

APPENDIX I. Cruise Report, Marine Mammal Observer UNDET Monitoring Hawaii Range Complex, 26-27 April 2011

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Final Cruise Report Marine Mammal Observer UNDET Monitoring Hawaii Range Complex, 26-27 April, 2011

Prepared for:
Commander, U.S. Pacific Fleet



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List of Acronyms and Abbreviations

ft	Feet
HRC	Hawaii Range Complex
HST	Hawaii standard time
kts	Knots (nautical miles per hour)
LMDE	Limpet Mine Disposal Equipment
MDSU	Mobile Diving Salvage Unit
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	Under-water 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 a Letter of Authorization (permit) from the National Marine Fisheries Service (NMFS) under the Marine Mammal Protection Act 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 under the permit. The monitoring plan and reporting will provide science-based answers to questions regarding whether or not marine mammals are exposed and reacting to Navy MFAS. The objectives of the monitoring plan are to answer the following questions:

1. Are marine mammals and sea turtles exposed to MFAS at regulatory thresholds of harm or harassment? If so, at what levels and how frequently are they exposed?
2. If marine mammals and sea turtles are exposed to MFAS in the HRC, do they redistribute geographically in the HRC as a result of repeated exposure? If so, how long does the redistribution last?
3. If marine mammals and sea turtles are exposed to MFAS, what are their behavioral responses? Are they different at various levels?
4. What are the behavioral responses of marine mammals and sea turtles that are exposed to various levels and distances from explosives?
5. Are the Navy's suite of mitigation measures for MFAS and explosives (e.g., Protective Measures Assessment Protocol [PMAP], measures agreed to by the Navy through permitting and consultation) effective at avoiding harm or harassment of marine mammals and sea turtles?

The Marine Mammal Observers (MMO) effort is intended to address questions 4 and 5.

1.2 UNDERWATER DEMOLITION

Purpose—To provide training in the identification and destruction or neutralization of inert ground mines, floating/moored mines, harbor clearance, and excess ship hulks.

Description—Underwater demolition exercises include training in the detection and explosive attack of inert, underwater mines, as well as harbor clearance. 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.

Location—The activities for this exercise took place offshore in the Pu'uloa 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 Procedures—All demolition activities are conducted in accordance with Commander Naval Surface Forces Pacific (COMNAVSURFPAC) Instruction 3120.8D, Procedures for Disposal of Explosives at Sea/Firing of Depth Charges and Other Underwater Ordnance (Department of the Navy, 1993). Before any explosive is detonated, divers are transported a safe distance away from the explosive and a thorough search is made of the area to identify marine mammals or sea turtles. If any are seen, the exercise is delayed until the animals leave the area. Specifically, all mitigation measures as described in the MMPA permit and Hawaii Range Complex EIS are followed. Standard practices for tethered mines in Hawaiian waters require ground mine explosive charges to be suspended 3 meters (10 feet) below the surface of the water. For mines on the shallow water floor (less than 40 feet of water), only sandy areas that avoid/minimize potential impacts to coral would be used for explosive charges.

2. METHODS

2.1 MARINE MAMMAL OBSERVERS

MMO monitoring was conducted from a shipboard platform that accompanied the exercises on site at the Pu'uloa Underwater Range (Danger Zone 334.1370). For the monitoring during 26-27 April 2011, a 27' Boston Whaler less provided and piloted by personnel of Mobile Diving Salvage Unit One (MDSU-1) was dedicated to the monitoring effort. There were two MMOs on board, each equipped with a pair of 7x50 binoculars, watch, and access to VHF communications with the other boats. One MMO was the data recorder as well as a secondary observer, and was equipped with a clipboard with data entry sheets (Table 1) 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 were not conducted for these UNDET monitoring efforts.

2.2 COMMUNICATIONS

Communication between MMOs and MDSU-1, and the other participating vessels (see "Results" below) were performed via VHF radio or direct communication with Navy personnel on the boat.

