

MARINE MAMMAL SCIENCE, 12(2):281–287 (April 1996)  
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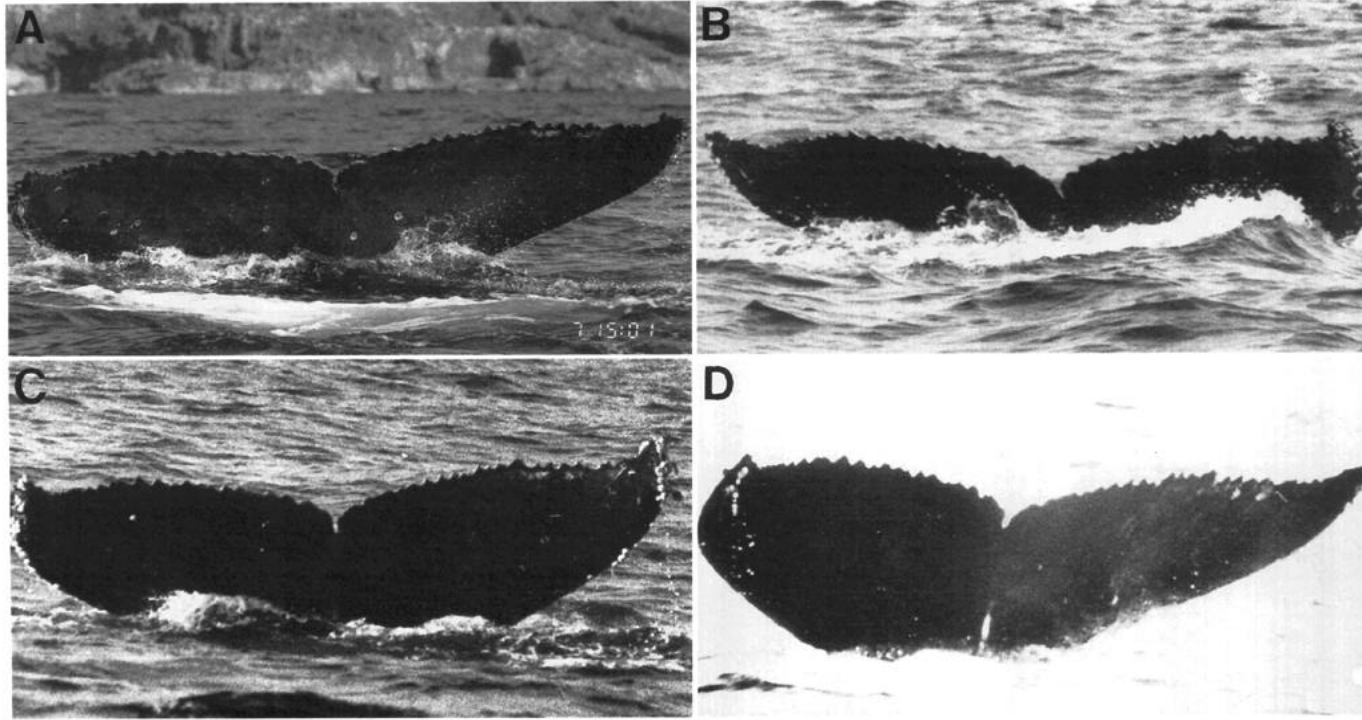
MOVEMENT OF A HUMPBACK WHALE  
(*MEGAPTERA NOVAEANGLIAE*) FROM JAPAN TO  
BRITISH COLUMBIA AND RETURN

We report the first records of a humpback whale (*Megaptera novaeangliae*) observed off both Japan and British Columbia. This whale was photographically identified off Japan in April 1990 and March 1991, off British Columbia in August 1991, and again off Japan in March 1993, as shown in Figure 1. The Japanese sightings were all in the winter assembly area off the Ogasawara Archipelago (Nishiwaki 1959, Rice 1978, Darling and Mori 1993), and the British Columbia sighting was in a summer feeding area off Vancouver Island (Darling and McSweeney 1985). The “great circle” distance between these sightings is 7,900 km.

