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Cruise Report
Marine Mammal and Sea Turtle Observer UNDET Monitoring
Hawaii Range Complex: 3 April 2014

Prepared for:
Commander, U.S. Pacific Fleet

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14. ABSTRACT
In order to train with mid-frequency active sonar (MFAS) and underwater explosives, the Navy has obtained from the National Marine Fisheries Service (NMFS) a Letter of Authorization (LOA) under the Marine Mammal Protection Act (MMPA) and a Biological Opinion under the Endangered Species Act. The Hawaii Range Complex (HRC) Monitoring Plan was developed with NMFS to comply with the requirements of the LOA. The monitoring projects and reporting will provide science-based answers to questions regarding whether or not marine mammals and sea turtles are exposed and reacting to Navy MFAS and exposives. The objectives of the monitoring is to to further our understanding of the monitoring questions:
1. What is the effectiveness of Navy lookouts when implementing protective measures?
2. Which marine mammals are observed in the vicinity

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List of Acronyms and Abbreviations

EIS	Environmental Impact Statement
EXWC	Engineering and Expeditionary Warfare Center
ft	Feet
fsw	Feet of sea water
GPS	Global Positioning System
HRC	Hawaii Range Complex
HST	Hawaii standard time
kts	Knots (nautical miles per hour)
MDSU-1	Mobile Diving Salvage Unit ONE
MFAS	Mid-frequency active sonar
MMO	Marine mammal observer
NEW	Net explosive weight
nm	Nautical miles
NMFS	National Marine Fisheries Service
PMAP	Protective Measures Assessment Protocol
RHIB	Rigid-hulled inflatable boat
RIMPAC	Rim of the Pacific, major training exercise
UNDET	Underwater detonation
VHF	Very high frequency
yd(s)	Yard(s)

1. INTRODUCTION

1.1 MONITORING PLAN

In order to train with mid-frequency active sonar (MFAS) and underwater explosives, the Navy has obtained from the National Marine Fisheries Service (NMFS) a Letter of Authorization (LOA) under the Marine Mammal Protection Act (MMPA) and a Biological Opinion under the Endangered Species Act. The Hawaii Range Complex (HRC) Monitoring Plan was developed with NMFS to comply with the requirements of the LOA. The monitoring projects and reporting will provide science-based answers to questions regarding whether or not marine mammals and sea turtles are exposed and reacting to Navy MFAS and explosives. The objectives of the monitoring is to to further our understanding of the monitoring questions:

1. What is the effectiveness of Navy lookouts when implementing protective measures?

2. Which marine mammals are observed in the vicinity of ASW and UNDET training that could be exposed to Navy sound sources?

1.2 UNDERWATER DEMOLITION

Purpose - Ensure mission readiness by training in the use of underwater explosive for destruction or neutralization of naval mines, harbor clearance, or combat swimmer operations.

Description - Underwater demolition exercises include training in the detection and explosive attack of inert (non-explosive) underwater mines, as well as conducting simulated harbor clearance operations. Tactics against ground or bottom mines involve the diver placing a specific amount of explosives, which when detonated underwater at a specific distance from a mine, results in neutralization of the mine. Floating, or moored, mines involve the diver placing a specific amount of explosives directly on the mine. Harbor clearance activities involve the diver placing a specific amount of explosives on underwater structures in order to clear these structures from their current position in the water column, or to perform underwater cutting, shearing, cratering, and venting when other tools are inappropriate. Combat swimmers train in use of charges specifically to attack enemy targets from underwater clandestinely.

Location - The activities for this exercise took place offshore in the Puuloa Underwater Range (Danger Zone 334.1370, also called Keahi Point in prior RIMPAC Environmental Assessments), Pearl Harbor.

Duration - Each demolition activity generally lasts 1 to 4 hours.