3. RESULTS

A total of four underwater detonation (UNDET) events were monitored: Two UNDETs on each day during the 26-27 April training exercise by MDSU-1 in the Pu'uloa Underwater Range for a total observation time of 5 hours 34 minutes.

3.1 PARTICIPANTS AND LOCATION

Navy Biologist observers:

Julie Rivers - Commander, Pacific Fleet (CPF) – April 26-27

Robert Uyeyama – Naval Facilities Engineering Command Pacific (NAVFAC PAC) – April 26
Morgan Richie - Naval Facilities Engineering Command Pacific (NAVFAC PAC) – April 26, 27

Naval Dive Team:

US Navy - Mobile Diving Salvage Unit One (MDSU-1)

Vessels Involved in UNDET exercise:

2X RHIB ~24 ft

1X 27 ft Boston Whaler - (Carrying three Navy MDSU-1 personnel and two Navy Biologist MMOs)

Location:

Pu'uloa Underwater Range (*Danger Zone 334.1370, also called Keahi Point in prior RIMPAC Environmental Assessments*)

3.2 DESCRIPTION OF ACTIVITY

MDSU-1 performed two underwater detonation (UNDET) events each day on 26 and 27 April 2011, for a total of four events, in the Pu'uloa Underwater Range, approximately 1.7 nm from Keahi Point located west of the Pearl Harbor entrance channel. The intent of the exercises was to provide training for harbor clearance activities. The bottom depth of the training location was approximately 15 m.

The two UNDETs of 26 April contained a net explosive weight (NEW) of 3.64 lb., and 2.44 lb., and were located at were located approximately at 21.29492° N, 157.98775° W.

The two UNDETs of 27 April contained 6.038 lb, and 16.106 lb. NEW, and were located approximately at 21.29025° N, 157.98958° W.

On both days, a total of 3 boats participated: 2 RHIBs, as well as the Boston Whaler that was dedicated to the monitoring effort (Fig. 1) and carried the two Navy biologist observers in addition two three MDSU-1 personnel.

3.2.1 UNDETs of 26 April

The purpose of the exercise was harbor clearance. The simulated obstruction was composed of bar of metal embedded in a cement ballast and oriented vertically in the water. The training task was to shear the metal bar using an explosive charge placed by divers (Fig 5.) The monitoring vessel was one of three vessels at the training location, the other two being ~24 ft RHIBs operated by MDSU-1. Two underwater explosive events were monitored on this day. Both UNDET locations on this day were within the Pu'uloa Underwater Range at approximately 21.29492° N, 157.98775° W (Fig. 2).

*No marine mammals or sea turtles were observed at the training location during the course of this day's monitoring effort for both events one and two, with the exception of a single sighting of a green sea turtle (*Chelonia mydas*) made during the return transit from the exercise, as described below under Event Two.*



Figure 1. Navy biologist observer on Boston Whaler (left), and one of two participating RHIBs (right).

