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# MARINE SPECIES MONITORING

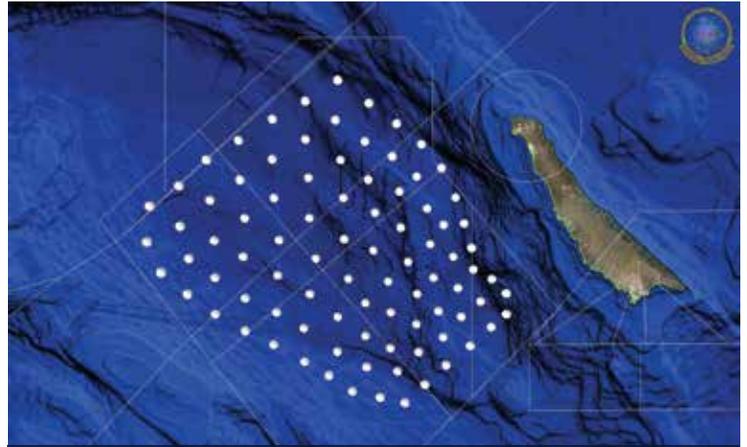
## Marine Species Monitoring in Hawaii and Southern California

For more than a decade, the U.S. Navy has been a world leader in marine species research. Navy-funded research, surveys, and data collection efforts have contributed significantly to the greater scientific knowledge and understanding of marine species occurrence and behavior.

As part of its Marine Species Monitoring Program, the Navy uses sophisticated underwater acoustic technologies and satellite tracking systems to improve the scientific community’s understanding of marine species and to determine the effects naval activities may or may not have on them.

Offshore of the Navy’s Pacific Missile Range Facility on Kauai and at the Southern California Antisubmarine Warfare Range, instrumented hydrophone ranges have been installed on the seafloor for use during training and testing activities. For more than 10 years, these high-tech systems have also been used to detect and record underwater sound, allowing for the long-term monitoring of the calls of marine species, resulting in unprecedented capabilities in marine species research which would otherwise have been nearly impossible.

Independent scientists also use advanced tagging methods, such as satellite tags and dive-behavior tags, to observe marine species distribution and behavior.



In-water hydrophones at the Southern California Antisubmarine Warfare Range

### Ongoing Monitoring Questions

The Navy must comply with federal environmental regulations that apply to marine mammals and other marine protected species, including the Endangered Species Act and the Marine Mammal Protection Act. The Navy meets specific requirements for monitoring and reporting on military training and testing activities involving the use of active sonar and underwater explosives.

The Navy has developed an Integrated Comprehensive Monitoring Program, which includes a collection of broad studies intended to address specific questions and meet specific objectives. Included in this fact sheet are some of the Navy’s marine species monitoring questions in Hawaii and Southern California for which Navy and independent scientists and researchers are currently collecting and analyzing data.



 Hydrophone image provided by John Hildenbrand



# Hawaii Range Complex



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## Estimation of Received Levels of Mid-Frequency Active Sonar on Marine Mammals at PMRF

Ongoing Monitoring Question:

- ▶ *What is the occurrence and estimated received levels of mid-frequency active sonar on 'blackfish,' humpback, minke, sperm, and Blainville's beaked whales within the instrumented range?*