Standard Operating Procedures - All demolition activities are conducted in accordance with Commander U.S. THIRD Fleet Instruction (COMTHIRDFLTINST) 3120.2B, Underwater Detonation Procedures in the Third Fleet Area of Operations (Department of the Navy, 2013), augmented with Protective Measures Assessment Protocol and Navy messages for more recent mitigations. Before any explosive is detonated, the area is cleared of vessel traffic and other recreational activities, divers are transported a safe distance away from the explosive, and a thorough search is made to identify the presence of marine mammals or sea turtles within the 640 m (700 yd) exclusion zone surrounding the underwater detonation (UNDET) area for at least 30

minutes prior to (and following) the exercise. Any sighting of a marine mammal or sea turtle delays the exercise until the animals have voluntarily cleared the exclusion zone for at least 30 minutes. Specifically, all mitigation measures as described in the MMPA LOA and HRC Environmental Impact Statement (EIS) are followed. Standard practices for tethered mines in Hawaiian waters require mine neutralization charges to be suspended 3 m (10 ft) below the surface of the water. For mines on the shallow water floor (less than 40 ft of water), only sandy areas that avoid/minimize potential impacts to coral should be used for explosive charges.

2. METHODS

2.1 PARTICIPANTS AND LOCATION

Navy marine species observers

- Meredith Fagan – Naval Facilities Engineering Command Pacific (NAVFAC PAC)
- Lee Shannon, USNR – Naval Facilities Engineering and Expeditionary Warfare Center (NAVFAC EXWC)

Naval Dive Team
US Navy - Mobile Diving Salvage Unit ONE (MDSU-1)

Vessels Involved in UNDET exercise

- 2 x RHIB ~6-7m carrying MDSU-1 divers and personnel
- 1 x RHIB~7m carrying two Navy MDSU-1 personnel and two Navy biologists (MMOs)

Location
Puuloa Underwater Range (Danger Zone 334.1370)

2.2 Description

MMO monitoring was conducted by Navy biologists from a small vessel platform that accompanied the exercises on site at the Puuloa Underwater Range (Danger Zone 334.1370) (Fig. 1). Monitoring occurred on 3 April, 2014; a 7 m RHIB was provided and piloted by personnel of Mobile Diving Salvage Unit ONE (MDSU-1).

As listed above in section 2.1, two MMOs were on board the monitoring vessel on 3 April. The MMOs present were equipped with 7x50 binoculars, a Canon camera with 200mm zoom lens, and access to VHF communications with the other boats. One MMO attempted to make underwater acoustic recordings of the UNDET events to collect data on ambient sound levels before and after detonations. The other MMO served the data recorder as well as a secondary observer, and was equipped with data entry sheets (Table 1), a clipboard and a handheld chart-plotting marine GPS unit. The MMOs were on effort throughout the duration of the day, from the time of the vessel leaving the dock, until its return. All sightings by MMOs and Navy lookouts were recorded, as well as whether mitigation measures were followed. Monitoring surveys from other platforms (e.g., aerial) were not conducted for these UNDET monitoring efforts.