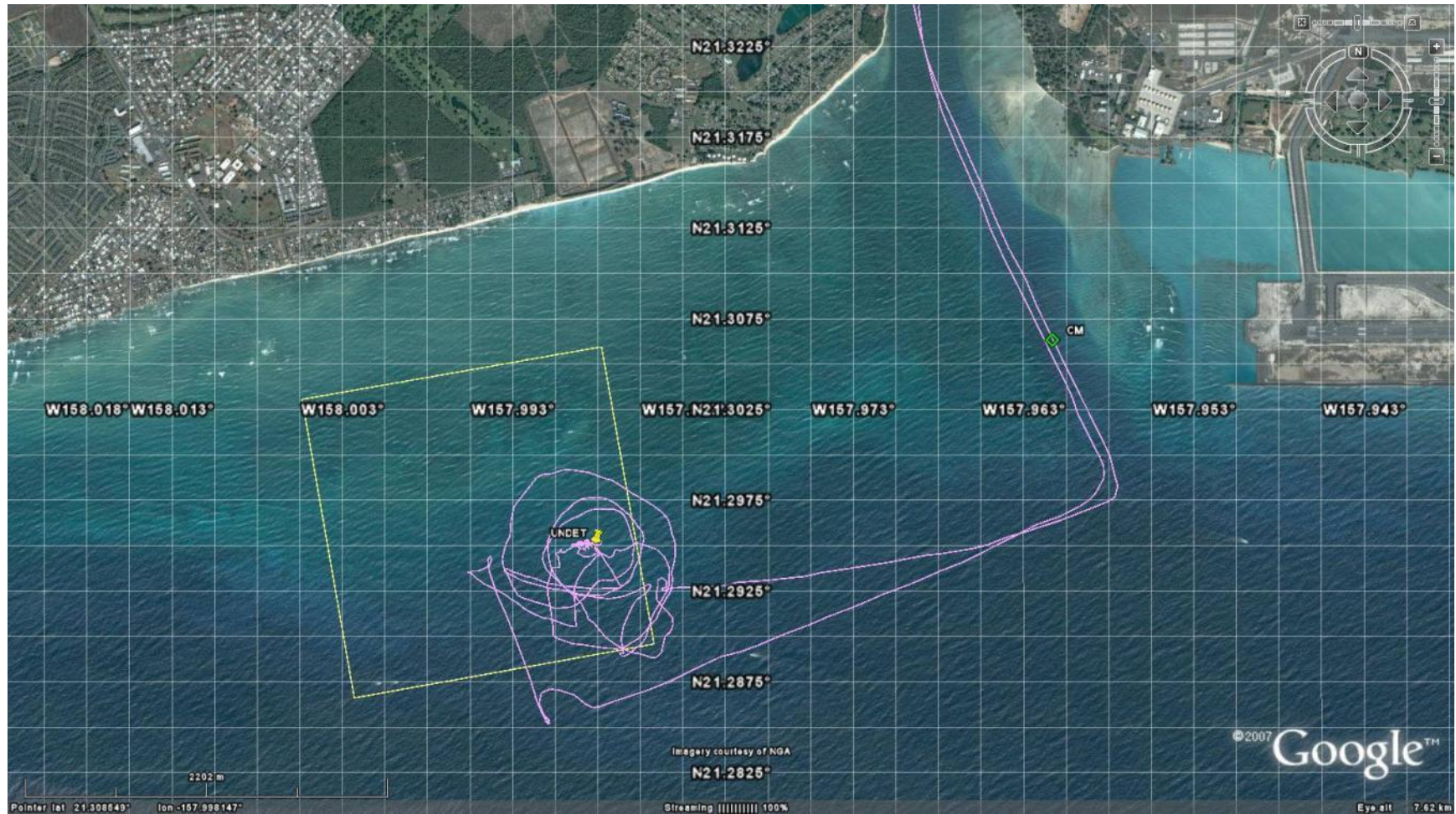


Figure 2. UNDET monitoring of 26 April 2011. The boundaries of the Pu'uloa Underwater range are marked by the yellow square. Monitoring vessel track shown in pink. The entrance to Pearl Harbor is at top. Sightings key: CM=Chelonia mydas.

EVENT ONE (NEW 3.64 Ib): The monitoring vessel departed the dock within Pearl Harbor at 09:56, and arrived at the training location at 10:33. The sea state remained at Beaufort 4 throughout the day's effort, with a swell height up to 2 ft. Cloud cover was 15% and visibility was excellent throughout the exercise. No marine mammals or sea turtles were observed during the transit to the training location.

