



The Azores Constitute a Migratory Stopover for Humpback Whales in the North Atlantic Ocean

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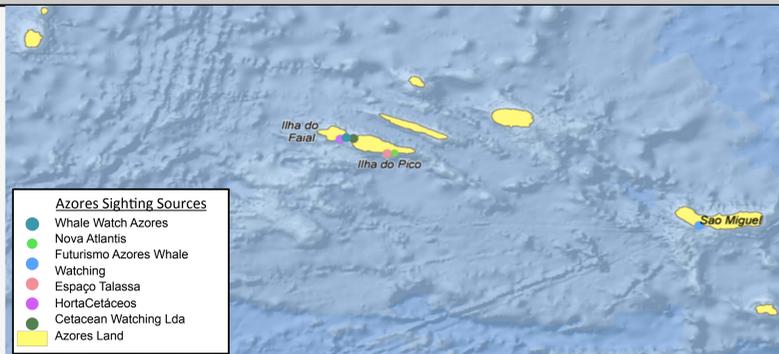
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Introduction

Humpback whale *Megaptera novaeangliae* migration in the North Atlantic is largely pelagic, however, work in various parts of the world has shown that humpbacks make brief stops for foraging during migration when prey are available. Bermuda is the only migratory stopover site that has been described in the North Atlantic to date. While humpback whales have long been known to occur in the Azores, their numbers have been few, providing little opportunity to investigate their movement patterns or habitat use. We examined records of individuals identified in the Azores by photographs of natural markings on the flukes to investigate patterns of movement. These results show that the Azores are used by humpback whales from the eastern North Atlantic as a migratory stopover, most likely associated with seasonal productivity and related foraging opportunities.

The Azores



Map credit: Lindsey Jones. Service layer: Esri, DeLorme, GEBCO, NOAA NGDC

The Azores are an archipelago of nine volcanic islands situated in the North Atlantic Ocean ~1,400km west of Portugal. Azorean waters experience a strong but variable spring peak in productivity, regularly attracting blue, fin and sei whales. At ~38° N it is substantially north of typical breeding and calving habitat for humpback whales, while being >2,000km from the nearest known major feeding area. As such, it seems likely that humpback whales in the area are passing through the area on migration.

Photo Identification

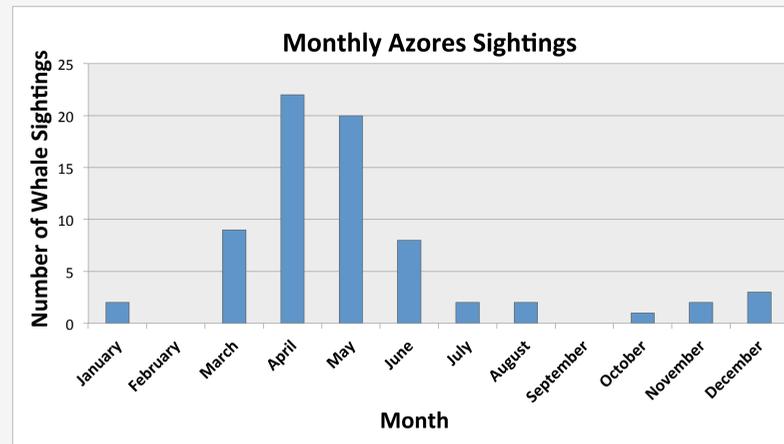
Whales were identified by photographs of the individually distinctive markings on the ventral fluke surface using standard procedures. Individual whales from the Azores were compared to those in the North Atlantic Humpback Whale Catalog (NAHWC) to identify re-sightings and investigate patterns of movement. The NAHWC is an international collaborative project that contains records of >8,000 individual whales identified by fluke photographs from all major habitats across the ocean basin.



