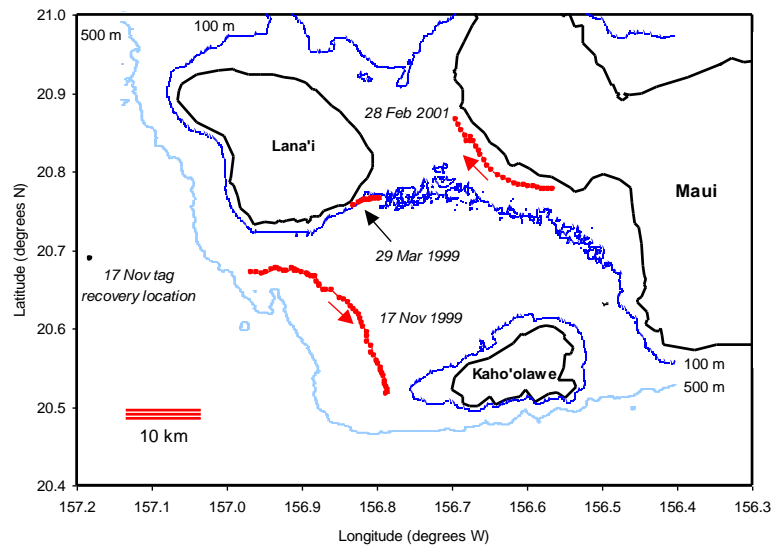


DIVING BEHAVIOR OF FALSE KILLER WHALES OFF MAUI AND LANA'I, HAWAII

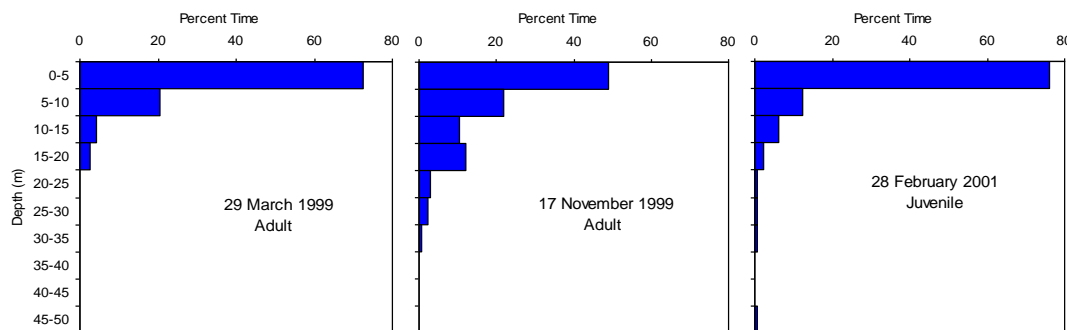
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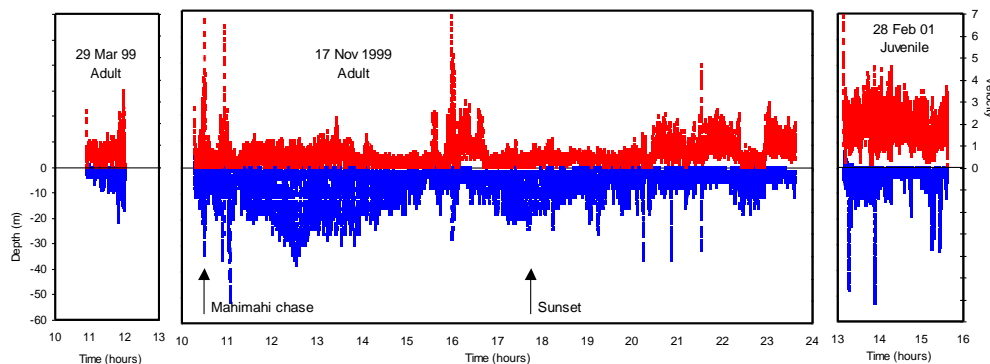
Routes of tagged false killer whales through the study area.



All individuals spent the majority of their time in the top 5 m of the water column.



