

**ENVIRONMENTAL ASSESSMENT
AND
DRAFT FINDING OF NO SIGNIFICANT IMPACT**



**TECHNOLOGY DEMONSTRATION
OF
REMOTELY OPERATED UNDERWATER MUNITIONS RECOVERY SYSTEM
(ROUMRS)
AND
ENERGETIC HAZARD DEMILITARIZATION SYSTEM (EHDS)
AT
ORDNANCE REEF (SITE HI-06)
WAI'ANAE, O'AHU, HAWAII**

Prepared for:



DEPARTMENT OF THE ARMY

**Office of the Assistant Secretary of the Army for Installations, Energy and Environment
Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health**

March 2011

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**Finding of No Significant Impact for the US Army's
Technology Demonstrations at Ordnance Reef (Site HI-06), Wai'anae, O'ahu, Hawai'i
[Remotely Operated Underwater Munitions Recovery System (ROUMRS) and Energetic
Hazard Demilitarization System (EHDS)]**

AUTHORITY: Pursuant to the National Environmental Policy Act (NEPA), as amended (42 USC 4347, Section 102 (2)(C); the implementing regulations issued by the Council on Environmental Quality (CEQ) (40 CFR 1500-1508); and Environmental Analysis of Army Actions (32 CFR 651), the Department of the Army gives notice that an Environmental Assessment (EA) has been prepared for proposed technology demonstrations at Site Hawai'i 06 (HI-06), Ordnance Reef, Wai'anae, O'ahu, Hawai'i. These technology demonstrations will assess the Remotely Operated Underwater Munitions Recovery System (ROUMRS) and Energetic Hazard Demilitarization System (EHDS).

PROPOSED ACTION: The Proposed Action (also referred to as the Demonstration) consists of technology demonstrations involving the limited recovery of underwater military munitions (UWMM) and the destruction (demilitarization) of any recovered UWMM using commercially available technologies that have been adapted, including development of new components and procedures, for the recovery and destruction of UWMM. Disposed UWMM are present at HI 06 on the ocean floor in US coastal waters off Wai'anae. The Proposed Action is not an environmental action, but rather a limited (roughly 21-day) demonstration of technologies (ROUMRS and EHDS) designed to evaluate the limited remote recovery of UWMM and the at-sea destruction of any recovered UWMM. These demonstrations will provide the Department of Defense technologies that may be required to address UWMM that are determined to pose an unacceptable risk to human health and the environment, while addressing concerns raised by the state of Hawai'i and local communities about the munitions present.

ALTERNATIVES CONSIDERED: The alternatives for the demonstration of newly developed or adapted technologies are limited. The two alternatives considered are the Proposed Action and the No Action Alternative. Although the Proposed Action could be performed at another location, the Demonstration Site (also known as Ordnance Reef or HI-06) was determined to be the only viable location for these demonstrations because the Army possesses extensive knowledge about the munitions present at the HI-06, including the depth and grid coordinates of individual and clusters of munitions. The characteristics (i.e., close-to-shore, shallow water—less than 120 feet, and a hard bottom surface) of the Demonstration Site provide conditions ideal for limiting any potential impact to the environment and ensuring safety. The Army has no other sites where all these conditions exist, therefore, alternative locations were not considered viable.

SUMMARY OF FINDINGS: The attached EA evaluated the potential effects of the proposed technology demonstrations (the Demonstration) on environmental resources at Ordnance Reef (HI-06) and the surrounding area. Environmental resources that could potentially be impacted by the Proposed Action that were assessed included: air quality, noise, biological resources, water resources, public health and safety, recreational resources, historic and cultural resources, and socio-economic conditions. Potential impacts of the Proposed Action on these resources are summarized below.

- **Biological Resources:** Sensitive habitat (i.e., coral reef) and protected species can be found within Ordnance Reef (HI-06). Under the Proposed Action, the potential for inadvertent damage to corals exists. However, the Proposed Action, which will be limited in scale and duration, will be guided by recommendations provided by the National Oceanic and Atmospheric Administration based upon pre-surveys of corals and UWMM completed prior to the initiation of the Proposed Action. Based on this guidance, the Proposed Action will not result in permanent or long-term, significant adverse impacts on biological resources.

- Air Quality: Significant adverse impacts to air quality would not occur as a result of the Proposed Action. The Hawai‘i State Department of Health – Clean Air Branch concurs with this determination and has issued an Air Permit Exemption for the Proposed Action.
- Water Quality and Sediments: No significant impacts to marine waters are anticipated as a result of the Proposed Action. The Proposed Action will not involve the discharge of any pollutants, debris, or other materials that might adversely impact water quality and sediments.
- Public Health and Safety: No adverse impacts to public safety and health would occur as a result of the Proposed Action as approved safety measures would be adhered to during all demonstration-related activities. The limited recovery of UWMM would result in potential beneficial impacts as UWMM are often encountered and investigated by recreational divers, and the limited recovery of UWMM from depths of between approximately 30 and 120 feet would reduce the potential human health and safety risks associated with divers moving, disturbing or attempting to recover UWMM as souvenirs, for scrap value or for other purposes.
- Noise Environment: Less than significant, short-term, temporary noise impacts are anticipated during implementation of the Proposed Action. Impacts on both the above-water and underwater noise environments will be reduced by limiting working hours and operational activities to approximately 12 hours per day. Implementation of the Proposed Action will not result in significant long-term adverse noise impacts.
- Historic and Cultural Resources: There will be no impacts to historic properties or cultural resources as a result of the Proposed Action because the Demonstration Site is located more than one mile off-shore in waters between approximately 30 and 120 feet in depth. Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, the US Army has received concurrence from the Hawai‘i State Historic Preservation Officer on its determination that the Proposed Action will result in “no historic properties affected”.
- Socio-Economics and Marine Recreational Resources: Socio-economic conditions or marine recreational resources of the area would not be adversely impacted by the Proposed Action. The Wai‘anae community, including ocean users have been actively involved in the development of the Proposed Action and supports its implementation.

DECISION: Based on information compiled and analyzed during preparation of the EA, the US Army finds that the Proposed Action to demonstrate and assess ROUMRS and EHDS would not result in significant adverse impacts on either the man-made or natural environment. Therefore, an environmental impact statement will not be required.

PUBLIC COMMENTS: Comments on this Draft Finding of No Significant Impact must be received within 30 calendar days after its initial publication and shall be directed to:

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The EA addressing the Proposed Action may also be obtained from the above office.

Approved By:

HERSHELL E. WOLFE
Acting Deputy Assistant Secretary
of the Army (Environment, Safety
and Occupational Health)

Date

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DEPARTMENT OF THE ARMY

ENVIRONMENTAL ASSESSMENT

AND

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TECHNOLOGY DEMONSTRATION:
REMOTELY OPERATED UNDERWATER MUNITIONS RECOVERY SYSTEM
(ROOMRS)

AND

ENERGETIC HAZARD DEMILITARIZATION SYSTEM (EHDS)

AT ORDNANCE REEF (SITE HI-06)
WAI'ANAЕ, O'AHU, HAWAI'I

March 2011

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29 MAR 2011
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ACRONYMS

ACHP	Advisory Council on Historic Preservation
AAQS	Ambient Air Quality Standards
ATSDR	Agency for Toxic Substances and Disease Registry
BIP	Blow-in-place
BMP	Best Management Practices
BMPP	Best Management Practices Plan
CAA	Clean Air Act
CAMIP	Coral Avoidance and Minimization of Injury Plan
CBD	Center for Biological Diversity
CCH	City and County of Honolulu
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CO	Carbon monoxide
CFR	Code of Federal Regulations
CWA	Clean Water Act
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act
DA	Department of the Army
DAR	Division of Aquatic Resources
dB	Decibels
DBEDT	State of Hawai'i Department of Business, Economic Development, and Tourism
DDESB	DoD Explosive Safety Board
DENIX	Defense Information Exchange
DERP-FUDS	Defense Environmental Restoration Program – Formerly Used Defense Sites
DHHS	United States Department of Health and Human Services
DLNR	State of Hawai'i Department of Land and Natural Resources
DOBOR	Division of Boating and Ocean Recreation
DMM	Discarded Military Munitions
DoD	Department of Defense
DOH	State of Hawai'i Department of Health
DSV	Demilitarization Support Vessel
EA	Environmental Assessment
EFH	Essential Fish Habitat
EHDS	Energetic Hazard Demilitarization System
EIS	Environmental Impact Statement
EO	Executive Order
EOD	Explosive Ordnance Disposal
EODD	Explosive Ordnance Disposal Detachment
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESACC	Expendable Small Arms Cartridge Cases

ESSP	Explosives Safety Site Plan
ESQD	Explosive safety quantity distance
FWCA	Fish Wildlife Coordination Act
GPS	Global positioning system
HAR	Hawai'i Administrative Rules
HRS	Hawai'i Revised Statutes
Hz	Hertz
IUCN	World Conservation Union
kHz	kilo Hertz
LED	Light-emitting diode
MC	Munitions constituents
MCE	Maximum credible event
MDAS	Material Documented as Safe
mm	Millimeter
MMPA	Marine Mammal Protection Act
MPPEH	Materials Potentially Presenting an Explosive Hazard
NEPA	National Environmental Policy Act
NEW	Net explosive weight
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NMFS-PRD	National Marine Fisheries Service – Protected Resources Division
NO ₂	Nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
ODASA(ESOH)	Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health
O ₃	Ozone
ORCC	Ordnance Reef Community Council
Pb	Lead
PM	Particulate matter
ppb	Parts per billion (by volume)
ppm	Parts per million (by volume)
RCBO	Radiant/Convection Batch Ovens
RCRA	Resource Conservation and Recovery Act
RDX	Cyclotrimethyl-enetrinitramine
RHA	Rivers and Harbors Act
RI	Remedial Investigation
ROT	Remotely operated technology
ROUMRS	Remotely Operated Underwater Munitions Recovery System
ROV	Remotely operated vehicle
RSV	ROV Support Vessel
SAA	Small arms ammunition
SHPO	State Historic Preservation Officer
SHWB	State of Hawai'i Department of Health – Solid and Hazardous Waste Branch
SO ₂	Sulfur dioxide

SPL	Sound Pressure Level
TNT	Trinitrotoluene
$\mu\text{g}/\text{m}^3$	Micrograms per cubic meter of air
μPa	Micro pascal
UH	University of Hawai'i
US	United States
USACE	United States Army Corps of Engineers
USACHPPM	United States Army Center for Health Promotion and Preventative Medicine (now US Army Public Health Command (USAPHC))
USATCES	United States Army Technical Center for Explosives Safety
USC	United States Code
USFWS	United States Fish and Wildlife Service
UWMM	Underwater military munitions
UXO	Unexploded ordnance
WSBH	Waiananae Small Boat Harbor
WWTP	Wastewater treatment plant

1. Introduction

1.1. Scope and Authority

The United States (US) Department of the Army (Army) through its Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (ODASA(ESOH)) has prepared this Environmental Assessment (EA) for a proposed technology demonstration at Site Hawai'i 06 (HI-06), Ordnance Reef, Wai'anae, O'ahu, Hawai'i. This EA addresses the environmental impacts associated with this Proposed Action (also referred to as the Demonstration) that consists of demonstrations involving the limited recovery of underwater military munitions (UWMM) and destruction (demilitarization) of any recovered UWMM using commercially available technologies that have been adapted, including development of new components and procedures, for the recovery and destruction of UWMM.

The Proposed Action will provide the Department of Defense (DoD) with technologies that may be required to address UWMM that are determined to pose an unacceptable risk to human health and the environment, while addressing concerns raised by the state of Hawai'i and local communities about the UWMM present at the Demonstration Site (also known as Ordnance Reef (HI-06)). These technology demonstrations will assess the Remotely Operated Underwater Munitions Recovery System (ROUMRS) and Energetic Hazard Demilitarization System (EHDS).

This EA has been prepared pursuant to the National Environmental Policy Act (NEPA) of 1969, 42 US Code (USC), Section 4321 et seq.; the Council on Environmental Quality (CEQ) regulations for implementing NEPA, 40 Code of Federal Regulations (CFR) Parts 1500 – 1508; and the Environmental Analysis of Army Actions (32 CFR 651). These technology demonstrations will be conducted under the Army's Environmental Quality Technology Program and will be a follow-on to the Army and the Navy Screening Level Survey conducted by the National Oceanic and Atmospheric Administration (NOAA) in 2006.

The intent of this EA is to ensure that comprehensive and systematic consideration is given to potential impacts of the Proposed Action and alternatives on the natural and man-made environment. It is intended to serve as an environmental disclosure document that identifies the purpose and need of the Proposed Action, reasonable alternatives, existing environmental conditions, potential environmental impacts, and mitigation measures to avoid or minimize such impacts, and compensatory mitigation measures, as appropriate.

This EA provides DoD decision makers, state agencies and the public with a complete, objective appraisal of the positive and negative environmental impacts associated with the various Proposed Action activities. The impacts analysis presented in this EA provides the basis to determine whether an Environmental Impact Statement (EIS) or Finding of No Significant Impact is appropriate. The Army NEPA regulations at 32 CFR 651.42(c) state that an EIS is normally required for the 'disposal of ...munitions, explosives, industrial and military chemicals, and other hazardous or toxic substances that have the potential to cause significant environmental impact.' In this case, the Proposed Action is a limited, short term technology

demonstration project that will result in the thermal destruction of explosive compounds. The resulting scrap metal will contain no explosive materials. The activities will be fully permitted under a RCRA research and development permit, as described more fully in this EA, and are not anticipated to cause significant environmental impacts. Accordingly, the Army believes an EIS is not required for the proposed action.

1.2. Overview of the Proposed Action

The Army is proposing to conduct a demonstration project to assess the feasibility of adapting and using a remotely operated technology (ROT) for the recovery of UWMM from the ocean floor, and the remote cutting of recovered munitions and the contained thermal treatment of exposed explosive munitions constituents (MC) compounds on an offshore barge (referred to as the Demilitarization Support Vessel or DSV) within the area of Ordnance Reef (HI-06). The remote cutting coupled with thermal treatment of exposed explosive MC compounds results in the demilitarization and destruction of the recovered munitions. This action is funded by the Army's Research, Development, Test and Evaluation appropriation and supports activities authorized and directed by the National Defense Authorization Act of 2007. The Proposed Action is expected to result in the recovery and disposal of many of the UWMM at Ordnance Reef (HI-06), between the depths of approximately 30 and 120 feet of water.

1.2.1. Demonstration Site Location

The Demonstration Site location, which the DoD identifies as Military Munitions Sea Disposal Site HI-06 (also referred to as Ordnance Reef), is located in near-shore US coastal waters along the western, leeward side of the island of O'ahu, Hawai'i. The nearest Hawaiian towns are Wai'anae, located approximately three miles to the northeast, and Mā'ili, located approximately five miles to the east (NOAA, 2007). Ordnance Reef (HI-06) encompasses an area approximately two nautical miles long in the north-south direction by one nautical mile wide in the east-west direction.

The Demonstration Site encompasses a surface area of approximately 1,695 acres and ranges in depth from 20 feet to approximately 120 feet of water. The northern portion of Ordnance Reef (HI-06) extends into Pōka'i Bay to the northeast and just beyond the Wai'anae Wastewater Treatment Plant (WWTP) sewer outfall to the south. The Demonstration Site was selected for these technology demonstrations because Ordnance Reef (HI-06) is well characterized, its characteristics (e.g., water clarity, range of depths, and variety of unfuzed munitions items) are appropriate for assessing the capabilities of the demonstration technologies, and there is logistical support in the area. The Demonstration Site and surrounding area are shown in Figure 1.

1.2.2. Demonstration Site History and Background

During a benthic survey of the Wai'anae WWTP sewage outfall in 1992, the City and County of Honolulu (CCH), Department of Wastewater Management's oceanographic team discovered UWMM between 0.3 and 0.6 miles northwest of the existing sewage outfall's



DEMONSTRATION SITE [Ordnance Reef (HI-06)]

FIGURE 1

diffuser. The UWMM observed between approximately 30 and 120 feet deep were suspected to include clipped .50 caliber small arms ammunition (SAA) and projectiles (possibly 3- to 5-inch naval projectiles) of various types, some between one and three feet in length. The CCH's oceanographic team also discovered UWMM south of the sewage outfall and just west of the Hawai'i-designated Fish Haven (NOAA, 2007).

In 2002, the DoD tasked the US Army Corps of Engineers (USACE) to conduct a study of Ordnance Reef (HI-06) to determine its eligibility for the Defense Environmental Restoration Program - Formerly Used Defense Site (DERP-FUDS). At the USACE's request, the US Navy's Explosive Ordnance Disposal Detachment (EODD) provided diving and underwater survey support to the USACE's Ordnance Reef Wai'anae Sewage Outfall project, which was conducted under the DERP-FUDS program. The Navy's EODD surveyed Ordnance Reef (HI-06) and identified roughly 2,000 UWMM, which it categorized as most likely discarded military munitions (DMM). However, Ordnance Reef (HI-06) was determined not to be eligible for a response under the DERP-FUDS program because DoD never owned, leased, otherwise possessed the site, nor did it ever exercise control over it, except to use Ordnance Reef (HI-06) for the disposal of military munitions (ARA, 2010a).

In May 2006, the Army and Navy subsequently funded NOAA to conduct a screening-level survey of the Ordnance Reef (HI-06). The NOAA survey, which was limited to depths of 24 to approximately 300 feet, determined both the boundaries of Ordnance Reef (HI-06) and the locations of UWMM present, provided information for use in identifying the types and approximate quantities of UWMM detected, and analyzed sediment and fish tissue samples for MC (i.e., metals and explosives) (ARA, 2010a; NOAA, 2007). NOAA released its independent report in March 2007. The UWMM present extend from depths of approximately 30 feet to over 300 feet, the maximum depth of the study. Many of the UWMM observed were heavily fouled with algae and benthic organisms. In some cases, munitions were observed with substantial coral growth. The report, which provided the DoD with screening-level data, also provided the basis for assessing the potential explosives safety and human health or environmental risks associated with the UWMM present and for making a determination of whether a response was required.

The Army's and Navy's explosives safety centers concluded that the UWMM present did not pose an immediate explosives safety risk to the public, and only deliberate activities (e.g., divers disturbing UWMM) posed a threat to those who use Ordnance Reef (HI-06) for recreational-related and other activities. The DoD Explosives Safety Board endorsed this conclusion. The Army, as part of its 3Rs (Recognize, Retreat, Report) Explosives Safety Education Program (Recognize—when you have encountered a munition and that munitions are dangerous, Retreat—do not touch, move or disturb it, Report—call 911) implemented a comprehensive public education effort that focused on, but was not limited to, the communities near Ordnance Reef (HI-06) (i.e., Wai'anae and Nānākuli).

Army's Center for Health Promotion and Preventive Medicine (USACHPPM), now the Army's Public Health Command, and the Navy's Environmental Health Center, the agencies responsible for health and environmental risk assessments, concluded that (a) the contaminant levels from any MC detected were all well below risk-based levels; and (b) the only metals

detected in fish tissue did not appear to be MC associated with the UWMM present at Ordnance Reef (HI-06). Based on available data, these assessors concluded that it was unlikely that the UWMM posed a health risk to humans. The ecological evaluation found no overt signs of stress or ecological impact. However, both agencies concluded that there were data gaps that needed to be addressed to answer the community's questions regarding possible risk to human health and/or the potential contamination of ocean food resources.

The US Department of Health and Human Services' (DHHS), Center for Disease Control, Agency for Toxic Substances and Disease Registry (ATSDR) performed a health consultation for Ordnance Reef (HI-06) based on the NOAA's report. ATSDR, which considers ingestion of biota as the most significant way people could contact chemicals, concluded contact with chemicals (i.e., MC) in sediments would not be of sufficient frequency to present a hazard by ingestion or dermal contact. ATSDR indicated that explosive MC were not detected in fish tissue, and the inorganic chemicals detected in fish tissue are not a public health hazard (ATSDR, 2007).

After review of NOAA's report, DoD (Army) determined that data gaps existed that would need to be addressed to make a definitive determination as to whether the UWMM at Ordnance Reef (HI-06) posed a risk to human health. In December 2007, the Army tasked USACE's Pacific Ocean Division to: (a) work with state agencies and potentially affected communities using its technical project planning process to identify study questions that a follow-on investigation should answer; and (b) determine the steps and information required to close the data gaps and reach a valid answer to those questions. In January 2008, USACE held an initial meeting with the Ordnance Reef Coordinating Council (ORCC) that the Army established, on behalf of the DoD, to review NOAA's survey report and related documents, and to consider courses of action to address community concerns about the UWMM present at Ordnance Reef (HI-06).

The ORCC identified two primary questions.

- Do the UWMM present at Ordnance Reef (HI-06) pose a risk to human health and the environment?
- Is seafood from the area safe to eat?

The Army subsequently obtained assistance from the University of Hawai'i (UH) to conduct sampling (sediment, biota and water column) to answer the community's concerns about whether the fish were safe to eat. In its conduct of this sampling, UH: (a) focused on the NOAA survey study area (Ordnance Reef (HI-06)), including areas up to the shoreline; (b) close data gaps about the human health risk potential posed by the munitions present; and (c) further investigate the site conditions using protocols adapted from those used in the Comprehensive Environmental Response, Compensation, and Liability Act's (CERCLA) Remedial Investigation (RI) process. UH completed its field work, conducting sampling during two timeframes February – March, and August – September 2010. The Army will release UH's report after review in 2011.

1.2.3. Military Munitions Present at Ordnance Reef (HI-06)

The UWMM located during the 2002 and 2006 surveys included, but were not limited to naval gun ammunition, 105 millimeter (mm) and 155 mm artillery projectiles, mines, mortars, and SAA. It is important to note that the UWMM present at Ordnance Reef are categorized as DMM, rather than unexploded ordnance (UXO). The important differences between DMM and UXO are briefly described below:

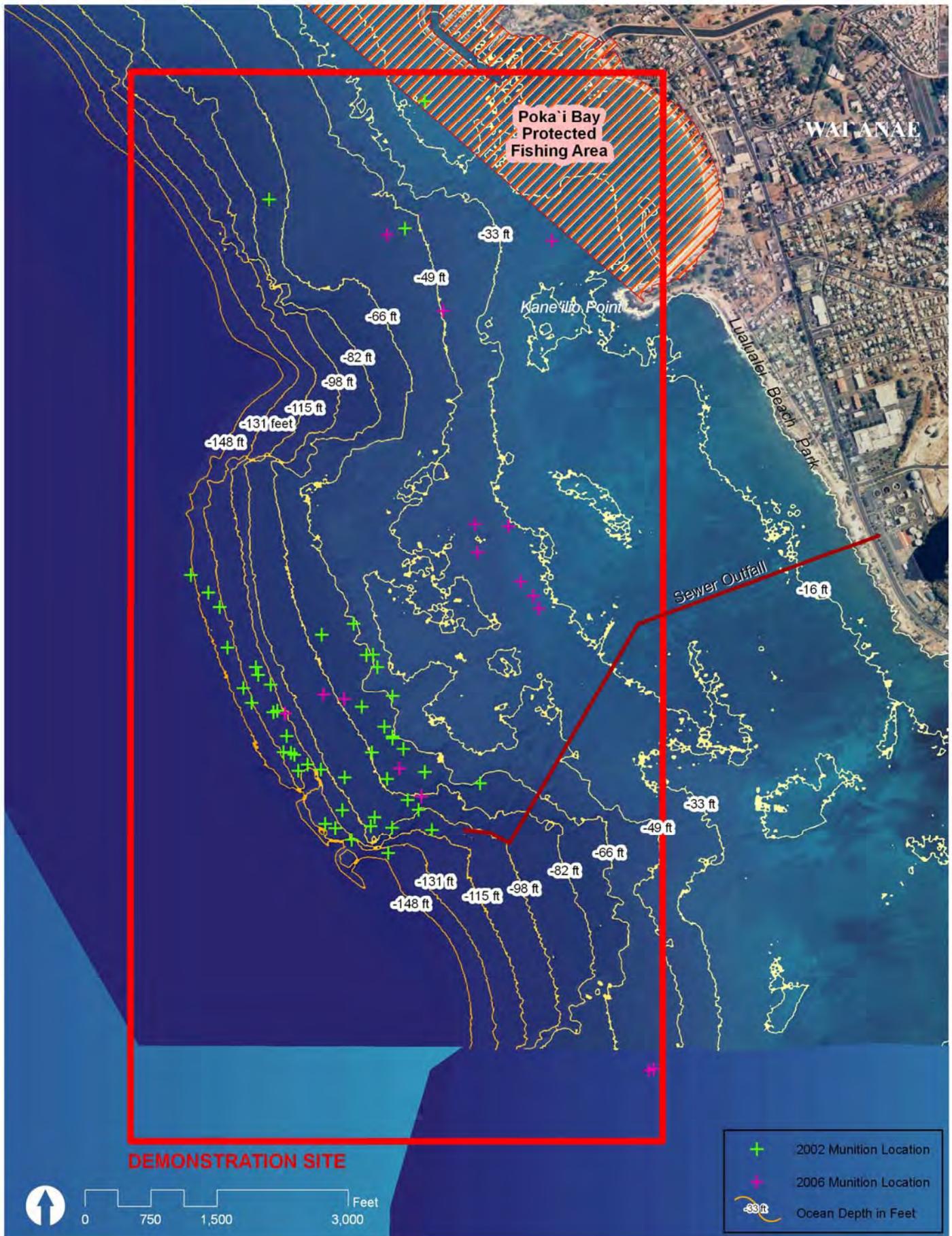
- DMM are defined as military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include UXO, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of, consistent with applicable environmental laws and regulations.
- UXO are military munitions that meet each of the criteria below:
 - Have been primed, fuzed, armed, or otherwise prepared for action;
 - Have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and
 - Remain unexploded whether by malfunction, design, or any other cause

DMM are considered to pose less of an explosives hazard than UXO because such munitions are normally not fuzed, and if fuzed, the fuze has not experienced the arming sequence required for them to function as designed.

The Army, in spite of comprehensive archival research, has not yet found records detailing disposal operations at Ordnance Reef (HI-06). Based on the type of munitions present, the Army believes the munitions were associated with World War II-related activities. Based on research conducted, the UWMM present at Ordnance Reef (HI-06) are expected to contain one or more of the following explosives (explosive MC): trinitrotoluene (TNT), cyclotrimethyl-enetrinitramine (Research Department Explosive or RDX), and/or tetryl, and Explosive D (ammonium picrate) (ARA, 2010a).

When additional DMM are occasionally found at Ordnance Reef (HI-06), their location is documented. The locations and approximate depths of the UWMM present, which were documented during the 2002 and 2006 surveys, are shown in Figure 2, and a listing of these UWMM, sorted by type, size, and location is attached as Appendix A.

The most comprehensive survey of UWMM at Ordnance Reef (HI-06) to date was completed by NOAA in late 2010. Munitions were visually identified and were categorized into three general types: SAA (i.e., ammunition, without projectiles that contain explosives, that is .50 caliber or smaller), small to medium caliber munitions (munitions above .50 caliber to and including 105 mm), and large caliber and other munitions (munitions larger than 105 mm and bombs, rockets, etc.). NOAA estimates 21,200 UWMM within the three Work Areas designated for the Proposed Action. The majority (64 percent) of UWMM documented were comprised of SAA (NOAA, 2011). NOAA's estimate is much higher than previous estimates due to: 1) its divers using NITROX, which provides much greater bottom time, and 2) the ability to take advantage of all previous surveys, which allowed NOAA to focus on areas where munitions



Military Munitions Present at Ordnance Reef (HI-06)

EA for Technology Demonstration: ROUMRS and EHDS at Ordnance Reef (HI-06)

FIGURE 2

Wai'anae, O'ahu, Hawai'i

were concentrated. In addition to conducting a more exhaustive survey, NOAA estimated its count of UWMM, including SAA, in eaches, rather than by packages, clusters or groupings of munitions. Previous surveys made no attempt to estimate SAA, and addressed packages, clusters and groupings collectively. A summary of UWMM documented by NOAA during their 2010 survey is presented in Table 1-1 below.

Table 1-1. Summary of UWMM Documented at Ordnance Reef (HI-06)

	SAA ¹	Medium Munitions ²	Large Munitions ³
Work Area A	14	0	0
Work Area B	229	1,461	0
Work Area C	12,557	6,061	874
Total	12,800	7,525	874

Notes:

¹ Ammunition without projectiles that contain explosives, that is .50 caliber or smaller.

² Munitions above .50 caliber to 105 mm.

³ Munitions larger than 105 mm and bombs, rockets, etc.

Source: NOAA, 2011

1.3. Public and Agency Involvement

NOAA's screening level survey (see Section 1.2.2.) provided the DoD a basis for both assessing the potential explosives safety and human health or environmental risks associated with the UWMM present at Ordnance Reef (HI-06) and determining whether a response was required. Based on the explosives safety evaluation, no response was deemed necessary. However, after review of the screening level data, it was determined that data gaps existed that would need to be addressed to make a definitive determination as to whether the UWMM present posed a potential risk to human health or the environment.

As previously indicated, the USACE obtained the services of UH to conduct an investigation to develop information needed to address these data gaps. The Army formed the ORCC, which is composed of representatives from other federal agencies, the state of Hawai'i, and leaders and community members from communities near Ordnance Reef (HI-06) (i.e., Wai'anae and Nānākuli). The ORCC has been an active vehicle for public participation, providing a forum for the exchange of information regarding community concerns and activities at Ordnance Reef (HI-06) (ARA, 2010a).

The first ORCC meeting was held in May 2007. ORCC meetings held to date include:

- 25 May 2007 (Hale 'Ikena, Fort Shafter)
- 18 September 2007 (Hale 'Ikena, Fort Shafter)
- 31 January 2008 (Pililā'au Beach Club, Wai'anae)
- 13 February 2008 (Kapolei Hale)
- 16 April 2008 (JW Marriott Ihilani)
- 29 October 2009 (JW Marriott Ihilani)

- 24 February 2009 (Kapolei Hale)
- 5 August 2009 (Kamehameha Schools Community Learning Center, Nānākuli)
- 2 December 2009 (Pirilā‘au Army Recreation Center)
- 3 June 2010 (Pirilā‘au Army Recreation Center)
- 17 November 2010 (Wai‘anae District Park)

Due to the large geographical area that the Wai‘anae Neighborhood Board represented, it recently split into two Neighborhood Boards to better represent the various constituencies along the leeward coast. The Wai‘anae Coast Neighborhood Board and the newly-formed Nānākuli-Mā‘ili Neighborhood Board are both represented on the ORCC. Joint neighborhood board meetings of the Wai‘anae Coast and Nānākuli-Mā‘ili Neighborhood Boards have been held on October 29, 2008, August 5, 2009, December 3, 2009, and November 18, 2010.

The Army has conducted outreach through various community groups (e.g., churches, civic organizations, schools) and through its presence at community events. Among the information the Army has and continues to distribute are 3Rs Explosives Safety Educational material, Fact Sheets, and both the Defense Information Exchange (DENIX) and USACE websites.

Public involvement activities include surveys, and solicitation of comments, questions, and suggestions. These activities take place at community events, neighborhood meetings, and at educational presentations to various community and/or civic groups. Information gathered is shared with the ORCC to keep them abreast of community issues and concern.

In addition to establishing the ORCC, the Army has taken an inclusive and collaborative approach to addressing UWMM in Hawai‘i. For example, UH and the state’s Department of Land and Natural Resources’ (DLNR) Division of Aquatic Resources (DAR) were involved in NOAA surveys as supporting agencies and continue to be involved with the ongoing investigation. In addition to direct involvement, the Army has also coordinated and consulted with various government agencies and private organizations regarding these technology demonstrations (the Proposed Action).

The ORCC participants including the Wai‘anae and Nānākuli communities; government agencies, both state and federal; and elected officials support the conduct of these technology demonstrations, which will have the added benefit of removing and destroying many of the UWMM present at Ordnance Reef (HI-06).

1.4. Technology Demonstrations – Purpose and Need

The DoD is faced with the challenge of characterizing locations in US coastal waters where UWMM are present and determining whether, based on site-specific conditions, the UWMM present pose an unacceptable risk to the public. Where UWMM are determined to pose such a threat, the DoD must determine the response needed.

To address the potential need to recover and then dispose of UWMM, while minimizing any risk to human health (including response workers) and the environment, ROUMRS and EHDS (see below) were developed. However, whether these technologies will meet the DoD's requirements for the safe, remote recovery of UWMM and for the destruction of such munitions in an environmentally benign manner that does not increase the potential explosives safety risks (e.g., requiring transport to a designated disposal site through communities) has not been demonstrated.

- ROUMRS was developed by adapting technology typically used in oil exploration operations for use in remotely recovering UWMM.
- EHDS was developed by using a combination of proven conventional munitions destruction technologies adapted to provide for the safe destruction of recovered UWMM.

