MARINE MAMMAL SCIENCE, 7(3):306–310 (July 1991)

MOVEMENT OF HUMPBACK WHALES BETWEEN CALIFORNIA AND COSTA RICA

We report on the migration of two humpback whales (*Megaptera novaeangliae*) between central California and Costa Rica. Although humpback whale movements in the North Pacific have been examined previously using discovery

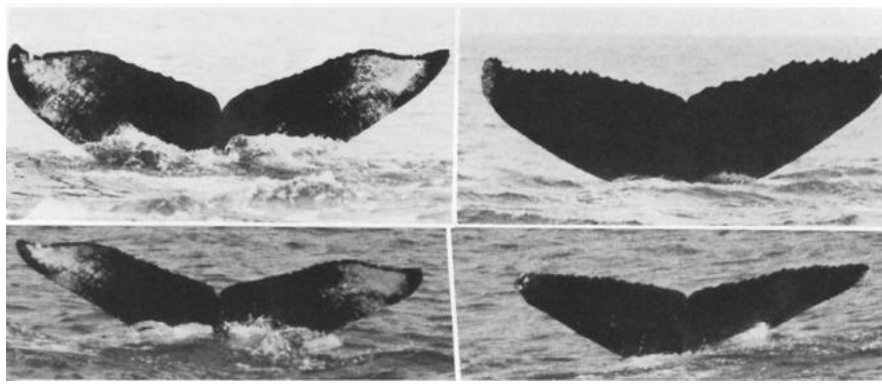

Figure 1. Flukes of humpback whales photographed off California (top) and off Costa Rica (bottom). The photographs of the dark-fluked whale were matched using the ridging along the trailing edge of the fluke. Photographs were taken by G. H. Steiger and D. W. Bockus (California) and R. Sears (Costa Rica).

tags (Ivashin and Rovnin 1967, Ohsumi and Masaki 1975) and, more recently, through individual photographic identification (Darling and Jurasz 1983, Darling and McSweeney 1985, Baker *et al.* 1986, Urbán *et al.* 1987, Calambokidis *et al.* 1989), this is the first documentation of movements of humpback whales between California and Central America.

Humpback whales were identified using photographs of the ventral side of the flukes (Fig. 1); photographic identification has been used extensively with this species since the 1970s (Katona *et al.* 1979). Two whales were photographed on 16 February 1988 at 08°40'N, 83°54'W, near Isla Caños, Costa Rica, during a search off Central America that covered the coastal waters (out to 35 km offshore) from Panama City, Panama (08°55'N, 79°34'W), around Peninsula de Azuero (07°10'N, 80°30'W), to Quepos, Costa Rica (09°26'N, 84°10'W) between 7–21 February 1988. They were the only humpback whales photographed on the trip. The photographs of the two whales were compared to a collection of 225 individual humpback whales identified in the Gulf of the Farallones, off central California (38°N, 123°W), from July to November of 1986 to 1988 (Calambokidis *et al.* 1989).

Both whales photographed off Costa Rica had been seen previously in the Gulf of the Farallones, California during 1986 (Fig. 1, Table 1). One whale had also been seen in the Gulf of the Farallones in 1987, 5.5 mo before it was observed off Costa Rica; the other individual was seen again in the Gulf of the Farallones in 1988, 7 mo after it was photographed off Costa Rica (Table 1). The minimum one-way distance that these whales traveled between the two locations was 5,200 km.

Humpback whales have been reported to winter and breed in three regions in the North Pacific: (1) in Mexican waters along the southern coast of Baja California, in the northern Gulf of California, off mainland Mexico including Isla Isabel and Islas Tres Marias, and in around the Revillagigedo Archipelago (Rice 1974, Urbán and Aguayo 1987); (2) off the main Hawaiian Islands from

Table 1. Dates and locations of sightings of two humpback whales off California (Gulf of the Farallones) and Costa Rica (Isla Caños).

Dates seen	Region
ID 10022	
15 Sept 1986	California
16 Feb 1988	Costa Rica
21 Sept–6 Oct 1988	California
ID 10087	
6 Sept 1986	California
19 Aug–30 Aug 1987	California
16 Feb 1988	Costa Rica

Kauai to Hawaii (Baker and Herman 1981); and (3) off Asia near the Mariana, Bonin, and Ryukyu Islands, and off Taiwan (Townsend 1935, Nishiwaki 1959, Johnson and Wolman 1984).

Although the Pacific coast of Central America is not considered a major wintering area for humpback whales, this species has been reported previously off the west coast of Panama. Townsend (1935) noted humpback whales taken off Panama on six days from March to May during nineteenth century whaling. Most of the humpback whales in this region, however, were taken from July through September (Townsend 1935) and were presumably from a southern hemisphere population. This region may represent an area of overlap for northern and southern hemisphere populations.

Humpback whales summering along the coast of California migrate to breeding areas off Mexico (Baker *et al.* 1986, Urbán *et al.* 1987, Calambokidis *et al.* 1989), although movements of a few whales to Hawaii has also been found (Baker *et al.* 1986, Calambokidis *et al.* 1989). Despite the small sample, the successful matching of both photographs to the central California collection may indicate a larger number of humpback whales moving between this region and Central American waters.