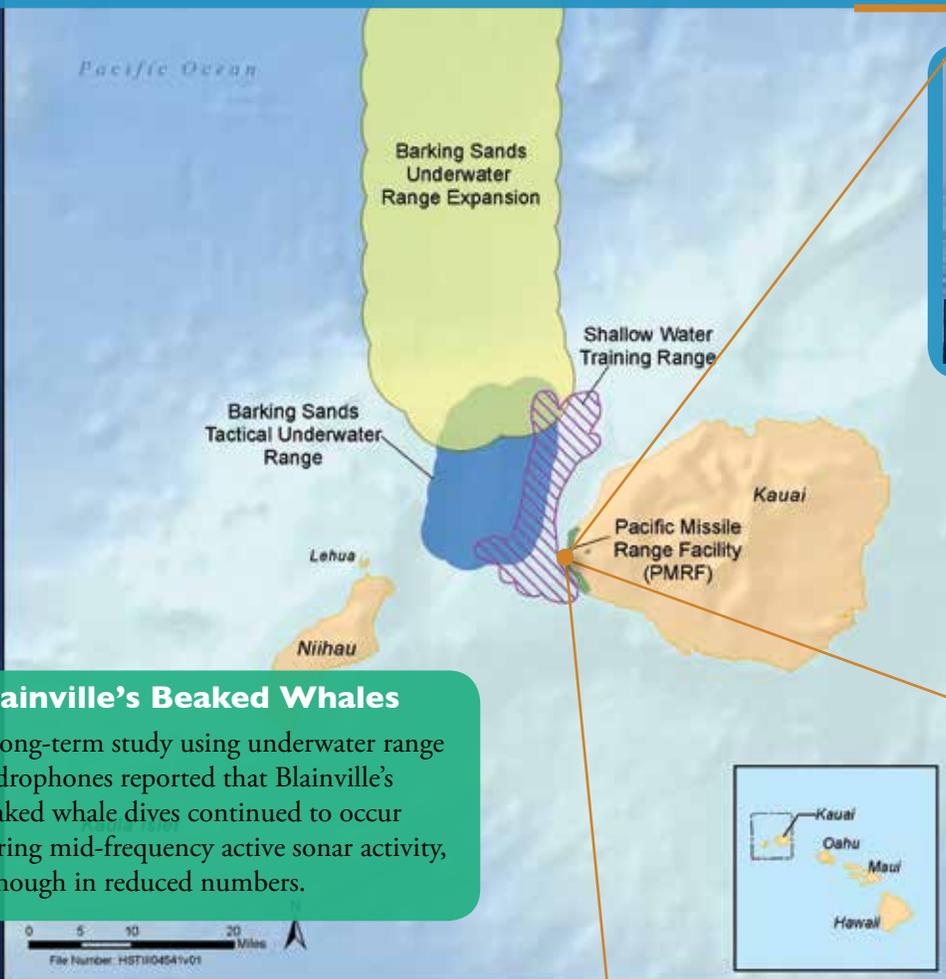


Image provided by Cascadia Research Collective, taken under NMFS Permit No. 15330 issued to Dr. Robin Baird

## Blainville's Beaked Whales

A long-term study using underwater range hydrophones reported that Blainville's beaked whale dives continued to occur during mid-frequency active sonar activity, although in reduced numbers.

## Marine Mammals and Exposure to Sonar

A novel, integrated approach used the data from the underwater instrumented range at PMRF to estimate received sound levels for tagged marine mammals. A tagged bottlenose dolphin showed no large-scale movements out of the area during sonar activity, despite relatively high estimated received levels. It was noted that a short-finned pilot whale moved toward areas of higher estimated exposure.



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## Behavioral Response of Marine Mammals to Navy Training and Testing at PMRF

Ongoing Monitoring Question:

- ▶ *What, if any, are the short term behavioral responses of 'blackfish,' humpback, minke, sperm, and Blainville's beaked whales when exposed to mid-frequency active sonar or explosions at different levels or conditions?*

# Southern California Range Complex



Image provided by Oregon State University Marine Mammal Institute taken under NMFS permit No. 14856 issued to Dr. Bruce Mate

## Blue and Fin Whale Satellite Tracking Along the West Coast

Ongoing Monitoring Question:

- ▶ *What are the occurrence, movement patterns, and residency patterns of blue and fin whales within Navy U.S West Coast at-sea ranges as compared to the rest of their distribution throughout the Pacific Ocean?*

## Blue and Fin Whales

Newly developed advanced dive-behavior tags attached to blue and fin whales provided new science on short-term animal movements and foraging behavior within and outside of the Navy's Southern California Range Complex.

Long-term satellite tracking of blue whales detailed new information on the movement patterns of individual animals and residence times. The influence of an unusually warm-water period in late summer 2014 was documented, with many of the tagged blue whales leaving Southern California for the Eastern Tropical Pacific earlier than any time previously.