1.4.1. Purpose

The purpose of the Proposed Action is to assess the operation and feasibility of both ROUMRS and EHDS. The Proposed Action will allow the Army to determine if these technologies meet the DoD's requirements for the safe, remote recovery of UWMM and for the destruction of any recovered UWMM in an environmentally benign manner that does not increase the potential explosives safety risks. If successful, ROUMRS and EHDS will provide DoD technologies it needs to address UWMM determined to pose an unacceptable risk to human health or the environment.

Currently, when appropriate and within DoD authority, DoD addresses UWMM that are determined to pose an unacceptable threat to human health and the environment by using explosive ordnance disposal (EOD) or UXO-qualified divers to recover or detonate the UWMM in-place. ROUMRS has the potential to substantially reduce the requirement for divers to both enter the water to address munitions and detonate UWMM in place. In addition, the use of ROUMRS and EHDS would reduce the potential adverse impacts to marine environments by reducing reliance on detonating UWMM in place (ARA, 2010b).

In summary, the Proposed Action will provide DoD a means to establish technologies, based on site-specific conditions, necessary to address UWMM that are determined to pose an unacceptable risk to the public. The Proposed Action will also meet the communities' and state's interest in removing some of the UWMM present at Ordnance Reef (HI-06).

1.4.2. Need

The techniques and tools currently used to address or recover UWMM are not cost effective and may be inadequate for large quantities of munitions of various types in varying states of deterioration. At deeper depths (beyond 120 feet), current recovery tools are extremely limited. Dive operations using EOD or UXO-qualified personnel are limited in the depths to which divers can work. Such operations, which are very expensive to plan and implement, expose divers and support teams to a variety of potential hazards. These potential hazards and the cost of these operations increase significantly as the water depth increases (ARA, 2010a).

Additionally, the current method for disposal of UWMM is intentional detonation of the UWMM in place using explosive charges. The detonation of explosives at culturally and environmentally sensitive locations is often a controversial issue for state and federal regulators and the public. Although detonation in place, also referred to as blow-in-place (BIP), operations will always be required for munitions for which the risk of movement is unacceptable, the DoD also needs safe and cost effective disposal alternative to support its munitions response operations.

In summary, UWMM, in some circumstances, may pose a potential explosive hazard to human health and the environment, and DoD's ability to address the recovery and disposal of UWMM is currently limited. Therefore, DoD needs to develop UWMM recovery and destruction methods that provide greater efficiency, human and environmental safety and protection.

1.5. Regulatory Framework

In addressing environmental considerations, the DoD is guided by several relevant statutes and Executive Orders (EO) that establish standards and provide guidance on environmental and natural resource management and planning. These statutes and EO include, but are not limited to, the Rivers and Harbors Act (RHA), Coastal Zone Management Act (CZMA), Endangered Species Act (ESA), Fish and Wildlife Coordination Act (FWCA), Magnuson-Stevens Fishery Conservation and Management Act, National Historic Preservation Act (NHPA), Resource Conservation and Recovery Act (RCRA), EO 13089 (Protection of Coral Reefs), EO 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations), and EO 13045 (Protection of Children from Environmental Health Risks and Safety Risks). Key provisions of these statutes and EOs are discussed throughout subsequent sections and in detail in Section 5.0 of this EA.

2. Description of the Proposed Action and Alternatives

This section describes the alternatives, including the Proposed Action, that were developed to meet the following objectives:

- Perform a demonstration of technologies capable of remotely recovering UWMM and demilitarizing recovered military munitions safely;
- Provide for the safety of personnel supporting the Proposed Action and the public;
- Limit damage to the ocean environment (e.g., coral reefs) during the recovery process;
- and Restore the ocean environment to a more natural state following the project.

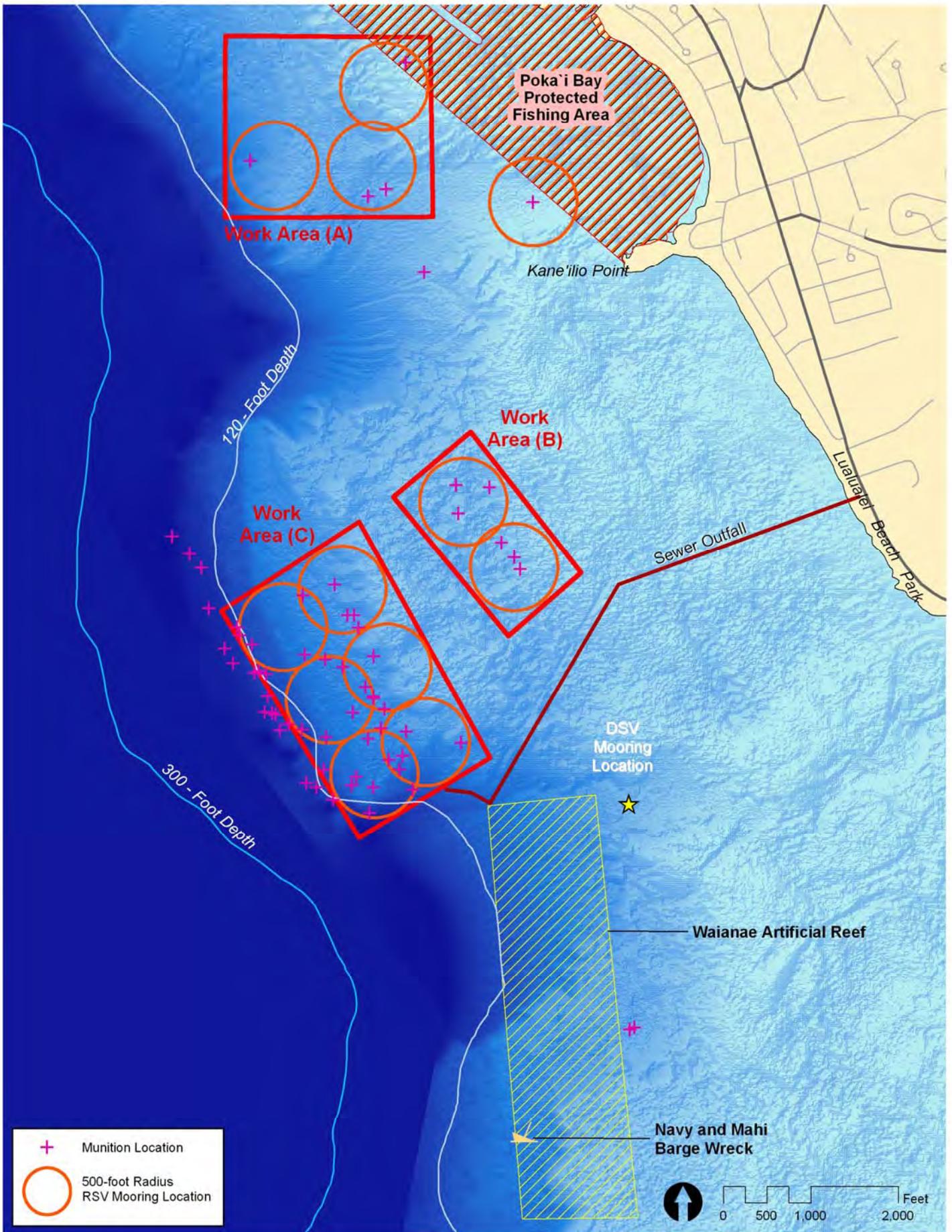
2.1. Proposed Action (Preferred Alternative)

The Proposed Action consists of technology assessments that will result in the limited, remote recovery of UWMM using ROUMRS from the ocean floor and the destruction of any recovered military munitions using the EHDS mounted on a barge at the Demonstration Site (Ordnance Reef (HI-06)). The Proposed Action is not an environmental response (removal action), but a limited technology demonstration that will occur over roughly a 21 day period. The Proposed Action is designed to evaluate the recovery of UWMM using the ROUMRS and at-sea destruction of recovered military munitions using EHDS.

All vessels and equipment for the Proposed Action will be operated out of the Waiʻanae Small Boat Harbor (WSBH) with the actual technology demonstration occurring at the Demonstration Site (Ordnance Reef (HI-06)). The Proposed Action, which will involve both underwater and surface operations, will be accomplished in two stages:

- Stage 1 Recovery of UWMM – This stage involves the subsurface collection and transfer of UWMM in depths of approximately 30 to 120 feet using the ROUMRS technology.
- Stage 2 Demilitarization of Recovered Military Munitions – This stage involves surface operations consisting of the recovery of UWMM from ROUMRS and the subsequent destruction of recovered military munitions using EHDS.

Recovery activities are proposed to occur within three Work Areas. These areas have been designated as areas A (approximately 112 acres); B (approximately 53 acres); and C (approximately 128 acres). ROUMRS will deploy its remotely operated vehicle (ROV) from and be tethered to a moored 75-foot ROV Support Vessel (RSV). The RSV will transport the ROV to and from each area. The RSV will also house ROV operators, observers and equipment needed for the operators to monitor the ROV. The ROV will place recovered UWMM in specially designed salvage baskets, and transport the baskets to one of several underwater staging areas until the baskets are transported by the ROV or lift bags to the surface for destruction. Demilitarization and destruction activities will occur on a moored barge designated the Demilitarization Support Vessel (DSV). The Work Areas for the Proposed Action, and the RSV and DSV mooring locations are shown in Figure 3.



Proposed Work Areas and Mooring Sites

FIGURE 3

2.1.1. ROUMRS

ROUMRS is an innovative use of commercial off-the-shelf technology that employs a ROV and employs techniques adapted from underwater search and recovery efforts. ROUMRS consists of an off-the-shelf ROV that has been retrofitted with manipulator arms, detachable salvage baskets, a hopper, recovery skids, video cameras, LED (light-emitting diode) lights, suction and jetting pumps, filters, sensors, and other appurtenances. System features of the ROUMRS are shown in Figures 4 and 5.

ROUMRS four subsystems are designed to perform specific tasks. ROUMRS four subsystems are:

- Base ROV and Manipulators Subsystem – Consists of the base ROV that includes the frame, flotation, thrusters, onboard hydraulics, vehicle and topside controls, topside power distribution, umbilical, launch, and recovery support equipment. In addition, manipulators used with the ROV include onboard port and starboard manipulators and control valves, and topside controls.
- ROV Sensor Subsystem – Consists of remote sensing equipment including camera systems, SONAR system, sub surface navigation system, and topside data monitoring and recording equipment and software.
- ROV Recovery Subsystem - Consists of the ROV Hopper with integral basket, actuator and control interface, manipulator tooling, and the suction pumps with discharge filter for recovering small particles (greater than 1/8 inch).
- Salvage Basket Subsystem – Consists of the salvage basket frame and the lift and tow rigging. The salvage basket's features include: opening-closing and locking fill doors, ROV lifting features, air lift bag with air bottle inflation, containment of bulk MC and 2,000-pound lifting capacity.

ROUMRS is designed to help identify, manipulate, and collect UWMM of various types from the ocean floor to a maximum depth of 300 feet. During the Proposed Action, ROUMRS will conduct a limited recovery of UWMM from depths between approximately 30 and 120 feet of water. After placing mooring blocks for the RSV, recovery activities will consist of five basic operational steps:

- Spot and set salvage basket on ocean bottom
- Recover and load UWMM into the ROV
- Transfer UWMM from the ROV to a salvage basket
- Stage and prepare the salvage basket for movement to surface
- Transfer (tow) the salvage basket to DSV

Dimensions: 90”L x 51”W x 69”H
Air Weight: 3040 LBS
Seawater Weight: +200LBS

Optics

- (2) Wide Angle Color-1 fixed , 1 on tilt actuator
- (1) 36X Color Zoom on Pan/Tilt actuator
- (1) Manipulator Color Camera w/ LED light
- (2) Lasers with line beam optics

Lights

- (6) 250 VA LED wide flood

Manipulators

- Dual 7-function arms, (1) w/ force-feed back

Hydraulics

- 15kW HPU with 16 function valve pack

Vehicle rated for 300m operations

- Upgradable to 2000m – requires floatation change

Thrusters

- (3) vertical 496LB up/down thrust
- (4) horizontal 496 LB fwd/rev/lateral thrust

Hopper Assembly

- 200LB lift capacity with a 5.8 FT3 fill volume

Suction/jetting pump with Canister Filter

- 3/16” filter-passes sand/retains propellant grains
- Suction nozzle carried by manipulator
- Canister Filters are jettisoned and later recovered in Salvage Basket

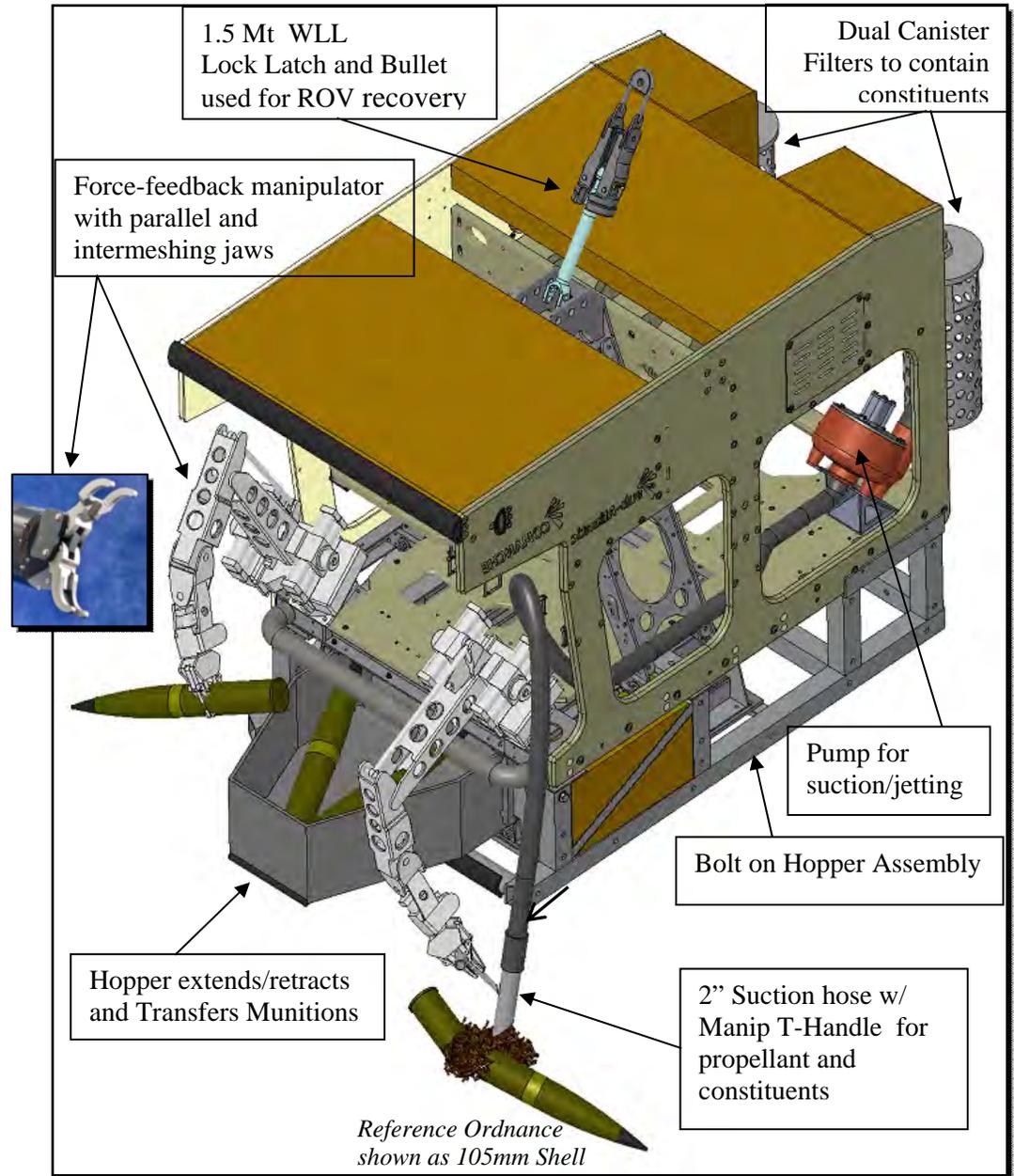
Onboard Sensors

- Scanning Sonar, depth, heading, roll/pitch

Fiber Optic telemetry : can install wide variety of sensors on spare fibers: (Ethernet, RS232, and RS484 serial data)

Optional Equipment

CTD, Current Speed, Explosive Plume Detector, water/sediment core sampling, altimeter, acoustic imaging



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ROUMRS ROV System Features

FIGURE 4

Overall Dimensions: 96”L x 60”W x 42”H

Loaded Capacity: 2000LB (in air weight)

Weight in Air (empty): 500LB (estimated)

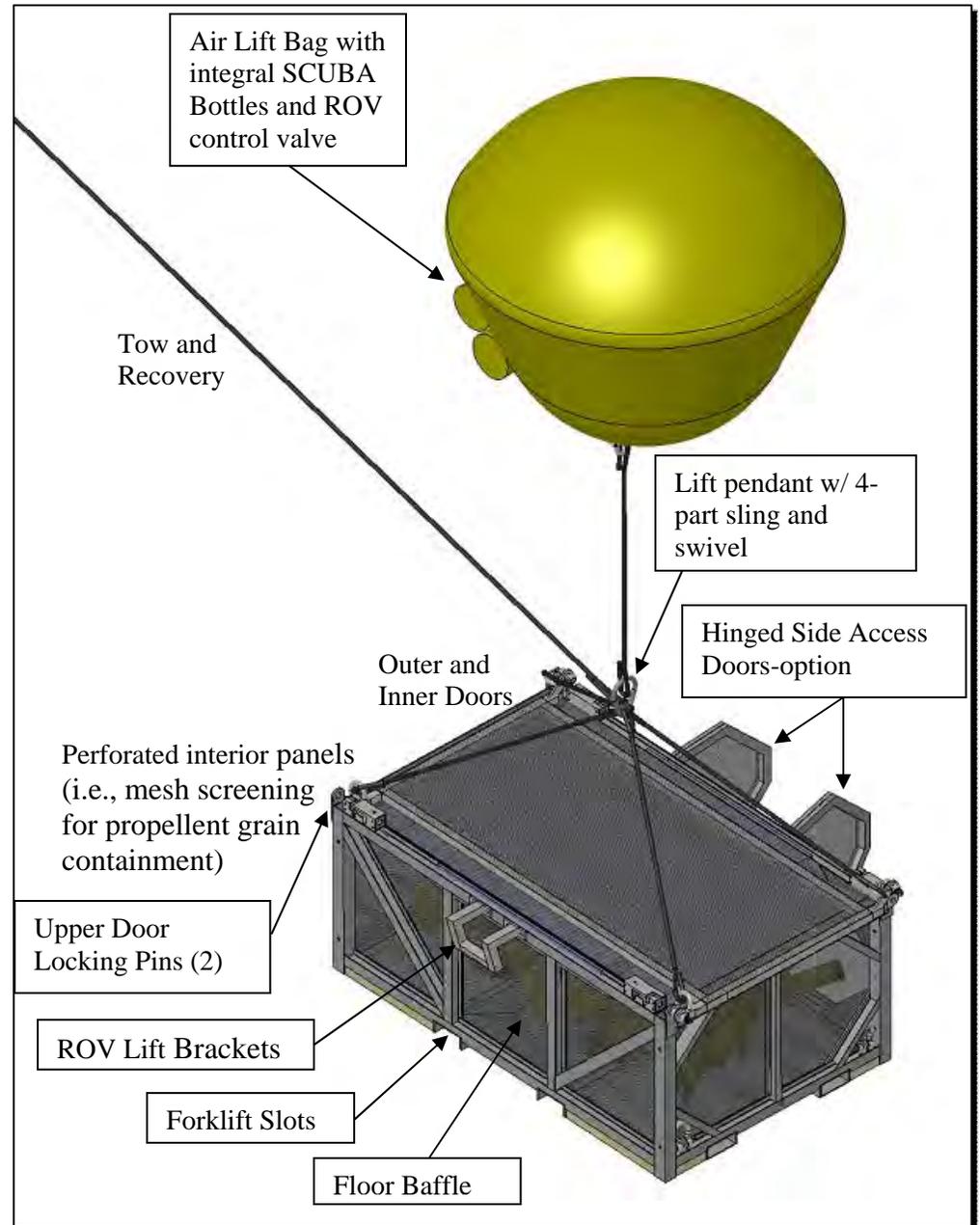
Weight in Water (empty): 150 LB (estimated)

Design Features:

- Upper Structural Hinged Door
 - ROV locking pins
 - Withstands loading. Supports Inner Door when inverted
- Dual lower Side Door panels: 32”H x 29”W
- Fork lift interfaces on all sides
- Interior lined with 1/8” perforated panels
 - Contains explosive pellets. Drains water/sand
- ROV lift bracket
 - Enables carrying by ROV when empty
- Spring loaded self closing inner door
 - Contains loose pellets
- Interior Floor Baffle
 - Prevents shifting loads
 - Promotes even weight distribution when loading

Lift Rigging Features

- Designed to ABS Structural Standards
- 4-part sling with swivel pendant.
- Variable volume 3000LB capacity Air Lift Bag
 - (2) integral SCUBA bottles
 - ROV actuated valve
 - Stowed in compact valise
- Tow line also functions as Recovery Lift Line



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ROUMRS Salvage Basket System Features

FIGURE 5

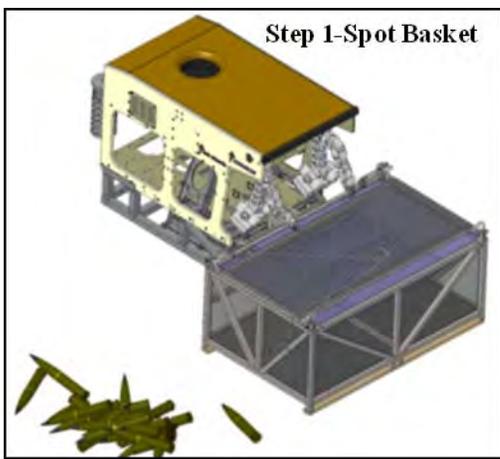
The operational steps are summarized below and illustrated in detail in Figure 6.

- Prior to recovery of UWMM, the ROV performs a reconnaissance of areas adjacent to the UWMM to identify suitable locations for placement of the salvage basket. Sensor equipment used for salvage basket staging area reconnaissance includes: scanning SONAR, wide angle and zooming cameras, pan/tilt camera mounts, underwater lighting, surface and subsurface navigation gear (for path planning and track following), and topside data archiving hardware and software. Once a suitable staging location is identified recovery of UWMM can commence.
- Recovery involves the use of electrically operated manipulators mounted on the ROV. The manipulators, which are capable of precise movements manipulate, grab, and lift UWMM ranging from SAA (i.e., .50 caliber and below) to military munitions up to eight inches in diameter, and bomb shapes that weigh up to 150 pounds. In addition, the manipulators are able to work with equipment to pry concreted UWMM from the ocean's hardbottom or reef.
- ROV manipulators place recovered UWMM into an on-board collection hopper (ROV hopper). When the ROV hopper is full, the ROV transfers the recovered UWMM into specially designed salvage baskets. Recovered UWMM will accumulate in the salvage basket and staged for subsequent movement to the DSV. The ROV manipulators place recovered UWMM that are too large to be placed in the ROV's hopper directly into the salvage basket.
- When the salvage basket has been filled, the ROV closes and locks the salvage basket's door. The salvage basket is brought to the surface using an air-lift bag attached by ROV. The air lift bag is inflated by air bottles that are attached to the salvage basket.

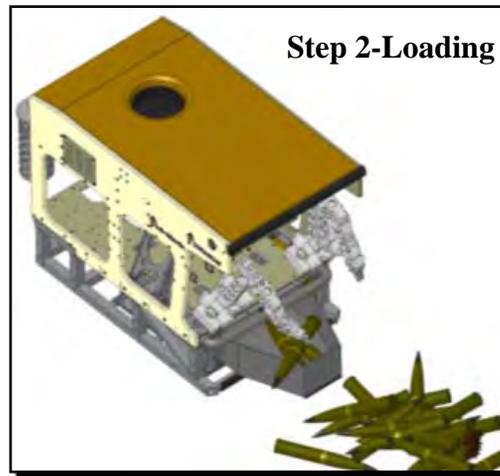
On the water surface a small, manned craft (less than 20 feet in length) operating between the moored DSV and RSV will rig towlines to the salvage basket's tow bridle once the salvage basket is floating approximately 14 feet below the surface. The small craft will tow the salvage basket to the DSV. The crew of the small craft will rig the lift line between the DSV and the salvage basket. The DSV will then lift the salvage basket using an onboard crane onto its deck and place it within a containment berm. The DSV's crew, who are UXO-qualified personnel, will open the salvage basket's upper door and unload the recovered military munitions within the containment berm. The DSV crew then moves the salvage basket to a safe area and prepares it for launch and recovery by the small craft for towing to the RSV. The empty salvage basket will then be lowered for use (ARA, 2010a).

2.1.2. EHDS

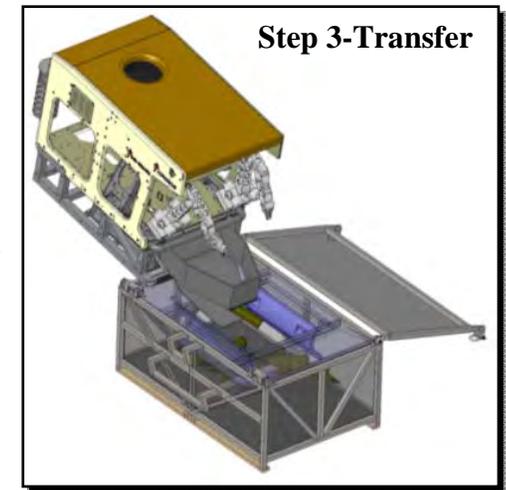
The Army determined that there is no single best technology available to address the variety of military munitions or varying conditions (e.g., corroded, encrusted) that could be used for the disposal of any UWMM recovered during the Proposed Action. In addition, the Army required that the disposal process not increase potential explosive safety risks to workers or the community and required that the destruction process be environmentally benign. As a result,



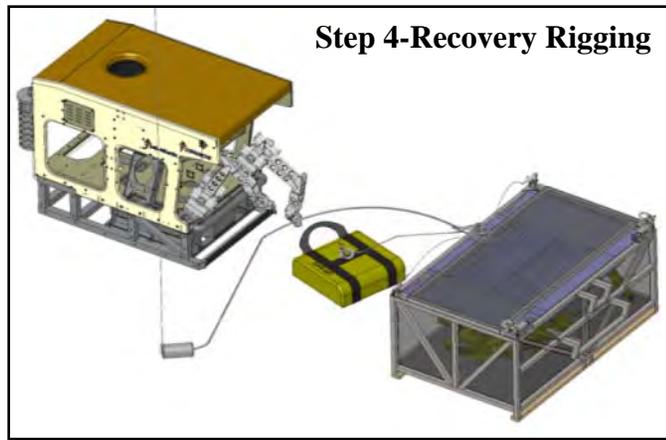
- a. The support vessel transports the ROV to a munitions location and sets anchor
 b. The ROV is deployed
 c. The ROV inspects the bottom for a suitable landing location for the salvage basket
 d. The salvage basket is lowered to the bottom and released
 e. The ROV positions the salvage basket near a concentration of munitions, un-pins and opens an upper door



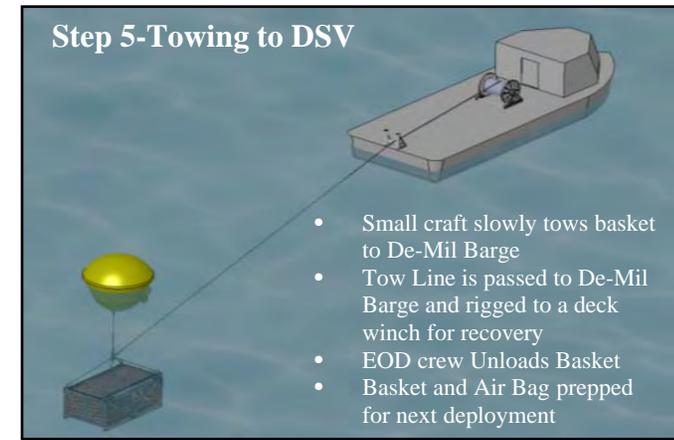
- f. The ROV positions itself near a concentration of munitions
 g. A munition is inspected and documented (video and laser scaling)
 h. A hopper is extended out of the ROV's recovery skid
 i. The ROV's recovers the munitions piece with the manipulator arm and places it in the hopper (smaller debris such as propellants and small arms ammunition are to be captured with a vacuum and placed in a canister filter)
 j. The hopper is retracted, once filled, and the ROV maneuvers to the salvage basket



- k. The ROV lands on the salvage basket, extends it hopper, and transfers its contents (smaller debris captured in the canister filter are also transferred to the salvage basket at this time).
 l. The ROV retracts its hopper and maneuvers to the next recovery location



- m. Once the salvage basket is filled, an air lift valve is lowered from the surface to the ROV
 n. The ROV attaches the air lift device and a tow line to the salvage basket
 o. The ROV activates the air lift bag
 p. The salvage basket ascends to the surface



- Small craft slowly tows basket to De-Mil Barge
 - Tow Line is passed to De-Mil Barge and rigged to a deck winch for recovery
 - EOD crew Unloads Basket
 - Basket and Air Bag prepped for next deployment
- q. The tow line is attached to the small craft and the salvage basket is transported to the destruction (demilitarization) barge
 r. The process would be repeated until all the munitions pieces that can be recovered have been recovered or until the end of the test window (three weeks) has been reached

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EHDS, which uses a combination of complimentary, proven, munitions disposal technologies and is capable of being barge mounted, was developed. The EHDS is also suited for use at culturally and/or environmentally sensitive locations.

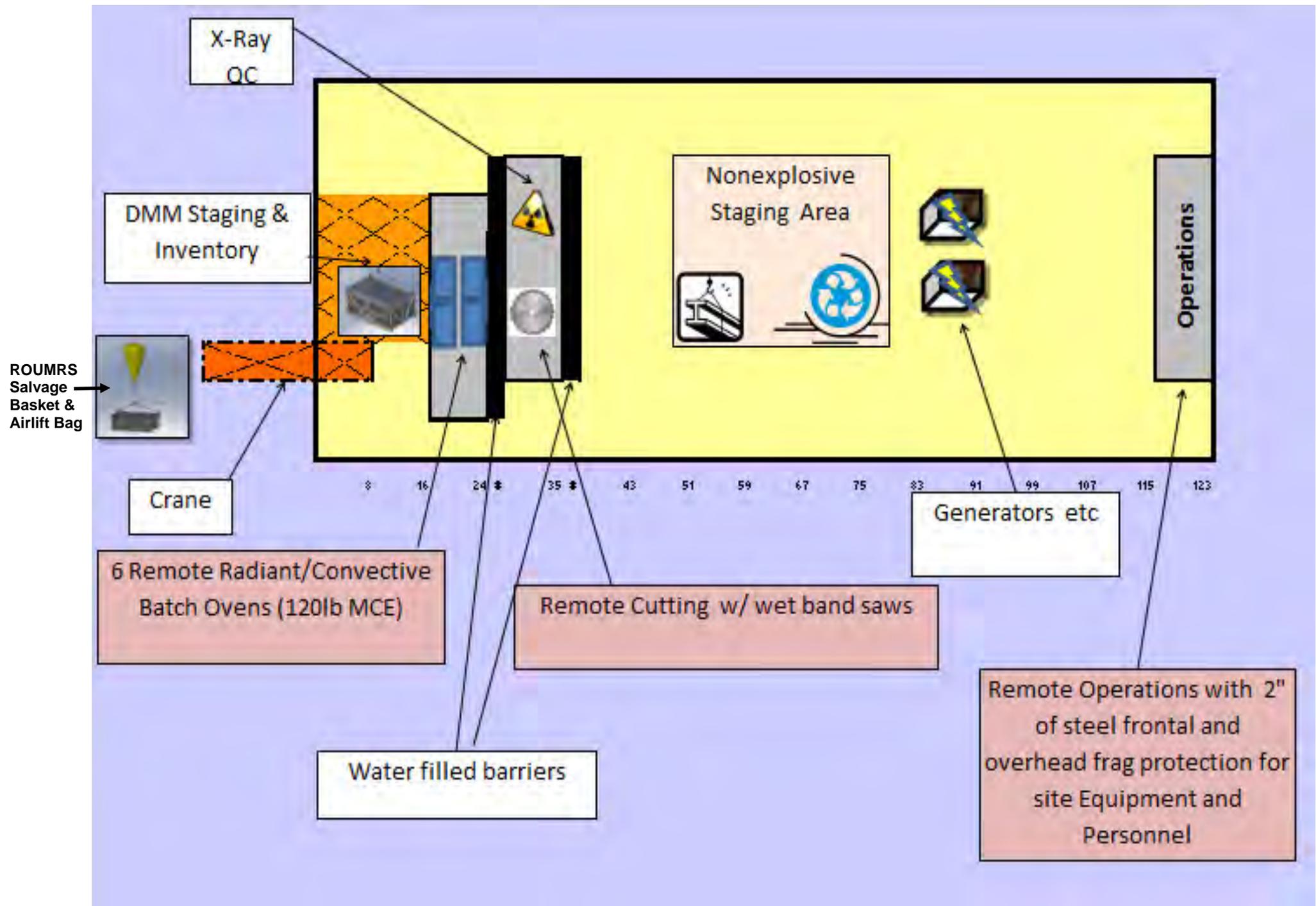
EHDS consists of two complementary technologies: cutting technology (band saw), and Radiant/Convection Batch Ovens (RCBO). EHDS's cutting technology is designed to remotely cut recovered military munitions to expose the explosive MC fill compounds for thermal treatment in the RCBO. The remote cutting of military munitions also constitutes demilitarization. The EHDS's RCBO is designed to thermally treat an explosive MC compound fill until it non-explosively decomposes (i.e., degrades to non-hazardous materials). After thermal treatment, any resulting scrap metal will be inspected and, if appropriate, documented as material documented as safe (MDAS), making it available for recycling.

