

## Population spatial structuring on the feeding grounds in North Atlantic humpback whales (*Megaptera novaeangliae*)

Stevick P.T, Allen J, Clapham P.J, Katona S.K, Larsen F, Lien J, Mattila D.K, Palsboll P.J, Sears R, Sigurjonsson J, Smith T.D, Vikingsson, Oien N, Hammond P.S. 2006. **Journal of Zoology** 270, 244 - 255.

### ABSTRACT

Population spatial structuring among North Atlantic humpback whales *Megaptera novaeangliae* on the summer feeding grounds was investigated using movement patterns of identified individuals. We analysed the results from an intensive 2-year ocean-basin-scale investigation resulting in 1658 individuals identified by natural markings and 751 individuals by genetic markers supplemented with data from a long-term collaborative study with 3063 individuals identified by natural markings. Re-sighting distances ranged from <1 km to >2200 km. The frequencies ( $F$ ) of re-sighting distances ( $D$ ) observed in consecutive years were best modelled by an inverse allometric function ( $F=6631D^{-1.24}$ ,  $r^2=0.984$ ), reflecting high levels of site fidelity (median re-sighting distance <40 km) with occasional long-distance movement (5% of re-sightings >550 km). The distribution of re-sighting distances differed east and west of 45°W, with more long-distance movement in the east. This difference is consistent with regional patterns of prey distribution and predictability. Four feeding aggregations were identified: the Gulf of Maine, eastern Canada, West Greenland and the eastern North Atlantic. There was an exchange rate of 0.98% between the western feeding aggregations. The prevalence of long-distance movement in the east made delineation of possible additional feeding aggregations less clear. Limited exchange between sites separated by as little as tens of kilometres produced lower-level structuring within all feeding aggregations. Regional and temporal differences in movement patterns reflected similar foraging responses to varying patterns of prey availability and predictability. A negative relationship was shown between relative abundance of herring and sand lance in the Gulf of Maine and humpback whale movement from the Gulf of Maine to eastern Canada.