

Migratory destination of a humpback whale satellite-tagged in the Cook Islands

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ABSTRACT

We report here on the first successful satellite-monitored tracking of a humpback whale from Breeding Stock F, in the Cook Islands. A mature female humpback accompanied by a first-year calf was tagged on 10th September 2006, off Rarotonga. The tag initially transmitted for 15 days, during which the whale remained in the vicinity of Rarotonga. The tag fell silent for three months, then resumed transmissions on 24th December, at which point the whale was approximately 1620 nm (3000 km) south of French Polynesia and heading towards the Antarctic. The tag continued to transmit for another 31 days, during which the whale migrated steadily southeast, covering an average of 50 nm per day. The last position was recorded on 23rd January 2007 at 65E 06 S, 126E 57.1 W, approximately 500 nautical miles north of West Antarctica and the Amundsen Sea, and some 7 degrees of longitude west of the eastern boundary of Area VI. This is the first confirmation of the migratory destination for a whale from Breeding Stock F, and implies that at least some humpbacks wintering in the Cook Islands feed in the waters of Area VI. However, given that the whale's last recorded location was only about 280 nm from the Area VI/Area I boundary, some interchange between these two management areas appears likely. The whale appeared to still be migrating at the time the last transmission was received, suggesting that she had not yet reached her summer feeding ground.

INTRODUCTION

The migratory destination of humpback whales (*Megaptera novaeangliae*) from IWC Breeding Stock F has never been clear. The putative range of this stock extends roughly from waters east of Tonga to French Polynesia and perhaps beyond. There have been no Discovery tag returns from this region of the tropics, but this reflects the fact that only two humpback whales were ever marked there. Furthermore, although there have been a number of photographic matches of identified individual humpbacks from Breeding Stock F (SC/59/SH14), these have all been among tropical wintering areas (either within F or to Stock E) rather than with any feeding ground. Given that whales from other Southern Hemisphere breeding areas migrate to summering grounds that are generally to the south, it has been assumed that most Stock F whales feed in the waters of Antarctic Management Area VI (encompassing longitude 120E-170E W). Here, we provide the first direct link between Breeding Stock F and Antarctic Area VI through the satellite-monitored track of a female humpback whale tagged in the Cook Islands.

METHODS

On 10th September 2006, at 21°16.057 S, 159°48.195 W, off the island of Rarotonga in the Southern Cook Islands, we attached an Argos satellite-monitored tag to a mature female humpback whale accompanied by a first-year calf. The tag, PTT number 22854, was an implantable transmitter model SPOT 4 manufactured by Wildlife Computers (Redmond, Washington, USA). They were the same used in a study with North Pacific right whales (Wade *et al.* 2006), except that the anchoring system was shorter. The transmitter was duty cycled to transmit every third day with a daily maximum of 300 transmissions during the period between 02:00 and 14:00 GMT. The transmitter was implanted into the left flank of the whale just ahead of the dorsal fin; the attachment was accomplished by hand with an 8-meter pole deployed from a 7-meter motor boat, using the technique described by Heide-Jørgensen *et al.* (2006) and Zerbini *et al.* (2006).

In plotting the subsequent track of the tagged whale, we used all Argos locations qualities (3, 2, 1, 0, A and B, in order of accuracy, Argos (1990)) when looking at fine scale movements in the wintering grounds. When looking at movements in the migratory routes and putative feeding destinations, average daily positions were computed from all location qualities (e.g. Zerbini *et al.*, 2006). However, in instances when only one poor quality location was available in a given day for two sequential days, the two locations were averaged.

RESULTS AND DISCUSSION

Tag #22854 initially transmitted for 15 days, during which time the whale remained around the island of Rarotonga; she circled the island several times at distances of up to 11 nautical miles from shore and on two occasions returned to the fringing reef area where she had been tagged. The tag then ceased transmission on 19th September 2006. The tag suddenly resumed transmissions on December 24th, at which point the whale was approximately 1620 nm due south of French Polynesia (Figure 1). The animal continued to migrate in an approximately southerly or southeasterly direction for the next month, covering an average of 50 nm per day. At the time of the last transmission on 23rd January 2007, the whale was located at 65E 06 S, 126E 57.1 W. This is approximately 500 nm north of West Antarctica, and less than 7 degrees of longitude west of the boundary between Area VI and I. The total point-to-point distance between the whale's original position at tagging off Rarotonga to its last transmission location was approximately 2940 nm.

The results reported here represent the first confirmation of migratory destination for a whale from Breeding Stock F, and they imply that at least some humpbacks wintering in the Cook Islands feed in the waters of Area VI. However, given that the final location of the whale was only about 280 nm from the western boundary of Area I, some interchange between Areas VI and I areas appears likely, and it is possible that wintering areas to the east of the Cook Islands (such as French Polynesia) host some whales that feed primarily in Area I.

That the whale continued to travel in a consistent direction and at a consistent speed suggests that she had not completed her migration, and therefore that her ultimate destination had not yet been reached. Comparison of her last location to humpback whale sightings from IDCR cruises, and to remotely sensed oceanographic data, would potentially be useful in establishing the likely feeding ground of this whale.

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Figure 1. Satellite-monitored track of a mature female humpback whale tagged off Rarotonga, Cook Islands, on 10th September 2006. The track between 10th September and 24th December (dotted line) is inferred.

