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MARINE SPECIES MONITORING

for the U.S. Navy's

Gulf Of Alaska

Temporary Maritime Activities Area

Annual Report 2014

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TABLE OF CONTENT

TABLE OF FIGURES

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INTRODUCTION

The U.S. Navy (Navy) prepared this Year 4 Annual Monitoring Report covering the period from November 1, 2013 through October 31, 2014 in compliance with the National Marine Fisheries Service (NMFS) Final Rule under the Marine Mammal Protection Act and Incidental Take Statement under the Endangered Species Act for the U.S. Navy's Gulf of Alaska Temporary Maritime Activities Area (GOA TMAA).

Navy met and exceeded its current GOA TMAA monitoring obligations from 2013-2014 as specified in the NMFS' Final Rule, Letters of Authorization, and Biological Opinions. Monitoring results are briefly summarized in this report with detailed technical analysis contained in Debich et al. (2014).

For additional clarification, there was no Navy at-sea activity or vessel use within the GOA TMAA during this reporting period.

YEAR 4 SUMMARY: Passive Acoustic Monitoring- Navy committed to long-term passive acoustic monitoring within the GOA TMAA as the most scientifically valid and cost effective means of obtaining year-round marine mammal occurrence data (DoN 2010).

A total of five (5) autonomous bottom-mounted High-frequency Acoustic Recording Packages (HARP) from Scripps Institution of Oceanography[1] were deployed on the shelf (n=1), slope (n=2), and seamounts (n=2) within the Gulf of Alaska from June 2013 to May 2014 (**Figure 1**). A total of 33,706 hours, covering 1,404 days of acoustic data were recorded in these deployments (Debich et al. 2014).

The elevated number of HARPs (five from 2013-2014) was a limited, one year increase in GOA TMAA monitoring above the Navy's original commitment for two (2) passive acoustic monitoring devices (DoN 2010). The goal of this year's monitoring was to:

- expand spatial monitoring coverage
- monitor marine mammal vocalizations and echolocation clicks
- derive seasonality of call occurrence
- detect anthropogenic sounds

[1] Technical details on HARP design and capability are available at:
http://cetus.ucsd.edu/technologies_AutonomousRecorders.html
HARPS record marine mammal vocalizations and echolocation clicks, as well as anthropogenic sounds on internal hard drives that must be retrieved during field service calls approximately every 7-10 months depending on battery life and duty cycle.