The sighting records are given in Table 1. The first two Japanese sightings were within a few days of each other in April 1990 when the whale was identified off Chichijima, Ogasawara (~27°5'N, 142°10'E) as a cow with calf, and later as one of a cow, calf, and escort group. The following year, in March 1991, it was sighted in the same region, accompanied by another whale (relative size unknown). During August 1991, five months after the Japanese sighting of that year, the same whale was identified on La Perouse Bank off Vancouver Island, B.C. (48°32'N, 125°34'W), slowly travelling with another whale (relative size unknown). The most recent record in March 1993 was back in Japan, off Hahajima, Ogasawara, 40 km south of the earlier sightings (grouping unknown). The locations of the Japan and B.C. sightings are given in Figure 2.<sup>1</sup>

The identification of individual whales by photographs of the black-and-white markings on the underside of the flukes, and the comparison of these identifications to determine movements between regions, is well established (*e.g.*, Katona *et al.* 1979, Darling and Jurasz 1983, Baker *et al.* 1986, Calambokidis

<sup>1</sup> This whale was identified again off the North American coast on 22 July 1995 (at 48°22.3'W, 125°30.4'N) by JC, approximately 50 km west of Cape Flattery and in the same region as the August 1991 sighting. Two return trips between Japan and British Columbia are now documented for this whale. (note added in proof)



*Figure 1.* Identification photographs of the same humpback whale taken in: (A) Japan, 7 April 1990; (B) Japan, 25 March 1991; (C) British Columbia, 23 August 1991; (D) Japan, 22 March 1993. Photographs were taken by K. Mori, H. Suganuma, P. Bloedel, and A. Mochizuki.