EHDS's RCBO consists of four ovens housed in a standard 20-foot ISO container, power generators, munitions cutting tool, munitions staging area, crane, and other supporting equipment that is mounted aboard the DSV. The EHDS layout and system features are shown in Figures 7 and 8. The military munitions demilitarization process is described below.

Recovered UWMM are transferred from the ROUMRS salvage baskets onto the DSV. Military munitions, with some exceptions (i.e., SAA, fuzes), that are recovered will be x-rayed to ensure they do not contain a liquid-fill. Should a recovered munition be determined to contain an unknown liquid fill or pose a danger to DSV operations, it will, when possible, be carefully lowered over the side of the DSV and suspended in the water column, with EOD support requested. Prior to being lowered over the DSV's side, munitions with an unknown liquid will be kept wet and wrapped in 6 mil plastic, placed in a sealed propellant can that is placed in a 6 mil plastic bag. Munitions lowered over the side will be suspended off the sea floor, and secured to the barge for safe holding pending completion of all DSV operations. (Depending on the situation, all DSV operations may be halted until EOD disposes the munition or arrives on site, or the munition may be retained in safe holding until a halt in DSV operations (i.e., at the end of the work day, work week or demonstration) at which time EOD will address any munitions in safe holding.)

With certain exceptions (i.e., SAA, fuzes), the remotely operated cutting tool will open each munition's casing, exposing the explosive MC compound that makes up the fill. Operators will run the cutting and related tools from the remote operations container, which is mounted on the DSV. After cutting, the munition's sections and exposed explosive MC compounds will be placed into open trays for low-temperature thermal treatment in the RCBO.

The RCBO uses low temperature thermal treatment over extended periods of time, safely raising the temperature of the exposed explosive MC compounds in trays until they non-explosively decompose, becoming non-hazardous material. This heating irreversibly breaks down chemical and molecular bonds. A detailed description of the thermal treatment process, including energetic compounds and decomposition products produced can be found in Appendix L (Sections VI and VII).

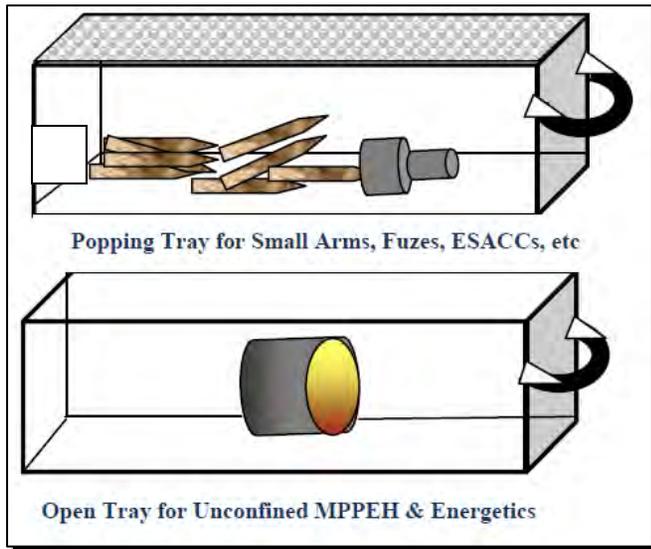


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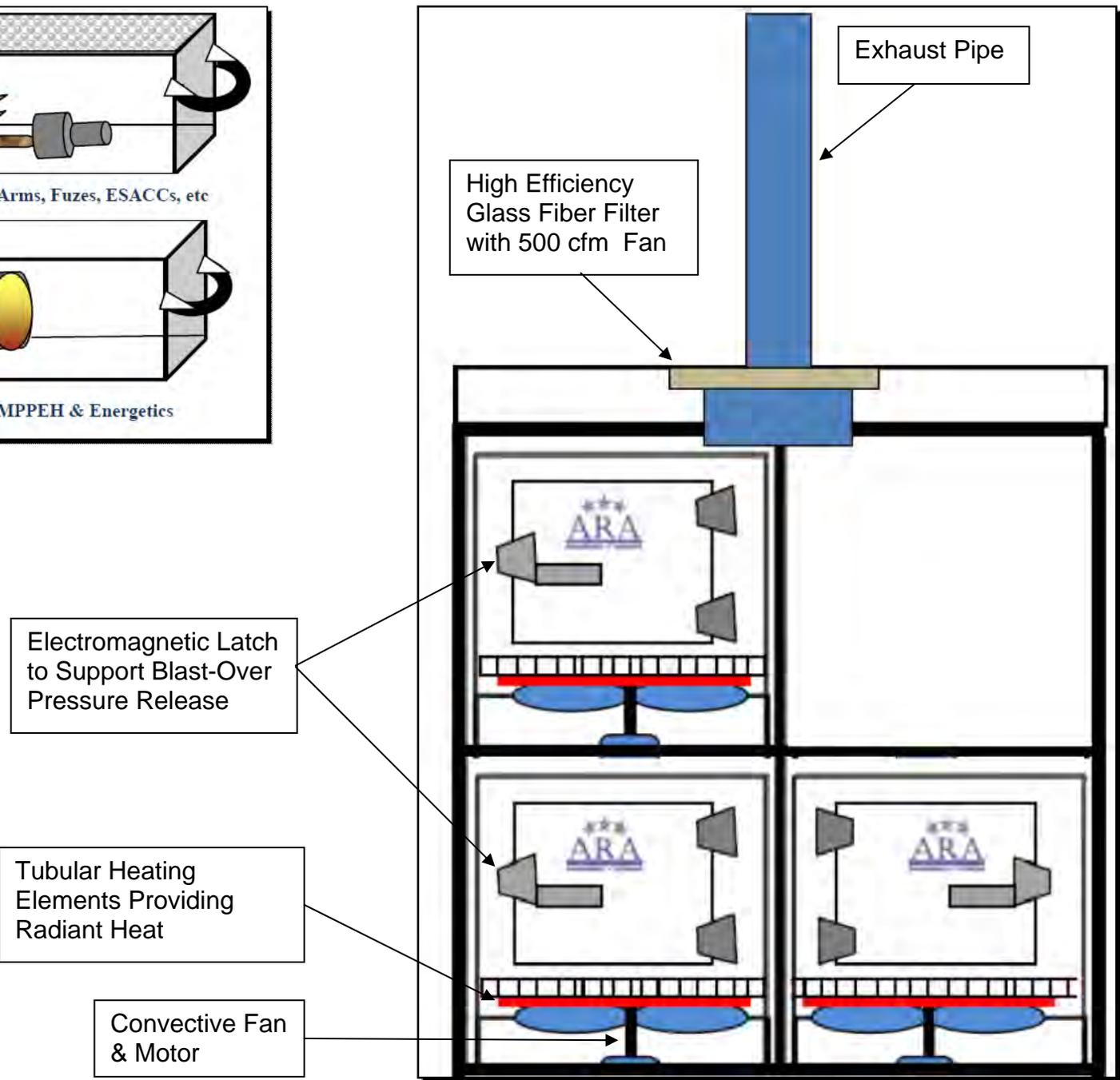
EHDS System Layout (Aboard DSV)

FIGURE 7

Munitions Tray



End View of RCBO in Standard ISO Container



EHDS – Radiant/Convection Batch Oven System

EA for Technology Demonstration: ROUMRS and EHDS at Ordnance Reef (HI-06)

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FIGURE 8

Wai'anae, O'ahu, Hawaii

It is important to note that the thermal treatment in the RCBO is not incineration. At no time, do flames or the radiant elements of the RCBO contact any of the exposed compounds. Thermal decomposition of the exposed explosive MC is an irreversible reaction that breaks the chemical bonds of the compounds and does not generate explosive gases. The temperatures will be maintained well below the ignition temperature of the exposed explosive MC. Operators within the DSV's remote operations container will perform real-time temperature monitoring to (a) verify that temperatures required for decomposition are reached and maintained; and (b) ensure temperatures that could cause a detonation of the energetic are not reached.

After thermal treatment, the remaining metal scrap will be inspected, and as appropriate in accordance with any requirements of the RCRA permit, documented as MDAS, and recycled, or retained for scientific study. The metal from recovered munitions that has been documented as MDAS may be provided for corrosion studies being conducted by DoD and NOAA.

Until the metals and other residuals have been documented as MDAS, they will be managed as materials potentially presenting an explosive hazard (MPPEH). All residuals and metals not intended for other useful purposes (e.g. further testing) are solid waste and will be managed and disposed in compliance with applicable State law.. The Proposed Action will be in full compliance with RCRA. Applicability of RCRA to the Proposed Action is discussed in further detail in Section 5.10.

It is important to note that the Proposed Action does not involve the intentional detonation of UWMM or of military munitions that have been recovered. EHDS provides an efficient, safe, and environmentally friendly means for the disposal of recovered military munitions. However, in the event a munition is encountered that is determined to pose an explosives or munitions emergency, EOD personnel will be requested to address it as soon as circumstances allow. EOD personnel will address such munitions using approved EOD procedures. These procedures and the circumstances may require detonation in place (underwater) or on the surface at a designated, safe location. Additionally, munitions encountered that contain an unknown liquid fill will be assessed to determine the most likely fill and, depending on the fill, will be destroyed at a designated, safe location using prescribed procedures that may involve use of contained detonation technology or open detonation. To ensure the safety of workers and the public, such munitions will be safely secured in place or at a designated staging area.

The Proposed Action may temporarily interfere with boating, fishing, and other in-water activities during work hours, which will be conducted during daylight hours 7 days a week for roughly 21 days (three weeks). The Proposed Action involves the robotic recovery of UWMM and demilitarization of recovered military munitions on the DSV, which will be positioned near Ordnance Reef (HI-06) approximately one mile off of the Wai'anae Coast. During demilitarization activities, these UWMM are not expected to be an explosive risk. However, during demilitarization activities, a conservative explosive safety quantity distance zone of 537 feet and 3,727 feet will be maintained around the DSV for essential and non-essential personnel, respectively. This safety zone is required by the DoD Ammunition and Explosives Safety Standards in case of an unintentional detonation of military munitions aboard the DSV. RSV and DSV operations may be staggered to enhance the efficiency of the operation. The safety zone will be maintained, when required, by using small craft to keep people and vessels outside

the safety zone - a safe distance from DSV operations. These issues are discussed in further detail in Section 3.2.

The above discussed explosives safety parameters of the Proposed Action, including, but not limited to military munitions treatment, disposal procedures, and the safety zone are addressed in detail in the *Ordnance Reef Technology Demonstration Explosive Safety Site Plan* (ESSP) developed per applicable Army and DoD Ammunition and Explosives Safety Standards (ARA, 2011). The ESSP will be reviewed and approved by the US Army Technical Center for Explosives Safety (USATCES) and separately and independently by the DoD Explosives Safety Board (DDESB) based on the quantity and type of military munitions expected to be recovered. At the time of the writing of this EA, the ESSP is in its draft form. However, the ESSP will be approved and finalized prior to initiation of Demonstration activities.

2.2. No Action Alternative

CEQ regulations require that a No Action Alternative be evaluated. The alternatives for demonstrating developed or innovative technologies are limited. The two alternatives considered are the Proposed Action (the Demonstration) and the No Action Alternative.

Although the Proposed Action could be performed at another location, the Demonstration Site was determined to be the only viable location for these demonstrations because the Army possesses extensive knowledge about the munitions present at the Ordnance Reef (HI-06), including the depth and grid coordinates of individual and clusters of munitions; the site's characteristics (i.e., a close-to-shore, shallow water—less than 120 feet, and a hard bottom surface), which provide conditions ideal for limiting any potential impact to the environment and ensuring safety; and the public's and state's concerns with the presence of UWMM in an area heavily used for recreational and commercial purposes. The Army has no other sites where these conditions exist; therefore, alternative locations were not considered viable. Therefore, only the Proposed Action and the No Action Alternative are analyzed in this EA. Although the No Action Alternative does not satisfy the purpose or meet the Proposed Action's objectives, it has been further analyzed to serve as a baseline from which to compare potential effects of implementing the Proposed Action.

Under the No Action Alternative, the newly developed ROUMRS/EHDS technology would not be demonstrated in the field. The Army would not be able to evaluate the feasibility and effectiveness of these new technologies in the recovery of UWMM and demilitarization of recovered military munitions at sites where UWMM were determined to pose an unacceptable risk to human health or the environment. Consequently, the needs and objectives discussed in Sections 1.4 and 2.0, respectively, would not be met.

2.3. Alternatives Considered, But Eliminated from Further Analysis

During the preliminary evaluation and development stages of the Proposed Action, extensive research was conducted assessing a range of alternative technologies for demonstration. Alternative technologies and locations that were assessed, but eliminated from further consideration are briefly discussed below.

2.3.1. Alternative Sites

Alternative locations where UWMM are known to be present that would allow for the conduct these technology demonstrations are limited. The location chosen for the Proposed Action needs to meet specific criteria. The criteria and requirements used in the selection of Ordnance Reef (HI-06) as the Demonstration Site include:

- Proximity to shore and availability of a port for logistical support
- Weather conditions conducive to operating equipment and without affecting test results (e.g., ocean conditions, temperature)
- Availability of:
 - Local support personnel and vessels
 - Technically qualified personnel to handle and process military munitions
- Shallow depths and bottom features (e.g., hard bottom, limited coral growth, currents) conducive to use of ROT to recover UWMM.
- Extensive knowledge about the site
- Presence of DMM as opposed to UXO
- The presence of both small and large caliber munitions to test the full capabilities of the ROT
- Separation distances that provide for public safety

Based on the above, Ordnance Reef (HI-06) was determined to be the only viable location for these technology demonstrations because the Army possesses extensive knowledge about the munitions present, including the depth and grid coordinates of individual and clusters of munitions; the site's characteristics (i.e., a close to shore, shallow water--less than 120 feet, and a hard bottom surface), which provide conditions ideal for limiting potential adverse impacts to the environment and public safety; and the community's and state's concerns with the presence of UWMM in an area heavily used for recreational and commercial purposes. The Army has no other sites where such conditions exist, therefore, alternative locations were not considered viable.

2.3.2. Alternative Technologies

During the initial stages of the Proposed Action, an extensive review and assessment of existing and innovative recovery and disposal technologies was performed. A large volume of data was collected and reviewed to document the application and performance of different technologies to meet the Army's requirements.

The Army assessed 7 alternative ROT and 14 alternative munitions disposal technologies. Individual technologies and technology combinations were evaluated based on various criteria including, but not limited to:

- Safety and Environmental Features - The ability of the technology to negate potential adverse human health and environmental effects associated with UWMM.
- Operational Capabilities - The capabilities of the technology in relation to operating depth, munitions size, sea states, maintenance requirements, and operating time intervals.
- Equipment Specifications - The identification and description of specific technology equipment components, surface vessels, and support equipment.
- Personnel Requirements - The quantity and training level of personnel required to operate the technology.
- Overall Cost - Technology cost including relocation to site, setup, operation, and maintenance.
- Mobility - The ability of the technology to be moved from site to site.
- Developmental Stage - The current stage of technology development and the time required to provide a system for demonstration.

Based on its assessment, the Army selected the ROUMRS and subsequently selected EHDS—a hybrid of many of the demilitarization technologies the Army reviewed—based on a proposal developed during final selection of technologies for the Proposed Action (NHV, 2009; NDCEE, 2009).

2.4. Proposed Action's Schedule

The demonstration of ROUMRS and EHDS is planned to be performed over roughly a 21-day period in the summer of 2011. The Proposed Action over this period is scheduled for 12-hours per day, beginning at 0600 and ending at 1800 hours.

3. Affected Environment, Environmental Consequences, and Mitigation Measures

3.1. Natural Environment

3.1.1. Water Quality and Sediments

Significance Criteria

For the purposes of the EA water quality impacts would be considered significant if a project:

- Violates federal or state water quality standards or objectives;
- Increases contaminant levels in the marine sediments, water column, or biota to levels shown to have potential to harm marine organisms; or
- Changes background levels of chemical and physical constituents or causes elevated turbidity that would produce long-term changes in the receiving environment of the project site, area, or region that would impair the beneficial uses of the receiving water.

Existing Conditions

Marine waters in Hawai'i are divided into Class A and Class AA waters. Under Chapter 11-54-03 Hawai'i Administrative Rules (HAR), the objective of Class AA waters is to preserve them "in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality of any human-caused source or actions." The objective of Class A waters is to ensure that their use for recreational and aesthetic enjoyment is protected. The Wai'anae coast is designated Class A waters from the southern end of Barbers Point to the northern end of Mākua Beach.

Water quality studies along the Wai'anae coast describe a "pristine, unperturbed coastal region." Temperature and salinity values indicate that the region is well flushed and minimally affected by surface runoff of terrestrial sediments (Bienfang and Brock 1980; NRDC 2004).

Land-based sources of nutrients from streams and surface water runoff cause localized increases in nutrient concentrations in coastal waters. The uptake of nutrients by marine plants and decomposition of marine life in the sea also contribute to variation in nutrient concentrations found in the water column.

In general, open ocean surface waters near the Hawaiian Islands are oligotrophic (nutrient poor); this is particularly true of waters off dry leeward sides of the islands such as Wai'anae, where nutrient concentrations are extremely low. Nutrient concentrations in seawater off the Wai'anae coast are likely to vary with the time of year and location, as observed in other coastal waters of Hawai'i (De Carlo et al., 2004).

Potential Impacts

Proposed Action

Potential adverse impacts to water quality and sediment as a result of the Proposed Action are unlikely. Although the Proposed Action includes procedures to limit release of MC, including propellants, it is possible that adverse impacts to water quality and sediments could occur as a result of an unexpected release of MC or an accidental fluid (e.g., oil) spill from equipment used to support the Proposed Action.

Potential impacts resulting from the Proposed Action do not meet the significance criteria, and would not result in significant adverse impacts to water quality or sediments.

No Action Alternative

Under the No Action Alternative, the UWMM present at the Ordnance Reef (HI-06) at depths between approximately 30 and 120 feet would not be recovered from the marine environment. Conditions would remain unchanged and there would be no impact to water and sediment quality.

Mitigation Measures

MC-related contamination to the water column and bottom sediments is not anticipated from activities related to the Proposed Action. However, a full set of operational precautionary measures have been developed for the Proposed Action. These precautionary measures are contained and defined in the Best Management Practices (BMP) Plan (BMPP) (see Appendix B). Under the BMPP, the Army and its contractors will strictly adhere to applicable BMPs throughout the Proposed Action to help to prevent any adverse impact to water quality or sediments throughout these technology demonstrations. BMPs that will be implemented to minimize any potential adverse impact to water quality and sediments include, but are not limited to:

- Prior to use, inspect Demonstration-related materials and equipment to be placed in the water to ensure it is free of visible pollutants. The ROV, and any mechanized equipment and other materials will be clean and free of obvious contamination and deleterious substances that may include toxic chemicals and/or clay-coated material.
- Daily pre-work equipment inspections will be conducted to ensure cleanliness and the absence of leaks. All heavy equipment operations will be postponed or halted should a leak be detected, and will not proceed until the leak is repaired and equipment cleaned.
- Fueling of vehicles and equipment related to the Proposed Action will take place at least 50 feet away from the water. Additionally, a spill contingency plan will be in place on landside platforms and all support vessels associated with the Proposed Action. Spill-response equipment such as absorbent pads and containment booms will also be stored and readily available on-site, to facilitate the clean-up of accidental petroleum releases.

- Turbidity and siltation from work related to the Proposed Action is not anticipated as a result of ROUMRS or EHDS operations. Turbidity and siltation from ROUMRS related work is expected to be temporary and localized at each pick-up location. Disturbance of bottom sediment will be minimized through careful movement of the ROV. Turbidity and siltation from EHDS operations is not anticipated.
- Turbidity and siltation from landward work associated with the Proposed Action will be minimized and contained, to the extent possible, within the vicinity of the landward work area through the appropriate use of effective site containment devices and the curtailment of work during adverse tidal and weather conditions.
- Although no construction debris will be generated during the Proposed Action, all waste, debris, and litter on the vessels associated with it will be controlled and not allowed to enter or remain in the marine environment during the Demonstration.
- No materials related to the Proposed Action should be stockpiled in water (intertidal zones, reef flats, stream channels, sea grass beds, etc.).
- Dispose of all Demonstration-related waste that is not recyclable at an approved, properly permitted facility.

Additionally, the ROV is equipped with a vacuum system designed to collect and filter any loose debris including accidental release of MC. The salvage basket has been designed to reduce the potential for an accidental release of MC, including propellant grains. (The salvage basket's siding is constructed of a fine-perforated aluminum sheet, specifically designed to contain any accidental propellant releases from munitions during recovery activities.)

3.1.2. Marine Biological Resources

Due to the nature and location of the Proposed Action, terrestrial biological resources would not be affected. Therefore, for the purposes of this EA assessment of potential impacts to biological resources has been limited to the marine environment.

Significance Criteria

Impacts to marine biological resources (including corals) would be considered significant if the Proposed Action:

- Causes the "take" of a highly sensitive resource, such as a threatened and endangered or special status species;
- Results in a jeopardy biological opinion by the US Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service (NMFS);
- Degrades the quality of the environment, substantially reduces the habitat of marine biota species, causes marine biota species to drop below self-sustaining levels, threatens to eliminate an animal community, or reduces the range of a rare or endangered species;
- Alters or destroys habitat that prevents re-establishment of marine biological communities that inhabited the area prior to project activities;

- Exposes marine life to contaminants that could cause acute toxicity or bioaccumulation;
- Causes long-term loss or impairment of a substantial portion of local habitat (species-dependent).
- Adversely affects a population of a threatened, endangered, regulated, or other sensitive species by reducing its numbers; altering behavior, reproduction, or survival; or causing loss or disturbance of habitat.
- Would have a substantial adverse effect, either directly or indirectly, on any listed, proposed, or candidate endangered or threatened species listed under federal ESA. Effects could include reducing the number or restricting the range of a threatened or endangered species.
- Causes injury or mortality or results in an action that could be considered a “take” under section 9 of the ESA; or
- Causes a “Level A or B take” of species protected under the Marine Mammal Protection Act (MMPA).

3.1.2.1. Benthic Habitat and Coral Reefs

Existing Conditions

The coastal waters off the Wai‘anae coast are characterized by rocky intertidal zones, coral reefs, and offshore pelagic and deep-sea marine environments. Intertidal zones provide rocky habitat to marine invertebrates and plants that are specifically adapted to constantly changing levels of exposure to waves and seawater. Pelagic and deep-sea ecosystems off the Wai‘anae coast are vast and support large marine animals like dolphins, whales, sea turtles, and the occasional endangered Hawaiian monk seal (NOAA, 2007).

The marine environment within Ordnance Reef (HI-06) can be categorized into four major benthic habitat types: (a) Sand, (b) Macroalgae, (c) Uncolonized Hardbottom, and (d) Unknown (NOAA, 2007). The benthic habitat types underlying Ordnance Reef (HI-06) are described below and are shown in Figure 9.

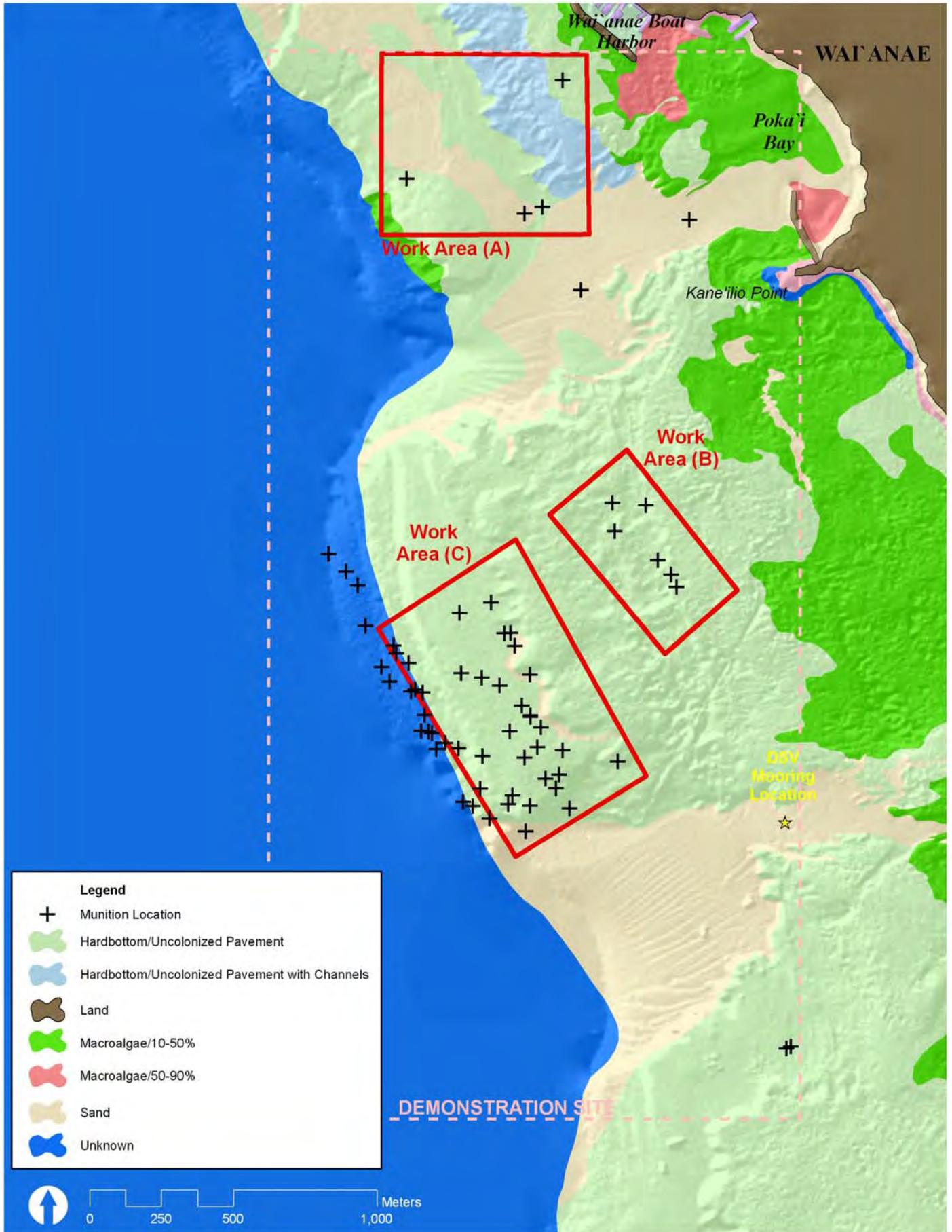
- Sand Habitat – Consists of coarse granular sediment typically found in areas exposed to currents or wave energy. Sand habitat comprises approximately 17.4 percent of the overall Demonstration Site, and 29.5 percent, 0 percent, and 6.5 percent of Work Areas A, B, and C, respectively.
- Macroalgae – Consists of areas with 10 percent or greater coverage of any combination of numerous species of red, green, or brown macroalgae. Usually occurs in shallow back reef and deeper waters on the bank/shelf zone. This habitat type can be further categorized based on the continuity of algal coverage. Of the four habitat types the macroalgae habitat contains the majority of marine life. However, it is the least common of the four habitat types comprising approximately 7.4 percent of the overall Demonstration Site, and 1.5 percent, 0 percent, and 0 percent of Work Areas A, B, and C, respectively.

- Continuous Macroalgae – In these areas, macroalgae covers 90 percent or greater of the substrate. May include blowouts of less than 10 percent of the total area that are too small to be mapped independently. This includes continuous beds of any density (may be a continuous, sparse or dense bed).
- Patchy Macroalgae – These areas contain discontinuous macroalgae with breaks in coverage that are too diffuse or irregular, or result in isolated patches of macroalgae that are too small to be mapped as continuous macroalgae.
- Uncolonized Hardbottom - This habitat is characterized by a hard substrate composed of relict deposits of calcium carbonate or exposed volcanic rock. Uncolonized hardbottom habitat is by far the most prevalent habitat type comprising 43 percent of the overall Demonstration Site, and 69 percent, 100 percent, and 92 percent of Work Areas A, B, and C, respectively.
- Unknown - Comprises the deeper areas, in the western portion of Ordnance Reef (HI-06), outside of the 20-fathom (120 foot) line, that have not been identified. Unknown areas comprise approximately 32 percent of the overall area, and 0 percent, 0 percent, and 1.7 percent of Work Areas A, B, and C, respectively.

Coral reefs in Hawaiian waters provide shoreline protection from waves and storm surge. They have provided a continuous supply of fresh fish and other basic food for the people of Hawai'i for the past thousand years. They are the source of the sand for Hawaii's beaches. They are an integral aspect of Hawaii's multi-billion dollar tourist industry, providing countless snorkeling, diving, surfing, and fishing opportunities. Coral reefs and hard bottom habitats are found along the length of the Wai'anae coast and provide food and shelter for reef fish and invertebrates (DBEDT, 2004).

Most coral reefs in the waters around the inhabited islands of Hawai'i are known as fringing reefs, growing near the shoreline. Fringing reefs are the first type of reef to form around young volcanic islands, such as Hawai'i, Maui, O'ahu, and Kaua'i. These reefs form in areas of low rainfall runoff, primarily along the leeward shores, such as the Wai'anae coast of O'ahu.

Generally, coral reef structure can be divided into four different zones. Typical reef zonation consists of the following: (a) reef flat zone (0 to 6.5 feet or 0 to 2 meters), (b) reef bench zone, (6.5 to 32.8 feet or 2 to 10 meters), (c) reef slope zone (32.8 to 98.4 feet or 10 to 30 meters), and (4) rubble zone (98.4 to 131.0 feet or 30 to 40 meters) (AECOS, Inc., 2002). A schematic diagram illustrating the reef depth profile and approximate zone boundaries is shown in Figure 10. Descriptions of the four reef zones are provided below.

