

Sperm Whales in Gulf Seemingly Unaffected by Distant Seismic Sounds

August 21 2008

A six-year study on sperm whales in the Gulf of Mexico – designed to learn more about their abundance, migration patterns and behavior – suggests that long-range seismic sounds associated with oil and gas exploration and production don't significantly affect the whales' movement at distances greater than five kilometers, or about three miles.

Bruce Mate, director of the Marine Mammal Institute at Oregon State University, said scientists compared four years of data on whale movements with detailed records of the seismic sounds created by air guns used in oil and gas exploration and found little impact from the activities at five-plus kilometers.

“There was virtually no difference between random sperm whale movement and the movement of whales that were in the vicinity of seismic activities,” Mate said. Scientists didn't have enough samples of whales migrating closer than five kilometers during air gun deployment to draw any conclusions about close-range impacts, he added.

The study findings were released Thursday by the Minerals Management Service. The six-year, \$9.3 million project was supported by the MMS and involved a consortium of 15 universities, federal and state agencies and other organizations, including Oregon State, Woods Hole Oceanographic Institution, Scripps Institution of Oceanography and Texas A&M University.

Mate, a pioneer in the use of satellites to track whales and other marine

mammals, led an effort to tag 51 endangered sperm whales and monitor their movements. The Oregon State University scientist and his colleagues also took DNA samples from the whales and discovered that the Gulf of Mexico stock was genetically distinct.

“The sperm whales are not only different from those living outside the region,” Mate said, “but groups living in one part of the gulf have different home ranges and core areas than those living in other parts of the gulf. Our tracking suggests that there are concentrations of whales in both the eastern and western waters of the gulf, although their ranges overlap to some extent.

“Over time, this regionalized emphasis may lead to genetic differences.”

While some whales ventured farther offshore into deeper water, most of them moved back and forth along the continental slope in waters that were 800 to 1,000 meters deep. One male sperm whale went into the north Atlantic for more than two months, but returned to the gulf via Cuba. The scientists hypothesize that the whales prefer this water depth in the gulf because of abundant deep-water squid populations, which are a primary food source.

The study was conducted because most of the new oil wells being drilled in the gulf are in similar depths along the upper slope edge, which is about 150 to 180 miles off some parts of Texas and only 30 miles offshore from the Louisiana delta. The sperm whales appear to congregate in areas of steep slopes adjacent to deep water, including canyons, which are biologically fertile and apparently rich in squid populations. And the organic material and detritus that has rained down on the ocean floor near those canyons for millions of years may have created some of the oil and gas deposits.

Mate said another population of sperm whales lives in the deeper waters

beyond the slope population that was tagged and tracked. Those animals rarely interact with the inner-gulf individuals.

“There may be an ‘onion skin’ effect where the layer of whales moving along the upper continental slope rarely interact with other layers of animals farther offshore in deeper water,” Mate pointed out.

Mate said the study also found that female whales banded together for long periods of time. DNA analysis showed most weren’t closely related, although there were some mother-daughter pairs. Males, on the other hand, stayed together in small groups for brief periods but did not exhibit long-term bonds. Instead, they moved around independently and seemed to join other small groups of males wherever they went.

The scientists also determined that Gulf of Mexico sperm whales hardly ever move closer to shore than water depths of 500 meters.

The scientists’ efforts were enhanced by new tags developed at Oregon State University’s Hatfield Marine Science Center that lasted up to 620 days, and provided year-round monitoring of many of the whales. The tag development was supported with funding from the Office of Naval Research.

ONR, Minerals Management Service and a joint industry program of oil and gas companies are funding the development of a new generation of tags being developed at Oregon State that log locations with GPS accuracy and provide detailed records of whales’ underwater diving behaviors.

In related research, OSU oceanographer Kelly Benoit-Bird has worked with Mate to determine the abundance of squid in areas where sperm whales are feeding through the use of acoustic techniques.

“The combination of the new tags with advanced acoustic techniques will be useful in determining the ‘safe’ distance for whales from human activities that generate loud or unusual underwater noises,” Mate pointed out.

Source: Oregon State University

Citation: Sperm Whales in Gulf Seemingly Unaffected by Distant Seismic Sounds (2008, August 21) retrieved 23 April 2024 from <https://phys.org/news/2008-08-sperm-whales-gulf-seemingly-unaffected.html>

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