

**FEDERAL AID
FINAL PERFORMANCE REPORT**

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 115526
Juneau, AK 99811-5526

**Alaska Department of Fish and Game
State Wildlife Grant**

Grant Number: T-1 **Segment Number:** 6
Project Number: 4
Project Title: Cooperative acoustic monitoring of Pacific Right Whales
Project Duration: July 1, 2003 – June 30, 2007
Report Period: July 1, 2006 – June 30, 2007
Report Due Date: September 30, 2007
Partner: University of California San Diego, Scripps Institution

Project Objectives

1. Construct and deploy two High-frequency Acoustic Recording Packages (HARPs) to acquire information on population abundance and trend, important habitats, and spatial and temporal geographic distribution of the North Pacific Right Whale; project will include data on other cetaceans, including humpback, fin, and killer whales.
2. Increase the spatial extent of the current acoustic monitoring program across the historical summer range of the right whale with two new HARPs.
3. Analyze data and conduct analyses of seasonality.

Summary of Project Accomplishments for entire project

Objectives 1 and 2:

1. One ADF&G funded HARP that had been deployed at mooring site M2 during April 2005 was successfully recovered using the NOAA Ship *Miller Freeman* in October 2005. This instrument recorded acoustic data continuously at 80 kHz between April and September 2005.
2. Two ADF&G funded HARPs were deployed at mooring sites M2 and M4 during October 2005 using the NOAA Ship *Miller Freeman*. These two HARPs were successfully recovered in May 2006, aboard the *Miller Freeman*. These HARPs recorded continuously at a sampling rate of 80 kHz until late January 2006.

Objective 3:

3. Data from these HARPs have been processed using a combination of manually browsing spectrogram data and automated right whale call detection software. Right whale calls were detected on 21 days in July through September 2005 at site M2, and on 10 days in October through December 2005 at sites M2 and M4. Humpback whale calls were also detected throughout these recordings.
4. HARP data were also studied for the presence of killer whale calls. A long-term spectral average of the data was scanned visually, and then promising times were examined in greater detail. On the M2 HARP 39 days with killer whale encounters were found

between April 2005 and January 2006 (10 months). On the M4 HARP (located further north) 12 days with killer whale encounters were found between October 2005 and January 2006 (4 months).

Project Accomplishments during last segment period only (July 1, 2006 – June 30, 2007)

Objective 3:

1. We have prepared a manuscript detailing right whale seasonal and daily calling patterns for publication.
2. We determined source levels of right whale calls and propagation loss on the southeast Bering Sea (SEBS) middle-shelf using calls received on multiple, calibrated hydrophones and localized to the source. These results can be used to predict range to an animal based on received levels at a single hydrophone.
3. We developed a second technique for estimating range to an animal using a single hydrophone, by modeling dispersion of normal modes in a shallow waveguide. We applied this technique to each call received on peak calling days and used received levels and propagation loss to check and improve our range estimates.
4. We are using acoustic ranging techniques to estimate minimum local abundance/density of right whales over the entire 2000-2005 study period. We will relate seasonal trends in right whale occurrence to oceanographic data obtained for 2000-05 from PMEL biophysical sensors on moorings at M2 and M4, and further investigate right whale acoustic behavior on shorter timescales.

Significant Deviations: No ADF&G funded HARPs were deployed in April 2006, owing to the occupation of the PMEL-NOAA moorings by PMEL-owned acoustic recorders. This means that we did not acquire acoustic data for the April – October 2006 period, a deviation from the original proposal.

Project Leader: J. Hildebrand

Additional Information:

1. In April 2006, one NOAA-funded autonomous Acoustic Recording Package (ARP) was recovered along the Bering Sea shelf break between Dutch Harbor and the Pribilof Islands
2. Data from the recovered ARP were processed by graduate student Lisa Munger and right whale calls were detected on one day in June 2005.