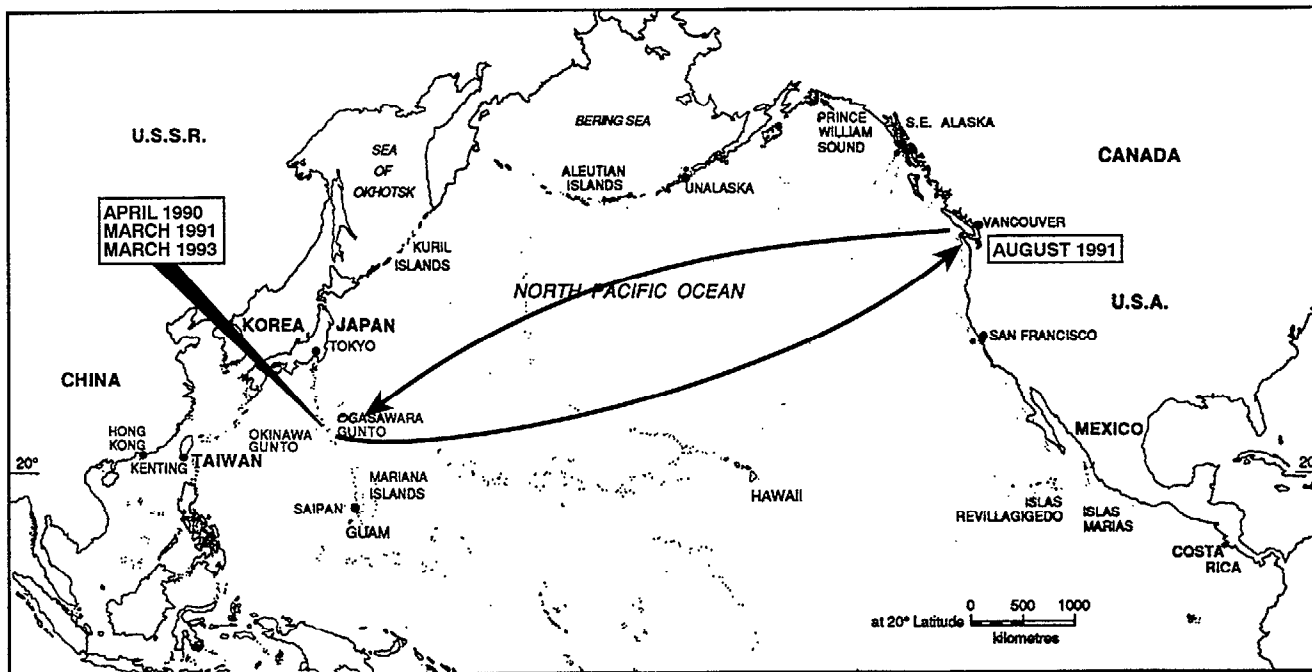


Figure 2. The locations in Japan and British Columbia where the whale was identified. The lines do not indicate the routes between areas; they only connect the sightings.

*Table 1.* Sighting records of matched whale. Catalogs: DAR—Darling (1991), OMC—Ogasawara Marine Center, BAL—K. Balcomb. Groups: CC—cow/calf, CCE—cow/calf/escort, PR—pair, UK—no information.

Region	Location	Date	Group	Catalog & No.		Photo
Japan	Ogasawara	7 Apr 90	CC	DAR	O-112	KM
Japan	Ogasawara	11 Apr 90	CCE	DAR	O-112	KM
Japan	Ogasawara	25 Mar 91	PR	OMC	O-112	HS
B.C.	Van. Is.	23 Aug 91	PR	BAL	14207	PB
Japan	Ogasawara	22 Mar 93	UK	OMC	O-112	AM

*et al.* 1990). The initial match between Japan and B.C. resulted from the manual comparison of identification photographs of 686 whales from the North American coast and 177 from Japan. This effort was part of a larger comparison of whales identified off California, Oregon, Washington, and British Columbia with photograph catalogs of humpback whales from other areas in the North Pacific undertaken by Cascadia Research. The photographs from the west coast of North America were taken between 1975 and 1992 by a number of research groups (Cascadia Research, Center for Whale Research, West Coast Whale Research) and the identifications from Japan were taken from 1987 to 1990 (Darling 1991). Later, the matched whale was compared to the updated Japanese photoidentification collection held by the Ogasawara Marine Center, and the 1991 and 1993 sightings were added. This whale had a primarily black tail with a few white markings, and although less distinctive than whales with bold black-and-white patterns, the match is no less exact. The pattern of serrations in the trailing edge of the fluke help confirm the match (Fig. 1).

North Pacific humpback whales assemble each winter in three primary mating and calving areas: (1) in the eastern North Pacific along the west coast of Baja California and mainland Mexico, and near the offshore Revillagigedo Islands; (2) in the central North Pacific around the main Hawaiian Islands; and 3) in the western North Pacific near the Ogasawara, Ryukyu, and Mariana Islands (Nishiwaki 1959, Rice 1978). In the summer these whales migrate to somewhat discrete feeding grounds, ranging along the Pacific rim from northern California to northern Japan (Darling and Jurasz 1983, Darling and McSweeney 1985, Baker *et al.* 1986, Perry *et al.* 1988, Calambokidis *et al.* 1990, Calambokidis *et al.* 1993; Calambokidis *et al.*, this issue). Migratory connections between specific winter and summer areas have been determined through the use of "Discovery Tags" (Nishiwaki 1966), and more recently with photoidentification matches. The predominant migration patterns appear to be between: the Mexican assembly area and the California—Oregon—Washington region (Urban *et al.* 1987, Calambokidis *et al.* 1990); the Hawaiian assembly area and the Southeast Alaska—Prince William Sound—British Columbia region (Darling and Jurasz 1983, Darling and McSweeney 1985, Baker *et al.* 1986, Perry *et al.* 1988); and the Japanese assembly area and the Aleutian Island—Bering Sea region (Nishiwaki 1966, Ohsumi and Masaki 1975). Evidence for the latter connection consists only of eight whales marked by Discovery Tags in the 1950s.

