

HABITAT PREFERENCES OF MELON-HEADED WHALES (*Peponocephala electra*) AROUND THE MAIN HAWAIIAN ISLANDS: IMPLICATIONS FOR INTERPRETATION OF THE 2004 HANAIEI BAY STRANDING EVENT

Allan D. Ligon¹, Robin W. Baird², Daniel L. Webster¹, Daniel J. McSweeney¹, Gregory S. Schorr²

¹Wild Whale Research Foundation, Holualoa, HI USA (aligon@aol.com);

²Cascadia Research Collective, Olympia, WA USA (rwbaired@cascadiaresearch.org)

Presented at the 17th Biennial Conference on the Biology of Marine Mammals, Cape Town, South Africa, 2007.

Why this is interesting –

- On July 3, 2004, a group of 150-200 melon-headed whales entered the shallow water (<15m) of Hanalei Bay, Kaua'i, Hawai'i and remained there for 28 hours until herded out with human assistance.
- This event coincided with the Rim-of-the-Pacific (RIMPAC) joint-Navy exercises involving midrange active sonar, cited in a NOAA report as a "plausible, if not likely, contributing factor" (Southall et al. 2006).
- Some (Fromm et al. 2006; Mobley et al. 2007) question NOAA's conclusion based partially on an anecdotal shallow water sighting of melon-headed whales in the Northern Marianas Islands during the same period (Jefferson et al. 2006).
- Melon-headed whales are found in tropical waters world-wide, however they are rarely observed and little is known about their distribution and habitat preferences.

What we did –

Between 2000 and 2006, we studied odontocete populations around the main Hawaiian Islands using research vessels ranging in size from 5.8 to 18m to obtain identification photos, tissue samples, and dive behavior data.

Surveys were conducted on 369 vessel-days covering 38,434 km of trackline with over 2,515 hours on-effort distributed among all four "island areas."

Sightings, Depths & Distance from Shore –

We had 851 odontocete sightings, 23 of which (2.7%) were melon-headed whales (tied with Blainville's beaked whales as the 8th most frequently encountered species). Melon-headed whale sightings occurred once off Kaua'i, once off O'ahu, and 21 times off the leeward coast of Hawai'i island.

The depths of melon-headed whale encounters ranged from 148 - 4,779 m (median = 1,610 m); distance-from-shore values ranged from 3.0 - 41.2 km (median = 9.8 km).

Melon-headed whales are found most frequently in deeper, offshore waters (>2,000 m) –

While over 55.7% of effort (1,402 hours) was in waters <1,000 m, only 21.7% of sightings occurred in this range. At a finer resolution, 811 hours (32.2 %) were spent <200 m with only one melon-headed whale encounter (4.3%).

For distance-from-shore, 43.5% of sightings occurred between 5 – 10 km from shore; only 17.4% occurred in waters <5 km; and none less than 3 km.

Consequently, when normalized against per-unit-effort, sighting rates were 4.5 times higher in depths >1000 m and 3.1 times higher for sightings >20 km from shore, indicating that melon-headed whales show a clear preference for deeper, offshore waters around the Hawaiian islands.

Discussion –

Based on extensive survey effort, we conclude that melon-headed whales around the main Hawaiian Islands show a clear and strong preference for deep, offshore waters, and that the 2004 Hanalei Bay embayment should be considered a highly abnormal, out-of-habitat event.

