Monterey Bay National Marine Sanctuary

Impacts on Whales from Human Uses

Management Issue

Monterey Bay National Marine Sanctuary (MBNMS or Sanctuary) provides important habitat for foraging and migrating whales, and supports human users, including large commercial vessels, cruise ships, recreational boaters, kayakers, and surfers. As a result, whales are subject to an increasing number of vessel strikes and disturbances, as well as an increase in anthropogenic noise underwater.

Description

Endangered humpback (*Megaptera novaengliae*), blue (*Balaenoptera musculus*), and fin (*Balaenoptera physalus*) whales forage within MBNMS, and gray whales (*Eschrichtius robustus*) migrate through the sanctuary seasonally. These four species comprise the most commonly sighted large whales and those most frequently struck by vessels transiting off the central-northern California coast. North-south marine traffic is routed a minimum of 12.7 nm offshore for commercial and 25 nm offshore for hazardous materials vessels, but little is known about how whales are using these offshore waters of the Sanctuary. Additionally, whales foraging closer to shore increase the risk for disturbance and collisions by kayakers, surfers, and recreational boaters, which have been documented well within the 100-yard approach limit issued by MBNMS. Any action that leads to a change in a whale's behavior is considered harassment under federal law and research has demonstrated that whales change their behavior in the presence of vessels and that disturbance during feeding may reduce foraging success and, consequently, overall energy acquisition. Both commercial and recreational vessels contribute to anthropogenic noise in the ocean, which has increased exponentially during the last 60 years. Baleen whales use low frequency (10-500 Hz) vocalizations to communicate, which are in the same frequency range as sound produced by commercial vessels. The overlap may reduce a whale's foraging and communication abilities and result in short and long-term behavioral and population-level changes. Relatively little is known about sound exposure levels and the effects of anthropogenic noise on large whales in MBNMS.

*Humpback whale (*Megaptera novaeangliae*) breaching. Photo credit: Shannon Lyday, CBNMS.*

Questions and Information Needs

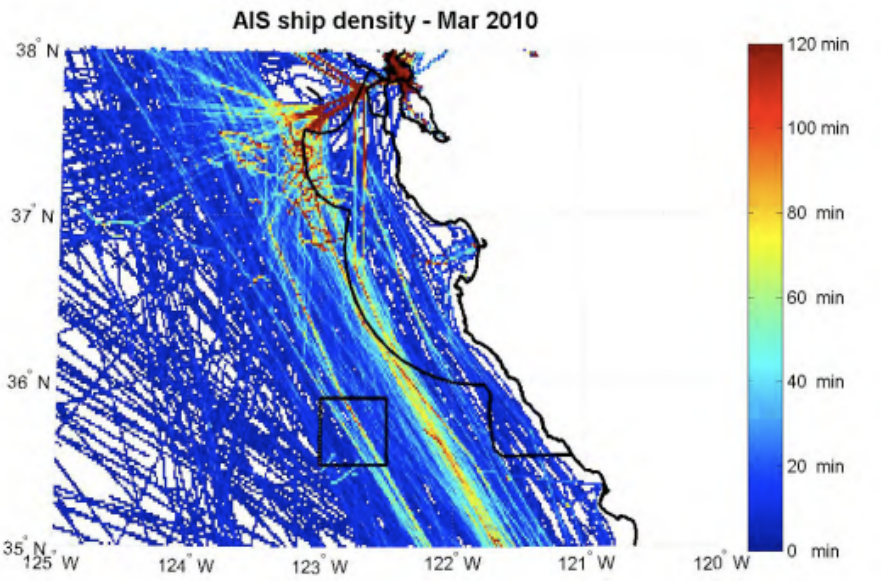
1) What regions of the Sanctuary do commercial vessels use? How frequently and at what speed are vessels transiting through sanctuary waters?
2) What are the spatial and temporal patterns of habitat use of large whales throughout sanctuary waters (both inshore and offshore)?
3) What is the degree of overlap between whale habitat and commercial vessel transit routes?
4) What are the environmental and prey characteristics that lead to foraging aggregations that may leave whales vulnerable to disturbance by recreational ocean users?
5) What are the ambient noise levels in the Sanctuary arising from both anthropogenic and natural sources and how are whales in the Sanctuary affected by increased anthropogenic noise?

Scientific Approach and Actions

- Identify regions of high risk for whale/vessel interactions
- Establish a monitoring system for whale sighting data collection from commercial vessels
- Describe and ultimately enable prediction of conditions leading to whale foraging aggregations
- Implement a passive acoustic monitoring program
- Identify and quantify sources of anthropogenic noise and evaluate the effects of sound on whales

Key Partners and Information Sources

NOAA's Gulf of the Farallones, Cordell Bank, Channel Islands, and Stellwagen Bank National Marine Sanctuaries, Cascadia Research Collective, Moss Landing Marine Laboratories, PRBO Conservation Science, Oikonos Ecosystem Knowledge, Naval Postgraduate School, Southall Environmental Associates, Inc., The Marine Mammal Center, and NOAA's National Marine Fisheries Service



Ship densities along the Central California coast for March 2010. Colors represent the total number of minutes vessels spent in one square arc-minute of area over the course of the month. Figure from Miller, 2011.

Support Products

- Map of existing ship traffic and whale sighting data
- Report summarizing findings to guide managers in decision making
- Improved ability to predict when and where high density aggregations of whales will occur

Planned Use of Products and Actions

- Collaborate with partners to inform stakeholders of mitigation measures to reduce ship strikes and anthropogenic noise
- Increase educational and outreach efforts when whales are particularly vulnerable to anthropogenic interactions
- Maintain and improve enforcement efforts of 100 yard approach limit

Program References

MBNMS Management Plan

– Marine Mammal, Seabird, and Turtle Disturbance Action Plan, Strategy MMST-1, MMST-6, MMST-8
– Sanctuary Integrated Monitoring Network (SIMoN) Action Plan. Strategy SI-1, SI-2, SI-3, SI-4, SI-5

MBNMS Condition Report

– What are the levels of human activities that may influence habitat quality and how are they changing? (Offshore and Nearshore environment – Question 8)
– What are the levels of human activities that may influence living resource quality and how are they changing? (Offshore and Nearshore environment – Question 14).

ONMS Performance Measures

– Number of sites in which habitat, based on long-term monitoring data, is being maintained or improved
– Number of sites in which select living marine resources, based on long-term monitoring data, are being maintained or improved