This match between the Japanese winter assembly area and a southern British Columbia feeding ground may be an "exception" to a more predominant migratory pattern for Japanese humpbacks. Other examples of such apparent "exceptions" include whales identified in Alaska and found in Mexico, and whales from California found in Hawaii (Baker *et al.* 1986, Calambokidis *et al.* 1993). However, the fact that this whale moved directly (in five months) from Japan to B.C., then returned (with possibly one intervening year) to Japan (twice; *added in proof*), suggests this movement may be more than a random occurrence. Considering the early stage of our understanding of humpback migrations, the possibility that this connection is evidence of a more complex pattern can not be ruled out. The east-west migration of this whale draws attention to the northeast-southwest component to some migratory connections in the North Pacific noted by Darling and Jurasz (1983).

The distance that this whale travelled is notable. Stone *et al.* (1990) report a distance record of a humpback that travelled at least 8,334 km from the Antarctic Peninsula to Colombia within five months from 19 April 1986 to 28 August 1986. The Japan-B.C. whale travelled at least 7,900 km in about the same time period. These distances indicate that the potential exists for individual humpback whales to travel throughout entire ocean basins over relatively short periods of time.

The matched whale was identified with a calf and hence is presumed to be a female (Darling 1983, Glockner and Venus 1983). Records of humpbacks that travelled to different winter grounds in different years indicate that the migration patterns of at least some males can be highly variable from year to year (Darling and McSweeney 1985, Darling and Cerchio 1993). Recently, the documentation of a female humpback that moved between California and Hawaii (Calambokidis *et al.* 1993), another that moved from Costa Rica to California (Steiger *et al.* 1991), and this report indicate that some females may break from the predominant migration patterns and also have a "wandering" component in their movements around the North Pacific.

The fidelity of individual humpbacks to particular regions, aggregations, and migration routes may be the general rule (Darling 1983, Glockner and Venus 1983, Darling and McSweeney 1985, Baker *et al.* 1986, Urban and Aguayo 1987, Perry *et al.* 1988, Calambokidis *et al.* 1990, Calambokidis *et al.* 1993), and this notion seems to be supported by early genetic analyses of some populations (Baker *et al.* 1993). However, mounting evidence from photoidentification matches (Darling and Jurasz 1983, Darling and McSweeney 1985, Baker *et al.* 1986, Perry *et al.* 1988, Darling and Cerchio 1993), and analysis of songs (Winn *et al.* 1981; Payne and Guinee 1983; Cerchio 1993; X. Guan, personal communication, 1993; S. Cerchio, personal communication, 1994) indicates that mixing occurs between seasonally isolated populations throughout the North Pacific. For example, humpbacks identified on the same feeding grounds off Vancouver Island have now been found in Hawaiian, Mexican, and Japanese breeding grounds (Darling and McSweeney 1985; Calambokidis, personal communication; this report). Such mixing may be a significant aspect of humpback population dynamics and gene flow.

## ACKNOWLEDGMENTS

We gratefully acknowledge the individuals and organizations who supported and assisted humpback studies in Japan and British Columbia, including the Ogasawara Village government, Ogasawara Whale Watching Association, Ogasawara Marine Center volunteer staff, Mr. Akihito Koga and Ogasawara Diving Center staff, Ogasawara High School, Ogasawara Subtropical Branch of Tokyo Metropolitan Agricultural Experiment Station, Akio Machida, and Mr. Shigeki Komori and other staff of World Wide Fund for Nature Japan. A special thanks goes to Gretchen Steiger and Tammy Steeves for their assistance with the manuscript. The work in Japan and British Columbia was funded by WWF-Japan, Ogasawara Marine Center, West Coast Whale Research Foundation, and Earthwatch. The NMFS Southwest Fisheries Center (J. Barlow, contract officer) supported the Cascadia Research matching effort.

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