At 10:36 the exercise participants located an exercise buoy that had previously been deployed to mark the location of the simulated obstruction. At this time, the crew of the first RHIB proceeded to set the explosive charges on the simulated obstruction, while the pre-exercise mitigation survey for event one was begun by the second RHIB, which surveyed a roughly circular radius at a distance of approximately 250-600 yds (~225 - 550 m) (Fig. 3). The monitoring vessel also surveyed the same circular radius at a position approximately opposite ends such that the UNDET location was roughly at the midpoint between the two monitoring vessels and conducted a visual search to both starboard and port sides to cover the full mitigation range of 700m. At 11:07 the RHIBs switched positions: the first RHIB took over conducting the visual survey along the circular path, while the second RHIB moved to the UNDET location to place the blasting caps then connect and arm the radio-controlled detonation device. All communication radios were secured and the UNDET shot was triggered by the radio frequency device at 11:22. The pre-exercise mitigation survey for event one had therefore been conducted for 46 minutes. The post-exercise mitigation survey began at 11:26, again utilizing the same circular radius with one RHIB and the monitoring vessel on opposite sides of the circle, and was conducted for 35 minutes, ending at 12:01.

EVENT TWO (NEW 2.44 Ib): The post-exercise survey for event one (beginning at 11:26) also served as the pre-exercise survey for event two. Again one RHIB set a charge while the other RHIB monitored, then the two vessels switched places to complete setting the blasting caps and arming the radio detonation device while the first vessel conducted monitoring. The UNDET shot was triggered by radio frequency device at 12:01. The pre-exercise mitigation survey for event two therefore had been conducted for 35 minutes (not including the 46-minute pre-exercise survey conducted for event one). After detonation (Fig. 4), the crews of both RHIBs retrieved floating debris composed of small sections of plastic bubble-wrap (Fig. 6). All visible pieces were retrieved including small pieces only a few inches in length. At 12:21 another small device that emitted a short pulse of smoke was set and detonated at the location of the two previous UNDETs. At 12:26 personnel transfers were begun between the three vessels, after which all vessels departed the range to return to port. Therefore the post-exercise mitigation observations were conducted for approximately 25-30 minutes after event two. During the return transit, a green sea turtle (*Chelonia mydas*) was observed at 12:34 (bearing 100 degrees to starboard, distance 10 m). The approximate distance of this sighting to the UNDET location was 3,058 m (3345 yds), well outside of mitigation range. The monitoring vessel returned to port at 12:42, for a total on-water time of two hours 46 minutes.



Figure 3. MDSU-1 divers preparing for the UNDET. RHIB is visible at right. Divers from the crew of the RHIB in the foreground right place charges at the obstruction marked by the buoy at far left. The second RHIB in the background conducts a circular perimeter.



Figure 4. Event two of 26 April: 2.44 lb.



Figure 5. Sheared metal of the simulated obstruction after exercises of 26 April.



Figure 6. MDSU-1 retrieving plastic bubble-wrap pieces from water surface following UNDETs of 26 April.

3.2.2 UNDETs of 27 April

As during the previous day, the purpose of the exercise was harbor clearance, training with the same simulated obstruction and clearance techniques as described above. As before, the monitoring vessel was one of three vessels at the training location, the other two being ~24 ft RHIBs operated by MDSU-1. Two underwater explosive events were monitored on this day. Both UNDET locations on this day were within the Pu'uloa Underwater Range at approximately 21.29025° N, 157.98958° W (**Error! Reference source not found.**).