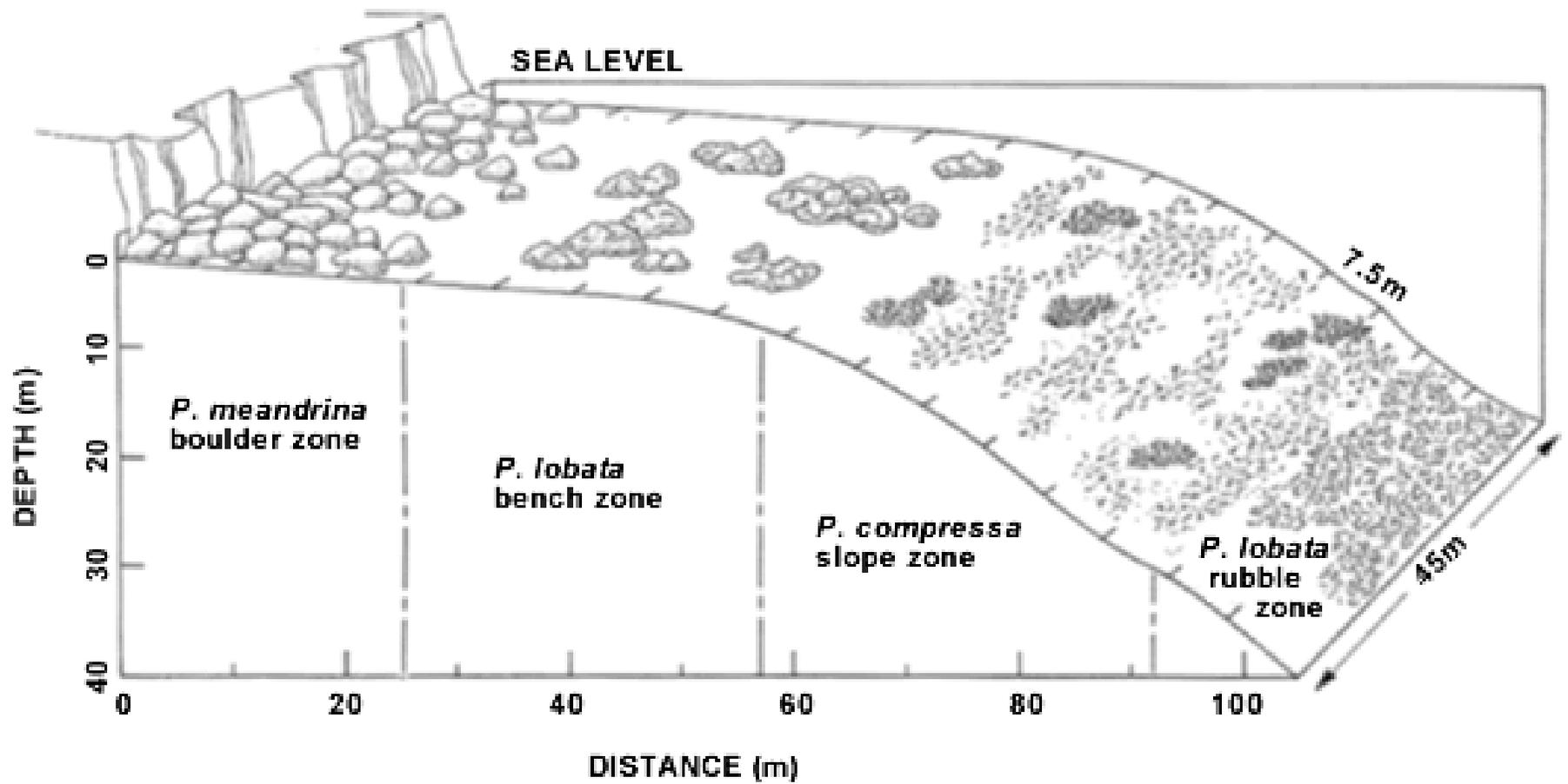


Benthic Habitat

EA for Technology Demonstration: ROUMRS and EHDS at Ordnance Reef (HI-06)

FIGURE 9

Wai'anae, O'ahu, Hawai'i



Coral Reef Zones

FIGURE 10

- Reef Flat Zone – On the Wai‘anae coast, sand occurs along the shore and is affected by substantial wave energy, especially through the winter due to the wrap-around effect from North Pacific storms. Below the waterline, sand is replaced by a limestone platform, or reef flat, that extends several feet offshore. This platform is virtually barren of macro invertebrates and macroalgae, although covered with short turf algae. Corals, represented by the compact and sturdy cauliflower coral (*P. meandrina*), are distributed in patches on the reef flat. Animals living in this zone must contend with strong surge and crashing waves by either boring into the rock (urchins), or by darting out between waves from a protective hole to feed on turf algae (AECOS, Inc., 2002).
- Reef Bench Zone – The limestone platform drops off vertically within 30 to 65 feet (10 to 20 meters) from shore, and the deeper vertical portions, known as the reef bench, contain the corals *P. meandrina*, *Porites lobata*, and *Lepastrea purpurea*. In areas of boulders, the common brown algae (*Padina* spp.) and red algae (*Liagora* spp.) are present. Unattached benthic invertebrates, such as sea urchins, are rare. Reef fish are moderately abundant around the boulders, and in the deeper areas of the shoreline bench (AECOS, Inc., 2002).
- Reef Slope Zone – Wave energy subsides at the depth of the reef slope zone, and the more delicate finger coral becomes common. The greatest concentration of living organisms is here, at the reef’s seaward edge, where plankton and clear water of normal salinity are dependably available. The characteristics of the seafloor are of great importance in structuring fish communities and in determining the number of fishes living in the area. In areas of high relief, where fish can seek refuge, a high abundance and diversity of fishes are present. Large schools of ta‘ape (bluelined snapper; *Lutjanus kasmira*), kole (goldring surgeonfish; *Ctenochaetus strigosus*), aloiloi (black damselfish; *Dascyllus albisella*), and other common fish species are present swimming over these rocks (Russo, 1997).
- Rubble Zone – Coral cover diminishes in the rubble zone, and coral rubble and sand dominate the seascape. Sandy bottoms or pavement rock generally attract very few fish, and fish concentrations drop off considerably, as the habitat provides little refuge in this zone (AECOS, Inc., 2002).

Off the Wai‘anae coast, the seafloor beyond the reef begins at approximately 328 feet (100 meters) depth, and continues to a depth of 16,400 feet (5,000 meters). Sand and sediment cover limestone and volcanic rock where currents do not scrub the seafloor bare. A massive and ancient landslide of the Wai‘anae mountain range exists 100 miles offshore (approximately 160 kilometers from the coast) in waters approximately 2.5 miles deep (4,000 meters) (NOAA, 2007).

Areas along the Waianae coast are fairly heterogeneous with sections of uncolonized hard bottom and sand as well as sections of low to high coral cover. Most of the seafloor is uncolonized pavement—a flat hardbottom of volcanic or limestone rock, interspersed with sand channels. However, corals thrive on the artificial reefs and on the armor rock at the inshore WWTP outfall pipeline, probably because of artificial topographical relief (Harrison, 1987; Russo, 1997).

The Wai'anae coastal waters are dominated by two common coral species, *Pocillopora meandrina* and *Porites lobata*.

- *P. meandrina* (a.k.a. the cauliflower coral) is one of the four most abundant species of Hawaiian reef-building corals. It is a surge-tolerant species that inhabits exposed shorelines and the surge zone of reef slopes. Its dense skeleton, sturdy branches and symmetrical head formation are well suited to the moderate wave action encountered close to the surface. It is the dominant coral species on reef slopes at depths of less than 10 feet, but can also be found to greater than 85 feet or more in depth (Russo, 1997).
- *P. lobata*, a massive and encrusting species, is the most common coral in the main Hawaiian Islands. It is surge-tolerant and can be found in a variety of habitats, from tide pools to depths of approximately 145 feet. It is most common on wave-exposed reef slopes between three and approximately 10 to 45 feet, in a zone below the cauliflower coral. The thin encrusting species *Lepastrea purpurea* is also found in Wai'anae coastal waters (Russo, 1997).

Overall, the habitats and topographical features encountered within the three Work Areas (A, B, and C) are fairly typical of O'ahu consisting of a shallow reef flat and a deeper reef bench sloping down to a deeper plateau. The work areas are qualitatively different in their relative coral abundances, benthic habitat distributions, and three dimensional complexities. Common coral species encountered in the three Work Areas include: *Pocillopora meandrina*, *P. eydouxi*, *Porites lobata*, *P. evermanni*, *P. duerdeni*, *Leptastrea sp.*, and *Montiporasp* (NOAA, 2011).

More detailed descriptions of the benthic habitat, relative coral coverage, and UWMM present in each of the proposed Work Areas is provided below (NOAA, 2011):

- Work Area A: Contains the highest level of coral abundance, coral density, and three dimensional coral habitat complexity of the three Work Areas. Work Area A is the only area found to contain large old *Porites sp.* colonies. Shoreward areas are composed of hard bottom reef flat with intermittent spur and groove formations as well as large depressions in about 30 to 40 feet of depth. Moving seaward, the intermittent spur and groove formations lead to deeper sand flats in 50 to 60 feet of water, gradually extending deeper to 70 to 80 feet.

This area contains the least amount of munitions of the three Work Areas (Table 1-1). The only munitions found in this area are individual SAA, comprising approximately 0.1 percent of the total number of SAA found among all three Work Areas.

- Work Area B: Ranges in depth from approximately 30 to 50 feet running inshore to offshore. The area is relatively heterogeneous in terms of flat, hard bottom substrate with intermittent high points supporting greater coral abundances and densities, as well as some patches of sand habitat.

SAA, small to medium, and large caliber military munitions are present in Work Area B. Approximately 2 percent of the total number of SAA surveyed are found in the northern part of the Work Area and are mostly found individually or in small piles. Approximately 20 percent of the total number of documented small to medium caliber military munitions are found in the northwest section of the area and are found consolidated in blocks of multiple munitions. A small number of individual large caliber munitions are spread across the center of the Work Area.

- **Work Area C:** Overall, the area is characterized by a flat, hard bottom shelf inshore at roughly 50 to 60 feet of depth. This shelf gives way, moving seaward, to a steep slope down to a deeper plateau at approximately 70 feet depth. This plateau gradually slopes seaward to depths of approximately 130 feet. Work Area C has the lowest coral abundances, densities, and complexity, of the three Work Areas. However, it still contains substantial habitat heterogeneity and discrete areas with relatively high amounts of corals. The highest coral presence is located on the shallow shelf (50 to 60ft depth) found on the shoreward side of the Work Area. The deeper shelf (70 feet and greater) is characterized by substantial habitat heterogeneity, with habitats ranging from relatively high coral abundance, to hard bottom with lower coral abundance, and areas of sand and rubble.

Work Area C contains approximately 92 percent of all UWMM found within the three Work Areas (Table 1-1). The area contains 98 percent, 80 percent, and 100 percent of all SAA, small to medium caliber munitions, and large caliber munitions, respectively. SAA are present as individuals to small areas with a 1,000 or more; small to medium caliber munitions are present in consolidated groups, and large caliber munitions are spread throughout the area both individually and in small groups. All of the larger munitions such as the small and large categories of projectiles are found in Work Area C. Small projectiles are present individually and in small clusters, while the large projectiles are found individually.

Potential Impacts

Proposed Action

Adverse impacts to corals could potentially occur if they are accidentally damaged or destroyed during activities related to the Proposed Action; particularly the recovery of UWMM, as a result of moorings and anchorages; the ROV tether line; mechanical damage from the ROV manipulators; release of MC from damaged munitions; or the accidental detonation of UWMM. In addition, UWMM, which have provided a suitable substrate and relief from the ocean bottom, are conducive to coral growth. Some munitions are heavily fouled with algae and benthic organisms. In some cases, munitions were observed with substantial coral growth. Removal of munitions that have coral growth could result in damage to corals.

A summary of potential adverse impacts to corals as a result of the recovery of UWMM by the ROV and RSV, and DSV mooring activities is presented below. More detailed discussion regarding potential injury risk to corals is presented in Appendix C.

ROV Recovery Operations

In Work Area A, the risks of coral injury are mostly moderate to high, particularly in the northeast portion of the Work Area where the large *Porites sp.* colonies are present (See Appendix C, Figure 19).

In Work Area B, the risks of coral injury are mostly low. However, due to the spatial heterogeneity of habitats in the area there are moderate risk sites in close proximity to flat uncolonized hard bottom and sand (See Appendix C, Figures 21 and 23).

In Work Area C, the risks of coral injury among SAA and small to medium caliber munitions sites range from low (where munitions are found on sand or uncolonized hardbottom) to high (where munitions are located in areas of high coral abundances and *P. eydouxi* colonies are present). Risks of coral injury are also variable among large caliber munitions (See Appendix C, Figures 21, 23, and 28). There is an area in the southwestern section of Work Area C that has moderate risks and one large caliber munition located in a moderate to high risk area. However, most of the large caliber munitions are present in relatively low risk areas.

There is an area in the southwestern portion of Work Area C that has higher risks in general than most other areas. There are also several moderate to high level risk sites in the central northern portion of the Work Area. Most of the large caliber munitions were found in sites that present relatively low risk of coral injury, although a few were found in low to moderate risk areas (See Appendix C, Figure 28).

Mooring Activities

The level of coral abundance, densities, and habitat heterogeneity in waters shallower than 60 feet in depth in all Work Areas present a substantial risk of coral injury from mooring activities. The deeper plateau starting at the 70-foot depth in Work Area C also contains areas of relatively high coral abundances and densities. However, these areas are fewer and farther apart than similar areas found in shallower depths. Therefore, the deeper plateaus represent a moderate risk of coral injury from RSV mooring activities.

The area to the south of the Work Areas designated as the Waianae Artificial Reef (a.k.a. Fish Haven) contains a large section of flat sand habitat which presents a low risk area to conduct mooring activities. South of the low risk area, but still within the Waianae Artificial Reef site, is an area similar to the 60-foot depth shelf in Work Areas A and C where coral is present and abundant. This area represents another high risk area for mooring activities. Areas of potential coral injury risk associated with mooring activities are shown in Figure 11.

It should be noted that the DSV mooring site was originally proposed to be located within the surveyed, relative low risk, area of the Waianae Artificial Reef. However, the DSV mooring site was relocated outside, and to the east of, the surveyed area due to its proximity to the Navy and Mahi Barge recreational dive sites located to the south (see Figure 11). It is highly probable that the benthic habitat in the immediate adjacent area (including the DSV mooring site) is similar in nature to the low risk areas identified within the Waianae Artificial Reef (i.e.,

Predominantly sand or uncolonized hardbottom with little or no vertical relief and low coral cover). However, prior to conducting mooring activities, NOAA will survey and confirm that the proposed DSV mooring location is within a relative low risk impact area or will identify an alternate low risk location.

In summary, the Proposed Action will result in unavoidable adverse impacts to corals. However, these impacts do not meet the significance criteria, as they can be effectively mitigated to less than significant impacts.

An indirect beneficial impact resulting from the Proposed Action would be the limited recovery of UWMM between approximately 30 and 120 feet of depth, and the return of the marine environment within the Demonstration Site to a more natural state. In addition, UWMM are often encountered and investigated by recreational divers. The limited recovery of UWMM from depths of between approximately 30 and 120 feet would reduce the potential human health and safety risks associated with divers moving, disturbing, or attempting to recover UWMM as souvenirs, for scrap value, or for other purposes. Indirect beneficial impacts would also occur as a result of the Proposed Action as future risk of damage and/or destruction of corals in the event of an accidental detonation would also be reduced.

No Action Alternative

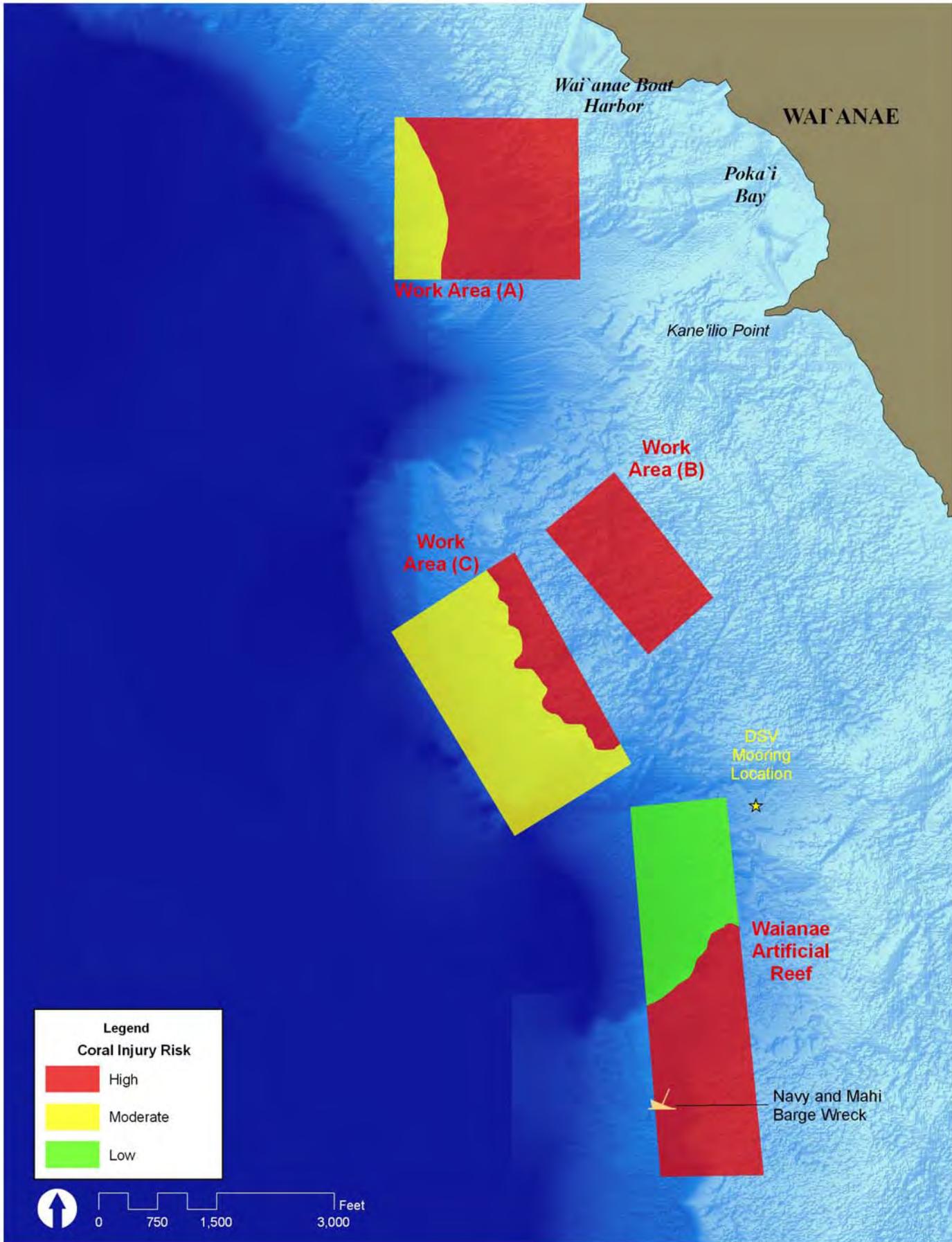
Under the No Action Alternative, the UWMM present at the Ordnance Reef (HI-06) at depths between approximately 30 and 120 feet would not be recovered, and environmental quality in the area would remain unchanged.

Mitigation Measures

Significant adverse impacts to corals are not anticipated as a result of the Proposed Action as the primary mitigation measure during the demonstration will be avoidance of corals. With some exceptions (e.g., SAA), ROUMRS will photograph UWMM before and during recovery, and also following recovery to allow any inadvertent damage to coral to be determined.

As previously described, ROUMRS is designed to allow the careful recovery of UWMM from the ocean's floor with minimal damage to the environment. However, some inadvertent damage to marine life, including corals, may occur during munitions operations. Therefore, ODASA(ESOH) has entered into an interagency agreement with NOAA to assist in preparing a Coral Avoidance and Minimization of Injury Plan (CAMIP) for the Proposed Action (Attached as Appendix C). The CAMIP reports the results of the pre-Demonstration survey of the coral reef ecosystem and munitions present. It addresses the relative risk of coral injury in the three Work Areas, and makes it possible to anticipate, in general, what Demonstration-related losses to coral may occur.

The Proposed Action will give priority to recovering munitions in areas of uncolonized hard bottom and sand while exercising due caution when working in areas of higher coral cover.



Source: NOAA, 2011

Potential Coral Injury Risk From Mooring Activities

FIGURE 11

When possible, recovery activities will avoid areas designated as having a moderate to high and high risk for coral injury and be limited to areas designated as having low and low to moderate risk. Furthermore, the DSV will moor only in an area designated as low risk (as shown in Figure 11).

The Army will consider a number of factors in determining whether to recover a particular munition. First, the Army will determine whether the munition is, from an explosives safety perspective, safe to move (recover). The Army will also consider whether there is sufficient space to maneuver the ROV and recover the targeted munitions without causing damage to coral or other benthic habitats. If substantial coral growth (12 inches or greater) is observed in a location where it could be damaged during recovery of a target munition, or if substantial coral growth (12 inches or greater) is observed on the target munition, the target munition will normally be left in place. Such a munition will only be removed if the Army determines that it is likely to pose an unacceptable explosive hazard to the public at some future date or, after consultation with NOAA, it is determined that the coral growth can be saved.

The CAMIP, comprises the first phase of NOAA's coral assessment efforts, and will be used by the Army and contractor for placement of moorings and anchorages and to guide the recovery efforts to avoid and minimize any impacts to coral. The CAMIP also includes a discussion of possible corrective mitigation measures, including emergency restoration efforts that can be undertaken to re-attach any corals that may become accidentally dislodged during recovery activities. The second phase of NOAA's coral assessment efforts will begin after UWMM recovery efforts have been completed and will include results of post-recovery survey efforts to document any injuries to corals resulting from the Proposed Action and recommendations for mitigation for those injuries. The third phase will involve the actual completion of coral mitigation activities by the Army, as necessary.

Should unintended injury to significant coral growth occur, the Army intends to take the appropriate measures (e.g., habitat replacement) necessary to restore the environment and mitigate any inadvertent damage. The Army will make a decision on whether mitigation measures are warranted upon completion of this roughly 21-day effort.

The Army has consulted and coordinated closely with NOAA throughout its efforts at Ordnance Reef (HI-06), particularly during planning. The Army will continue to work closely with NOAA and other state and federal agencies during and after the Proposed Action. In addition, NOAA will continue to provide the with Army pre-operational, operational, and post-operational support consisting of the following:

- Work Plan review and BMP approval – This pre-operational effort will add efficiency to ROUMRS UWMM recovery processes by providing ROV operators a relative risk evaluation of activities associated with ROV and mooring operations in the three Work Areas and the Artificial Reef.
- Pre-screen – NOAA is cataloging the type and locations of corals present at Ordnance Reef (HI-06) during this pre-operational effort. These surveys have focused on areas

where munitions are known to be present, based upon previous underwater surveys conducted. These surveys allow for the identification of relative coral abundance in the areas where the munitions are known to be located. This will assist in identifying appropriate locations for mooring and staging equipment as well as locations to avoid during ROV operations. The presence of any other marine life of concern will also be documented.

- Real time characterization – During the Proposed Action, NOAA will be able to review digital images that ROUMRS records during UWMM recovery operations providing for on the fly post-recovery verification and allowing for continuous improvement of methods employed to mitigate environmental impacts. These images will allow NOAA to determine what impact operations may be having on corals, if any. Because the ROUMRS ROV will have multiple camera angles and a real time positioning system, any injuries to large coral colonies (particularly colonies of *P. eydouxi*) during UWMM recovery activities can be reported to NOAA (Incl. photos of the larger injured colonies, and GPS coordinates). NOAA staff can then determine the feasibility of attempting emergency restoration measures consisting of reattaching any colonies that were broken off from the substrate (using cement or epoxy). Reattaching large colonies should enhance the corals chances of survival and should the colonies undergo mortality their skeletons would still contribute to local habitat complexity.
- Post-inspection/restoration – This post-operational effort will allow NOAA to assist the Army in assessing any ROUMRS-related impacts to corals and determining the need for a coral reef restoration or mitigation plan.

In addition to continued consultation and coordination efforts with NOAA and following recommendations set forth in the CAMIP (as practicable), all BMPs applicable to the prevention of adverse impacts to coral habitat shall be strictly adhered to per the BMPP. BMPs that will be implemented to minimize potential adverse impacts to corals include, but are not limited to:

- The ROV and topside crew will be briefed prior to ROV operations. The crew shall be briefed about:
 - Coral growth, reefs, marine life, protected marine species, and habitat that must be avoided.
 - Culturally important structures and locations.
 - Photographs, drawings, previous reports, and the NOAA CAMIP, which details the locations of sensitive corals and other benthic habitats and documents the relative level of concern for each Work Area.
- All coral species, including Branching Corals (*Pocillopora meandrina*, *Pocillopora eydouxi*, etc.) or Lobate Corals (*Porities lobata*, *Porities evermanni*, *Porities duerdeni*, etc.) greater than 12 inches in vertical growth that is either growing on a target object (i.e., UWMM) or in a location that could be damaged during recovery of the target object will be documented. Recovery of UWMM or munition debris with corals having greater than 12 inches of vertical growth will not occur until NOAA has been consulted about coral mitigation options (e.g., transplantation, habitat, replacement) and the Army

concur with the recovery. Any UWMM intentionally not recovered will be documented as to type, location, and reason for leaving it in place.

- Care will be taken when mooring or operating in areas of moderate relative coral abundance. Extreme care will be taken when mooring or operating in areas of high relative coral abundance. UWMM will normally be left in place if a highly developed coral reef system is present.
- Mooring, anchorage, and staging areas will be located using global positioning systems. The coordinates for each potential mooring, anchorage, and staging area must be confirmed prior to contacting the bottom.
- The ROV tether will:
 - Be manned at all times.
 - Have positive buoyancy to minimize bottom contact and possible disturbance of reef structures.
- The ROV will:
 - Be used to reconnoiter the position of mooring, anchorages, or staging areas prior to contacting the bottom to confirm that these areas are acceptable based on criteria provided in the CAMIP.
 - Exercise caution when approaching the mooring, anchorage, or staging areas to avoid contact with the bottom, environmental features, coral, or structures.
 - Be used to lower moorings, anchorages, or equipment to the bottom, or such will be lowered using lines. Moorings, anchorages, or equipment will not be dropped or released freely from the surface
 - Digitally record, document and save an image of the target location (i.e., the mooring, anchorage, or staging area) prior to contacting the bottom.
 - Avoid all coral species, protected marine species, reefs, and habitats of concern, and culturally important structures to prevent damage prior to and following placement of the mooring, anchorage, or equipment on the ocean bottom.
 - To the extent possible, limit contact with and avoid disturbance of the bottom while collecting munitions and munitions debris.
 - Confirm that the location and placement of the salvage basket is in an area that will not injure coral or other benthic habitat as noted in NOAA's CAMIP.
- Moorings and anchorages in sensitive locations will employ floated lines.
- Upon completion of work at each Work Area within Ordnance Reef (HI-06), the condition of the Work Area will be digitally recorded and saved after the mooring, anchorage, or staged equipment is removed. Any injury to sensitive areas will be identified and reported to the Army's lead.

3.1.2.2. Reef Fish

Existing Conditions

There are 557 documented species of reef and shore fish in Hawai‘i. Of these species 135 are endemic and surgeonfish are the dominant fish group. Herbivores generally account for over 70 percent of the total reef fish biomass, followed by invertebrate feeders (13 percent) and plankton feeders (9.7 percent). Predators are rare, accounting for 3.8 percent of reef fish biomass (Brainard et.al., 2002).

The Wai‘anae coast has few locations with complex habitat. Thus, most of the reef along the coast has low species diversity and biomass. The Wai‘anae coast in general offers relatively few fish species and low numbers of fish. However, there are exceptions where large schools of reef fish have been documented. They include the three artificial reefs—Pōka‘ī Bay Artificial Shoal (created with old cars, concrete pipes and a steel barge in 1963), the Mahi shipwreck (sunk in 1982) and the seaplane wreck (sunk in 1986), the outfall pipe of the WWTP in Wai‘anae town; and the thermal outfall of the Kahe power plant just south of Wai‘anae (Kanenaka, 1991; Harrison, 1987).

The weke (yellowstripe goatfish; *Mulloidichthys flavolineatus*), na‘ena‘e (surgeonfish; *Acanthurus dussumieri*), ‘ū‘ū (menpachi; *Myripristis berndti*), and the saddleback wrasse (*Thalassoma duperrey*) occur in large schools at these sites. Also common are the brown surgeonfish (*Acanthurus nigrofuscus*), Pacific Gregory (*Stegastes fasciolatus*), goldring surgeonfish (*Ctenochaetus strigosus*) and the blackfin chromis (*Chromis vanderbilti*). Moray eels belong in the family Muraenidae in the genus *Gymnothorax*. These eels are common apex predators with 38 species of morays found on Hawaiian reefs. Individuals are resident to specific reef areas, and feed on a wide range of reef associated fish and invertebrates (NOAA, 2007).

Armor rock surrounding pipes and artificial reefs provides ample habitat space for hiding and mating, ample surface for the colonization of food sources, and a reference point above the seafloor for aggregation and maintenance of schools. Artificial structures placed in areas normally devoid of bottom relief can attract large numbers of fish and provide surfaces for coral and other sessile organism attachment. Macroalgae represent over 50 percent of the benthic cover in the Hawaiian coral reef ecosystem. Red algae are the most commonly occurring algae in Hawai‘i, representing four of the five most common species. Green and brown algal species are found in most reefs in smaller numbers (Brainard, et. al., 2002; NOAA, 2007).

Potential Impacts

Proposed Action

Significant adverse impacts to reef fish and marine life would not occur as a result of the Proposed Action. However, potential less than significant impacts could occur from the accidental release of MC from UWMM, or accidental fluid spills from equipment. An indirect beneficial impact resulting from the Proposed Action would be the limited recovery of UWMM

between approximately 30 and 120 feet of depth, and the return of the marine environment within the Demonstration Site to a more natural state.

Potential impacts resulting from the Proposed Action do not meet the significance criteria or such impacts that can be effectively mitigated would not result in significant adverse impacts to reef fish and marine life.

No Action Alternative

Under the No Action Alternative, the UWMM present at the Ordnance Reef (HI-06) at depths between approximately 30 and 120 feet would not be recovered, and environmental quality in the area would remain unchanged.

Mitigation Measures

Under the BMPP, the Army and its contractors will strictly adhere to applicable BMPs to prevent adverse impacts to fish and other marine resources within Ordnance Reef (HI-06) throughout the Proposed Action. BMPs that will be implemented to minimize potential adverse impacts to fish and marine resources would include, but not be limited to those previously described in sections 3.1.1. and 3.1.2.2.

3.1.2.3. Protected Species

Since 1973, the ESA has regulated a wide range of activities affecting flora and fauna classified as endangered or threatened. Reauthorized in 1988, the provisions of the ESA apply only to species listed in the Federal Register as endangered or threatened. Under the provisions of the ESA, all federal agencies are required to undertake measures to protect and conserve threatened and endangered species during the execution of their missions and are prohibited from authorizing, funding, or carrying out any action that would jeopardize a listed species or destroy or alter their critical habitat.

A species is classified as "endangered" when it is in danger of extinction within the foreseeable future in all or a significant portion of its range. A "threatened" classification is assigned to a species likely to become endangered within the foreseeable future in all or a significant portion of its range.

Existing Conditions

Several protected marine species occur within the main Hawaiian Islands. Below is a brief summary of protected marine species known to use the waters off O'ahu, including its leeward coast.

- **Marine Mammals** – Humpback whales appear in Hawaiian waters between November and April, when they socialize, mate, and give birth. When engaged in singing, nursing, or competition for mates, whales can become very vulnerable to human hazards because their attention is focused on these reproductive activities. Humpback whales migrate

annually from Alaska to Hawaiian waters, covering nearly 3,000 miles of open-ocean in less than two months' time. Approximately 2,000 to 5,000 individuals come to Hawai'i each year, constituting a substantial portion of the total North Pacific population of 6,000 to 10,000 whales (NOAA, 2007). Humpback whales are an endangered species protected under both the MMPA and the ESA.

The Hawaiian Islands Humpback Whale National Marine Sanctuary was established to protect the largest breeding grounds for the humpback whale, and includes near shore waters along parts of all the main Hawaiian Islands including the northern coast of O'ahu. Neither Ordnance Reef (HI-06) nor the Wai'anae coast is located within the Hawaiian Islands Humpback Whale National Marine Sanctuary boundary.

Within the Hawaiian Archipelago spinner dolphins (*Stenella longirostris longirostris*) are found around all of the main Hawaiian Islands and are also found at some of the Northwest Hawaiian Islands (e.g., Midway, Kure, Pearl and Hermes Reef and French Frigate Shoals). However, in contrast to the Northwest Hawaiian Islands, the main Hawaiian Islands are large and offer many potential resting areas for spinner dolphins (NOAA, 2010).

The Hawaiian monk seal (*Monachus schauinslandi*), a federally listed endangered species, most commonly inhabits the Northwestern Hawaiian Islands. However, monk seals are occasionally sighted around the main Hawaiian Islands, including off Mākuā Beach on the Wai'anae coast. Prominent threats to monk seal populations include entanglement in fishing gear; disturbance by humans, which can cause seals to abandon haul-out areas and their pups; and predation by sharks.

- Sea Turtles – The green sea turtle (*Chelonia mydas*), considered the most abundant sea turtle in Hawaiian waters, is listed as a threatened species under the federal ESA. These turtles can be seen in the waters off Wai'anae. Threats to green sea turtles occur from land-based and sea-based activities, such as the loss of nesting habitat due to development, nest predation, boat collisions, entanglement in fishing gear, and ingestion of marine pollution.

Hawksbill turtles are distributed throughout the tropics, generally occurring at latitudes from 30 degrees north to 30 degrees south within the Atlantic, Pacific, and Indian Oceans and associated bodies of water. In Hawai'i, hawksbills nest only on main Hawaiian Island beaches, primarily along the east coast of the island of Hawai'i. The hawksbill turtle is listed as endangered throughout its range. In the Pacific, this species is rapidly approaching extinction due to a number of factors, but the intentional harvest of the species for meat, eggs, shell, and stuffed curio trade is of greatest impact (NOAA, 2007).

- Corals – At the time of the writing of this EA, coral species are not protected under the ESA. However, pursuant to a petition filed by the Center for Biological Diversity (CBD) on October 20, 2009, the NMFS is currently reviewing the candidacy of 82 species of coral for listing as threatened or endangered under the ESA. A Notice of 90-Day Finding on the subject petition was published by the NMFS in the Federal Register on February 10, 2010 (FR, 2010).