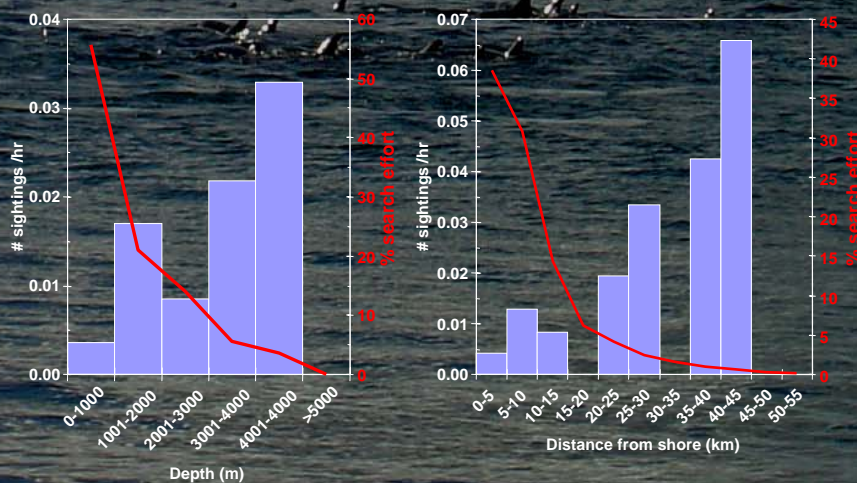
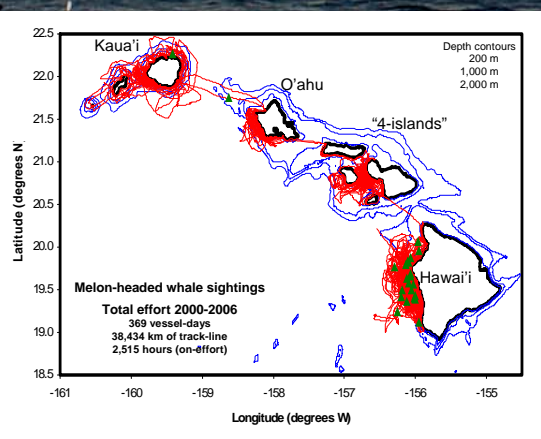
Regarding the near-shore report of melon-headed whales off Rota in the Marianas Islands (Jefferson et al., 2006), we would like to point out that:

- behavioral and habitat preferences often vary between populations
- virtually no substantial surveys have been conducted around the Marianas to determine habitat preferences, therefore it is possible that near-shore occurrences of melon-headed whales off Rota could be common
- behavioral descriptions of the Hanalei embayment and Rota sighting are quite different:

Hanalei: whales very tightly grouped in extremely shallow water (<10m) for 28 hours until departing via human intervention

Rota: widely spread group with close-to-shore, multi-species (*S.b.*) encounter occurring in depth range from 77 to >1000 m.

Therefore, we believe that the Hanalei embayment and the near-shore observation of melon-headed whales off Rota are completely unrelated.



References

- Fromm, D. M., Mobley, J. R. Jr., Martin, S. W., Nachtigal, P. E., Analysis of melon-headed whale aggregation in Hanalei Bay, July 2004 (A), Abstract submitted to J. Acoust. Soc. Am., Vol. 120, No. 5, Pt. 2, November 2006.
- Huggins, J., Baird R. W., Webster, D. L., McSweeney, D. J., Schorr, G. S. and Ligon, A. D., Inter-island movements and resightings of melon-headed whales within the Hawaiian archipelago. Abstract submitted to the 16th Biennial Conference on the Biology of Marine Mammals, San Diego, CA, December 12-16, 2005.
- Jefferson, T. A., Fertl, D., Michael, M., Fagin, T. D., An unusual encounter with a mixed school of melon-headed whales (*Peponocephala electra*) and rough-toothed dolphins (*Steno bredanensis*) at Rota, Northern Mariana Islands, Micronesia 38(2):239-244, 2006.
- Mobley, J. Jr., Lunar influences as possible cause for simultaneous aggregations of melon-headed whales in Hanalei Bay, Kauai and Sasanhaya Bay, Rota. Abstract submitted to 17th Biennial Conference on the Biology of Marine Mammals, Cape Town, SA, 2007.
- Southall, B. L., Braun R., Gulland, F., Heard, A. D., Baird R.W., Wilkin, S. M., Rowles, T. K., Hawaiian Melon-headed Whale (*Peponocephala electra*) Mass Stranding Event of July 3-4, 2004. NOAA Technical Memorandum NMFS-OPR-31, April 2006.

Acknowledgments

Funding was primarily from the Southwest Fisheries Science Center of NOAA Fisheries and the U.S. Navy, facilitated by Jay Barlow. Additional funding came from the Wild Whale Research Foundation, the Pacific Islands Fisheries Science Center, the M.R. and Evelyn Hudson Foundation, and Dolphin-Quest. Jeremy Davies produced depth values for sightings and effort. A number of individuals assisted in the field, including Annie Gorgone, Alice Mackay, La Ren Antoine, Annie Douglas and Mark Deakos. This research was undertaken under NMFS Scientific Research Permits 731-1509 (issued to R.W. Baird) and 774-1437 (issued to the S.W. Fisheries Science Center).

Background photo by Brenda Zaun (USFWS) taken during 3 Jul. 2004 melon-headed whale stranding at Hanalei Bay, Kaua'i.

For more information on our Hawai'i odontocete research visit: www.cascadiaresearch.org/robin/hawaii.htm