EVENT ONE (NEW 6.038 lb): The sea state remained between Beaufort 2-3 throughout the day's effort, with a swell height up to 3 ft. Visibility was excellent throughout the exercise, with no significant cloud cover. The monitoring vessel departed the dock within Pearl Harbor at 09:46, and arrived at the boundary of the range at 10:27. Three green sea turtles were sighted from the time the vessels left the dock to the time that they arrived at the range. Two of these three turtles were mating approximately 20m from shore within Pearl Harbor (Fig. 9). Upon arrival, the crews of the two RHIBs alternated between preparing for the detonation at the UNDET site, and conducting a perimeter visual survey at a radius of between approximately 200 to 350 yds (~180 – 320 m), while the monitoring vessel continually monitored the perimeter at approximately the opposite side of the UNDET location. The two monitoring vessels conducted the visual search to both starboard and port sides to cover the full mitigation range of 700m. The detonation method was the same radio-controlled method of the previous day's exercises. The detonation for event one occurred at 11:01 (Figs. 10, 11). The pre-exercise survey was 34 minutes. The post exercise survey began immediately after event one at 11:03. At 11:07, a green sea turtle was sighted approximately 10 meters from the whaler, and re-sighted at 11:08, 11:10 and 11:11 (Fig. 12). Another green sea turtle was sighted approximately 200 m from the whaler at 11:09. Another green sea turtle was sighted at 11:41, 50 meters from the whaler, but was outside the exclusion zone. The post-exercise survey was served by the pre-exercise survey for event two, and began at 11:11 and lasted for 39 minutes, which was 30 minutes from the last sighting at 11:11 within the exclusion zone.

EVENT TWO (NEW 16.106 lb): The 30 minute monitoring interval for event two began at 11:11 (i.e., after the last sea turtle sighting within the mitigation zone) again with the RHIBs alternating between monitoring and preparing the charge for radio-controlled detonation. This second detonation, of 16.106 lb net explosive weight, occurred at 11:50 (Fig. 13), for a total of 39 minutes of pre-exercise survey. No green sea turtles were sighted between 11:50 and 12:18. Visual monitoring continued, and at 12:18, a small charge producing a short burst of smoke was activated at the UNDET location as in the previous day. At this time, preparations began to leave the exercise site. The monitoring vessel departed the previously-surveyed perimeter at 12:24, for a total post-exercise survey of 34 minutes. One dead fish – likely a filefish or triggerfish – was sighted after event two (Fig. 14). An attempt was made to collect the fish for identification, but collection was not possible without a net. The monitoring vessel went off-effort at 12:34, outside the Pearl Harbor entrance channel approximately west of the Honolulu airport's reef runway. Two mating green sea turtles were sighted off-effort near the entrance channel. Total monitoring time was 2 hours 48 minutes.

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Figure 7. UNDET monitoring of 27 April 2011. The boundaries of the Pu'uloa Underwater range are marked by the yellow square. Monitoring vessel track shown in pink. The entrance to Pearl Harbor is at top. Sightings key: CM=Chelonia mydas.