The species petitioned are all corals identified by the World Conservation Union (IUCN) as vulnerable, threatened, endangered, or critically endangered. Of the 82 species under consideration, the IUCN has classified 75 as vulnerable, six as endangered, and one as critically endangered. Seventy-five (75) of the species occur in the Indo-Pacific and seven occur in the Caribbean-Atlantic region. All of the coral species can be found in the US and its territories. However, many occur more frequently in other countries (CBD, 2009).

Of the 75 corals species occurring in the Indo-Pacific region, nine species are found in the Hawaiian Islands. These are: *Acropora paniculata*, *Cyphastrea agassizi*, *Cyphastrea ocellina*, *Leptoseris incrustans*, *Montipora dilatata*, *Montipora flabellata*, *Montipora patula*, *Pocillopora elegans*, and *Psammocora stellata*. However, of these nine species found in Hawai‘i none are known to occur within Ordnance Reef (HI-06) or along the Wai‘anae coast.

Potential Impacts

Proposed Action

Significant adverse impacts to protected marine species are not anticipated as a result of the Proposed Action. As previously noted, neither Ordnance Reef (HI-06) nor the Wai‘anae coast is located within the Hawaiian Islands Humpback Whale National Marine Sanctuary boundary. Furthermore, the Proposed Action is scheduled to take place during the summer months of 2011, which fall outside of whale season (November through April). However, there exists the possibility of encountering some protected species, in particular green sea turtles, at Ordnance Reef (HI-06).

The NMFS has confirmed that there is no designated or proposed critical habitat for any listed marine species with or adjacent to the proposed demonstration area. Therefore, the Proposed Action would have no affect of designated or proposed critical habitat for marine species (Appendix F).

An indirect beneficial impact resulting from the Proposed Action would be the limited recovery of UWMM between approximately 30 and 120 feet of depth, and the return of the marine environment within the Demonstration Site to a more natural state.

Potential impacts resulting from the Proposed Action do not meet the significance criteria, or can be effectively mitigated, and would not result in significant adverse impacts to protected species.

No Action Alternative

Under the No Action Alternative, the demonstration and resultant potential adverse impacts to protected species would not occur.

Mitigation Measures

Under the BMPs, the Army and its contractors will strictly adhere to applicable BMPs to prevent impacts to protected species during implementation of the Proposed Action within Ordnance Reef (HI-06). BMPs that will be implemented to minimize potential adverse impacts to ESA and MMPA protected species would include, but not be limited to:

- All on-site Demonstration-related personnel will be apprised of the status of any ESA-listed or MMPA-protected species potentially present in the work area and the protections afforded these species under Federal laws.
- Constant vigilance will be kept for the presence of ESA-listed or MMPA-protected marine species during all aspects of the Proposed Action, particularly in-water activities such as ROV and support vessel operations, diving, and mooring and anchoring activities.
- A competent observer will be designated to survey the marine areas adjacent to the Proposed Action for ESA-listed or MMPA-protected marine species.
- Visual surveys will be made prior to the start of work each day, and prior to resumption of work following any break of more than one half-hour. Additional periodic surveys throughout the workday would be conducted.
- The designated Demonstration points of contact for in-water activities will ensure that observers are in place and protocols are followed during all periods of in-water work to avoid any potential contact with, or harassment of ESA-listed or MMPA-protected species.
- Records of any protected species observed in the Demonstration areas during in-water activities will be maintained and submitted at the close of in-water activities.
- All in-water work will be postponed or halted when ESA-listed or MMPA-protected marine species are observed within 210 feet (64 meters) of the proposed work, and will only begin or resume after the ESA-listed or MMPA-protected species has voluntarily departed the area. If ESA-listed or MMPA-protected species are observed within 210 feet (64 meters) of the proposed work after the work has already begun, such work can continue only if, in the best judgment of the Demonstration Manager, the work will in no way adversely affect the ESA-listed or MMPA-protected marine species.
- When piloting vessels, vessel operators will:
 - Alter course to remain at least 300 feet (91 meters) from whales, and at least 210 feet (64 meters) from other marine mammals and sea turtles.
 - Reduce vessel speed to 10 knots or less when piloting vessels at or within the ranges described above from marine mammals and sea turtles. Operators will be particularly vigilant to watch for turtles at or near the surface in areas of known or suspected turtle activity, and if practicable, reduce vessel speed to 5 knots or less.
 - If, despite efforts to maintain the distances and speeds described above, a marine mammal or turtle approaches the vessel, put the engine in neutral until the animal is at least 50 feet away then slowly move away to the prescribed distance.

- Marine mammals and sea turtles will not be encircled or trapped between multiple vessels or between vessels and the shore.
- Attempts to feed, touch, ride, or otherwise intentionally interact with any ESA-listed marine or MMPA-protected species by personnel involved in the Proposed Action will be prohibited.

In the unlikely event that any ESA or MMPA listed species are harmed, injured or killed the Army shall immediately cease operations and notify the NMFS Protected Resources Division. Mitigation measures for the protection of coral species are contained within the BMPs found in Appendix B. The Army will reinitiate consultation with NMFS if any of the following conditions occur:

- A take occurs,
- New information reveals the action has affected protected species in a manner or to an extent not previously evaluated,
- If the action is subsequently modified and causes effects to protected species in a manner or to an extent not previously considered or evaluated, or
- A new species is listed or critical habitat is designated that may be affected by the authorized work.

3.1.3. Air Quality

Ambient air pollution concentrations are regulated by both federal (Section 40, Part 50 CFR) and state (Hawai'i Revised Statutes (HRS), Chapter 11-59) Ambient Air Quality Standards (AAQS). Federal AAQS are divided into primary and secondary standards. The primary standards are intended to protect the public with an adequate margin of safety, while secondary standards are intended to protect public welfare through the prevention of damage to soils, water, vegetation, animals, wildlife, man-made materials, visibility climate and economic values (40 CFR, Part 50). State AAQS are intended to "protect public health and welfare and to prevent the significant deterioration of air quality" (State of Hawai'i, 2001).

The US Environmental Protection Agency (EPA) has promulgated federal AAQS, which include six criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), lead (Pb), ozone (O₃), and particulate matter (PM). However, monitoring for lead was no longer required after October 1997. In addition to the federal standards, Hawai'i has established standards for CO and NO₂ that are more stringent than the federal AAQS and has also set an ambient air standard for hydrogen sulfide.

Table 3-1 summarizes both the federal and state AAQS. Each regulated air pollutant has the potential to adversely impact human health or to produce environmental degradation when present in sufficiently high concentrations for prolonged periods of time. Additionally, the state's Air-Pollution Control Regulations also prohibit visible emissions at the property line of fugitive dust from concentration activities (State of Hawai'i, 2001).

Table 3-1. Summary of State of Hawai‘i and Federal Ambient Air Quality Standards

Pollutant	Sampling Period	National AAQS Primary	National AAQS Secondary	State of Hawai‘i AAQS
Particulate Matter (PM ₁₀) ^a	Annual 24 hour	-- 150 µg/m ³	-- 150 µg/m ³	50 µg/m ³ 150 µg/m ³
Particulate Matter (PM _{2.5}) ^b	Annual 24 hour	15 µg/m ³ 35 µg/m ³	15 µg/m ³ 35 µg/m ³	-- --
Sulfur Dioxide (SO ₂)	Annual	0.03 ppm	--	0.03 ppm
	24 hour	0.14 ppm	--	0.14 ppm
	3 hour	--	0.5 ppm	0.5 ppm
Nitrogen Dioxide (NO ₂)	1 hour	75 ppb	--	--
	Annual	0.053 ppm	0.053 ppm	0.04 ppm
	1 hour	100 ppb	--	--
Carbon Monoxide (CO)	8 hour	9 ppm	--	4.4 ppm
	1 hour	35 ppm	--	9 ppm
Ozone (O ₃)	8 hour	0.075 ppm	0.075 ppm	0.08 ppm
Hydrogen Sulfide	1 hour	--	--	25 ppb
Lead (Pb)	Quarterly	0.15 µg/m ³	--	1.5 µg/m ³

^a Particles are less than or equal to 10 microns aerodynamic diameter.

^b Particles are less than or equal to 2.5 microns aerodynamic diameter.

Source: DOH, 2010

ppb = parts per billion by volume

ppm = parts per million by volume

µg/m³ = micrograms per cubic meter of air

Significance Criteria

Impacts on air quality are considered significant if any of the following apply:

- Violates any air quality standard or exceeds de minimis levels to an existing or projected air quality violation, including normal operational and accidental releases;
- Results in a cumulatively substantial net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state AAQS;
- Exposes the public to substantial pollutant concentrations that are above acceptable health effects levels as established by state or federal regulations; or
- Conflicts with or obstructs implementation of any applicable federal, state, or local air quality plan.

Existing Conditions

Air quality at Ordnance Reef (HI-06) is considered good as it is in a coastal area and influenced heavily by circulating ocean winds. The rural nature of the adjacent Wai‘anae community and the absence of nearby major sources of industrial or vehicular emissions further contributes to the good air quality of the region.

The state of Hawai‘i Department of Health (DOH) maintains a limited network of air monitoring stations around the state to gather data on the pollutants listed in Table 3-1 above. There are six DOH air monitoring stations on the island of O‘ahu. Monitoring stations nearest Ordnance Reef (HI-06) are West Beach, Ko‘olina Golf Course Station and the Kapolei Station, located approximately 8 and 10 miles south of Ordnance Reef (HI-06), respectively.

The most recent published air quality data from the West Beach and Ko‘olina monitoring stations is presented in Table 3-2 below. These data are indicative of the generally good air quality throughout most of Hawai‘i and may be considered reasonable representative of existing air quality in the area that encompasses Ordnance Reef (HI-06).

Table 3-2. DOH Air Quality Data at Monitoring Stations Near Ordnance Reef (HI-06) 2009

Pollutant	Concentration
Particulate Matter (PM ₁₀)	
24-hour (max)	28 µg/m ³
Annual	13 µg/m ³
Particulate Matter (PM _{2.5})	
24-hour (max)	20 µg/m ³
Annual	3.5 µg/m ³
Sulfur dioxide (SO ₂)	
3-hour (max)	0.006 ppm
24-hour (max)	0.002 ppm
Annual	0.001 ppm
Carbon monoxide (CO)	
1-hour (max)	3.8 ppm
8-hour (max)	0.8 ppm
Annual	0.2 ppm
Ozone (O ₃)	
8-hour (max)	0.036 ppm
Annual	0.013 ppm
Nitrogen Dioxide (NO ₂)	
Annual	0.003 ppm

Notes: 1. CO, NO₂, and PM_{2.5} are from the Kapolei station
2. O₃ data are from the Sand Island monitoring station

Source: DOH, 2009

As shown in the table above, ambient air quality in the vicinity of Ordnance Reef (HI-06) is very good with criteria pollutant concentrations falling well below both the state and federal AAQS thresholds.

Potential Impacts

Proposed Action

No significant impacts to air quality are anticipated as a result of the Proposed Action. EHDS operations on the DSV would result in emissions from the RCBO. The EHDS is not a major stationary source of emissions, and EHDS-related emissions would be negligible, short-

term, and localized in nature. A detailed description of the energetic compounds and decomposition products (including emissions) resulting from the EHDS process can be found in Appendix L (Section VII). Furthermore, the DSV would be located approximately two miles off shore and any emissions would be readily dispersed out at sea.

The DOH - Clean Air Branch was consulted regarding the Proposed Action, and in a letter (dated July 15, 2010) issued an Air Permit Exemption (see Appendix D) for the operation of the EHDS-RCBO.

Potential impacts resulting from the Proposed Action would be less than significant and would not result in long-term adverse impacts to air quality.

No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no impact to ambient air quality.

Mitigation Measures

No mitigation measures are required.

3.1.4. Noise Environment

The impacts of sound on the environment are determined by several factors including sound level (loudness), the duration of exposure to the noise, the frequencies involved, and the variation or fluctuations in noise levels during exposure. Loudness is measured in units called decibels (dB).

When describing underwater acoustic phenomena it is normal to express the sound pressure through the use of a logarithmic scale termed the Sound Pressure Level or SPL. The SPL is usually expressed using the logarithmic dB scale. The fundamental unit of sound pressure is the Newton per square meter, or Pascal. Underwater sound is conventionally presented in dB referenced to 1 microPascal (μPa), and is expressed as dB re 1 μPa (ICES, 2005).

Significance Criteria

For the purposes of this EA sound-related impacts could be considered significant if the Proposed Action results in:

- A substantial permanent or long-term increase in ambient noise levels in the surface environment in the vicinity of the project, above levels existing without the project;
- A substantial permanent or long-term increase in ambient noise levels in the subsurface environment in the vicinity of the project, above levels existing without the project, that may result in permanent, irreversible damage to marine biota; or

- Noise levels exceeding the local noise ordinance or any applicable noise regulations promulgated on the federal or state level at upland locations such as parks, recreational areas, residences, or schools.

Existing Conditions

Due to its off-shore location, surface ambient sound levels at Ordnance Reef (HI-06) are primarily controlled by the naturally occurring sounds of open ocean waves and wind. In the northeastern portion of Ordnance Reef (HI-06), closest to Pōka'i Bay and the WSBH, dispersed and intermittent sounds of recreational and commercial ocean vessels and recreational ocean users also influence ambient sound levels, and to a lesser degree harbor activities. Harbor activities include onsite motor vehicles, and ocean vessel docking activities. The noise generated from harbor operations are for the most part not radiated beyond the harbor property boundaries.

Subsurface background, or ambient, noise occurs in all oceans and seas. There are many sources of ambient noise, which may be classified as either:

- Physical – wind driven, turbulence, seismic (earthquakes, etc.) and microseisms, thermal, rainfall, seabed generated and icebergs;
- Biological – human and animal sounds and movement; and
- Man-made – shipboard machinery, propeller, water flow around, and discharges from, the hull.

These diverse sources all contribute to the generation of underwater background ambient noise levels (ICES, 2005). The subsurface ambient noise environment within Ordnance Reef (HI-06) would also be influenced by similar physical, biological, and man-made sources, due to its location along the Wai'anae coastline and its proximity to the WSBH and public beaches.

In areas farther off-shore (i.e., outside the surf zone along shorelines), ambient noise is often as low as 35 - 70 dB re 1 μ Pa; during times of high wind and storms, wave noise alone can increase to over 80 dB. Dense animal or shipping noise can peak as high as 140 dB re 1 μ Pa at very low frequencies (below 10 Hz), 100 dB re 1 μ Pa at frequencies up to 1 kHz, and 60 dB re 1 μ Pa at frequencies over 1 kHz. Other more recent studies have shown individual supertankers being as loud as 189 dB re 1 μ Pa at low frequencies, with most large ships having individual source levels between 160 and 180 dB re 1 μ Pa (AEI, 2001).

Many marine animals rely on hearing for a wide variety of critical functions, and exposure to prolonged and/or excessive noise could adversely impact them. However, determining potential underwater sound-related impacts to marine life is difficult. Hearing loss due to sound exposure is well studied in humans and other terrestrial animals, but data for marine animals are sparse (USN, 2007).

Although there are many data gaps regarding auditory impacts to marine animals, the present scientific consensus is that problems in a marine mammal's hearing capability will not arise at source levels of less than 180 dB re 1 μ Pa. At higher received levels or greatly extended continuous duration one cannot be certain, and the general consensus is that the 180 dB re 1 μ Pa

level should be considered as the point above which some potential problems in marine mammals' hearing capability may begin to occur (USN, 2007).

Potential Impacts

Proposed Action

The ROUMRS and EHDS technologies will emit sound both above and below the water surface during munitions recovery and disposal operations. Adverse impacts to the noise environment above the water surface would be negligible to non-existent. The mechanized sound levels generated by the technology demonstration activities on the water surface would be both comparable and consistent with existing at-sea activities and operations of recreational and commercial ocean vessels that use the area. Furthermore, noise generated during the Proposed Action would occur in remote off-shore areas, and would be temporary, and short-term in nature.

The ROUMRS will also generate underwater noise from its propulsion system, mechanized recovery equipment, and SONAR from its reconnaissance surveying, and acoustic navigation systems. Source level noise generated by the ROUMRS sonar scanning and acoustic navigation systems would be 210 dB re 1 μ Pa and 190 dB re μ Pa, respectively.

Although the sound levels generated by these ROUMRS scanning and navigation systems are greater than 180 dB re 1 μ Pa, significant adverse impacts to the underwater noise environment are not anticipated, because these sound levels would be generated intermittently and over a short period of time. The referenced decibel levels can occur if the equipment is operated at full power which is not part of the standard operating procedure, and may occur infrequently if at all. Furthermore, the ROUMRS was designed using off-the-shelf commercially available ROT. Consequently, the sound levels generated fall within common sound level ranges for non-military, commercial bathymetric, depth-finding sonar equipment which often have source levels of 220 dB or 230 dB re 1 μ Pa (ICES, 2005).

In addition, to operational noise generated by ROUMRS impulsive sound could be generated as a result of unintentional underwater detonation of munitions. Powerful impulsive noise is generated by the use of explosives underwater, by the airgun arrays used in seismic surveying, and by some forms of construction activity such as underwater pile driving. These sources generate impulsive waves of short duration, high peak pressure, and a wide frequency bandwidth, and may consequently represent a hazard to underwater animals.

Significant adverse impacts from explosion-related impulsive sound are not likely to occur, because as previously discussed the chances of the unintentional detonation of unfired, unarmed, and unfuzed sea-disposed munitions is remote. Furthermore, if such an unlikely detonation event were to occur, the resultant impulsive sound generated would be an isolated, singular, short-term event as opposed to a repetitive event of long-term duration (e.g., underwater pile driving).

In summary, potential sound impacts resulting from the Proposed Action would be short-term and temporary in nature. They do not meet the significance criteria, and would not result in significant adverse impacts to the noise environment.

No Action Alternative

Under the No Action Alternative, the demonstration would not occur and there would be no impact to the surrounding noise environment.

Mitigation Measures

Although significant adverse underwater sound impacts are not anticipated, as a precautionary measure, in-water activities during the Proposed Action will employ, as practical and feasible as possible, sound attenuation measures (not operating the ROV at full power) to minimize the intensity and duration of percussion impacts through the aquatic environment.

3.2. Social Environment

3.2.1. Public Health and Safety

Significance Criteria

Any impact on public safety from Proposed Action would be considered significant if it resulted in:

- Loss of life or serious injury to both people involved with and/or not involved with the project;
- The cause and/or transmittal of chronic disease or physical illness to the public; or
- Long-term damage to the environment.

Existing Conditions

As previously noted, UWMM present at Ordnance Reef (HI-06) are believed to be discarded there by DoD sometime after World War II. These military munitions are both numerous and varying in types and size. UWMM documented at the Ordnance Reef (HI-06) include, but may not be limited to: naval gun ammunition, 105mm and 155mm artillery projectiles, mines, mortars, and SAA (i.e., ammunition, without projectiles that contain explosives (other than tracers), that is .50 caliber or smaller, or for shotguns).

Potential Impacts

Proposed Action

Beneficial impacts to public safety and health would occur as a result of the Proposed Action. UWMM are often encountered and investigated by recreational divers, and the limited recovery of UWMM from approximately 30 to 120 feet of depth would reduce the potential

human health and safety risks associated with divers moving, disturbing or attempting to recover UWMM as souvenirs, for scrap value, or for other purposes.

Adverse impacts to public health and safety could potentially occur if an unintentional detonation occurs. However, the chances of an unintentional detonation event during the Proposed Action are extremely low. As previously discussed, UWMM at Ordnance Reef (HI-06) are categorized as DMM. As such, these munitions pose less of an explosives hazard than UXO because, even if fuzed, these munitions have not been armed as a result of being used as intended. Nevertheless, an unintentional detonation of UWMM that has been brought to the surface could pose a risk to public health and safety in the form of blast and fragment hazards.

Potential impacts resulting from the Proposed Action, do not meet the significance criteria, and would not result in significant impacts to public health and safety.

No Action Alternative

Under the No Action Alternative, the current situation would remain unchanged, and the potential for adverse impacts to public health and safety could occur in the event UWMM are encountered, investigated, or disturbed by recreational divers.

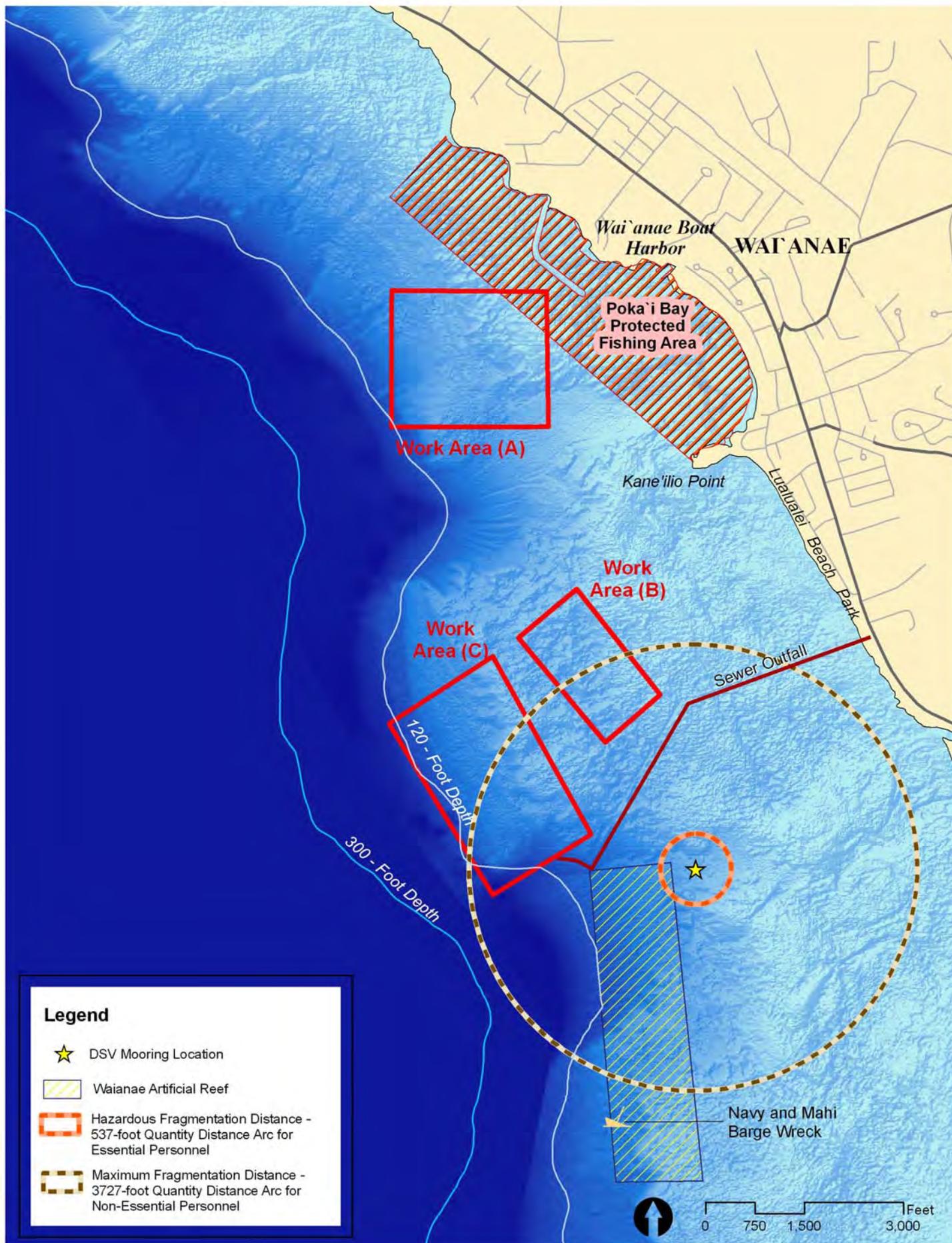
Mitigation Measures

DoD has established explosives safety criteria to protect the public from the potential explosives hazards associated with various quantities and types of munitions. One of these criteria is the establishment of explosives safety zones. These safety zones, which are referred to as Explosive Safety Quantity Distance (ESQD) arcs, vary in distance based on the net explosive weight (NEW) of any munitions present at a given location. An EQSD is determined based on either a planned NEW—normally the maximum NEW that would be allowed—or on the actual NEW present. An ESQD radiates from the outer edges of any munitions present.

The ESQD required for the Proposed Action will be approved by the USATCES, and separately by the DDESB. As a mitigation measure, when munitions containing high explosives are being processed, an ESQD of 537 feet and 3,727 feet will be maintained around the DSV for essential and non-essential personnel, respectively (ARA, 2011).

The ESQD will be maintained as a restricted exclusion zone by use of small contracted craft to keep people and vessels out of the ESQD (safety zone). The ESQD perimeter will not intersect with beaches, public lands, or roadways. The ESQD locations and size are shown in Figure 12.

To minimize potential explosive risks to the public, all demilitarization activities, with the exception of removal from the ROUMRS' salvage baskets, will be performed inside 20-foot steel shipping containers, shielded with blast and fragmentation barriers that are designed to withstand and direct the forces of an intentional detonation. During ROUMRS DMM recovery and towing activities, an ESQD of 254 feet will be maintained around the ROV, salvage basket, and RSV for non essential personnel (ARA, 2011).



Explosive Safety Quantity Distance (EQSD)

FIGURE 12

All demilitarization activities will be performed per the ESSP developed per applicable Army and DoD Ammunition and Explosives Safety Standards. The ESSP will be reviewed and approved by USATCES and separately by the DDESB. As previously mentioned, the ESSP is currently in its draft form but, will be approved and finalized prior to initiation of Demonstration activities. Additionally, the parameters of the ESSP and related plans will be closely coordinated with the US Coast Guard, and the WSBH’s Harbormaster.

3.2.2. Marine Recreational Resources

Significance Criteria

For the purposes of this EA, impacts to recreational resources would be considered significant if the project activities:

- Conflict with existing or future area wide or local recreational policies or plans;
- Permanently alter, diminish, or eliminate a marine recreational resource;
- Substantially reduce the quality of the recreational experience (e.g., project activities degrade the character of a recreational area); or
- Create incompatible adjacent marine uses.

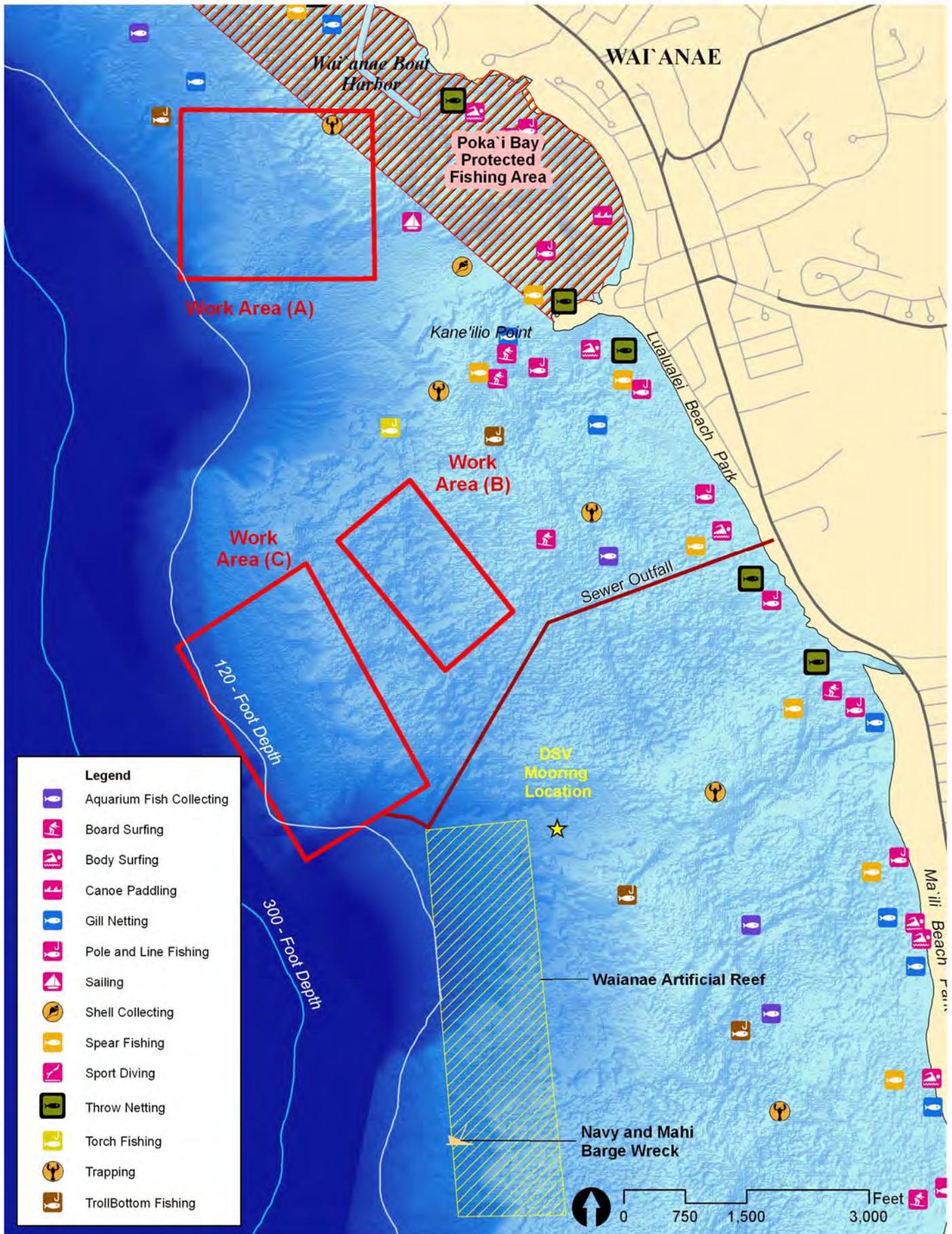
Existing Conditions

The Wai‘anae coast, which extends from Ka‘ena point to Kahe point, provides diverse opportunities for marine recreational opportunities, including among others, fishing (off-shore and near-shore), surfing, diving, snorkeling, spear fishing, canoe paddling, and swimming (shown in Figure 13). There are numerous public beach parks and harbor facilities along the Wai‘anae coast that provide access to these recreational activities.

Private and commercial vessels operating along the Wai‘anae coast provide access to a ocean recreational activities, which include fishing, snorkeling, SCUBA diving, and sightseeing tours to watch spinner dolphins and humpback whales.

The WSBH is just off Farrington Highway and adjacent to the Wai‘anae Regional Park. The WSBH was constructed in 1972, and owned and operated by the state of Hawai‘i DLNR-Division of Boating and Ocean Recreation (DOBOR). The harbor has 146 slips, 94 of which are occupied. The harbor also has seven boat launching ramps, a vessel washdown area, a fish hoist, and a marine sanitation device pumpout facility. The WSBH is one of Oahu’s main small boat and ramp facilities, thus at times it can be quite busy (DOBOR, 2009).

- Public Beaches – Approximately 18 miles of the Wai‘anae coast consists of beach parks and community recreation areas. These parks and recreation areas provide access to the shoreline for coastal recreational activities including swimming, fishing (throw netting, pole and line fishing, spear fishing, etc.), snorkeling, surfing, canoe paddling, seaweed picking and shell collecting (NOAA, 2007).



Source: DOBOR, 2009

Ocean Recreational Resources

EA for Technology Demonstration: ROUMRS and EHDS at Ordnance Reef (HI-06)

FIGURE 13

Wai'anae, O'ahu, Hawaii

- **Surfing** – The surf conditions along the Wai‘anae coast benefit from a westerly swell, and the coast is also well-oriented to pick up waves from the north and south, making it one of the premier year-round surf locations. Numerous board surfing and body surfing sites are located along the Wai‘anae coast. Along the Wai‘anae coast, two surf shops provide equipment rentals and lessons for surfing as well as other activities such as snorkeling and kayaking (DOBOR, 2009; NOAA, 2007).
- **Diving** – There are numerous diving sites located along the Wai‘anae coast. Some of the more well-known dive sites in the area include Ka‘ena Point, Kealoa Stars (Land of Oz), Makaha Caverns, Ulua Cave, Airplane Canyon, M/V Mahi, Electric Beach, Black Rock, Black Rock Arches, 29 Down, LCU (Landing Craft Utility) Wreck, and Twin Caves. The M/V Mahi, Airplane Canyon, 29 Down, and LCU wreck were plane and boats that were intentionally sunk to serve as artificial reefs. These dive sites are frequented by the diving tour boats operating out of the WSBH and the Ko‘olina Marina (DOBOR, 2009; O‘ahu Dive Sites; Ocean Concepts O‘ahu Dive Sites).
- **Recreational Fishing** – Fishing off the Wai‘anae coast attracts people from all over O‘ahu. Numerous private and charter fishing boats provide access to near-shore and offshore fishing opportunities. One of the state’s major fishing tournaments—the Ahi Fever Fishing Tournament—is hosted by the Wai‘anae Boat Fishing Club. This annual tournament is held every June and has the largest number of registered boats and number of anglers of any tournament in Hawai‘i (NOAA, 2007).

