APPENDIX K. Analysis of Historical Passive Acoustic Monitoring Recordings in Hawaii Range Complex

This project has been actively in progress since April 2011. Final analyses have not been completed at the time of the writing of the FY11 year-end monitoring report. It is expected that all analyses and the final report will be completed December 2011.

The project's goal is analysis of passive acoustic monitoring recordings that were obtained by scientists at Hawaii Institute of Marine Biology (HIMB) using Ecological Acoustic Recorders (EAR) devices. The information to be extracted from the recordings is on the presence of marine mammals and the nature of the sounds they make. Some of these historical recordings from 2009 and 2010 coincide with Naval training events in the areas around the islands of Oahu and Kauai. In optimal situations, analysis of days of recordings from a few days before, during, and a few days after the training events were available to characterize the baseline environmental acoustic state before and after events as well as any changes that may occur during events.

The project incorporates various data analyses to enable marine mammal call identification in these acoustic recordings. These analyses consist of detecting and classifying calls present according to marine mammal species, and providing summary statistics of the detected calls. Analysis prioritization is: 1) beaked whales; 2) sperm whales; 3) ESA-endangered baleen whales (blue, fin, humpback); 4) other odontocetes and mysticetes.

The final report is also currently in progress. The report is scoped to include:

- Date and time of acoustic detections of marine mammals from PAM device and direction, if possible
- Basic timeline of each recording highlighting significant events in the recording
- Species or at least family identification of detections, if possible
- Description of breadth of repertoire of marine mammal species
- Quantitative and qualitative description of classes of vocalizations by species, including representative spectrograms
- General characterization of noise levels in the environment during acoustic detections
- Signal to noise ratios of acoustic detections
- Classification and characterization of anthropogenic noise detected
- Description of vocalizations detected by date and location
- General sound budget of the recording site – a description of what types of sounds present occupy what portion of the sound spectrum and general patterns in the sound present in the environment over the diurnal cycle
- Rates of detection of species
- Mean rates of vocalization by species
- Quantifiable changes (if any) in vocalizations during anthropogenic noise
- General changes in marine mammal vocalizations over time
- Rough (qualitative) abundance estimates for species.

Tables 1 and 2 lists the dates for which historical recordings are desired. These dates are historical dates of Navy training events; the goal is the analysis of any recordings available a few days before, during, and a few days after the dates in the tables. Figure 1 illustrates the locations of these devices on maps of the islands of Oahu and Kauai

Table 1. Historical recordings for Oahu

Location No.	Dates of Historical Training Events
2 - Mokapu	3-4 October 2009
3 – Makapuu	23 August 2009 2-4 October 2009
4 – Barber's Pt.	9 & 18 February 2010 30-31 March 2010
5 – Kaena Pt.	17-18 November 2009 18 February 2010

Table 2. Historical recordings for Kauai

Location No.	Dates of Historical Training Events
4 - (SW)	16-19 February 2009 5 May 2009
5 - (NW)	16-19 February 2009 27-29 August 2009 13, 18, & 21 September 2009 17-19 February 2010

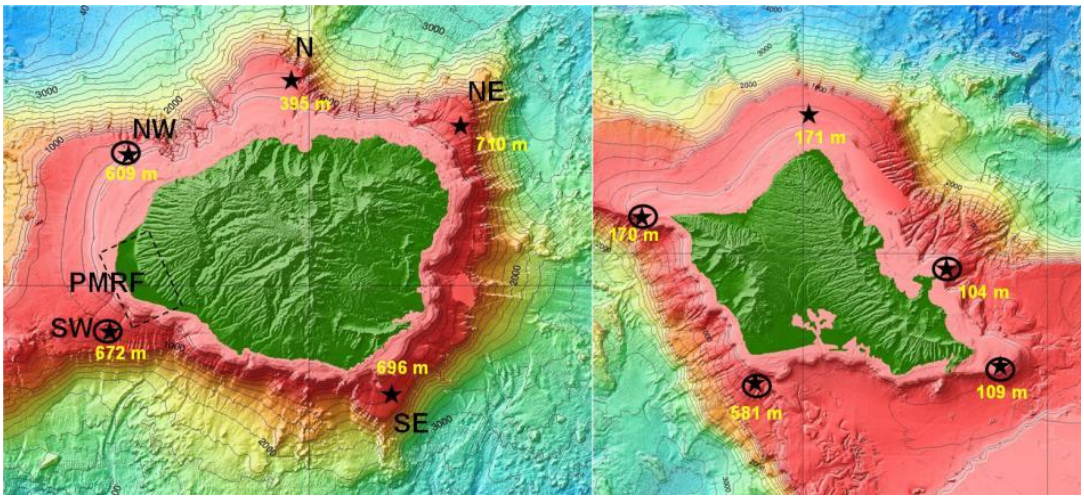

Figure 1. Approximate locations of EARs (shown as stars) deployed around Kauai and Oahu as a part of an ONR program to monitor marine mammals in high Navy activity locations in the Hawaii Range Complex. The circled stars are EARs in which data during specified times were analyzed.

The final report of this project is expected to be included as part of the FY12 year-end monitoring report.