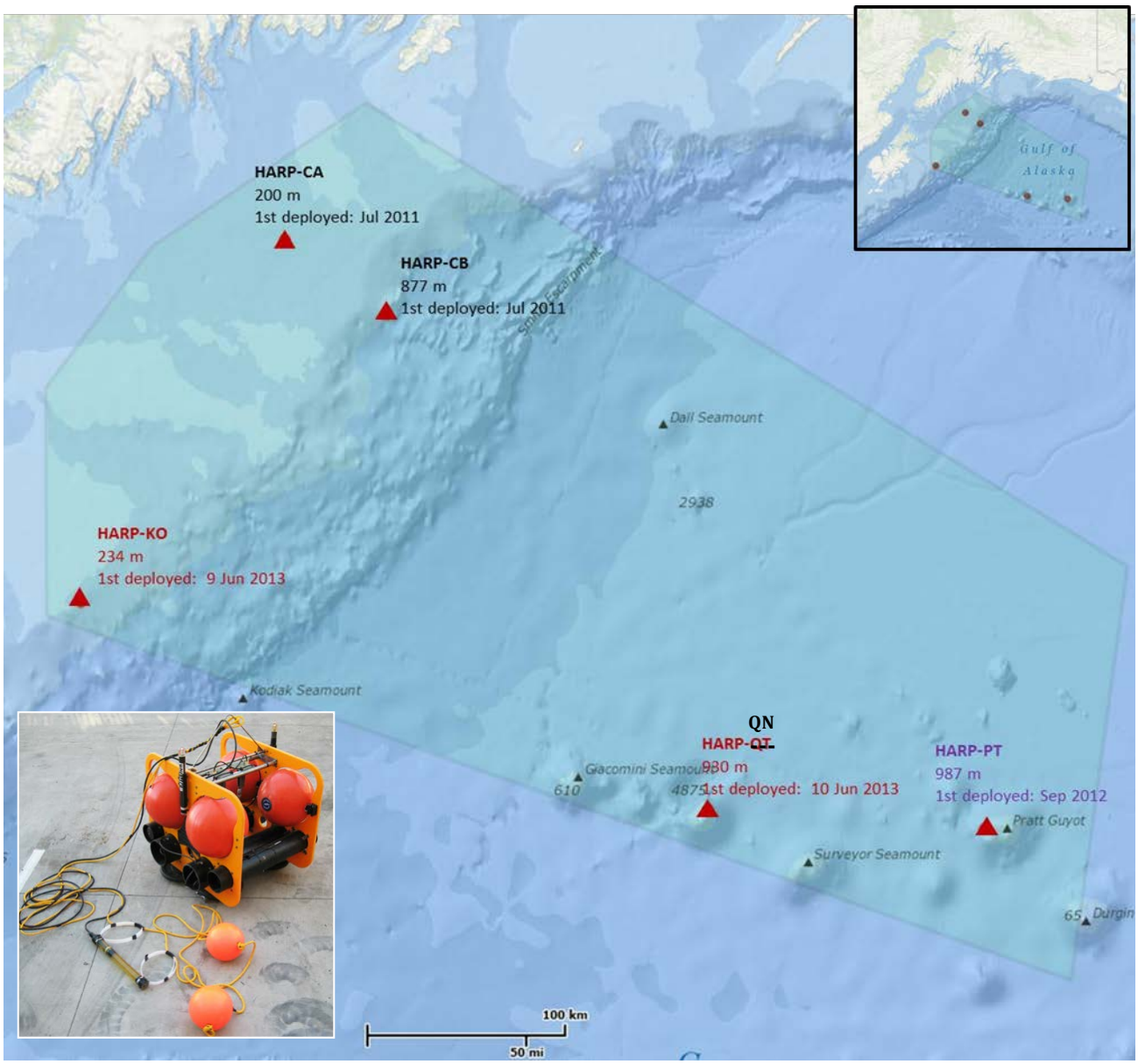

Figure 1. Location of five Navy funded HARPs in the Gulf of Alaska 2013-2014.
(Picture of HARP courtesy of J. Hildebrand, Scripps Institute of Oceanography; site "QN" originally mislabeled "QT" in original figure)

The below information is from the five HARP analysis for the period June 2013 through May 2014 and quoted from Debich et al. (2014).

Focus in this report is to summarize results primarily for ESA-listed species and beaked whales. Additional information is also available in Debich et al. (2014) for other detected species.

Figure 1 shows individual HARP locations mentioned below with:

- HARP CA shelf site
- HARP CB northern slope site
- HARP KO slope site off Kodiak Island
- HARP QN Quinn Seamount
- HARP PT Pratt Seamount

Baleen whales - "Across all sites, fin whales and humpback whales were the most commonly detected baleen whales throughout the recordings."

Blue whales- "Blue whale D calls and Central Pacific tonal calls peaked in summer months, while blue whale Northeast Pacific B calls and fin 20 Hz calls peaked later in fall months. Blue whale D call detections were the highest from June to August 2013. Very few D calls were detected at site CA, while most D call detections occurred at sites CB and QN. There was no discernable diel pattern for blue whale D calls. Blue whale Northeast (NE) Pacific B calls were detected from June 2013 through March 2014 with a peak in September – October 2013 and with fewest calls detected at sites CA and QN. There was no discernable diel pattern for the NE Pacific B calls. Central Pacific tonal calls were detected at sites CB, PT, and QN from June to October 2013 with most detections occurring in July and August. There was no diel pattern for Central Pacific tonal calls."

