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FOR IMMEDIATE RELEASE
October 24, 2011

Southern Coast of Oman is Important Habitat for Endangered Arabian Sea Humpback Whale Population

The Dhofar coast of southern Oman is an important habitat for the Arabian Sea population of humpback whales (*Megaptera novaeangliae*), the only known non-migratory population of humpback whales in the world and one of the most endangered, according to a new modeling study.

In a paper published online October 21 in the journal *Endangered Species Research*, Peter Corkeron and co-authors suggest a new way to use spatial models with limited data in cetacean conservation planning,using their experience in Oman as an example. Corkeron is a marine mammal researcher at the Woods Hole Laboratory of NOAA's Northeast Fisheries Science Center.

Whale sightings data were collected from small boat surveys off the coast of Oman between 2000 and 2003 by a team led by Robert Baldwin of the Environment Society of Oman (ESO). Surveys were primarily for photo-identification and genetic sampling in areas where the Arabian Sea population of humpback whales were likely to be found, and places that were relatively easy to survey. These whales are members of the smallest humpback population known to exist, and are the only humpbacks that do not undertake extensive seasonal migrations.

Designated as Endangered in 2008 in the IUCN Red List for cetacean species, the Arabian Sea humpback population is estimated at less than 100 individuals. Its distribution includes the waters of Pakistan, India, Iran and Yemen, but there is little or no survey data from these areas. Analysis of photo-identification work and genetic samples conducted by the ESO team has shown that this population is completely isolated from the nearest Indian Ocean population. IUCN, the International Union for Conservation of Nature, is the world's oldest and largest global environmental network.

Assessing the distribution of humpbacks in three areas off Oman allowed the researchers to make some recommendations about the relative importance of particular areas as habitat for the whales. During the four-year field study, researchers surveyed regularly off the coast of Muscat, during October and November in the Gulf of Masirah, and during February and March off the Dhofar coast. The authors suggest ways to start conservation planning to lessen impacts on humpback whales in that particular area.

"Relatively simple spatial models can provide the scientific basis for conservation planning and management actions," said Corkeron, lead author of the paper. "Small marine mammal populations, with little or no reliable data on human-related mortality and limited resources to study them, are a common problem in most of the world. Using what data we have for conservation planning can initiate positive steps forward."

"There are likely many animal populations around the world where considerable data has been collected but isn't being fully used because it falls outside the standard practices of modeling," Corkeron said. "The demands of photo-identification mean that you can end up with sightings data that are somewhat biased, simply due to how the photos are collected. This modeling technique uses some sophisticated mathematics to remove some of that bias, making the final model of whales' space use more reliable. And because the technique runs in R, the Open Source statistics language, anyone who understands R can run the same sort of model on their own data, for free."

Corkeron has studied humpback whales for almost three decades, but only became involved in the work in Oman in 2010, and returned in March of this year. As a proof of concept, he deployed a marine acoustic recording unit (MARU) from Cornell University's Bioacoustic Research Program. identical to those used by colleagues off the Northeast U.S. coast to study endangered North Atlantic right whales, The MARU recorded whale sounds in a remote coastal area of Oman not far from the border with Yemen.

"It was an amazing experience," Corkeron recalls. "We saw humpbacks, Bryde's whales, a couple of blue whales, and heard sperm whales." As the team of three pulled up to a campsite that the ESO team had identified as being a promising location for whale sightings, Robert Baldwin saw whales before the car had even stopped. "In one day on the water, we collected seven biopsies and photo-identified eight humpback whales."

Corkeron, who now heads the large whale research team in the Center's Protected Species Branch, sees many similarities between the problems facing North Atlantic right whales in local waters, and the humpbacks off Oman. He hopes to be able to return to Oman to continue the work. Despite the remoteness of the location, Corkeron says much work remains to be done.

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Related links:

Endangered Species Research paper: http://www.int-res.com/abstracts/esr/v15/n1/
Environment Society of Oman: www.eso.org.om
NEFSC's Protected Species Branch: http://www.nefsc.noaa.gov/read/protspp/mainpage/