Depth (bottom) and velocity (top) data for all individuals. There were only two clear peaks in velocity that occurred while we were following Whale 2, and one of these was associated with the whale chasing a mahimahi. A period of relatively low and constant velocity and dive depths to between 20 and 30 m while this whale was being followed (after 1220 hrs, see Figure) was associated with directional travel behavior.



CAN DIVING BE INFERRED FROM DIET? Cetacean dive depths are sometimes inferred from knowledge of the habits of their prey. For false killer whales an early published report suggested they might dive to 500 m, based upon general feeding habits. However, dive depths have not previously been documented for this species. In Hawaiian waters, this species has been observed feeding on fish such as mahimahi and yellowfin tuna, which spend most of their time in surface waters. We hypothesize that such observations are biased towards surface-oriented prey, and false killer whales are also likely feeding at depth.

STUDYING DIVING WITH SUCTION-CUP ATTACHED TIME-DEPTH RECORDER/VHF RADIO TAGS: During 1999 and 2001, we deployed three suction-cup attached time-depth recorder/VHF radio tags on this species around Maui and Lana'i, Hawaii, obtaining just over 16 hours of depth/velocity data. The tags we used are the same as those used to study the diving behavior of several other species of cetaceans (Hooker and Baird 1999; Baird *et al.* 2000, 2001), and contained a Wildlife Computers Mk6 TDR and a VHF transmitter. Tags were attached to the end of a 3 m pole and were deployed from a 6 or 7.5 m rigid-hull inflatable while the false killer whales were swimming underneath or around the boat. Once tagged, the whales were followed, and we recorded location (using a GPS in our boat when near the tagged whales) and behavior at 5-minute intervals.

SHALLOW DIVES IN DEEP WATER: Reactions to tagging consisted of a tail flick/slap and fast dive for all three individuals. Tagged whales engaged in travel, social/play activity, foraging and feeding during the periods when they were followed. Tagged whales were found in waters ranging from 46 to 450 m deep; for most of the time they were followed they were not depth limited. Dives were relatively shallow (maximum 22, 52 and 53 m, average from 8 - 12 m). Regressions of dive depth versus duration for all whales were positive, however the r-squared values were relatively low (0.07 – 0.55), suggesting that dive shape is highly variable (and dive duration cannot be used as a predictor of dive depth). A comparison of day and night dive parameters (depth, duration, velocity) for one whale showed some differences, however dive parameters suggested foraging both during the day and at night. A comparison of dive parameters (depth and duration) for dives deeper than 4 m for Whale 2 between the day and night showed that dives during the day were both longer (mean = 1.08 min, SD= 0.92, *n* = 281) and deeper (mean = 13.97 m, SD = 7.95) than those during the night (duration: mean = 0.63 min, SD = 0.57; depth: mean = 9.45 m, SD = 4.7; *n* = 281). Velocity readings at night (mean = 0.60, SD = 0.44) were on average slightly higher than those during the day (mean = 0.46, SD = 0.46).

DIVING BEHAVIOR IS DRIVEN BY ECOLOGY: In general, the dive depths of the three false killer whales were shallow relative to depths documented for several smaller species of odontocetes, suggesting that diving behavior is likely driven more by ecology than body size. Given the relatively shallow depth profile of the whales, it appears that surface-based observations of predation may be relatively unbiased for this species in near-shore Hawaiian waters.

Dive summary statistics. Results using two dive definitions are shown.

Whale	# of dives	Dives > 4 m		Dives > 5 m	
		Depth - m Mean (SD)	Duration - min Mean (SD) Range	Depth - m Mean (SD)	Duration - min Mean (SD) Range
1	27	8.26 (4.69)	1.35 (0.57) 0.38-2.43	18	10.4 (4.4) 1.53 (0.44) 0.93-2.43
2	960	8.51 (6.5)	0.57 (0.69) 0.1-3.98	562	11.7 (6.9) 0.85 (0.8) 0.1-3.98
3	73	11.7 (8.6)	0.79 (0.51) 0.13-2.98	67	12.3 (8.8) 0.83 (0.52) 0.13-2.98