Photo provided by Roxanne Parker, taken under NMFS permit no. 14856 issued to Dr. Bruce Mate



Photo provided by Cascadia Research Collective, taken under NMFS permit no. 16111 issued to John Calambokidis

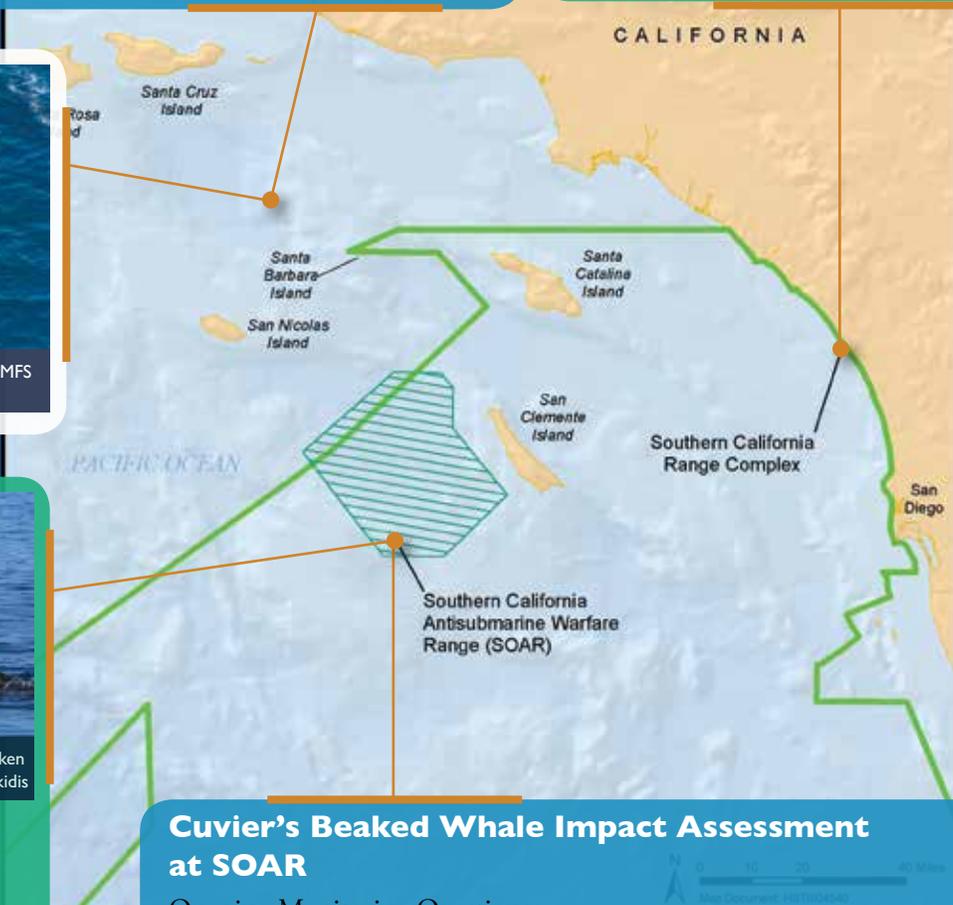
## Cuvier's Beaked Whales

Cuvier's beaked whales detected at SOAR were found to be persistently present in an area of repeated sonar use, suggesting these whales may be part of a smaller regional subpopulation, rather than transient members of a large and dispersed west coast population.

## Cuvier's Beaked Whale Impact Assessment at SOAR

Ongoing Monitoring Questions:

- ▶ *What, if any, are the short term behavioral and/or vocal responses when exposed to sonar or explosions at different levels or conditions?*
- ▶ *Does exposure to sonar or explosives impact the long term fitness and survival of individuals or the population, species, or stock?*



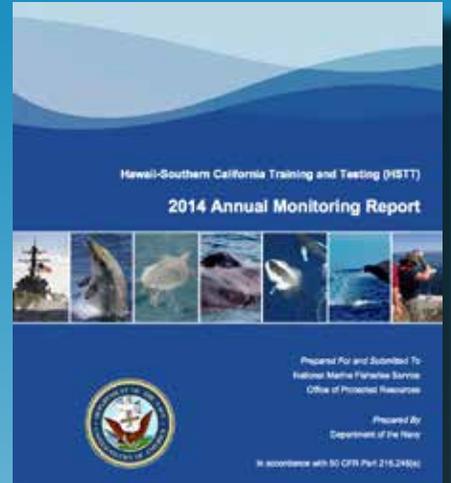
# Navy's Marine Species Monitoring Program Online Portal

Visit [www.navymarinespeciesmonitoring.us](http://www.navymarinespeciesmonitoring.us) for access to:



- ▶ Peer-reviewed publications
- ▶ Annual reports
- ▶ Data
- ▶ Updates on current monitoring projects

The Navy also provides reports and data to the National Marine Fisheries Service and shares with the Ocean Biogeographic Information System, where the public can search for marine research data from all over the world.



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US Navy



Protecting the Marine Environment While Training Sailors and Testing New Technologies