Fin whales- "Fin whale 40 Hz calls peaked in summer months at sites CB, PT, and QN whereas these calls peaked in fall months at sites CA and KO. There was no discernable diel pattern for fin whale 40 Hz calls. Fin whale 20 Hz calls, associated with singing and call-countercall among animals, were the dominant fin whale call type. Peaks in call index representative of 20 Hz calls occurred September – December 2013. Differences in the timing of peak calling presence per call type may indicate distinct behavioral functions associated with these call types (Širović et al., 2013)."

Humpback whales- "Humpback whale detections were high from late October 2013 through early January 2014 at sites CA and KO while they occurred in December 2013 through February 2014 at sites CB, PT, and QN. Overall, higher detections occurred at sites CA and KO than at other sites. The diel pattern suggests a preference for calling during nighttime hours. The substantial presence of humpback whales during the late fall at sites CA and KO, and at all sites during winter does not fit models of whale migration to subtropical or tropical waters during the winter breeding season. These data instead suggest that some whales remain in subpolar waters during the winter."

North Pacific right whale- "North Pacific right whale up calls were detected at site QN in June and August, 2013. Though there were few detections, each call was detected during daytime hours. North Pacific right whale upcalls have not been detected in previous recordings at these sites [(Baumann-Pickering et al. 2012, Debich et al. 2013)-part of Navy funded GOA TMAA monitoring] and these are the first recording of this species in this part of the Gulf of Alaska (Širović et al. in press)."

Based on response from A. Širović, given the location of HARP QN at near the southern boundary of the GOA TMAA (**Figure 1**), that HARPs as currently configured cannot report call directionality, and that North Pacific right whale calls could propagate several 10's up to 50 miles, it remains unclear if the North Pacific right whale detections were for animal(s) within or outside of the GOA TMAA.

Toothed Whales

Sperm whale- "Sperm whales detections were common at every site. Sperm whale clicks were most prevalent at site CB, with peaks in detections June through late-November 2013. Site CA had the least number of detections. There was no discernable diel pattern for sperm whale clicks. Site KO had no sperm whale detections in the months of January through mid-April 2014."

Beaked whales- "Baird's, Cuvier's, and Stejneger's beaked whales were detected at sites CB, PT, and QN, with peaks in detections occurring in winter and early spring months.

Baird's beaked whale was the most commonly detected beaked whale. Baird's beaked whale echolocation signals were detected at sites CB, PT, and QN. Peaks in detections at site CB occurred during winter months while peaks in detections at site QN occurred during spring months. There was no discernable diel pattern for Baird's beaked whale echolocation signals. There were slightly more cumulative hours of detections per week of Baird's beaked whales during this monitoring period than previous ones (Baumann-Pickering et al. 2012, Debich et al. 2013)."

Cuvier's beaked whale FM pulses were detected at the three sites for which there was effort. Cuvier's beaked whale FM pulses were detected at sites CB, PT, and QN. Peaks in Cuvier's beaked whale detections occurred in the winter months. There was no discernable diel pattern for Cuvier's beaked whale detections.

Stejneger's beaked whale FM pulses were detected at the three sites for which there was effort. Stejneger's beaked whale FM pulses were detected at sites CB, PT, and QN. Stejneger's beaked whale detections were most prevalent at site CB, with a peak in detections in September 2013 and lower detection rates from June through August 2013. There was no discernable diel pattern for Stejneger's beaked whale detections."

Anthropogenic sound- Several anthropogenic sounds were detected in the recordings: broadband ship noise, echosounders, low-frequency active (LFA) sonar, and explosions.

Shipping Noise- "Broadband vessel noise was a common anthropogenic sound and detected at all sites, though site CA had the least amount of detections. Peaks in broadband ship noise occurred in late March and early April 2014 at site CA, late June late fall 2013 at site KO, and in June 2013 and February 2014 at site QN. There was a peak in detections beginning at or slightly before sunrise, continuing throughout the daytime hours, at site CB. In general, there were more broadband ship detections during this monitoring period than previous monitoring periods (Baumann-Pickering et al. 2012, Debich et al. 2013)."

