

A TROPHIC SHIFT OFF WEST SCOTLAND: MINKE WHALES AND BASKING SHARKS

Peter T. Stevick¹, Susannah V. Calderan¹, Colin Speedie², Juliet Shrimpton¹ and Clare B. Embling³

(1) Hebridean Whale and Dolphin Trust, 28 Main Street, Tobermory, Isle of Mull PA75 6NU, UK (peter@hwdt.org)

(2) The Wildlife Trusts' Basking Shark Project, Falmouth Marine School, Killigrew Street, Falmouth, TR11 3QS, UK

(3) Sea Mammal Research Unit, Gatty Marine Laboratory, University of St Andrews, St Andrews, Fife KY16 8LB

The distribution of large marine predators is primarily determined by the distribution of their prey. Changes in the observed distribution and abundance of cetaceans and basking sharks along the west coast of Scotland during 2005 and 2006, coinciding with declines in reproductive success in several species of seabirds, suggests that a prey shift has occurred in the region. Surveys for cetaceans and basking sharks were conducted throughout the Inner Hebrides during June through August from 2003-2006 by the Hebridean Whale and Dolphin Trust, and from 2002-2006 by the Basking Shark project of the Wildlife Trust. Both surveys operated between the Kintyre Peninsula and the south coast of Skye.

The number of minke whales sighted per hour of on-effort transect sampling declined significantly and steadily throughout the period ($t = -6.524$, $p = 0.00033$). The sighting rate in 2006 was only 12% of that in 2002. Conversely, on-effort basking shark sightings increased dramatically and significantly over the same period ($t = 2.638$, $p = 0.034$). In 2002 no basking sharks were observed in >57 hours of survey effort, increasing to well over 500 total sightings in 2006. There is a strong but not significant correlation between these trends ($r = -0.79$). The decline in minke whale sightings was most pronounced in the northern reaches of the study area, from the north coast of Mull to the south coast of Skye, the area which also saw the largest increase in basking shark sightings. There was substantial overlap in the habitats used by minke whales and basking sharks, though minke whales were more common inshore; sharks were more abundant offshore.

These observations are consistent with a regional shift in available prey from fish to large zooplankton. Minke whales on the west coast of Scotland have been described as feeding primarily on lesser sand lance and Atlantic herring. The region of highest whale density includes a high-use habitat for sand lance and a spawning ground for herring. Anecdotally, little or no surface feeding by minke whales was seen during 2005 and 2006 in contrast with earlier years, while provisioning rates at local alcid colonies was reported to be exceedingly low. Both of these factors further indicate declines in small schooling fish. Sand lance and herring are largely planktivorous, and so it appears that a simultaneous reduction in abundance of both species resulted in reduced predation pressure on zooplankton, resulting, in turn, in an increase in available prey for planktivorous basking sharks.