Functional Ecology

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Humpback and blue whale "super-groups" near dense, consistently distributed krill patches

Cade, David; Seakamela, S. Mduduzi; Findlay, Ken; Fukunaga, Julie; Kahane-Rapport, Shirel; Warren, Joseph; Calambokidis, John; Fahlbusch, James; Friedlaender, Ari; Hazen, Elliott; Kotze, Deon; McCue, Steven; Meÿer, Michael; Oestreich, William; Oudejans, Machiel; Wilke, Christopher; Goldbogen, Jeremy

On Dec. 16, 1892, William S Bruce, a scientist aboard a whaling vessel near South Georgia Island on the edge of the Southern Ocean, observed thousands of fin and blue whales gathered close together: "Whale's backs and blasts were seen at close intervals quite near the ship, and from horizon to horizon." Other contemporary accounts note similarly large aggregations, but by the latter half of the 20th century after intense commercial harvest that reduced populations to < 1% of historic abundances, groups of more than a handful of whales were rarely observed. Bruce himself notes that in 1912, more than 11,000 whales were killed in a single season by South Georgia whalers. Recently, however, large groups of densely aggregated blue whales have been reported off the California coast, and extraordinarily large groups of humpback whales (numbering upwards of 100-200 animals in a region 200 m on a side) have been observed in small patches of the ocean off South Africa's west coast.

What draws these animals together? In both California and South Africa, abundant concentrations of krill are key prey for these large, lunge-feeding predators. In this work, we describe how krill patches near these super-groups are thicker, denser and more consistently distributed than other krill patches in the environment in which whales were observed foraging. We used video bio-logging tags to record the behavior of whales in these groups, and found that they fed more rapidly than whales not in super-groups, suggesting that prey was both high-quality and more accessible such that whales did not have to traverse as far between high-quality mouthfuls.

Large, densely aggregated group of humpback whales, surfacing near Cape Town, SA © Dave Hurwitz

These large predators must navigate spatially and temporally patchy environments to find high-quality food during the limited foraging season. Our findings suggest that whales could potentially use cues from conspecifics to locate the best foraging environments, gathering in large numbers where prey is the most available. As populations continue to recover, we may see a positive feedback loop whereby more whales increase the ability of the whole population to find and detect prey.