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Diving and foraging behavior of blue whales tracked with intermediate-duration Advanced Dive Behavior Tags off Southern California

[Ladd Irvine](#) [Bruce Mate](#) [Daniel Palacios](#)

We deployed four Advanced Dive Behavior tags on blue whales near Pt. Mugu, California, in August 2014. The tags recorded data at 1 Hz from 3-axis accelerometers, magnetometers, and a pressure sensor (depth), while also recording FastLoc GPS locations. Tag attachment duration ranged from 18.3-20.0 d, recording 1068-2918 dives and 185-2539 GPS locations while attached. Whales foraged near the tagging area for up to seven days before dispersing as far as Ensenada, Mexico, and Cape Mendocino, California. Foraging lunges were detected as peaks in the Minimum Specific Acceleration and Jerk during dives, and foraging effort was summarized by identifying sequences of dives (foraging clusters) with no more than three consecutive non-foraging dives. The median foraging cluster contained 10 dives over 1.6 h bouts (min = 3 dives over 0.4 h; max = 68 dives over 12.3 h). Variability between foraging clusters in terms of median dive depth, duration, and number of lunges per dive likely reflects local prey availability. The number and duration of foraging clusters decreased substantially during more linear travel segments after departure from the tagging area. The area covered by lunge clusters was calculated for two tracks with high numbers of GPS locations (2297 and 2539 locations) to compare the spatial scales of foraging effort. Foraging clusters were generally small (median = 1.2 and 1.5 km², respectively) and temporally distinct (median = 1.8 h and 2.2 h apart, respectively) for both whales. The two whales were in close proximity (< 1 km) to each other nine times, but did not always forage at the same depth. The data from these tags represent the first time rorqual foraging effort has been measured continuously for periods of up to 20 d, and are providing new insights into the dynamics of blue whale foraging.

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