

Hawaiian Islands Humpback Whale National Marine Sanctuary

Remote Monitoring of Key Resources

Management Issue

In order to determine when to enact any future management initiatives, the Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS or Sanctuary) needs to be able to remotely determine the density of whales throughout the Sanctuary. As the whales' presence in the Sanctuary is seasonal, being able to determine the beginning, peak and end of their presence is important for any seasonal management actions.

Description

While humpback whales are generally predictable in their seasonal migration and distribution throughout the HIHWNMS, they do not all arrive and depart at the same time. Instead, some may arrive two months prior to the majority, their abundance gradually swelling and then diminishing, with a few whales lingering several months beyond the rest. The number of singing humpback whales has been shown to be correlated with the relative density of all whales through the season, therefore the level of song energy can be a reliable proxy for the numbers of whales using the area at any given time.



*Example of passive acoustic recording device (EAR).
Photo Credit: Hawai'i Institute of Marine Biology*

Questions and Information Needs

- 1) How closely does the number of singing whales reflect the overall density in key areas throughout the Sanctuary?
- 2) Can the number of singing whales (or simply song energy) be a reasonable proxy for the relative density of whales in a given location?
- 3) Can that knowledge be used to help to determine when whale densities have reached certain thresholds at which potential management initiatives could be put into place (e.g. speed limits, vessel alerts.....etc.)?

Scientific Approach and Actions

- Coordinate the deployment of passive acoustic recording devices at key locations throughout the Sanctuary
- Conduct aerial visual surveys, using methodologies that are comparable to historical methods (for maximum benefit), throughout the Sanctuary and throughout the whale season.
- Conduct small vessel visual surveys periodically at several key locations in order to be able to compare all three methodologies (e.g. acoustic, aerial and surface).
- Correlate acoustic "counts" with visual surveys in order to calibrate the relationship between the number of singing whales and the overall density of whales.
- Opportunistically record levels of anthropogenic sound at locations throughout the Sanctuary to determine impact on acoustic environment

Potential Key Partners and Information Sources

NOAA Fisheries, PISC, Hawaiian Institute of Marine Biology, Hawaii Marine Mammal Research Consultants, University of Hawaii at Hilo, Stellwagen Bank National Marine Sanctuary

Updated: 5/26/2011

For More Information -- <http://www.sanctuaries.noaa.gov/science/assessment>

Management Support Products

- Researchers' analyses of best and simplest method to estimate density of singers (e.g. individual counts, overall acoustic energy at certain frequencies....etc.)
- Best method correlating density of singers to overall whale density
- Recommendations for best methods to monitor singers in real time
- Recommendations for key locations to monitor for best overall estimate of density throughout the Sanctuary

Planned Use of Products and Actions

HIHWNMS management needs a real time cost effective tool to estimate whale density in the Sanctuary throughout the season. This tool could then be used to notify Ocean users when whale densities have reached particular thresholds, which could then trigger either voluntary or regulatory management actions.

Program References

HIHWNMS Management Plan

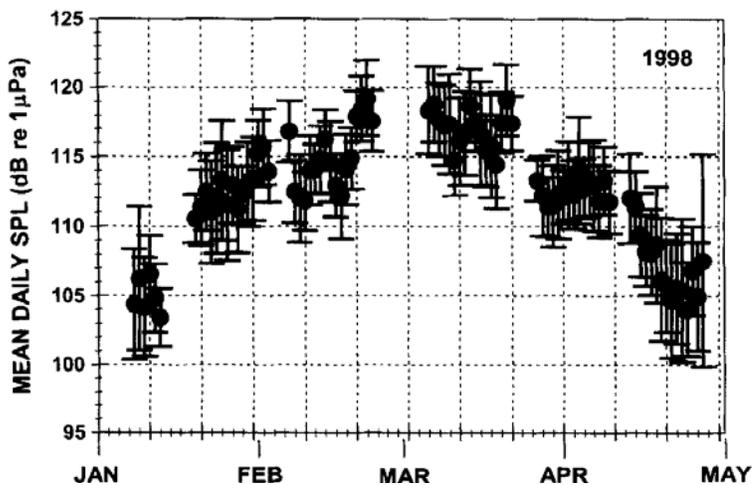
- RM-1 activity A. Continue to monitor and estimate the numerical abundance of humpback whales in the main Hawaiian Islands.
- RM-1 activity B. Continue to examine and describe the spatial and temporal aspects of humpback whale distribution, movement and demography in the main Hawaiian Islands
- RM-2, activity A. Assess and monitor existing and potential threats and impacts to humpback whales and their habitat.

HIHWNMS Condition Report

- What is the status of key species and how is it changing?
- What are the levels of human activities that may influence living resource quality and how are they changing?

Performance Measures

- Number of sites in which select **living marine resources (LMRs)**, based on long-term monitoring data, are being maintained or improved.
- By 2017, all sanctuaries will have monitoring programs with an observing system component that adequately track the status and trends of sanctuary resource conditions.



Seasonal change in song energy off Western Maui corresponds with seasonal density of all whales. Image Credit: Au et. al., 2000.

Updated: 7/26/2010

For More Information -- <http://www.sanctuaries.noaa.gov/science/assessment>