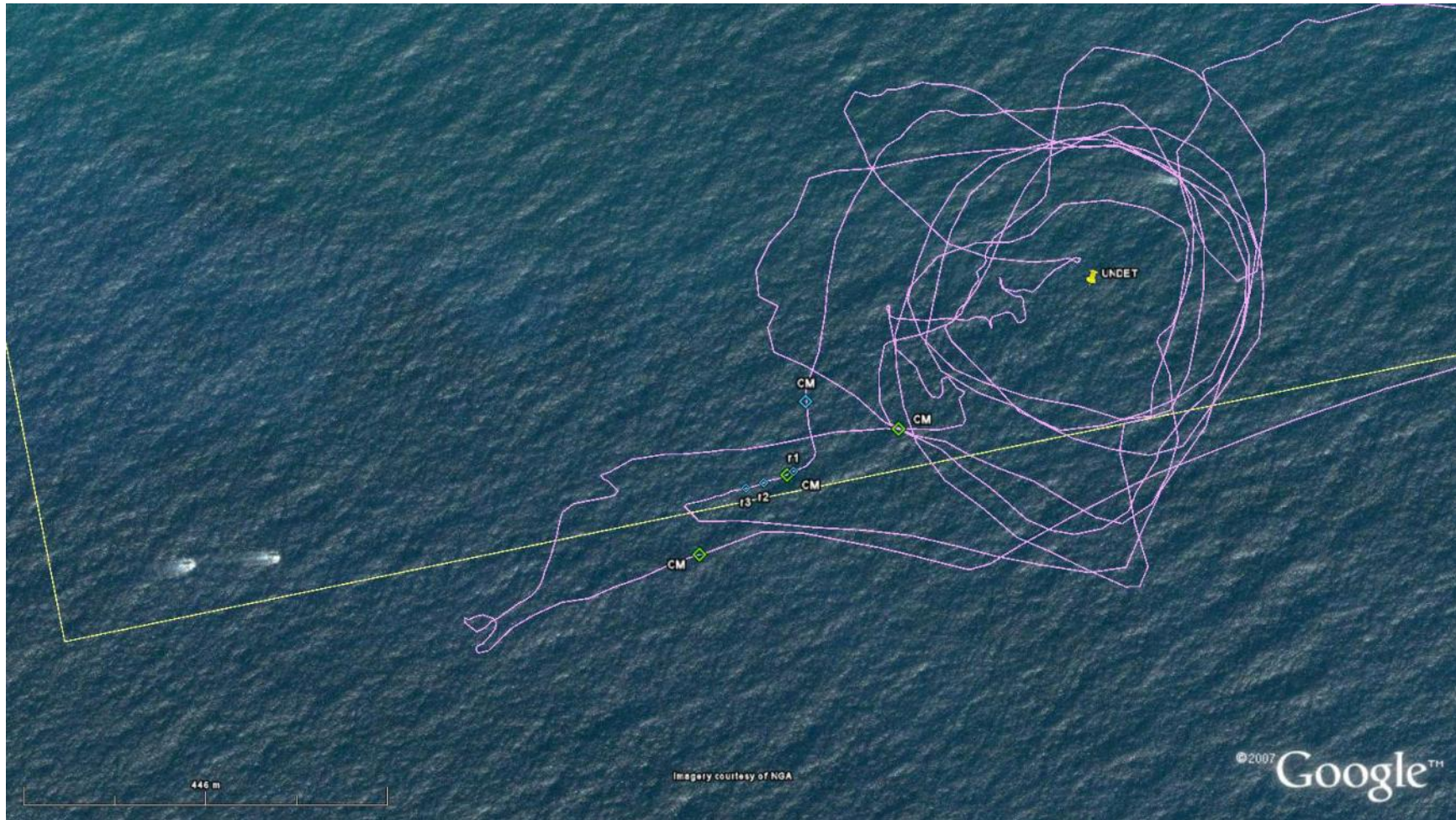


Figure 8. Detail of UNDET monitoring of 27 April 2011. The boundaries of the Pu'uloa Underwater range are marked by the yellow lines. Monitoring vessel track shown in pink. Sightings key: CM=Chelonia mydas; r1/r2/r3=successive re-sights of the CM in blue.



Figure 9. Green sea turtles mating in Pearl Harbor.



Figure 10. Event one of 27 April: 6.038 lb shot.



Figure 11. Water surface immediately after Event one of 27 April: 6.038 lb shot.



Figure 12. Green sea turtle sighted 11:07, April 27 after event one.



Figure 13. Event two of 27 April: 16.106 lb shot.



Figure 14. Dead filefish or triggerfish after event two of 27 April.

4. CONCLUSIONS

4.1 MARINE MAMMAL MONITORING

MDSU-1 was cooperative and instrumental with 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. Overall they knew the mitigation requirements well and followed them as described in the MMPA permit and Hawaii Range Complex EIS. The MMO time spent with the Navy divers helps foster the understanding of why these mitigation measures are in place and how important these measures are to protecting marine life and also to Navy training. Protocols for the coordination of future UNDET monitoring efforts were also clarified.

5. ACKNOWLEDGEMENTS

We thank the officers and crew of MDSU-1, including but not limited to CWO3 Chris Lehner and NDCS Richard Stafford for their outstanding support and hospitality during this cruise.

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