Echosounders- "Echosounders across a variety of frequencies were detected in low numbers at sites CA, CB, KO, and QN. Echosounder pings were more prevalent at sites CA and CB than other sites. This could indicate closer, local boat sources at sites CA and CB. There were no echosounder pings at sites CA, CB, and KO during the late fall and winter months. This corresponds with the lower levels of shipping noise at sites CA and KO. Most echosounder pings occurred during daytime hours at site CA. There were too few echosounder ping detections at sites KO and QN to establish a diel pattern."

Explosions- "Explosions were detected in low numbers at each site. Most explosion detections occurred during summer months at sites CB, KO, PT, and QN. A peak in detections at site CA occurred during late-October 2013. During the summer, the explosions were most common at the offshore sites PT and QN, although they were detected at all sites. A peak in detections in fall occurred at site CA during late October 2013, when few detections occurred at sites CB and KO. Explosions were low or ceased during winter months at all sites. Though there were few explosion detections, most detections occurred during daytime hours. The explosions are likely fishery-related seal bombs based on the spectral properties of the signals."

Mid-frequency active sonar- "No mid-frequency active (MFA) sonar events were detected throughout the recordings."

Low-frequency Active Sonar- "Low Frequency Active (LFA) sonar was reported in June and July 2013 at site QN. Site QN was the only site with reported LFA detections. Detections peaked in June 2013. There were no detections after July 2013. Most detections occurred during daytime hours."

Based on review of the information in Debich et al. (2014) and related spectrograms, a retired Navy operator trained in U.S. Navy LFA concluded the acoustic signals reported in Debich et al. (2014) could not have come from U.S. Navy LFA. Furthermore, there was no U.S. Navy LFA use during the time frame described in Debich et al. (2014), nor any within 1,000 miles of the HARP QN in the Gulf of Alaska as confirmed by Navy LFA program managers at Chief of Naval Operations and operations staff within U.S. Pacific Fleet.

PROPOSED YEAR 5 MONITORING FROM 1 NOVEMBER 2014 TO 31 OCTOBER 2015

For 2014-2015, Navy will be returning to the originally obligated commitment for deployment of two (2) long-term passive acoustic monitoring devices.

Monitoring Technique	2014-2015 Implementation
Passive Acoustic Monitoring	Maintain passive acoustic data collection from two (2) HARPs through June 2015 and present final analysis from these HARPs in the December 2015 annual report
Underwater Glider Passive Acoustic Deployment	Deploy underwater glider within the northern Gulf of Alaska*

Supporting this objective, in June 2014 Scripps Institution of Oceanography retrieved all deployed HARPs in the GOA TMAA. Two HARPs were then redeployed, one on the slope (HARP CB) and one on Quinn Seamount (HARP-QN)(**Figure 1**). These devices will continue to collect data until June 2015, after which they will be permanently removed and data analyzed by December 2015

Reporting- Previous year's monitoring reports, updates, and links to other research by range complex, including the GOA TMAA, will be posted onto this site as available. The site can be accessed at: http://www.navymarinespeciesmonitoring.us/

OTHER FUTURE NAVY RESEARCH PLANNED FOR THE GULF OF ALASKA

Ocean glider deployment (June-July 2015)-U.S. Pacific Fleet in support of additional Navy monitoring within the GOA TMAA funded an Office of Naval Research-sponsored passive acoustic glider deployment in the summer of 2014. This proposed effort was described in the Navy's 2013 GOA TMAA annual monitoring report (DoN 2013).

Due to glider technical difficulties in the summer of 2014 and conflict with similar subsequent surveys with the same glider in the Marinas Islands and Hawaii, it was decided to rescheduled the GOA TMAA glider survey for the next available window in June-July 2015. Goals are for the glider to complete a 600 km track within the slope waters of the Gulf of Alaska and collect marine mammal vocalization and echolocation click data. Developed by the Applied Physics Laboratory of the University of Washington and Oregon State University, the glider can travel about 20 km/day for a period of weeks to months and dive from the surface to 1,000m and back in a few hours.

The Navy will report on results from the 2015 glider deployment in the December 2015 annual monitoring report.

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