Note added in proof—Since the acceptance of this manuscript, an additional match between Costa Rica and California was made by Sally Mizroch, coordinator of the joint North Pacific humpback whale photo-identification collection at the National Marine Mammal Laboratory. The match found was between one of two whales photographed by Carol Henderson (submitted by John Tresmer) near Isla Caños, Costa Rica on 29 January 1990 and a whale photographed by Prentice Bloedel on 26 July 1988 at 35°06.6'N, 120°47.9'W, near San Luis, California. With this additional finding, three of the four whales identified from Costa Rica have been matched to whales feeding in California. Though the sample size remains small, this supports a close affiliation between the most southern wintering area and one of the most southern feeding areas for humpback whales in the North Pacific.

Acknowledgments

Research in California was funded by the Gulf of the Farallones National Marine Sanctuary; Nancy Stone and Miles Croom of the sanctuary and Gary Fellers of the National Park Service provided project support. We thank all those who worked on the California study: L. Barry, S. Bartok, L. Bloedel, P. Bloedel, D. Bockus, D. Claridge, G. Falxa, T. Ford, S. Goldman, H. Rodingier, J. Smith, and N. Wadsworth. T. Kieckhefer provided data from his work in the area. Help with photographic developing, matching, and data compilation was provided by K. Balcomb-Bartok, N. Haenel, J. Horn, J. McGowan, E. McManus and D. Smith. Bodega Marine Laboratories and *Achilles Inflatable Craft* assisted in logistics of the California research. Flip Nicklin and the National Geographic Society funded and organized the cruise off Central America. Martine Berubé and Joseph Evenson helped with manuscript preparation. Steven K. Katona and Brendan P. Kelly reviewed the manuscript. We thank these people and organizations.

Literature Cited

Baker, C. S., and L. M. Herman. 1981. Migration and local movement of humpback whales (*Megaptera novaeangliae*) through Hawaiian waters. Canadian Journal of Zoology 59:460–469.

Baker, C. S., L. M. Herman, A. Perry, W. S. Lawton, J. M. Straley, A. A. Wolman, G. D. Kaufman, H. E. Winn, J. D. Hall, J. M. Reinke and J. Ostman. 1986. Migratory movement and population structure of humpback whales (*Megaptera novaeangliae*) in the central and eastern North Pacific. Marine Ecology Progress Series 31:105–119.

Calambokidis, J., G. H. Steiger, J. C. Cubbage, K. C. Balcomb and P. Bloedel. 1989. Biology of humpback whales in the Gulf of the Farallones. Report to the Gulf of the Farallones National Marine Sanctuary, NOAA, San Francisco, CA 94123. 93 pp.

Darling, J. D., and C. M. Jurasz. 1983. Migratory destinations of North Pacific humpback whales (*Megaptera novaeangliae*). Pages 359–368 *in* R. Payne, ed. Communication and behavior of whales. Westview Press, Boulder, CO.

Darling, J. D., and D. J. McSweeney. 1985. Observations on the migrations of North Pacific humpback whales (*Megaptera novaeangliae*). Canadian Journal of Zoology 63:308–314.

Ivashin, M. V., and A. A. Rovnin. 1967. Some results of Soviet whale marking in the waters of the North Pacific. Norsk Hvalfangst-Tidende 56:123–135.

Johnson, J. H., and A. A. Wolman. 1984. The humpback whale, *Megaptera novaeangliae*. Marine Fisheries Review 46:30–37.

Katona, S. K., J. A. Baxter, O. Brazier, S. Kraus, J. Perkins and H. Whitehead. 1979. Identification of humpback whales by fluke photographs. Pages 33–44 *in* H. E. Winn and B. L. Olla, eds. Behaviour of marine animals. Plenum Press, New York.

Nishiwaki, M. 1959. Humpback whales in the Ryukyuan waters. Scientific Reports of the Whales Research Institute, Tokyo 14:49–87.

Ohsumi, S., and Y. Masaki. 1975. Japanese whale marking in the North Pacific, 1963–1972. Bulletin of the Far Seas Fisheries Research Laboratory (Shimizu) 12: 171–219.

Rice, D. W. 1974. Whales and whale research in the eastern North Pacific. Pages 170–195 *in* W. E. Schevill, ed. The whale problem. Harvard University Press, Cambridge.

Townsend, C. H. 1935. The distribution of certain whales as shown by logbook records of American whaleships. Zoologica 19:1–50.

Urbán J., and A. Aguayo L. 1987. Spatial distribution of the humpback whale, *Megaptera novaeangliae,* in the Mexican Pacific. Marine Mammal Science 3:333–344.

URBÁN J., K. C. BALCOMB, C. ALVAREZ, P. BLOEDEL, J. CUBBAGE, J. CALAMBOKIDIS, G. STEIGER AND A. AGUAYO. 1987. Photoidentification matches of humpback whales (*Megaptera novaeangliae*) between Mexico and central California. Page 72 *in* Abstracts of the Seventh Biennial Conference on the Biology of Marine Mammals, Miami, FL.

GRETCHEN H. STEIGER AND JOHN CALAMBOKIDIS, Cascadia Research Collective, Waterstreet Building, 218½ West 4th Ave., Olympia, Washington 98501 USA; RICHARD SEARS, Mingan Island Cetacean Study, 285 Green St., St-Lambert, Quebec, Canada J4P 1T3; KENNETH C. BALCOMB, Center for Whale Research, 1359 Smugglers Cove Road, Friday Harbor, Washington 98250; JAMES C. CUBBAGE, Cascadia Research Collective. Received April 20, 1990. Accepted November 9, 1990.