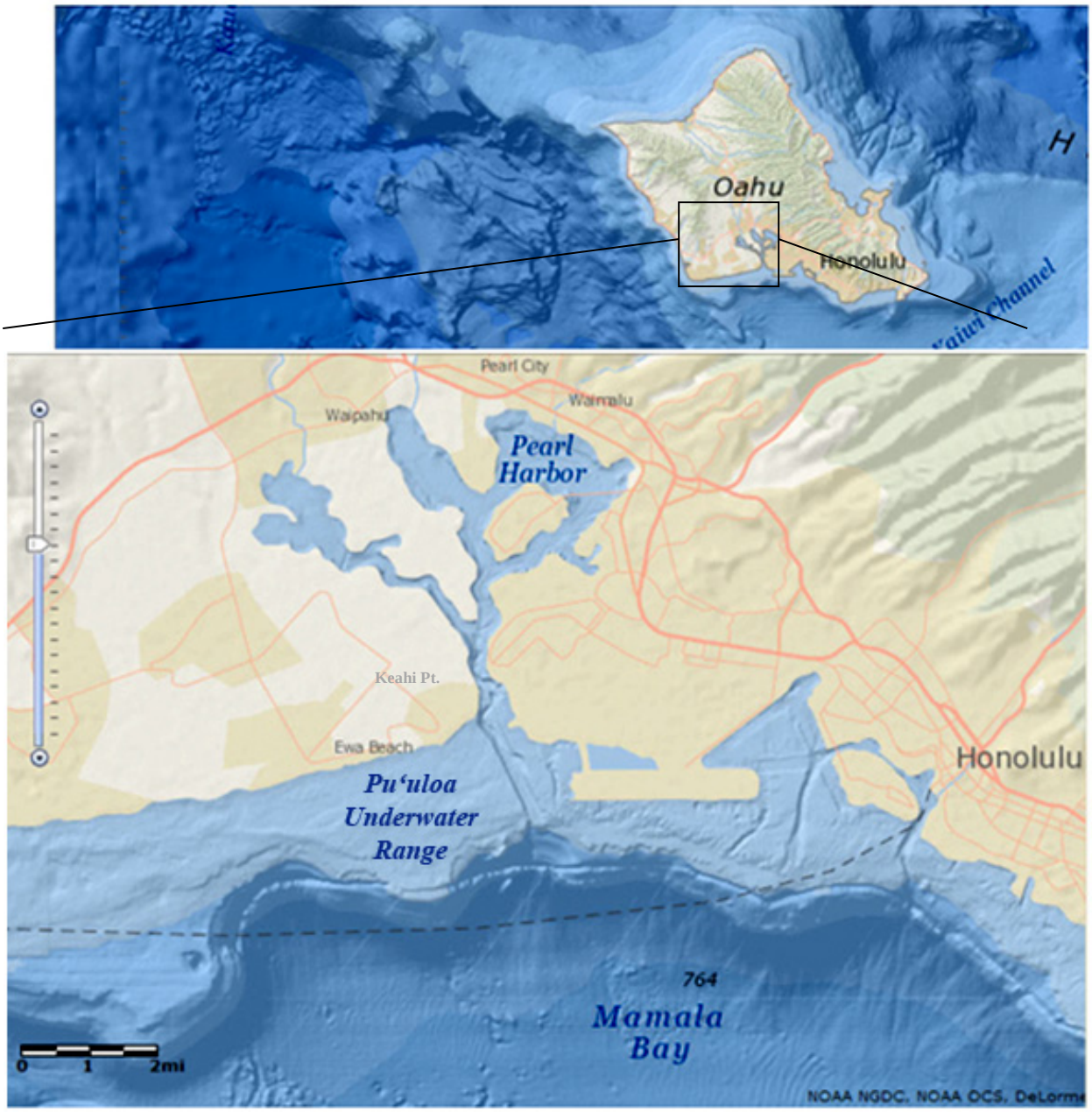

Figure 1. Puuloa Underwater Range.

3. RESULTS

MDSU-1 performed one underwater detonation (UNDET) event on 3 April 2014, at the Puuloa Underwater Range (Danger Zone 334.1370), approximately 1.7 nm from Keahi Point located west of the Pearl Harbor entrance channel. The intent of the exercise was to provide training for underwater demolition. The bottom depth of the detonation training locations was approximately 20 m (60 fsw). The device was remotely triggered using a MK 67 radio-controlled command detonator. As a continuation of a pilot study, a MMO studied the feasibility of utilizing a dipping

hydrophone to take recordings of the underwater detonation events from the MMO vessel platform during the event.

The net explosive weight (NEW), approximate location, and time of this event were: 9.8lbs; N 21.28816º, W 157.98566º; 11:18am

The approximate location of the MMO vessel at time of detonation was: N 21.28018º, W 157.99373º.

A summary of sightings is given in Table 1.