Although far fewer inshore reef fish are caught in Wai‘anae than in other sites around the islands, goatfish or weke (*Mulloidichthys spp.*) and the introduced blue-lined snapper or ta‘ape (*Lutjanus kasmira*) are taken in fairly large numbers. Spear fishing, shore casting and throw netting are fishing methods employed by fishers along the Wai‘anae coast. Most non-commercially caught fish are kept, either for self-consumption or shared with family and friends (DOBOR, 2009).

Potential Impacts

Proposed Action

The Proposed Action would result in less than significant impacts on marine recreational resources and activities. The Proposed Action Work Areas are located a considerable distance off shore, and are situated well beyond the majority of ocean recreational areas along the coast (Figure 13). Additionally, the Proposed Action is a limited effort of roughly 21 days and any interference or displacement it may cause to marine recreational or commercial activities would be temporary in nature, only lasting the duration of the Proposed Action. Further, recreational and commercial activity areas are available all along the coast and could continue to operate around Ordnance Reef (HI-06) and any delineated safety buffer zone. At the conclusion of the Proposed Action, these areas would again be available to recreational users along the Wai‘anae coast.

To further minimize impacts to marine recreational resources, the proposed location for the DSV barge will be more than a mile off shore. Furthermore, DSV operations requiring imposition of an ESQD will only operate five days per week (Monday - Friday). The ESQD will not be in place during weekday evening hours and on weekends, although the DSV may be conducting operations (e.g., processing SAA) that do not require an ESQD.

Recreational divers have been known to encounter and investigate UWMM at the Ordnance Reef (HI-06) which poses a public safety hazard. Such actions pose a potential explosive hazard to divers, particularly if divers move or disturb the UWMM encountered. Such actions may also pose a potential hazard to the public should divers remove UWMM for retention as souvenirs, for scrap value or other purposes.

As a result of the Proposed Action, some of the UWMM would be removed and no longer be an attraction to divers. Therefore, over the long-term, benefits to marine recreational resources would result from the Proposed Action as it would reduce potential health and safety hazards from the Wai'anāe coastal waters.

The Proposed Action will also provide DoD an opportunity to obtain technologies it needs to address UWMM determined to pose an unacceptable risk to the public. The Proposed Action will also meet the communities' and state's interest in removing some of the UWMM present at Ordnance Reef (HI-06). These are beneficial impacts, which are expected to result from the Proposed Action.

No Action Alternative

Under the No Action Alternative, the demonstration would not occur and there would be no long-term benefit. Additionally, the added safety provided by limited recovery of UWMM from depths at which most recreational divers are limited would not occur.

Mitigation Measures

No mitigation measures are warranted or proposed.

3.2.3. Historic and Cultural Resources

Significance Criteria

For the purposes of the EA, historic and/or cultural resource impacts would be considered significant if a project:

- Violates federal or state agency cultural resource statutes or regulations;
- Results in the elimination or substantial permanent or long-term reduction of a traditional cultural resource area or practice without appropriate consultation and mitigation;

- Causes a substantial adverse change in the significance of a historic resource as defined on the federal level by its eligibility for listing on the National Register of Historic Places; or
- Directly or indirectly destroys a unique cultural resource or historic site.

Existing Conditions

Ordnance Reef (HI-06) is offshore of the district of Wai‘anae, leeward O‘ahu. The district of Wai‘anae consists of nine ahupua‘a, including Nānākuli, Lualualei, Wai‘anae, Mākaha, Kea‘au, ‘Ōhikilolo, Mākua, Kahanahāiki, and Keawa‘ula. Wai‘anae and Lualualei are the ahupua‘a closest to Ordnance Reef (HI-06). A literature review of cultural impact assessments conducted for projects located along the Wai‘anae coast have revealed no offshore historic, cultural or archaeological resources within the offshore areas that comprise Ordnance Reef (HI-06). However, there are several other land-based or near-shore sites of significance within the ahupua‘a that comprise the Waianae district.

One particularly significant on-shore site, which has definite ties to the ocean and is relatively close to Ordnance Reef (HI-06), is the Ku‘ilioloa heiau. The heiau is situated on a small peninsula known as Kane‘ilio Point, which juts out into the sea, south of the WSBH, and separates Pōka‘ī Bay and Lualualei Beach. Said to have been built in the 11th or 12th century, the Ku‘ilioloa heiau is the only heiau in Hawai‘i that is surrounded on three sides by ocean. After the kapu system was abolished in 1819, Ku‘ilioloa was one of the few heiau still used by the Hawaiian community. Over the years, the heiau fell into disuse, but has been restored by the Wai‘anae community.

The word “Wai‘anae” has been interpreted to mean “mullet water” and has been associated with a large fresh water fishpond located within the district. This fishpond, known as Puehu, was used for mullet harvesting by native Hawaiians (Handy and Handy, 1972; Linclon and Hammatt, 2009). Historically, nearshore fisheries and marine resources have been an important resource to native Hawaiians for subsistence and recreation. The Puehu fishpond, located within Pōka‘ī Bay, off the Wai‘anae ahupua‘a, was reported to have been almost completely filled by 1954 (CSH 2009a).

The Kumulipo (creation chant) and legends of the demigod Maui make reference to Wai‘anae and the ocean, although the references are not specific to the Ordnance Reef (HI-06) area. Some legends about Maui relate to the ocean and fishing. Maui is said to have been born in Wai‘anae. The Maui Pohaku—where Maui “reposed and sunned himself”—is located along Farrington Highway in Lualualei.

Historically, Wai‘anae was known for its abundant fishing grounds, particularly for the deep sea fishing opportunities to the northwest, off Ka‘ena (CSH, 2009b). Off the coast of Wai‘anae, fish and other seafood were plentiful and early settlers were able to live off the ocean resources and thrive in this area (Sterling and Summers, 1978).

Oral accounts of community members tell of a more recent time when marine and coastal resources were still plentiful. Resources included varieties of limu (limu kohu, limu kala, limu

pe‘e pe‘e, and wāwae‘iole), fish and other marine life, shells, and coral. While many of these resources are still available in the area’s nearshore waters, the supply has been reduced. There is much less fishing and gathering done today than 50 years ago. Because of the reduced supply, most fishing and gathering practiced today is for recreational purposes and not as a means of earning a living (per. comm. G. Grace). Community members attribute this depletion to physical alterations to the coastal areas, such as breakwaters and channelized streams; the capping and diverting of upland streams; the replacement of a large sewer culvert on the Ma‘ili side of Pōka‘ī Bay; and over-harvesting of resources, beyond what is needed for subsistence (CSH, 2009b; pers. comm. A. Greenwood).

Along the Wai‘anae coast, traditional cultural practices that continue to be observed today include fishing, net laying, spear fishing/diving, gathering of limu and other marine life (e.g., pīpīpī, ‘opihi, wana), surfing, swimming, canoe paddling, diving, and honoring kupuna that have been laid to rest at sea. At one time, there was a salt pond located at Keaulana beach, where salt collection was practiced (CSH, 2009b).

Various marine plants and animals do have cultural significance to native Hawaiians. Some are mentioned in traditional oli and mele, such as the lengthy creation chant, the Kumulipo. Some plants and animals have ceremonial meaning for religious purposes. Also, many families have personal deities in animal form, known as ‘aumakua. Manō (shark), honu (turtle) and he‘e (octopus) are common marine species that are often family ‘aumakua.

Potential Impacts

Proposed Action

Though it is likely that the area around Ordnance Reef (HI-06) was used historically for fishing, it is improbable that cultural or archaeological resources would be encountered at or near Demonstration Site. Surveys conducted by NOAA in support of the Proposed Action, have not, to date, encountered any evidence that would suggest sensitive historic, archaeological or cultural sites exist within Ordnance Reef (HI-06).

According to community members interviewed during this EA, the offshore Work Areas do not hold any particular cultural significance to native Hawaiians. Most activities such as fishing, diving, canoeing and gathering of limu take place closer to the shore. Interviewees also said that they did not know of the presence of any significant cultural resources in any of the offshore Work Areas, adding that the cultural legacy lives on in legends and chants. Interviewees did not believe that the Proposed Action would have any negative impact on cultural resources or practices in the Wai‘anae region (see Appendix J).

The long-term benefits of removing some of the UWMM from depths of between 30 and 120 feet as well as the knowledge gained from the Proposed Action, which could potentially be applied to the limited recovery of UWMM that may be determined to pose an unacceptable risk at other sites in Hawai‘i and around the world would offset any temporary impacts to cultural practices.

The Proposed Action is not expected to result in any significant adverse direct or indirect impacts on historic, archaeological or cultural resources, or traditional cultural practices occurring along the Wai‘anae coast. The demonstration is a limited effort of roughly 21 days and any interference or displacement it may cause to cultural practices would be temporary in nature lasting only the duration of the Proposed Action. At the conclusion of the Proposed Action, any areas used for cultural practices that may have been made temporarily inaccessible would again be available to practitioners.

The Army has determined that the Proposed Action will result in “no historic properties affected”, and in accordance with Section 106 of the NHPA of 1966, as amended, the Army has provided notification of this determination to the State Historic Preservation Officer (SHPO), and SHPO has concurred with the determination of “no historic properties affected”. The NHPA Section 106 findings and SHPO concurrence can be found in Appendix I.

No Action Alternative

Under the No Action Alternative, the demonstration would not occur and there would be no impact to historic or cultural resources.

Mitigation Measures

No mitigation measures are warranted or proposed.

3.2.4. Socio-Economic Conditions and Environmental Justice

Significance Criteria

For the purposes of this EA socioeconomic impacts would be considered significant if the Proposed Action:

- Creates long-term exclusion of marine areas that historically have been important to the commercial fishing and other commercial industries;
- Depletes fisheries resources;
- Creates long-term economic losses to the local commercial fishing and other industries as a result of project activities; or
- Induces substantial growth or concentration of population.

An environmental justice impact would be considered significant if project activities results in:

- A disproportionately adverse impact to a population that is more than 50 percent minority or has a minority population that is meaningfully greater than the minority population in the general population or other appropriate unit of geographic analysis; or
- A disproportionately adverse impact to a low-income population (as defined by poverty thresholds from the US Bureau of the Census).

Existing Conditions

The *Wai‘anae Sustainable Communities Plan* delineates the Wai‘anae community boundary around a grouping of leeward O‘ahu ahupua‘a (i.e., traditional Native Hawaiian land division). Ahupua‘a within the defined Wai‘anae community include: Keawa‘ula, Kahanahāiki, Mākua, ‘Ōhikilolo, Kea‘au, Makaha, Wai‘anae, Lualualei, and Nānākuli (CCH, 2010). Demographic data about the Wai‘anae community was obtained from the US Census Bureau at the census tract level.

As of the 2000 Census, the Wai‘anae community had an approximate population of 42,000 persons or roughly five percent of the population of the County of Honolulu, which encompasses the entire island of O‘ahu. Table 3-3 below provides a demographic profile of the Wai‘anae community and the County of Honolulu. More recent estimates of the Wai‘anae community suggest a population of approximately 49,000 persons, which includes roughly 6,000 “homeless” persons. These “homeless” persons include those living on the beach, those in transitional shelters, and those living with friends or other family members (CCH, 2010).

Table 3-3. Demographic Profile of the Waianae Community

	<u>Wai‘anae Community</u>		<u>County of Honolulu (O‘ahu)</u>	
	Total	Percentage	Total	Percentage
<u>Basic Demographics:</u>				
Total Population	42,323	4.83 ^a	876,156	100.00
Median Household Income	\$42,098.56 ^b	—	\$53,310.43 ^b	—
Per Capita Income	\$13,435.57 ^b	—	\$22,067.01 ^b	—
Median Age	40 - 44	—	35 - 39	—
<u>Education:</u>				
Total Population (over 25) with a Bachelors Degree	1,414	6.09	109,571	18.89
<u>Unemployment:</u>				
Total Unemployed (over 16)	2,557	8.68	25,490	3.69
<u>Race:</u>				
Caucasian alone	4,701	11.10	185,413	21.16
African American alone	379	0.90	19,688	2.25
American Indian/Native Alaskan alone	143	0.34	1,881	0.21
Asian alone	7,265	17.17	404,493	46.17
Hawaiian/Pacific Islander alone	11,682	27.60	77,175	8.81
Other (1 race)	463	1.09	10,996	1.26
2 or more races	17,690	41.80	176,540	20.15

^a. Percentage of Oahu’s population that resides within the Wai‘anae community area

^b. In 1999 US Dollars

Source: US Census, 2000

The median age group in the Wai'anae community is between 40 and 44 years old, slightly higher than the median age group for O'ahu, which is 35 – 39 years old. Similar to the rest of O'ahu, there is no ethnic or racial majority in the Wai'anae community. Nearly 42 percent of Wai'anae area residents identify themselves as having multiple racial heritages. However, a higher proportion of the Wai'anae community identify themselves as being solely of Hawaiian or Pacific Islander heritage; approximately 28 percent, as compared to just nine percent for O'ahu. Asian and Caucasian racial identities, the next two most populous identifications, comprise approximately 17 percent and 11 percent of the Wai'anae community population, respectively (US Census, 2000). A comparison of the ethnic diversity in Wai'anae and the County of Honolulu is shown in Figure 14.

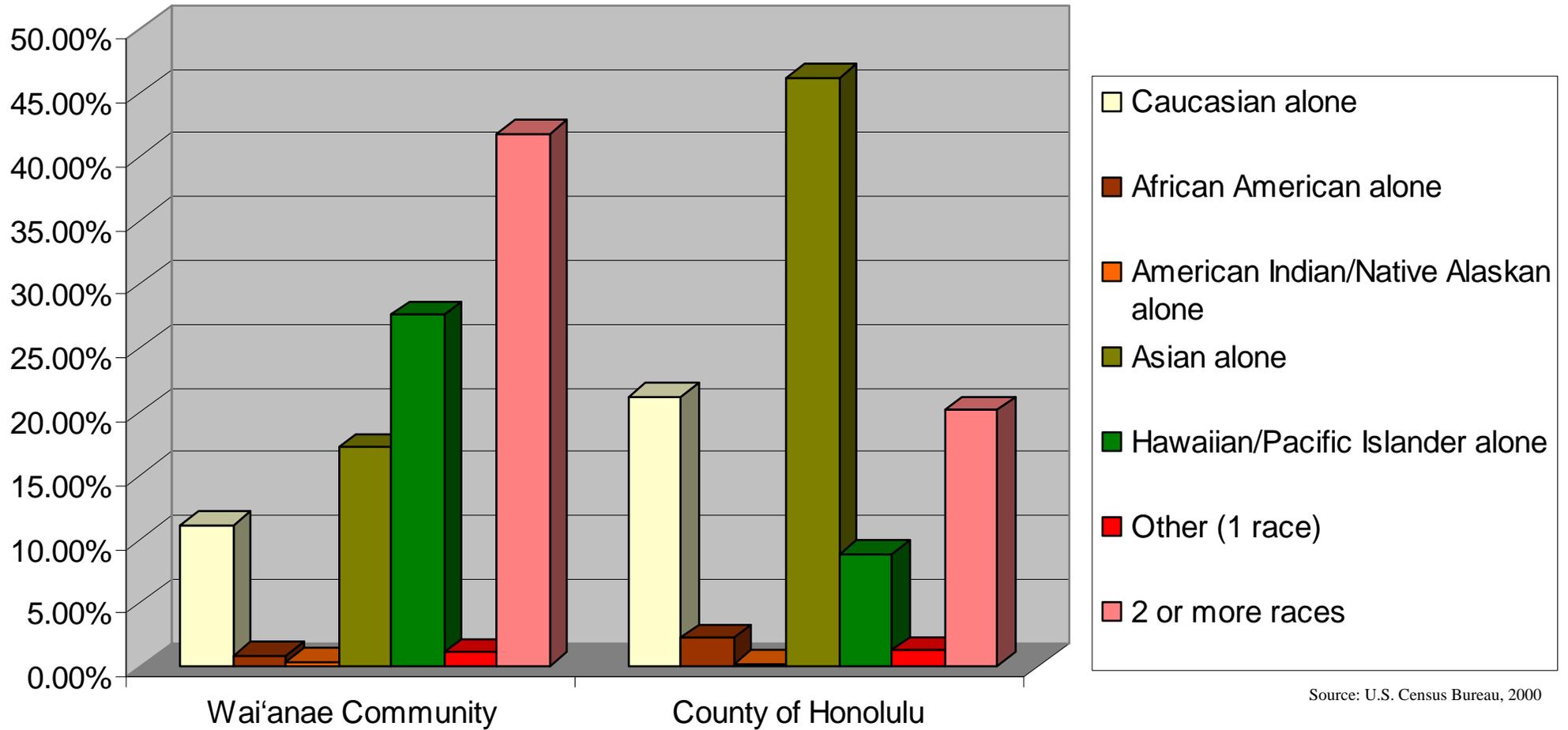
Overall, economic conditions for the Wai'anae community are difficult to accurately quantify based on Census Bureau data. Major changes in the economic climate within the US and the state of Hawai'i have taken place since the 2000 Census data was collected and released, and 2010 Census data will not be made available for public review until early-to-mid 2011. However, it is known that historically the Wai'anae community has experienced lower levels of education, lower levels of income and higher rates of unemployment as compared to the rest of O'ahu and the state of Hawai'i. The median household and per capita income for O'ahu was \$53,310 and \$22,067, respectively. By comparison, the Wai'anae community had a median household income of \$42,099, and a per capita income of \$13,436. This is approximately 79 percent and 61 percent of O'ahu's median household and per capita income (US Census, 2000).

Unemployment in the Wai'anae community was approximately 8.68 percent, which compares to just 3.69 percent for O'ahu. Given the recent economic downturn, current unemployment numbers for both the Wai'anae community and O'ahu should be higher than that given by the 2000 Census. In regards to educational attainment, roughly six percent of the Wai'anae community over the age of 25 had a Bachelor's degree compare to 19 percent for O'ahu (US Census, 2000).

Commercial Activities

There are 16 vessels that operate commercially from the WSBH. These operations include charter fishing boats, marine mammal sightseeing and snorkeling tour boats, and SCUBA diving boats. The capacities of these commercial vessels vary, and range from approximately 6 to 150 passengers (DOBOR, 2009).

The Ko'olina Marina is a privately-owned facility located near the southern tip of the leeward O'ahu shoreline. The Ko'olina Marina has 330 slips, 23 of which are reserved for commercial operations. There were 13 commercial vessels operating out of the Ko'olina Marina, which consisted of charter fishing boats and sailboats, marine mammal sightseeing and snorkeling tour boats, and SCUBA diving tour boats (DOBOR, 2009). In addition, vessels operating out of other harbors and marinas around O'ahu may also conduct commercial activities along the Waianae coast.



Source: U.S. Census Bureau, 2000

Comparison of Ethnic Diversity in Wai'anae vs. the County of Honolulu

FIGURE 14

Skipjack tuna or aku (*Katsuwonus pelamis*) is the top commercially-caught species landed in the Wai‘anae district. Other species caught in large numbers along the Wai‘anae coast include yellowfin (*Thunnus albacares*), bigeye ahi (*Thunnus obesus*), and blue marlin (*Makaira mazara*) (NOAA, 2007). Near-shore species that are commercially fished along the Wai‘anae coast include akule (*Selar crumenophthalmus*) and ‘ōpelu (*Decapterus macarellus*) (DLNR-DOBOR, 2009). Bottomfish fishing is not a significant commercial fishing activity along the Wai‘anae coast. The “Deep 7” species (opakapaka, onaga, lehi, ehu, hapu, gindai and kalekale) only constitute roughly 0.3 percent of the total commercially-landed bottomfish in Hawaiian waters (DAR, 2008).

According to the *Commercial Marine Landings Summary Trend Report for Calendar Year 2008*, sea landings (i.e., fish caught) off the Wai‘anae coast totaled 667,466 pound, or 11 percent of the total landings in the Main Hawaiian Islands (DAR, 2008).

Potential Impacts

Proposed Action

The Proposed Action is not expected to result in any significant adverse impacts to the existing socio-economic conditions of the Wai‘anae community or to Environmental Justice. Proposed Action activities would be conducted within roughly a 21-day window during the summer of 2011. Because of its limited scope, the Proposed Action would have no long-term direct measurable effects, positive or negative, on the employment or population of the Wai‘anae community. Furthermore, the Proposed Action would not result in disproportionate adverse impacts to minority or low-income populations within the Wai‘anae community either in the long- or short-term.

The Proposed Action would result in some beneficial impacts on the local area, particularly marine operators. To support the Proposed Action, several commercial small boat operators will be needed to maintain the safety zone around the DSV, and local UXO-qualified personnel will be involved in some operations, including the processing of scrap metal. The limited recovery of UWMM from depths between approximately 30 and 120 feet from Ordnance Reef (HI-06) may also provide some benefit to commercial marine operators by reducing the potential explosives hazards present.

The limited recovery of UWMM would also result in potential beneficial impacts as UWMM are often encountered and investigated by recreational divers, and the limited removal of munitions from depths of between approximately 30 and 120 feet would reduce the potential human health and safety risks associated with divers moving, disturbing or attempting to recover UWMM as souvenirs, for scrap value or for other purposes.

Potential impacts resulting from the Proposed Action, which do not meet the significance criteria, or can be effectively mitigated, would not result in significant adverse impacts to socio-economic conditions and environmental justice.

No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no impact to socio-economic resources or Environmental Justice.

Mitigation Measures

No mitigation measures are warranted or proposed.

3.3. Cumulative Impacts

Cumulative impacts are two or more individual effects, that, when considered together, compound or increase the overall impact. Cumulative impacts can arise from the individual effects of a single action or from the combined effects of past, present, or future actions. Thus, cumulative impacts can result from individually minor but collectively significant actions taken over a period of time. The cumulative impacts of implementing the Proposed Action along with past and reasonably foreseeable future projects proposed were assessed based upon available information.

Considering the off-shore location of Ordnance Reef (HI-06), cumulative impacts associated with the Proposed Action would be primarily associated with other in-water or maritime improvement projects along the Wai‘anae coast. No known future improvement projects are expected to occur within the immediate area of Ordnance Reef (HI-06). However, the proposed Hoakalei development in ‘Ewa Beach, which is approximately 15 miles south of Ordnance Reef (HI-06), will include the construction of a new 52-acre marina, containing approximately 600 to 800 boat slips. Although excavation for the new Hoakalei Marina is approximately 70 percent complete, the marina is not expected to be completed for several more years (DOBOR, 2009).

Due to the off-shore location and the roughly 21-day schedule of the Proposed Action, the absence of other existing or future projects in the area, and the timing and location of known maritime improvement projects, cumulative impacts are not anticipated.

4. Summary of Environmental Consequences

The Proposed Action was assessed with regard to potential direct, indirect, and cumulative impacts on the environment. The previous sections of this EA have provided a discussion of potential impacts and how they pertain to the Proposed Action and different environmental attributes. Table 4-1 below provides a summary of the environmental impacts associated with the Proposed Action.

Table 4-1. Summary of Impacts for the Proposed Action

Environmental Attribute	Direct Impacts	Indirect Impacts	Cumulative Impacts
Water Quality and Sediments	N	N	N
Benthic Habitat and Coral Reefs	M, (-)	M, (-),(+)	N
Reef Fish	L, (-)	L, (-),(+)	N
Protected Species	L, (-)	L, (-),(+)	N
Air Quality	L, (-)	N	N
Noise Environment	L, (-)	L, (-)	N
Public Health and Safety	N	L, (+)	N
Marine Recreational Resources	L, (-)	L, (+)	N
Historic and Cultural Resources	N	L,(+)	N
Socio-Economics and Environmental Justice	L,(+)	L,(+)	N

N = No impact

L = Less than significant impact

M = Significant Impact, but mitigable to less than significant

S = Significant impact

(+) = Beneficial impact

(-) = Adverse impact

As shown in the table above, environmental impacts resulting from the Proposed Action are not anticipated to be significant and are limited to negligible direct operational impacts that are temporary and short-term in nature. As discussed in the previous sections, where appropriate, mitigation measures will be employed to eliminate and/or further diminish any such impacts. No significant indirect or cumulative impacts were identified as a result of the Proposed Action.

Under the No Action Alternative, none of the UWMM present at the Demonstration Site at depths between approximately 30 and 120 feet would be recovered from the marine environment. Environmental quality in the area would remain unchanged or could potentially be adversely impacted by the continued corrosion and degradation of the UWMM and release of MC over time. In addition, potential human health and safety risks associated with divers moving, disturbing, or attempting to recover UWMM as souvenirs, for scrap value, or for other purposes would remain.

5. Relationship To Environmental Regulations and Policies

5.1. Coastal Zone Management Act (CZMA)

The CZMA of 1972, as amended (16 USC 1451 et seq.), is administered in Hawai'i by the Department of Business Economic Development and Tourism's (DBEDT) Office of Planning. The CZMA affects all projects on federal lands and/or involving federal agencies and requires federal agencies to conduct their planning, management, development and regulatory activities in a manner consistent with the state's coastal zone management (CZM) program. The CZM program objectives and policies are to provide coastal recreational opportunities; preserve and protect historic, scenic and coastal ecosystem resources; provide economic uses; reduce coastal hazards; improve public awareness in coastal zone management; and manage development within the coastal zone. The entire island of O'ahu is situated within the coastal zone area affected by the CZMA and a consistency determination of "no effect" is required for the Proposed Action under the CZM program.

The Proposed Action is located within the "state coastal zone" under the CZMA. The Army has reviewed Hawaii's CZM program and associated enforceable policies, and determined that the Proposed Action would have no significant adverse impacts on any coastal use or resource. Furthermore, the Proposed Action's beneficial impacts would be consistent with state CZM program policies and objectives, by improving the quality of state coastal waters and the marine environment (i.e., returning the area to more natural conditions). The Army is submitting a letter to the State Office of Planning which provides specific information related to the Proposed Action and certifies that the Proposed Action complies to the maximum extent practicable with the enforceable policies of the State of Hawaii's federally-approved coastal management program (Attached as Appendix E).

5.2. The Endangered Species Act (ESA)

The ESA of 1973 requires that every federal agency ensure that any action it carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse impact of habitat critical to that species. The USFWS has jurisdiction over endangered and threatened terrestrial flora, fauna, and birds. NOAA, through the NMFS, has jurisdiction over marine mammals and fish. The two agencies share responsibility for listed (threatened or endangered) sea turtles.

Under Section 7 of the ESA, the responsible federal agency must consult with these agencies when a Proposed Action (i.e., the Demonstration) may impact listed or candidate species under their jurisdiction. The Army has determined that by applying applicable BMPs throughout the roughly 21-day Proposed Action, there will most likely not be adverse impacts to either the marine environment or ESA-listed species, including green and hawksbill turtles, the Hawaiian monk seal, and humpback whales that may transit Ordnance Reef (HI-06). By letter dated December 1, 2010, the Army initiated informal consultation with NMFS seeking concurrence with this determination, and received concurrence from NMFS by letter dated January 19, 2011, with the added stipulation that the BMPs be amended to expand the protection

zone for these protected species from 50 yards to 63 meters to guard them from acoustic impacts from operation of the ROUMRS vehicle. Copies of these correspondences are included at Appendix F of this EA. In addition, the Army and NOAA continue to work closely to identify and avoid, minimize and mitigate potential impacts to coral in the vicinity of Ordnance Reef (HI-06) through the CAMIP as discussed in substantial detail in Section 3.1.2.2. – Coral Reefs – Mitigation Measures – above.

5.3. Fish and Wildlife Coordination Act (FWCA)

By letter dated December 1, 2010, the Army requested consultation under the Fish and Wildlife Coordination Act (16 USC 661 et seq.; 48 Stat. 401), as amended (FWCA) and requested a Planning Aid Letter to address protection of wildlife during execution of the proposed technology demonstration. A copy of this letter and related correspondence is included at Appendix G of this EA. Agency review under the FWCA helps determine the possible damage to fish and wildlife resources by a proposed activity, and develop means and measures designed to prevent the loss or damage to fish and wildlife resources. As a result of consultation, the USFWS has made the recommendation that the CAMIP (attached as Appendix C) be followed to avoid/minimize loss or damage to corals, fish, and wildlife resources.

5.4. Marine Mammal Protection Act (MMPA)

The MMPA of 1972 (16 USC 1361, et seq.) was the first article of legislation to call specifically for an ecosystem approach to natural resource management and conservation. MMPA prohibits the taking of marine mammals, and enacts a moratorium on the import, export, and sale of any marine mammal, along with any marine mammal part or product within the US. The US Congress defines “take” as “the act of hunting, killing, capture, and/or harassment of any marine mammal; or, the attempt at such.” The MMPA provides for enforcement of its prohibitions, and for the issuance of regulations to implement its legislative goals. When it initiated consultation under Section 7 of the ESA, the Army also requested consultation with NMFS on potential impacts to marine mammals under the MMPA. The Army is seeking a Letter of Concurrence from NMFS that the Proposed Action will not adversely impact or result in a take of a marine mammal protected under the MMPA.

5.5. Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265) (16 USC 1801-1882, April 13, 1976, as amended) requires that federal agencies consult with NMFS on activities that could harm Essential Fish Habitat (EFH) areas.

The Act specifies that the NMFS must coordinate with other federal agencies to conserve and enhance EFH, and federal agencies must consult with NMFS on all actions or proposed projects authorized, funded, or undertaken by the agency that may adversely affect EFH. In turn, NMFS must provide recommendations to federal and state agencies on such activities to conserve EFH. These recommendations may include measures to avoid, minimize, mitigate, or

otherwise offset adverse effects on EFH resulting from actions or proposed projects authorized, funded, or undertaken by that agency.

Under the Act, the Army has initiated consultation with NMFS requesting concurrence with its finding that implementation of the Proposed Action will not adversely affect designated EFH for federally-managed fisheries in the Pacific Ocean (see initiation letter in Appendix H). During the consultation process, NMFS has concurred that provided project BMPs are implemented fully and properly, NMFS does not object to the determination of no adverse effect on EFH.

5.6. The National Historic Preservation Act (NHPA)

Section 106 of the NHPA of 1966, as amended, and its implementing regulations (36 CFR Part 800), requires federal agencies while reviewing and evaluating their programs to identify and consider the potential effects of their Proposed Actions on historical, archaeological, and architectural resources in consultation with the Advisory Council on Historic Preservation (ACHP), the SHPO, and other interested members of the public. The ACHP encourages consultation among the agency official/proponent of the action, SHPO, and other interested parties during the early stages of the planning process.

The Proposed Action's area of potential effect is in water approximately 30 to 120 feet deep. There is no evidence of historic or cultural properties in the vicinity of Ordnance Reef (HI-06). The Proposed Action is not expected to affect any historic or cultural properties. The Army initiated Section 106 consultation with the Hawai'i State Historic Preservation Division and other potentially interested parties and organizations by letters dated December 2, 2010. The Army received concurrence from SHPO by letter dated December 19, 2010 on its determination that there will be no effect on historic or cultural properties resulting from the Proposed Action (Appendix I).

5.7. The Rivers and Harbors Act (RHA)

Under the RHA of 1899, USACE has been delegated the responsibility of preserving navigation through the Department of Army (DA) permit program. Work that affects the course, condition, location, or capacity of navigable waters is prohibited by Section 10 of the RHA, unless a permit is obtained from the USACE. The Proposed Action is subject to the provisions of the Act, and a Section 10 RHA Permit is required prior to commencing proposed activities. A copy of the RHA permit application is included as Appendix K.

5.8. Federal Clean Water Act (CWA)

The federal CWA prohibits the discharge of dredged or fill material into waters of the US without authorization from the USACE under the DA permit program. Because the Proposed Action will not involve the discharge of dredged or fill material, a CWA authorization under Section 404 is not required.

5.9. Federal Clean Air Act (CAA)

The federal CAA (42 USC 7401) requires the adoption of national AAQS to protect public health, safety, and welfare from known or anticipated effects of air pollution. As discussed in Section 3.1.3, the State of Hawaii DOH Clean Air Branch determined that the Proposed Action would not result in adverse impacts to air quality and/or violate the CAA and has issued an Air Permit Exemption (Appendix D).

