in d13C values, indicating all clusters most likely feed at the same trophic level but forage in different habitats, at least partially. Results suggest that the drivers of false killer whale space use are likely scale-dependent, where environmental contexts may be more influential at finer scales (location-based habitat selection) while social cluster membership is more influential at larger scales (track-based ranging behavior).