Table 1. Sightings summary: 3 April 2014

	Date	Time (HST)	Species	Group size (min/max/best)	Vessel location
1	3 Apr 2014	08:55:20	*Chelonia mydas*	2/2/2	N 21.30259º W 157.95944º
2	3 Apr 2014	09:43:57	*Chelonia mydas*	1/1/1	N 21.28646º W 157.97971º
3	3 Apr 2014	10:17:21	*Chelonia mydas*	1/1/1	N 21.28798º W 157.97844º
4	3 Apr 2014	11:52:11	*Chelonia mydas*	1/1/1	N 21.28750º W 157.97971º
5	3 Apr 2014	12:01:07	*Chelonia mydas*	1/1/1	N 21.30022º W 157.95822º
6	3 Apr 2014	12:01:42	*Chelonia mydas*	1/1/1	N 21.30300º W 157.95981º
7	3 Apr 2014	12:02:38	*Chelonia mydas*	2/2/2	N 21.32979º W 157.96596º

Weather conditions for the survey day were sunny (about 15% cloud cover) but windy (Beaufort Sea State [BSS] 5 with 4-5ft. swells). No pictures were taken during the survey due to the rough conditions. However, during the outbound transit to the exercise location, the monitoring vessel sighted two green sea turtles (*Chelonia mydas*) in the vicinity of the Pearl Harbor entrance channel buoys 1, at N 21.30259º, W 157.95944º, well outside the mitigation range.

When the RHIB carrying the MMO's arrived at the Puuloa Underwater Range (Danger Zone 334.1370), they were informed that one of the other vessels had spotted a sea turtle within the mitigation range. At that point, the 30 minute pre-exercise visual survey commenced. Approximately 16 minutes into the survey period (sighting 2, Table 1), a sea turtle was spotted inside the mitigation zone. The detonation was delayed for another 30 minute period and the visual survey continued. A sea turtle was spotted (sighting 3, Table 1), this time outside of the mitigation zone, approximately 33 minutes later. Since the animal was outside of the mitigation zone, it was determined that the detonation could take place.

The first attempt to detonate the UNDET occurred approximately an hour after sighting 3 (Table 1). During this time, the RHIB carrying the MMO's, as well as one of the RHIBs with MDSU-1 personnel continued to monitor for marine species. It was unclear to the Navy biologists what caused this delay. However, it is standard procedure to cease using any radio transmitters while preparing to fire an RC command detonated device. No VHF radio traffic would be heard to indicate the cause of the delay. The first attempt to fire the UNDET was unsuccessful. The second attempt to fire the UNDET occurred approximately 5 minutes later.

During the post-exercise visual survey, a sea turtle was once again spotted within the mitigation zone (sighting 4, Table 1). It is thought that sightings 2 through 4 were all the same sea turtle based on the location, size of the turtle, and behavior. The sea turtle appeared to float at the surface for long periods of time but did not seem to be in distress in any other way. However, when the RHIB got close to the sea turtle to see if it was in distress, the turtle dove away from the RHIB.

There were three more sightings of sea turtles during the transit back to Pearl Harbor near the entrance channel buoys.

4. CONCLUSIONS

MDSU-1 was cooperative and instrumental in the coordination of placing MMOs on board for monitoring the UNDET events. In general, the UNDET training requires Navy divers to be vigilant with a number of safety considerations, not only for the environment, but for the personnel on board and civilians in the vicinity. They knew the mitigation requirements well and followed them as described in the MMPA LOA and HRC EIS.

The pilot study of making digital underwater recordings with a dipping hydrophone during UNDET exercises was conducted as described during the October 26 and November 2 2013 events. The 3 March recording was begun 1-2 minutes prior to detonation, and continued for 2-5 minutes afterwards. These data will contribute to a corpus of information on relative changes in ambient sound after detonations, to be analyzed at later time.

5. ACKNOWLEDGEMENTS

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