5.10. Resource Conservation and Recovery Act (RCRA)

RCRA (42 USC 6901-6992k) was enacted by Congress in 1976. The primary policy of RCRA is that generated waste should be treated, stored, or disposed of so as to minimize the present and future threat to human health and the environment.. RCRA requires the States to regulate the management of solid waste and authorizes EPA and approved States to regulate the management and disposal of hazardous waste. RCRA provides “cradle-to-grave” control of hazardous waste by imposing waste management requirements on generators and transporters of hazardous waste and on owners and operators of treatment, storage, and disposal facilities. The State of Hawaii DOH has been authorized by EPA to regulate hazardous waste management in lieu of the Federal RCRA program. Hawaii DOH does so pursuant to State law and regulations

Under the Proposed Action, the handling of UWMM is management of solid (and potentially hazardous due to ignitability) waste. Subsequent treatment of recovered military munitions that are hazardous waste during the EHDS process constitutes the treatment of a hazardous waste. The further management and disposal of the residual materials, including recycling of the casings and munitions debris, is management of solid waste.

The Army has initiated coordination with the state of Hawai'i Department of Health – Solid and Hazardous Waste Branch (SHWB) to ensure that the Proposed Action will be in full compliance with applicable Federal and State RCRA requirements. In accordance with applicable sections of HAR 11-270 and EPA regulation 40 CFR 270, the Army has applied for a Hazardous Waste Research, Development, and Demonstration Treatment Permit for the Proposed Action. Correspondence with the SHWB and the Hazardous Waste Permit Application are attached as Appendix L.

5.11. Executive Order (EO) 13089 – Protection of Coral Reefs

EO 13089 states that “all Federal agencies whose actions may affect US coral reef ecosystems shall: (a) identify their actions that may affect US coral reef ecosystems; (b) use their programs and authorities to protect and enhance the conditions of such ecosystems; and (c) to the extent permitted by law, ensure that any actions they authorize, fund or carry out will not degrade the conditions of such ecosystems.”

As noted in Section 5.2 above, the Army has initiated consultation with the USFWS and NMFS. The continued consultation with these agencies, and additional recommendations set forth in the CAMIP, will ensure that the Proposed Action will comply with EO 13089 regarding the protection of coral reefs.

5.12. EO 12898 – Environmental Justice in Minority Populations and Low-Income Populations and EO 13045 – Protection of Children from Environmental Health Risks and Safety Risks

On February 11, 1994, EO 12898 entitled *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* was issued. EO 12898 requires federal agencies to identify and address disproportionately high and adverse human health and environmental effects of federal programs, policies, and activities on minority and low-income populations.

A Presidential memorandum that accompanied EO 12898 specified that federal agencies “shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities, when such analysis is required by the National Environmental Policy Act of 1969, 42 U.S. Code Section 4321 et seq.” The memorandum further stated that federal agencies “shall provide opportunities for community input in the NEPA process, including identifying potential effects and mitigation measures in consultation with affected communities and improving the accessibility of meetings, crucial documents, and notices.”

On April 20, 1997, EO 13045 entitled *Protection of Children from Environmental Health Risks and Safety Risks* was issued. EO 13045 requires that federal agencies make it a priority to identify and assess environmental health and safety risks that may disproportionately affect children. It also requires that agencies ensure that their policies, programs, activities, and standards address such risks.

No significant adverse environmental impacts are anticipated as a result of the Proposed Action. The Proposed Action involves technology demonstration activities, over a limited off-shore area, over a roughly 21-day period. Any impact from the Proposed Action would be negligible, short-term and temporary in nature. As discussed in Section 3.2.4, there would be no significant adverse environmental impacts to minority and low-income populations within the Wai'anae community. No disproportionate adverse effects on children are expected to result from implementation of the Proposed Action. The Proposed Action would result in beneficial impacts to public health and safety and the environment.

6. List of Preparers

This EA was prepared for ODASA(ESOH) by the US Army Engineer District, Honolulu, Engineering and Construction Division, Environmental Branch and its subcontractor Wil Chee – Planning and Environmental. The following list identifies individuals and organizations involved in the preparation of this EA and their respective roles

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8. Appendices

- Appendix A – Munitions Discovered at Ordnance Reef (2002 and 2006)
- Appendix B – Best Management Practices Plan
- Appendix C – NOAA - Coral Avoidance and Minimization of Injury Plan (CAMIP)
- Appendix D – Department of Health Air Permit Exemption
- Appendix E – CZMA Consistency Determination
- Appendix F – ESA and MMPA Consultation
- Appendix G – Fish and Wildlife Coordination Act Consultation
- Appendix H – Magnuson-Stevens Fishery Conservation and Management Act - EFH Consultation
- Appendix I – NHPA Section 106 Consultation
- Appendix J – Traditional Cultural Practices and Resources Assessment
- Appendix K – Rivers and Harbors Act Permit Application
- Appendix L – Hazardous Waste Treatment Permit Application

APPENDIX A

Munitions Discovered at Ordnance Reef (2002 and 2006)

**Munitions Discovered at Ordnance Reef
(2002 and 2006)**

Ordnance ID	Latitude	Longitude	Description	Quantity	Size	Units	Type	Year Found	Depth (Feet)	Explosive Weight (lbs)	Total Weight (lbs)
7.0	21.42825	-158.20547	18 x 8in proj	18	8 in		proj	2002	148	22	260
14.1	21.42892	-158.20506	5 x 8in proj	5	8 in		proj	2002	130	22	260
22.3	21.42344	-158.20186	2 x 8in proj	2	8 in		proj	2002	129	22	260
27.0	21.42928	-158.20133	75 items naval gun ammunition in varied sizes between 5in and 8in	75	8 in		naval gun ammo	2002	74	22	260
28.0	21.42889	-158.20097	75 items naval gun ammunition in varied sizes between 5in and 8in	75	8 in		naval gun ammo	2002	72	22	260
29.0	21.42797	-158.20047	75 items naval gun ammunition in varied sizes between 5in and 8in	75	8 in		naval gun ammo	2002	73	22	260
31.0	21.42389	-158.20122	naval gun ammunition between 6in to 8in 12 items	12	8 in		naval gun ammo	2002	101	22	260
32.0	21.42303	-158.20064	3 x naval gun ammunition 8in	3	8 in		naval gun ammo	2002	138	22	260
35.0	21.42383	-158.20050	naval gun ammunition between 6in to 8in 5 items	5	8 in		naval gun ammo	2002	91	22	260

**Munitions Discovered at Ordnance Reef
(2002 and 2006)**

Ordnance ID	Latitude	Longitude	Description	Quantity	Size	Units	Type	Year Found	Depth (Feet)	Explosive Weight (lbs)	Total Weight (lbs)
37.0	21.42619	-158.20117	naval gun ammunition 8in 12 items	12	8 in		naval gun ammo	2002	85	22	260
39.0	21.42469	-158.19997	naval gun ammunition 8in 7 items	7	8 in		naval gun ammo	2002	85	22	260
2.0	21.43181	-158.20722	5 x 155mm proj	5	155 mm		proj	2002	161	16	97
6.0	21.42953	-158.20600	10 x 155mm proj	10	155 mm		proj	2002	149	16	97
10.0	21.42753	-158.20433	20 x 155mm proj	20	155 mm		proj	2002	125	16	97
12.1	21.42614	-158.20378	15 x 155mm proj	15	155 mm		proj	2002	132	16	97
13.1	21.42564	-158.20364	15 x 155mm proj	15	155 mm		proj	2002	135	16	97
22.1	21.42344	-158.20186	10 x 155mm proj	10	155 mm		proj	2002	129	16	97
23.0	21.42764	-158.20150	3in to 6in naval gun ammunition 35 items	35	6 in		naval gun ammo	2002	80	13	105
24.0	21.42700	-158.20075	3in to 6in naval gun ammunition 35 items	35	6 in		naval gun ammo	2002	77	13	105
25.0	21.42664	-158.20047	3in to 6in naval gun ammunition 35 items	35	6 in		naval gun ammo	2002	76	13	105
46.1	21.43025	-158.20176	high concentration of 6in projectiles	No Estimate	6 in		proj	2002	71	2	130
47.0	21.42928	-158.20112	high concentration of 6in projectiles	No Estimate	6 in		proj	2002	73	2	130
48.0	21.42522	-158.19754	high concentration of 6in projectiles	No Estimate	6 in		proj	2002	64	2	130
38.0	21.42536	-158.20067	naval gun ammunition 5in 5 items	5	5 in		naval gun ammo	2002	84	2	56

**Munitions Discovered at Ordnance Reef
(2002 and 2006)**

Ordnance ID	Latitude	Longitude	Description	Quantity	Size	Units	Type	Year Found	Depth (Feet)	Explosive Weight (lbs)	Total Weight (lbs)
5.0	21.42867	-158.20497	24 x 105mm proj	24	105	mm	proj	2002	129	7	29
9.0	21.42836	-158.20456	17 x 105mm proj	17	105	mm	proj	2002	123	7	29
12.0	21.42614	-158.20378	10 x 105mm proj	10	105	mm	proj	2002	132	7	29
13.0	21.42564	-158.20364	20 x 105mm proj	20	105	mm	proj	2002	135	7	29
20.1	21.42397	-158.20275	5 x 105mm proj	5	105	mm	proj	2002	133	7	29
21.1	21.42383	-158.20242	10 x 105mm proj	10	105	mm	proj	2002	131	7	29
30.0	21.42439	-158.20217	3 x 105mm proj	2	105	mm	proj	2002	117	7	29
33.0	21.42542	-158.20208	62 ea 105mm projectiles	62	105	mm	proj	2002	99	7	29
34.0	21.42417	-158.20108	62 ea 105mm projectiles	62	105	mm	proj	2002	97	7	29
45.0	21.44272	-158.19997	105mm cart casing	1	105	mm	cart casing	2002	56	7	29
26.0	21.44672	-158.19928	100lb old style frag bomb recon from surface not diver verified	1	100	lb	frag bomb	2002	16	65	120
3.0	21.43125	-158.20664	1 x 90mm mortar	1	90	mm	mortar	2002	150	2	43
36.0	21.42992	-158.20283	beginning of large pile of ordnance 43 items counted within divers visibility before ascent	43	0		ordnance	2002	81		
40.0	21.42439	-158.19961	naval gun ammunition various sizes 10 items	10	0		naval gun ammo	2002	93		
42.0	21.42669	-158.20047	naval gun ammunition various sizes 55 items	55	0		naval gun ammo	2002	76		

**Munitions Discovered at Ordnance Reef
(2002 and 2006)**

Ordnance ID	Latitude	Longitude	Description	Quantity	Size	Units	Type	Year Found	Depth (Feet)	Explosive Weight (lbs)	Total Weight (lbs)
43.0	21.42631	-158.20011	naval gun ammunition various sizes 55 items	55			naval gun ammo	2002	75		
44.0	21.42558	-158.19939	naval gun ammunition various sizes 55 items	55			naval gun ammo	2002	73		
15.1	21.42747	-158.20447	200 x .50cal rds	200	50	cal	rds	2002	129	1	1
27.1	21.42928	-158.20133	large piles of 50cal rounds sited at several locations	No Estimate	50	cal	rds	2002	74	1	1
28.1	21.42889	-158.20097	large piles of 50cal rounds sited at several locations	No Estimate	50	cal	rds	2002	72	1	1
29.1	21.42797	-158.20047	large piles of 50cal rounds sited at several locations	No Estimate	50	cal	rds	2002	73	1	1
46.0	21.43025	-158.20176	high concentration of 50cal rounds	No Estimate	50	cal	rds	2002	71	1	1
DODDive3	21.41613	-158.19192	possible 50 cal round	1	50	cal	rds	2006		1	1
Site17sw	21.43070	-158.19553	one 50 cal round	1	50	cal	rds	2006		1	1
Site18sw	21.43109	-158.19572	one 50 cal round	1	50	cal	rds	2006		1	1
Site22sw	21.43248	-158.19759	scattered 50 cal rounds	5	50	cal	rds	2006		1	1
Site160202	21.41620	-158.19176	possible 50 cal rounds	3	50	cal	rds	2006		1	1
Site181920	21.42743	-158.20408	50 cal casing recovered by ROV; brass donnage ring	1	50	cal	rds	2006	103	1	1
Site205636	21.42789	-158.20209	50 cal casing	1	50	cal	rds	2006	80	1	1

**Munitions Discovered at Ordnance Reef
(2002 and 2006)**

Ordnance ID	Latitude	Longitde	Description	Quantity	Size	Units	Type	Year Found	Depth (Feet)	Explosive Weight (lbs)	Total Weight (lbs)
Site19sw	21.43155	-158.19615	two 37mm shell casings, one 50 cal shell casing	3	37 mm	rds		2006		1	1
Site11sw	21.43330	-158.19655	one 30 cal round and 37 mm casing	2	30 cal	rds		2006		1	1
11.0	21.42672	-158.20403	250 x 25mm rds	250	25 mm	rds		2002	129	1	1
5.1	21.42867	-158.20497	90 x 20mm rds	90	20 mm	rds		2002	129	1	1
13.2	21.42564	-158.20364	100 x 20mm rds	100	20 mm	rds		2002	135	1	1
14.2	21.42892	-158.20506	200 x 20mm rds	200	20 mm	rds		2002	130	1	1
18.1	21.42583	-158.20333	100 x 20mm rds	100	20 mm	rds		2002	124	1	1
19.1	21.42567	-158.20289	200 x 20mm rds	200	20 mm	rds		2002	129	1	1
20.2	21.42397	-158.20275	150 x 20mm rds	150	20 mm	rds		2002	133	1	1
21.2	21.42383	-158.20242	200 x 20mm rds	200	20 mm	rds		2002	131	1	1
37.1	21.42619	-158.20117	a large quantity of 20mm rounds	No Estimate	20 mm	rds		2002	85	1	1
38.1	21.42536	-158.20067	a large quantity of 20mm rounds	No Estimate	20 mm	rds		2002	84	1	1
39.1	21.42469	-158.19997	a large quantity of 20mm rounds	No Estimate	20 mm	rds		2002	85	1	1
40.1	21.42439	-158.19961	a large quantity of 20mm rounds	No Estimate	20 mm	rds		2002	93	1	1
41.0	21.42375	-158.19917	a large quantity of 20mm rounds	No Estimate	20 mm	rds		2002	115	1	1
Site20sw	21.43338	-158.19767	dozen 20mm shells	12	20 mm	rds		2006		1	1
6.1	21.42953	-158.20600	10 x closed ammo boxes (2ftx2ftx2ft)	10	8 sqft	ammo box		2002	149		
8.0	21.42778	-158.20519	2 x closed ammo boxes (2ftx2ftx2ft)	2	8 sqft	ammo box		2002	146		
14.0	21.42892	-158.20506	10 x closed ammo boxes (2ftx2ftx2ft)	10	8 sqft	ammo box		2002	130		

**Munitions Discovered at Ordnance Reef
(2002 and 2006)**

Ordnance ID	Latitude	Longitude	Description	Quantity	Size	Units	Type	Year Found	Depth (Feet)	Explosive Weight (lbs)	Total Weight (lbs)
15.0	21.42747	-158.20447	3 x closed ammo boxes (2ftx2ftx2ft)	3	8	sqft	ammo box	2002	129		
22.2	21.42344	-158.20186	4 x closed ammo boxes (2ftx2ftx2ft)	4	8	sqft	ammo box	2002	129		
PS2_75sw	21.44010	-158.19870	potential munition boxes	2	8	sqft	ammo box	2006	75		
17.0	21.42619	-158.20389	20 x tubes (4ft x 3in dia)	20	4	ft	tubes	2002	136		
18.0	21.42583	-158.20333	10 x tubes (4ft x 3in dia)	10	4	ft	tubes	2002	124		
19.0	21.42567	-158.20289	10 x tubes (4ft x 3in dia)	10	4	ft	tubes	2002	129		
20.0	21.42397	-158.20275	10 x tubes (4ft x 3in dia)	10	4	ft	tubes	2002	133		
21.0	21.42383	-158.20242	10 x tubes (4ft x 3in dia)	10	4	ft	tubes	2002	131		
22.0	21.42344	-158.20186	10 x tubes (4ft x 3in dia)	10	4	ft	tubes	2002	129		
16.0	21.42622	-158.20414	1 x has? (2ft x 3in dia)	1	2	ft	has	2002	142		
Site77sw	21.44251	-158.20058	three cylinders found 1 foot long by 5 inch dia	3	1	ft	tubes	2006			
1.0	21.44364	-158.20453	bottom mine	1	0		mine	2002	82		
4.0	21.43081	-158.20625	depth chg	1	0		depth chg	2002	145		

**Munitions Discovered at Ordnance Reef
(2002 and 2006)**

Ordnance ID	Latitude	Longitde	Description	Quantity	Size	Units	Type	Year Found	Depth (Feet)	Explosive Weight (lbs)	Total Weight (lbs)
WPokBayRov	21.44150	-158.20150	large protruding cluster standing proud off bottom; undetermined man-made objects	1			unknown	2006			
Site164749	21.42803	-158.20278	ROV ops	1			unknown	2006			
Site205909	21.42569	-158.20024	ROV ops	1			unknown	2006			
Site210008	21.42481	-158.19951	ROV ops	1			unknown	2006			

APPENDIX B

Best Management Practices Plan

ARA Incorporated
Technology Demonstration
at Ordnance Reef (HI-06), Waianae, Oahu, Hawaii
Best Management Practices (BMP)

The technology demonstrations (the Demonstration) that are proposed to occur at Ordnance Reef (HI-06) consists of two commercially available technologies that have been adapted for (a) the remote recovery of munitions from the ocean floor; and (b) the demilitarization of recovered munitions on an offshore barge. These technologies (the Remotely Operated Underwater Munitions Recovery System (ROUMRS) and Energetic Hazards Demilitarization System (EHDS)) will be assessed concurrently at Ordnance Reef (HI-06)). These Best Management Practices (BMP) are focused on the ROUMRS technology demonstration. ROUMRS is designed to demonstrate its capabilities to recover underwater military munitions (UWMM) in a manner protective of the public and environment. ARA's BMP describe procedures ARA will employ to protect human health and the environment, including to help avoid or limit injury to coral and other benthic habitats, and protecting sensitive marine life (e.g., marine species listed under the Endangered Species Act (ESA) or Protected Under the Marine Mammal Protection Act (MMPA), during field operations.

During or as a result of this Demonstration:

- Remedial or corrective actions will not be required. However, should inadvertent damage to coral or other benthic habitats occur, the Army will implement mitigation measures.
- Hazardous waste will not be generated.
- Managed solid waste will not be disposed at Ordnance Reef (HI-06).

The BMP to be used are:

1. General
2. Briefings
3. Pre-dive Checks
4. Placement of Anchorages, Moorings and Staging Areas In Environmentally Sensitive Areas
5. Subsea Investigation and Classification Munitions and Munitions Debris

6. Recovery of Munitions and Munitions Debris
7. Salvage Basket Operations
8. Lift Bag Operations
9. Operations in Sensitive Areas
10. Marine Species - Endangered Species Act (ESA)
11. Spill Contingency Plans

The steps taken to help avoid or limit injury to coral and other benthic habitats are addressed in BMP 2, 4, 5, and 6.

FINAL

Best Management Practice 1: General

Systematic planning and execution is essential for the efficient demonstration of ROURMS and for the safe and effective operation of ROURMS' remotely operated vehicle (ROV). The Demonstration's overall objectives will be accomplished by performing a number of general tasks. At a minimum these tasks will include:

- All required permits for topside and subsea activities will be secured from State, Federal, Port, and Local authorities as required. These permits may include:
 - Rights of Entry
 - Section 10 Permits
 - Anchorage Authorizations
 - To be determined, as required and listed in the work plans
- The Project Engineer for ROURMS Operations will
 - Ensure all required equipment is scheduled, available and prepared for use (sea and topside operations).
 - Ensure all parties directly involved with topside and subsea operations are briefed on planned operations and emergency procedures.
- Each crew member will review the work plans to develop a complete understanding of the overall operation and mission. This includes a thorough review of any customer-produced documentation (e.g., scope, photographs, previous reports).
- The ARA team will:
 - Mobilize all equipment allocated and scheduled for topside and subsea operations.
 - Transport all equipment, personnel, and spares to the work site.
 - Check, prepare, and confirm operability of all equipment for the individual tasks in proper order of use.
 - Minimize any turbidity and siltation from landward Demonstration-related work and contain it, to the extent possible, within the vicinity of the site through the appropriate use of effective containment devices and the curtailment of work during adverse tidal and weather conditions.
 - Compare and coordinate all pre-dive functionality tests as well as checklists for deployment.
 - Inspect, prior to use, all demonstration-related materials and equipment (barges, ROVs, etc.) to be placed in the water to ensure it is free of visible pollutants.

- Prevent the stockpiling of demonstration-related materials in the water (intertidal zones, reef flats, stream channels, sea grass beds, etc.).
- Dispose of all demonstration related waste that is not recyclable at approved properly permitted facility.
- Prevent the contamination (e.g., trash or debris disposal, the introduction of non-native species, the attraction of non-native pests) of adjacent habitats (e.g., reef flats, channels, open ocean, stream channels, sea grass beds) by demonstration-related activities.
- Ensure fueling of Demonstration-related vehicles and equipment occurs away from the water.
- Prepare a contingency plan to control petroleum products accidentally spilled during the Demonstration and have absorbent pads and containment booms on-site, if appropriate, to facilitate the clean-up of accidental petroleum releases.
- Deploy equipment; locate the work site, and begin work.
- At the completion of the work task, recover equipment (per detailed procedures).
- Perform post-dive functionality checks as well as visual condition inspections.
- Clean, pack, and demobilize equipment, upon completion of the Demonstration.

Best Management Practice 2: Briefing

The operation of an ROV is a team effort. Each day, prior to starting ROV operations, a full crew briefing is essential to ensure efficient tasking and enhance team synergies. The crew briefing, at a minimum, will include:

- Mission tasking and/or threat outline, detailing the specific tasks assigned to each crewmember.
- A thorough and complete explanation of the individual tasks for each day's mission.
- A safety briefing.
- The scope of work and specific goals to be accomplished during individual tasks.
- Ingress and egress routes to the work site.
- Crew positions and specific responsibilities during the tasks.
- Tactics, techniques, and procedures for accomplishing each individual task and completing the mission.
- Specific information needed as well as methods of documentation.
- Relevant information about munitions to be inspected and recovered including, but not limited to drawings, photographs, damage reports, witness statements and any other information that will assist in the work task.
- Work area coordinates.
- Topographic maps, bathymetric data, tide tables, underwater obstruction analysis, prior surveys and any other environmental information that will assist in accessing the work areas.
- Summary of previous work performed at Ordnance Reef (HI-06) to include the Oceanic and Atmospheric Administration (NOAA) Coral Avoidance and Minimization of Injury Plan (CAMIP) detailing the locations of sensitive corals and other benthic habitats.
- Schedule for completion of mission objectives including the best and worst case scenarios, with consideration of potential delays.

Best Management Practice 3: Pre-Dive Checks

The following pre-dive check should be carried out prior to every dive:

- Visually inspect the ROV to ensure the propellers are not fouled, all components are secured, and there is no mechanical damage to the frame or other components.
- Check the tether for scrapes, nicks, or other visible damage. The ROV will not be used, if the tether jacket is broken through.
- Verify correct operation of the ROV's thrusters. (CAUTION: ROV thrusters should only run for a few seconds when not submerged in water.)
- Ensure:
 - All fasteners are in place and secure.
 - Whip connectors at the electronics and tether termination cans are connected securely. (Note: Dielectric silicone grease will be used to lubricate electrical connections, as necessary.)
 - Unused vehicle connectors are capped securely with dummy plugs.
 - Surface cables are securely connected.
- The Auto Depth switch on the control panel will be switched to OFF, the Manual Depth Control knob will be centered, and the Auto Heading selector will be OFF prior to powering up the system.
- Lights, camera, manipulators, tooling functions, and thrusters will be tested. The data recorders and documentation processes will be tested to ensure they are operating properly. (CAUTION: Lights should only be tested for a few seconds if not submerged in water seconds to prevent heat buildup.)
- After the vehicle is placed into the water confirm the operability of the ballast and trim.
- If any instruments or equipment are not functioning properly, the Project Engineer will determine the potential impact and implement actions necessary to achieve mission objectives. Any maintenance performed will be documented.

Best Management Practice 4: Placement of Anchorages, Moorings and Staging Areas in Environmentally Sensitive Areas.

This section contains the detailed BMP for anchoring watercraft and the staging of subsea equipment. Special considerations are included to avoid injury to coral and other benthic habitats and to minimize such injury during remote operations. Every operational situation is unique with special needs and requirements.

- If available, the coordinates for each potential mooring, anchorage, and staging area must be confirmed prior to contacting the bottom.
- Mooring, anchorage and staging areas will be located using global positioning systems.
- A crew briefing will be conducted prior to ROV operations, with the ROV and topside crew be briefed about:
 - Coral growth, reefs, marine life, protected marine species, and habitat, that must be avoided.
 - Culturally important structures and locations.
 - Photographs, drawings, previous reports, and the NOAA CAMIP documenting the relative level of concern for each area at Ordnance Reef (HI-06).
- The ROV will only be operated by approved and qualified operators.
- The pre-dive checklist will be followed prior to launching the ROV.
- Watercraft will not be allowed in the ROV operating area
- The RSV will not move without the prior knowledge of the ROV operator.
- The ROV will be launched as far away as practical from propellers and any overboard obstructions.
- The ROV tether will:
 - Be manned at all times.
 - Have positive buoyancy to minimize bottom contact and possible disturbance of reef structures.
- The ROV will:
 - Be used to reconnoitered the position of mooring, anchorages and staging areas prior to contacting the bottom to confirm these areas are acceptable based on criteria provided the CAMIP.
 - Approach the mooring, anchorage, or staging areas, exercise caution and avoid contact with the bottom, environmental features, coral, or structures.
 - Digitally record, document and save an image of the target location (e.g., mooring, anchorage, staging locations) prior to contacting the bottom.

- Avoid coral species, protected marine species, reefs, habitats of concern, and culturally important structures and locations to prevent damage prior to and following placement of the mooring, anchorage, or equipment on the bottom.
- Used to lower moorings, anchorages, and equipment to the bottom or such will be lowered using lines – **moorings, anchorages, and equipment will not be dropped or released freely from the surface!**
- Good communications will be maintained between the ROV operator and the helm to ensure the ROV operator is aware of the relative positions of the ROV to the vessel, and is informed of the vessel's anticipated.
- Moorings and anchorages in sensitive locations will employ floated lines.
- Upon completion of work at the site, the condition of the target location will be digitally recorded and saved after the mooring, anchorage, or staged equipment is removed. **Injury to sensitive areas will be reported to the Army's lead.**

Best Management Practice 5: Subsea Investigation and Classification Munitions and Munitions Debris

This section contains the detailed BMP for investigating munitions and munitions debris. Some steps describe precautions to be taken during ROV operations in environmentally and culturally sensitive areas. Every operational situation is unique with special needs and requirements.

- A crew briefing will be conducted prior to ROV operations, with the ROV and topside crew be briefed about:
 - Coral growth, reefs, marine life, protected marine species, and habitat, that must be avoided.
 - Culturally important structures and locations
 - Photographs, drawings, previous reports, and the NOAA CAMIP documenting the relative level of concern for each area at Ordnance Reef (HI-06).
- ROV will only be operated by approved and qualified operators.
- The pre-dive checklist will be followed prior to launching the ROV.
- Watercraft will not be allowed in the ROV operating area.
- The RSV will not move without the prior knowledge of the ROV operator.
- The ROV will be launched as far away as practical from propellers and any overboard obstructions.
- The ROV tether will:
 - Be manned at all times.
 - Have positive buoyancy to minimize bottom contact and possible disturbance of reef structures.
- Care will be taken to ensure the ROV tether does not foul or contact the bottom.
- The ROV will circumnavigate the munitions and munitions debris, collecting and recording digital images of the area.
- If needed, unique markers may be placed next to individual munitions, clusters of munitions, and other materials of interest and digitally recorded.
- Coordinates of the identified munitions and other materials of interest will be documented and saved.
- Images of the munitions and munitions debris will be digitally recorded and assigned a unique identifier. Co-located or multiple munitions may be recorded with a single identifier. Target identifiers will include at a minimum an alpha numeric identifier, coordinates, and a description of the munition or material.

- All coral species, including any Branching Corals (*Pocillopora meandrina*, *Pocillopora eydouxi*, etc) or Lobate Corals (*Porities lobata*, *Porities evermanni*, *Porities duerdeni*, etc) greater than 12 inches in vertical growth that is either growing on a munition or in a location where it could be damaged during recovery of the target (munition) will be documented. Recovery of munitions or munitions debris with corals having greater than 12 inches of vertical growth will not occur until NOAA has been consulted about coral mitigation options (e.g., transplantation, habitat replacement) and the Army concurs with the recovery. Any munitions intentionally not recovered will be documented as to type, location, and the reason for leaving it in place.
- Encrusting Corals (e.g., *Leptastrea*, *Montipora captata*, *Montipora patula*) commonly grow on targets at Ordnance Reef (HI-06), but will not be noted.
- **Injury to sensitive areas will be identified and reported to the Army Lead.**

Best Management Practice 6: Recovery of Munitions and Munitions Debris

This section contains the detailed BMP for recovering munitions and munitions debris from the bottom. Munitions and munitions debris selected for recovery will be interrogated and classified per the appropriate ARA BMP and the work plan. Every operational situation is unique with special needs and requirements.

- The selection and prioritization of munitions and munitions debris for recovery will be performed prior to initiating ROV dive operations.
- Selected munitions and munitions debris will be prioritized and placed onto a Recovery Sheet that is presented to the field crew prior to initiating ROV operations.
- At a minimum, Recovery Sheets will include the Identification number of the munitions and munitions debris, its description and the coordinates from which it was recovered.
- If needed, salvage baskets will be staged near munitions and munitions debris being recovered per the appropriate BMP. Prior to beginning ROV recovery operations, the ROV operator will:
 - Confirm the salvage basket's operational status.
 - Confirm the ROV's navigation corridor to and from the salvage baskets to limit potential impacts to all coral species.
- The ROV will limit, to the extent possible, contact with and avoid disturbance of the bottom while collecting munitions and munitions debris
- When contact with the bottom is necessary, the ROV operator will ensure that corals and reef structures are avoided using the following checklist to minimize impact.
 - Transit route to the target must be established to help avoid or limit injury to coral and/or other benthic habitats, and navigate to the target safely without damaging the ROV.
 - Remove the target (munition or munitions debris) from the bottom without causing injury to coral or other benthic habitats.
 - If there is a release of munitions constituents (MC) to the environment, the MC will be recovered to the extent possible using the ROV mounted vacuum and trash pump.

- The ROV will be set down and perform any required work without damaging coral or other benthic habitats.
- If these activities cannot be performed, consult with NOAA and the Army concerning alternatives.
- All coral species, including any Branching Corals (*Pocillopora meandrina*, *Pocillopora eydouxi*, etc) or Lobate Corals (*Porities lobata*, *Porities evermanni*, *Porities duerdeni*, etc) greater than 12 inches in vertical growth that is either growing on a munition or in a location where it could be damaged during recovery of the target (munition) will not be removed until NOAA has been consulted about coral mitigation options (e.g., transplantation, habitat replacement) and the Army concurs with the recovery. Any targets intentionally not recovered will be documented as to type, location, and the reason for leaving it in place.
- Once a munition has been collected, it will be placed into the ROV's hopper or, if necessary, transferred directly to the salvage basket at a nearby staging area.
- The ROV hopper will be unloaded into the salvage baskets as necessary.
- After a munition has been recovered from the bottom, images of its former location will be digitally recorded.
- Any munitions debris recovered from underwater and from munitions processed by the EHDS will be hauled off site, and be recycled or disposed per applicable laws and regulations. The Army may retain some munitions debris for scientific study.

Best Management Practice 7: Salvage Basket Operations

- Inspect the salvage basket per ARA Salvage Basket's Pre and Post Dive Checklist.
- Confirm using the ROV that the location and placement of the salvage basket is in an area that will not injure coral or other benthic habitats as noted in NOAA's CAMIP.
- Perform salvage basket preparation and maintenance topside. Confirm that the:
 - Salvage basket does not have damage that would effect its operation (e.g., broken structural elements, holes that would allow release of contents).
 - The hopper doors open and operate correctly.
 - Lifting points and rigging are in good condition.
 - Side and top salvage gates open and operate correctly.
 - Air bottles of the lift system are filled and ready for deployment.
- Perform salvage basket launch and recovery per BMP 4 and BMP 8.
- Tow the salvage basket.

Best Management Practice 8: Lift Bag Operations

- Confirm that lift rigging and tow bridle are operable, correct if inoperable noting any maintenance performed.
- Confirm that lift bag and air system are operable, correct if inoperable noting any maintenance performed.
- Perform ascent and descent preparation by:
 - Confirming:
 - ✓ All personnel are ready for a lift.
 - ✓ The ascent corridor is free and clear of personnel, watercrafts, and marine life.
 - Communicating with salvage basket recovery team regarding the lift.
 - Activating air system remotely using the ROV.