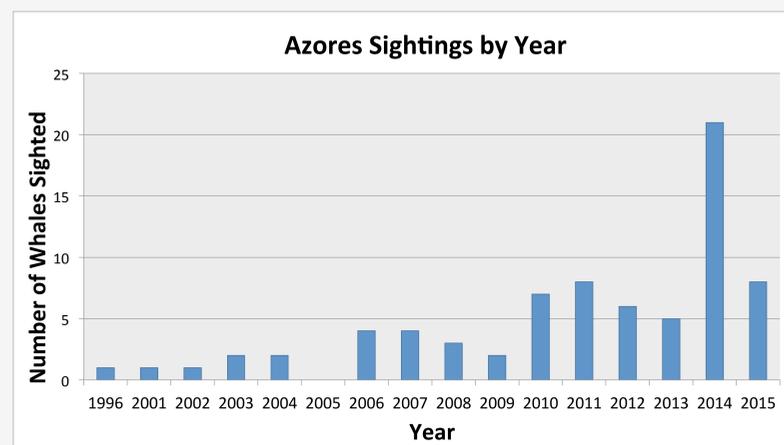
Photo credit:Espaço Talassa

Temporal Patterns

- Small numbers of humpback whales visit the Azores annually. 76 individual humpback whales were identified in the Azores between 1999 and 2015.



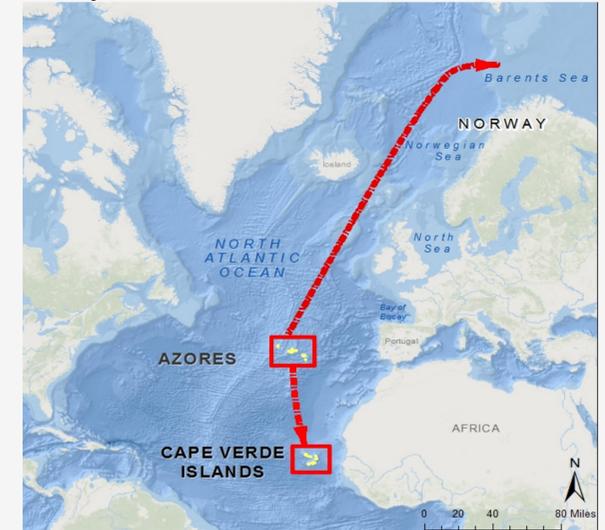
- Most sightings occurred between March and June, with the largest number identified in April. The low numbers between July and February correspond with the peak of productivity and foraging in Norwegian waters.
- There were only two months of the year during which no humpback whale sightings were recorded. Minimum numbers occurred between the summer and early winter, overlapping with the primary feeding period in the eastern North Atlantic.



- Many individuals had long periods without sightings. The maximum gap in sightings was 13 years.
- No more than four individuals were identified in a year prior to 2010. The number of humpback sightings observed in 2014 was three times greater than that seen in any other year, suggesting that extent and duration of use of the Azores by humpbacks is a function of the annually variable prey base.

Migratory Destinations

All of the observed movements to breeding and calving grounds were to the Cape Verde Islands (n= 8) and all movements to feeding grounds were to Norway (n=7). This suggests that the Azores are used occasionally as a migratory stopover between these two major eastern North Atlantic seasonal habitats.



Map credit: Lindsey Jones. Service layer: Esri, DeLorme, GEBCO, NOAA NGDC

Of those that were seen in both areas, the sighting date in the Azores was later in the season than their sighting at the Cape Verde Islands. This is consistent with the Azores being visited more commonly by whales on the northerly migration. However there was only one sighting of an animal in both areas in the same year, making conclusions difficult.

Discussion

The seasonal peak in sightings during the spring suggests that individuals are likely stopping in the area to obtain food while on migration, much as has been suggested at Bermuda (Stone & Katona, 1987). In contrast to Bermuda, however, the season is quite protracted, indicating perhaps that there is a more extensive food resource and related foraging opportunities available in the Azores. This is consistent with the regular presence of other baleen whales at similar times of the year which is not known to occur at Bermuda. The extended season also suggests the possibility that humpbacks stop at the Azores during both the southbound and northbound migration, though there are not the within-season re-sightings to confirm this. If so, this also contrasts with Bermuda where few whales are observed except during northbound migration.

Citation: Stone, Gregory S., Steven K. Katona, and Edward B. Tucker. "History, migration and present status of humpback whales *Megaptera novaeangliae* at Bermuda." *Biological conservation* 42.2 (1987): 133-145.

Acknowledgments



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