Best Management Practice 9: Operations in Sensitive Areas

A Demonstration-Specific Work Plan (WP) will be prepared and submitted to responsible parties before in-water activities begin. The name and contact information for the designated Demonstration points of contact (POC) for all in-water activities are included in the Health and Safety Plan portion of the WP. The designated POC will ensure that daily visual inspection of Ordnance Reef (HI-06) and its environs are conducted to verify that Demonstration-related activities do not result in uncontrolled adverse environmental impacts and that should environmental injury occur, such injury is minimized to the maximum extent practicable. Visual inspections will be documented with photographs and written descriptions, if necessary. Full water column silt curtains are not needed for this Demonstration because there are no anticipated effects from the suspension of disturbed sediments and turbidity. The WP will include measures to help ensure:

- In-water activities employ sound attenuation measures that will minimize the intensity and duration of percussion impacts through the aquatic environment to the extent practical and feasible.
- The ROV, any mechanized equipment and other materials used during the Demonstration will be clean and free of obvious contamination and deleterious substances that might include toxic chemicals and clay-coated material.
- A Spill Contingency Plan (BMP #11) is in place on landside platforms and in all support vessels associated with the demonstration. The Project Manager or ship's Captain will detail procedures for managing the accidental release of petroleum products to the aquatic environment, if there is a release. Particular care per the site-specific planning documents must be taken to ensure that no petroleum products, trash, or other debris enter near-shore waters. When such material is found within the operating area, the material will be collected and disposed of at a permitted facility. Additionally, spill containment kits will be kept on hand.
- Watercraft will be piloted by licensed people who are familiar with operating in Hawaiian waters.
- Visual surveys will occur prior to the start of work each day, and periodically during the day, including prior to resumption of work following a break of more than 30 minutes.

- All in-water work will be postponed or halted when an ESA-listed marine species or a species protected under the MMPA is within 210 feet (i.e., 63 meters) of the proposed work, and will only begin or resume after these marine species has voluntarily departed the area. If ESA-listed marine species are noticed within 210 feet after work has already begun, that work may continue only if, in the best judgment of the Project Manager, there is no way for the activity to adversely affect the ESA-listed or MMPA-protected species.
- Protocol and operations measures for the avoidance and protection of protected species that include, but may not be limited to green sea and hawksbill turtles, Hawaiian monk seals, humpback whales and other protected species in active, mechanized equipment and boat areas of operation will incorporate the following site-specific avoidance and minimization measures:
 - When piloting watercrafts, operators will alter course to remain a minimum of 300 feet from whales and 210 feet from other marine mammals and sea turtles,
 - Reduce watercraft speed to 10 knots or less when piloting watercrafts at or within the ranges described above from marine mammals and turtles. Operators will be particularly vigilant to watch for turtles at or near the surface in areas of known or suspected marine mammal or turtle activity, and if practicable, reduce watercraft speed to 5 knots or less,
 - If despite efforts to maintain the distances and speeds described above, a marine mammal or turtle approaches a watercraft, put the engine in neutral until the animal is at least 50 feet away, and then slowly move away to the prescribed distance,
 - Marine mammals and sea turtles will not be encircled or trapped between multiple watercrafts or between vessels and the shore,
 - Do not attempt to feed, touch, ride, or otherwise intentionally interact with any ESA-listed or MMPA-protected marine species,
 - All on-site demonstration personnel must be apprised of the status of any ESA-listed species potentially present in the demonstration area and the protections afforded to those species under Federal laws. Information explaining laws and regulations for listed species in Hawaii may be downloaded at <http://www.nmfs.noaa.gov/protres/MMWatch/hawaii.htm>. The POC will ensure that protocols and observers in place to avoid the potential contact with or harassment of ESA-listed or MMPA-protected species are followed during all periods of in-water work,

- Records any protected species observed in the demonstration areas for the duration of in-water activities will be maintained and submitted at the close of in-water activities.
- Immediate notification to Don Hubner (808-944-2233) Protected Resources Division, NMFS, PIRO, if:
 - A take occurs;
 - New information reveals the action has affected listed species in a manner or to an extent not previously evaluated;
 - If the action is subsequently modified and causes effects to listed species in a manner or to an extent not previously considered or evaluated; or
 - A new species is listed or critical habitat is designated that may be affected by the authorized work.
- For stranded sea turtles, contact 808-983-5730 (M-F 0700-1600) or the pager number 808-288-5685/0023 after hours and weekends for a fast call back.
- For concerns relating to marine mammals contact 888-256-9840.

Best Management Practice: 10. Marine Species Listed Under the Endangered Species Act (ESA) or Protected Under the Marine Mammal Protection Act (MMPA)

The following BMPs are intended to ensure that the proposed action would have insignificant impacts on ESA-listed or MMPA protected marine species, or to diminish the likelihood of impact below the threshold of discountable.

Note: Any concurrence by National Marine Fisheries Service (NMFS) Protected Resources Division that the proposed action is not likely to adversely affect ESA-listed marine species would be based in large part on the expectation that as a minimum the following BMPs would be implemented. These BMPs are in no way intended to supersede or replace measures required by any other agency including, but not limited to the USFWS, USEPA, or NMFS Habitat Conservation Division.

Constant vigilance will be kept for the presence of ESA-listed or MMPA protected marine species during all aspects of the proposed action, particularly in-water activities such as dredging, boat operations, diving, or ROV operations.

- A competent observer will be designated to survey the marine areas adjacent to the proposed action for ESA-listed or MMPA protected marine species.
- Visual surveys will occur prior to the start of work each day, and periodically during the day, including prior to resumption of work following any break of more than one half hour.
- All in-water work will be postponed or halted when an ESA-listed marine species is within 210 feet of the proposed work, and will only begin or resume after the ESA-listed marine species has voluntarily departed the area. If ESA-listed or MMPA-protected marine species are noticed within 210 feet after work has already begun, that work may continue only if, in the best judgment of the Project Manager, there is no way for the activity to adversely affect the ESA-listed or MMPA-protected marine species. For example; the ROV performing surveys or underwater work is likely safe, whereas the air-lifting of the salvage baskets may not be prudent.
- When piloting watercraft, operators will alter course to remain a minimum of 300 feet from whales and 210 feet from other marine mammals and sea turtles.
- Reduce speed to 10 knots or less when piloting watercraft at or within the ranges described above from marine mammals and sea turtles. Operators will be particularly vigilant to watch for turtles at or near the surface in areas of known

or suspected marine mammal or turtle activity, and if practicable, reduce watercraft speed to 5 knots or less.

- If despite efforts to maintain the distances and speeds described above, a marine mammal or turtle approaches the watercraft, put the engine in neutral until the animal is at least 50 feet away, and then slowly move away to the prescribed distance.
- Marine mammals and sea turtles will not be encircled or trapped between multiple vessels or between vessels and the shore.
- Do not attempt to feed, touch, ride, or otherwise intentionally interact with any ESA-listed or MMPA-protected marine species.

No contamination of the marine environment is anticipated from demonstration-related activities.

- To control petroleum products accidentally spilled during the demonstration, appropriate materials to contain and clean potential spills will be stored and readily available at the work site.
- All demonstration-related materials and equipment to be placed in the water will be free of visible pollutants prior to use. The Project Engineer responsible for operations or his designated person will perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations will be postponed or halted should a leak be detected, and will not proceed until the leak is repaired and equipment cleaned.
- Turbidity and siltation from demonstration-related work will be minimized. Silt containment devices are not applicable for this technology demonstration.
- Although no construction debris will be generated during the ROUMRS demonstration, all waste, debris, and litter on the watercraft will be controlled and not allowed to enter or remain in the marine environment during the demonstration.

Best Management Practice 11: Spill Contingency Plan

This Spill Contingency Plan is designed to identify and prevent potential spill hazards, and outline protocols to respond to spill hazards at ARA Incorporated Field Operations on Oahu, Hawaii. ARA will have a spill containment kit onboard the RSV and the DSV.

- All watercraft used in the demonstration will have their own spill contingency plans, and personnel involved with the demonstration will be briefed on those plans.
- Define the severity and type of the spill – A chemical spill during the technology demonstration is highly unlikely because the storage of hazardous chemicals, other than petroleum products onsite is not anticipated. The most of any one chemical being stored is a one gallon in a container approved for commercial products.
 - All chemicals are stored in containers of one gallon or less causing minimal problems in the event of a container breaking or tipping over.
 - All watercraft fueling operations will occur at approved marina fueling locations.
 - Fueling of all other approved portable fuel receptacles (gas cans) will occur at licensed facilities
- Response to an accidental release of a petroleum product or other hazardous material:
 - Evacuate the immediate vicinity of affected areas if exposure puts you and others in imminent danger.
 - If the spill is in a building, close all doors and open windows if substance is volatile and initiate emergency actions (see below).
 - If the spill is on a watercraft, use spill kits to control spill and prevent an overboard release.
 - Activate actions listed in the Demonstration Health and Safety Plan if serious bodily injury or property damage has occurred or is imminent. Call 911.
 - Administer first aid to victim(s), taking the appropriate personal protective equipment (PPE) and other necessary precautions to prevent rescuers exposure. Identification of specific hazard is essential.
 - **Contact Watercraft Captain, Operations, and Project Manager.**

- Actions to take in the event of a petroleum spill, bodily injury:
 - Flush affected eyes, skin and clothing with water using eyewash station, sinks or safety shower. Remove contaminated clothing.
 - If possible and safe to do so, use petroleum or chemical spill kits to and absorb the spill. Wear appropriate PPE, including respirator, if necessary. Sweep up and bag the absorbent. Dispose of material properly. Refer to material safety and data sheets (MSDS).
 - If spill occurs in an enclosed area, leave and close the door behind you.
 - Pull Fire Alarm switch to activate the occupant emergency plan.
 - Assemble in a designated area.
 - Take a head count. Notify the Captain, Project Manager, or Facilities Manager on the nature of the emergency.
 - Activate Emergency Response Plan, if necessary.
 - Stay away from the affected area or building and do not re-enter until it is cleared by the safety officer.

Emergency Telephone Numbers

Emergency Telephone	911
US Coast Guard, NRC	800.424.8802
Fire Department Honolulu	808.523.4411
State Spill Response (business hours only)	808.586.4249
24 Hour State Spill Hotline	808.247.2191

Once contact is made report:

- Your Name
- Location of Emergency
- Type of Emergency
- Type of Help Required

ARA Emergency Contact Numbers:

- ROUMRS Program Manager –John Coughlin – 443.745.4163
- ROUMRS Project Manager – Josh Bowers – 814.243.9460
- ROV Support Vessel Captain –TBD
- Demilitarization Support Vessel Operations Manager -TBD

APPENDIX C

NOAA - Coral Avoidance and Minimization of Injury Plan (CAMIP)

Ordnance Reef (HI-06) Coral Avoidance and Minimization of Injury Plan



MARCH 2011

U.S. Department of Commerce

National Oceanic and Atmospheric Administration

National Marine Fisheries Service

Office of Habitat Conservation

National Ocean Service

Office of National Marine Sanctuaries

Office of Response and Restoration



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List of Acronyms

ACoE	Army Corps of Engineers
CAMIP	Coral Avoidance and Minimization of Injury Plan
DoD	Department of Defense
DMM	Discarded Military Munitions
DSV	Demilitarization Support Vessel
GPS	Global Positioning System Equipment
NOAA	National Oceanic and Atmospheric Administration
ROV	Remotely Operated Vehicle
RSV	ROV Support Vessel
SAA	Small Arms Ammunition
SCUBA	Self-contained Underwater Breathing Apparatus
UH	University of Hawai'i
UWMM	Underwater Military Munitions
UXO	Unexploded Ordnance

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Introduction

The National Oceanic and Atmospheric Administration (NOAA) acts on behalf of the U.S. Department of Commerce as a natural resource trustee. NOAA has the responsibility to protect and restore aquatic resources and their associated habitats. The US Army requested NOAA's support to ensure that best management practices for protection of coral and other benthic habitats are incorporated into a remote, underwater, military munitions recovery system demonstration, currently under development.

The Demonstration Site, which the Department of Defense (DoD) identifies as Military Munitions Sea Disposal Site HI-06 (also referred to as Ordnance Reef (HI-06)), is located in near-shore U.S. coastal waters along the western, leeward side of the island of O'ahu, Hawai'i. The nearest Hawaiian towns are Wai'anae, located approximately three miles to the northeast, and Mā'ili, located approximately five miles to the east. Ordnance Reef (HI-06) encompasses an area approximately one nautical mile long in the north-south direction by 0.5 nautical miles wide in the east-west direction, and lies in approximately 10 to 70 meters of water. The northern portion of Ordnance Reef (HI-06) extends into Pōka'i Bay to the northeast and just beyond the Wai'anae Wastewater Treatment Plant sewer outfall to the south. This area was selected for the Demonstration because the site is well characterized, there is logistical support in the area, and site characteristics (such as water clarity, range of depths, and variety of munitions items) are appropriate for assessing the capabilities of the Demonstration technologies. Ordnance Reef (HI-06) work areas for the Demonstration, and surrounding areas, are shown in [Figure 1](#).

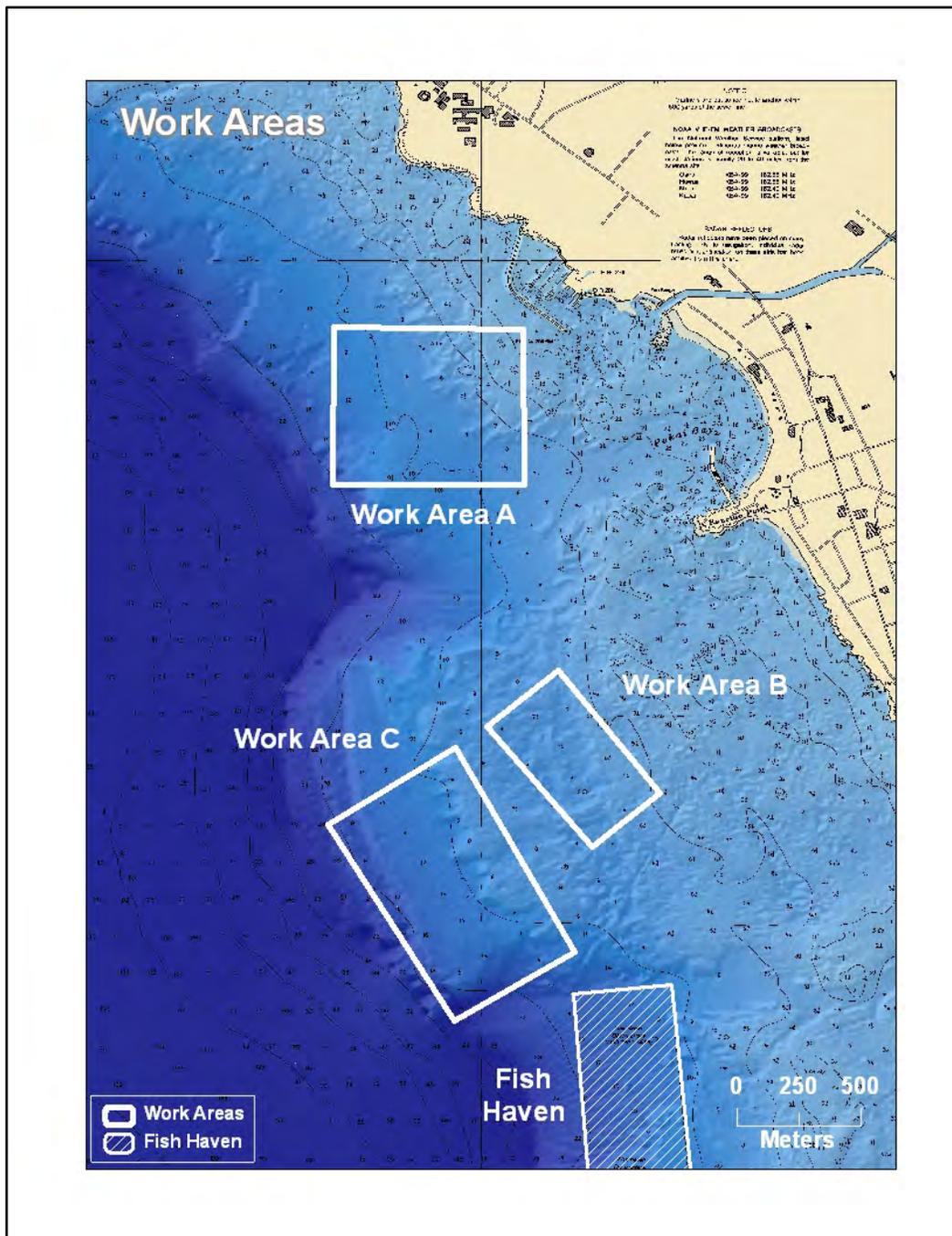


Figure 1. Map of Ordnance Reef (HI-06), including work areas for the Demonstration, and surrounding areas.

In 2002, at the request of the Army Corps of Engineers (ACoE), US Navy Explosive Ordnance Disposal Detachment divers conducted a visual survey of Ordnance Reef (HI-06) to determine the amounts and types of military munitions present. Underwater military munitions (UWMM) were located during the survey, including naval gun ammunition, 105mm and 155mm artillery projectiles, mines, mortars, and small arms ammunition (SAA) (ammunition, without projectiles, that contain explosives (other than tracers), and that is .50 caliber or smaller, or for shotguns).

The UWMM encountered during the survey are categorized as discarded military munitions (DMM)¹ as opposed to unexploded ordnance (UXO)².

In June 2006, under a Special Studies Agreement with the Army, NOAA conducted a hydrographic mapping and screening level assessment of Ordnance Reef (HI-06) (Cox, et al, 2007). The geographic boundaries of this effort encompassed a search area of approximately 3 by 1.5 nautical miles at a depth of 10 to 70 meters of water. A variety of modern acoustic sonar instruments were used to image military munitions and to define the spatial extent of the disposal site. NOAA also collected sediment, water, and fish samples to assess the health of the ecosystem and potential threats to human populations living in close proximity to the Demonstration site.

During interagency review of NOAA's 2006 mapping and screening level assessment report, data gaps were identified. The need for understanding ocean currents in the offshore areas of Ordnance Reef (HI-06) was one of the identified data gaps. As a result, NOAA, under a separate Special Studies Agreement with the Army, installed ocean current monitoring sensors at five locations in, or adjacent to, Ordnance Reef (HI-06). These sensors collected information relating to the speed and direction of ocean currents throughout the water column for a full year. Hypothetical contaminant (such as munitions constituents) release scenarios using this current data will inform decision makers as they consider future remediation options.

In November 2009, the Army obtained assistance from the University of Hawai'i (UH) to conduct sampling (sediment, water column, and biota) to answer the community's concerns about whether the fish were safe to eat. In its conduct of this sampling, UH:

- a) Focused on the NOAA survey study area (Ordnance Reef (HI-06)), including areas up to the shoreline.
- b) Closed data gaps about the human health risk potential posed by the munitions present.
- c) Followed the Comprehensive Environmental Response, Compensation, and Liability Act's Remedial Investigation process.

UH completed its sampling fieldwork during two time frames: February through March and August through September, 2010. The Army will release UH's report in 2011.

In fall 2009, the Army contracted with ARA Engineering and Sciences for the design, development, and demonstration of a remote underwater military munitions recovery system at Ordnance Reef (HI-06). The Demonstration's objective is to develop an integrated remote

¹ Discarded Military Munitions. Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of, consistent with applicable environmental laws and regulations. (10 U.S.C. 2710(e)(2)).

² Unexploded Ordnance. Military munitions that (A) have been primed, fused, armed, or otherwise prepared for action; (B) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and (C) remain unexploded whether by malfunction, design, or any other cause. (10 U.S.C. 101(e)(5)(A) through (C)).

recovery system that provides DoD with a variety of options for the safe, cost effective characterization and recovery of all types of military munitions from a variety of depths and environments. The integrated system is a package of technologies consisting of a remotely operated vehicle (ROV), adaptable attachments, specialized tools, and lifting packages. The Demonstration's efforts at Ordnance Reef (HI-06), which will focus on the recovery of UWMM from depths of approximately 30 to 120 feet, will last an estimated 21 days. Many, but not all of the UWMM present, will be removed during the Demonstration. It is scheduled for summer 2011.

The Demonstration proposes to recover munitions from three work areas. These areas have been designated as Work Area A (approximately 112 acres); Work Area B (approximately 53 acres); and Work Area C (approximately 128 acres). During the Demonstration, the ROV will be deployed and tethered to a moored 75-foot ROV Support Vessel (RSV). The RSV will transport the ROV to and from each area. The ROV will place recovered munitions in specially designed salvage baskets and transport the baskets to one of several underwater staging areas until the baskets are transported by the ROV or to the surface, in lift bags, for destruction. Munitions demilitarization activities will occur on a second moored barge designated the Demilitarization Support Vessel (DSV). The RSV will be moored within the Demonstration's work areas, The DSV will be moored in the State's designated "Fish Haven" area, which is part of their statewide artificial reef program ([Figure 1](#)).

The Demonstration may result in unavoidable impacts to corals. Beginning in 2010, NOAA began working collaboratively with the Army on a two-year project to assess the corals present within Ordnance Reef (HI-06), develop procedures to avoid and minimize any potential impacts to corals resulting from the technology Demonstration, and develop an appropriate coral mitigation strategy commensurate with any injury to corals that occur. NOAA anticipates that the project will be completed in three phases. Phase I of the project involves an assessment of the corals present within Ordnance Reef (HI-06) and corals growing on and in the vicinity of UWMM. Specific tasks for this phase include:

- Identifying corals of high ecological value that should not be disturbed and conducting baseline survey and mapping of corals prior to the Demonstration.
- Coordinating with the contractor and relevant federal, state, and local resource agencies and stakeholders on permit issues and identification of potential mitigation projects.
- Developing a relative risk evaluation for avoidance and minimization of coral injury ([Table 1](#)).

Phase II will involve an assessment of the impacts to coral and the development of appropriate coral mitigation guidelines. Specific tasks for this phase include:

- Developing a plan to assess impacts to corals.
- Conducting post-Demonstration munitions recovery coral surveys.
- Quantifying any impacts to corals that occur.
- Identifying and scaling required coral mitigation activities.

Phase III will involve the Army's completion of the necessary coral mitigation activities.

This Coral Avoidance and Minimization of Injury Plan (CAMIP) includes the results of NOAA's Phase I efforts to survey corals present in the Demonstration's work areas and Fish Haven and to develop a relative risk evaluation for avoidance and minimization of coral injury.

Purpose and Need

The purpose of this CAMIP is to provide the Army and its contractors with assistance in avoiding coral reef injuries and minimizing impacts to benthic habitat in connection with the Demonstration. This document provides a basic coral injury risk assessment for the Ordnance Reef (HI-06) Demonstration and guidance on minimizing injuries to coral and coral reefs.

The two greatest potential sources of injury to corals are ROV activities (such as setting down of the ROV, mechanical removal of the munitions, and dragging of the ROV tether) and mooring activities for both the RSV and DSV. NOAA worked with the Army to develop best management practices for the Demonstration. These practices govern the field activities and compliance will ensure that environmental impacts are minimized. The survey described in this plan was necessary to document the current conditions. To address concerns relating to coral injury, the major focus of the survey was to avoid coral injuries through specific identification of areas of higher UWMM densities and lower abundances of corals within the Demonstration's work areas. Not only will focusing recovery activities in these areas reduce the potential for coral injuries, but this emphasis should also increase the total number of munitions removed. Greater efficiency during the Demonstration will likely result in shorter search times, a smaller number of mooring sites, and less overall potential for coral injuries.

The survey also provides guidance for mooring activities of the RSV and DSV associated with the Demonstration. Areas of sand bottom were surveyed for placement of the DSV moorings within the Fish Haven. Areas of lower coral presence were also identified to help guide the mooring activities of the RSV in the Demonstration's work areas.

While the CAMIP provides general guidance for coral reef injury avoidance and minimization, the information contained within it is all in summary form. The maps and information provided should not be used for navigation, ROV activities, or placement of moorings and are presented here purely for initial planning purposes. The raw data and information will be transmitted to the Army contractor for use in fine scale planning and evaluation of the Demonstration's efforts.

Methodology

Visual surveys of areas where UWMM were present were conducted to identify areas of relative coral injury risks. This was accomplished by NOAA scientific divers using SCUBA. Because of the depths involved, divers used Nitrox gas mixtures, containing between 30% and 32% oxygen to increase no-decompression limit bottom times (allowable search times). Operationally, divers were restricted to working above 100 feet in depth.

UWMM and habitat types were documented with digital photography while global positioning system (GPS) equipment was towed on a surface float above each diver. All photographs were then geo-referenced to specific coordinates using GPS-Photo Link software (version 4.3.5). Care was taken by the divers to maintain as little scope on the surface float line as possible to produce the most accurate GPS coordinates for each munition or clusters of munitions and habitat sites.

Dive sites were chosen based on surveys for munitions conducted in 2002 and 2006, as well as from information gained during the project dives. Munitions were generally found in linear trails, and where concentrations were found, the trails were followed either until there were no UWMM or divers were forced to surface due to air limitations.

NOAA staff reviewed all photo documentation obtained during the survey dives and estimated the number and types of munitions as well as habitat types present. UWMM were visually identified in the photographs and categorized into three general types based on recommendations from ARA: small arms ammunition (SAA) (ammunition without projectiles containing explosives that are .50 calibers or smaller, [Figure 2](#)), medium caliber munitions (munitions above .50 caliber to and including 105 mm) ([Figures 3, 4](#) and [5](#)), and large caliber and other munitions (munitions larger than 105 mm and bombs, rockets, etc) ([Figure 6](#)).



Figure 2. SAA, most likely a mix of .30 to .50 caliber rounds.



Figure 3. A single medium caliber munition (center, right). SAA can be seen for comparison (center, left).



Figure 4. A single, medium cartridge case.



Figure 5. Two large munitions (center). SAA can be seen for comparison (center, left).



Figure 6. A single large munition.

Munitions were only counted individually if they were completely or partially visible and could be separated and quantified. Quantities of munitions were only estimated if they were not visibly separable, or could not be directly observed in photographs (e.g. if munitions were located under a top surface layer of other munitions, they were not included in the quantity estimates). When counting individual munitions was impractical, the quantity was estimated. Unknown or unidentifiable objects were noted and the resulting photographs will be sent to the Army contractor for possible identification.

Perceived risk of injury to coral from ROV activities within the Demonstration's work areas were qualitatively grouped into relative risk levels (low, low-to-moderate, moderate-to-high, and high) based on the vertical relief, relative coral abundance, species types, and the presence of a specific species of coral ([Table 1](#)). In the table, categories one through three represent a continuum of relative risk (from low to high) for coral injury. Category describes any photograph that contained an identifiable *Pocillopora eydouxi* coral colony, as this species provides a relatively large amount of three-dimensional structures to the habitat (contributing both to ecological diversity and increased risk of injury). For perceived risk of injury to coral from mooring activities within the work areas and the Fish Haven, the distinction between moderate-to-high and high was not used, as mooring efforts are less precise than the ROV activities. Risks in these areas were grouped into relative risk levels low, medium, and high.

Table 1. Relative Risk Evaluation for Avoidance and Minimization of Coral Injury.

Criteria for ROV Activities

Relief \ Coral	Category 1: Majority of area sand or un-colonized hard bottom.	Category 2: Coral colonies present but substantial space to accommodate ROV footprint.	Category 3: Coral colonies abundant; little space to accommodate ROV footprint.	Category 4: Presence of <i>P. eydouxi</i> colonies.
Little to no relief	Low	Low	Low to Moderate	High
Low vertical relief	Low	Low to Moderate	Moderate to High	High
High vertical relief	Low	Low to Moderate	Moderate to High	High

Criteria for Mooring Activities

Relief \ Coral	Category 1: Majority of area sand or un-colonized hard bottom.	Category 2: Coral colonies present but substantial space to accommodate mooring point.	Category 3: Coral colonies abundant; little space between to accommodate mooring point.	Category 4: Presence of <i>P. eydouxi</i> colonies.
Little to no relief	Low	Low	Moderate	High
Low vertical relief	Low	Moderate	High	High
High vertical relief	Low	Moderate	High	High

A quantitative assessment of coral resources was not conducted at this time for a number of reasons. Given the large size of the work areas involved, approximately 293 acres (roughly 222 football fields), and the presumed localized nature of possible injuries, any kind of randomized statistical sampling would be unlikely to capture the areas that may be injured. Additionally, to cover such a large area in a statistically meaningful sampling regime would have required a representatively large number of sample transects. The Demonstration will collect coordinates for the RSV and DSV mooring sites as well as real time positions of the ROV path, so a post-assessment census of any injury that occurred—rather than using a before, after, control, impact experimental design—is not only a viable but more efficient approach.

Habitat Descriptions

Three work areas were selected to be the focus of the Demonstration, Work Area A, B and C. The three work areas are known areas of higher UWMM densities based on the previous underwater surveys conducted in 2002 and 2006. The Fish Haven was selected for the mooring location of the DSV.

Overall, the habitats and topographical features encountered across the three work areas are fairly typical of O'ahu consisting of a shallow reef flat and a deeper reef bench sloping down to a deeper plateau (Fletcher *et al*, 2008; AECOS, Inc. 2002). Depths surveyed range from approximately 30 to 120 feet (operationally divers were restricted to 100 feet of working depths; however, underwater visibility allowed for a visual surveying down to greater depths). The Demonstration's three work areas were qualitatively different in their relative coral abundances, benthic habitat distributions, and three dimensional complexities. While a detailed survey of coral species was not conducted, common coral species encountered included: *Pocillopora meandrina*, *P. eydouxi*, *Porites lobata*, *P. evermanni*, *P. duerdeni*, *Leptastrea sp.*, and *Montipora sp.* The distances required to survey for UWMM as well as the time constraints at depth precluded a more thorough and representative list of less abundant species of corals.

WORK AREA A

Work Area A contained the highest level of coral abundance, density, and three dimensional habitat complexities of the work areas (Figure 7).

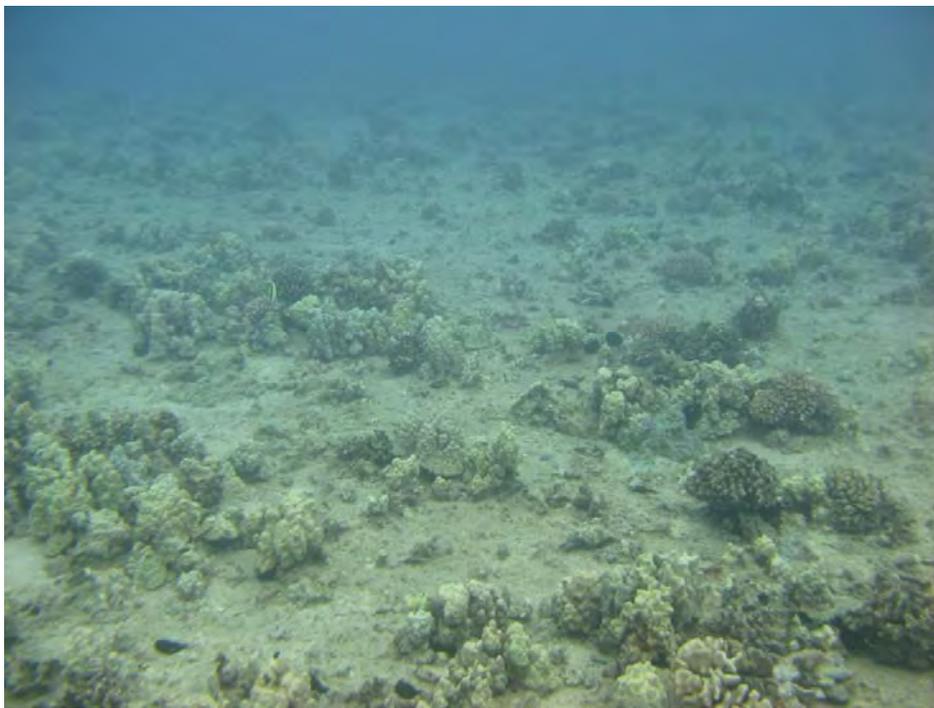


Figure 7. A representative habitat photo from Work Area A shows the abundance and density of corals in the area.



Figure 8. Large *Porites evermanni* colonies found in the north eastern portion of Work Area A.

Work Area A is the only area where large, old *Porites sp.* colonies (2 meters in diameter and greater) were found (Figure 8).

The shoreward portion of Work Area A is composed of reef flat with intermittent spur-and-groove formations as well as large depressions in about 30 to 40 feet of depth. Moving seaward the intermittent spur-and-groove formations lead to deeper sand flats in 50 to 60 feet of water, gradually extending deeper to 70 to 80 feet.

WORK AREA B

Work Area B ranged in depth from approximately 30 to 50 feet running inshore to offshore. The area is relatively heterogeneous in terms of flat, hard bottom substrate ([Figure 9](#)) with intermittent high points supporting greater coral abundances and densities ([Figure 10](#)), as well as some patches of sand habitat ([Figure 11](#)).

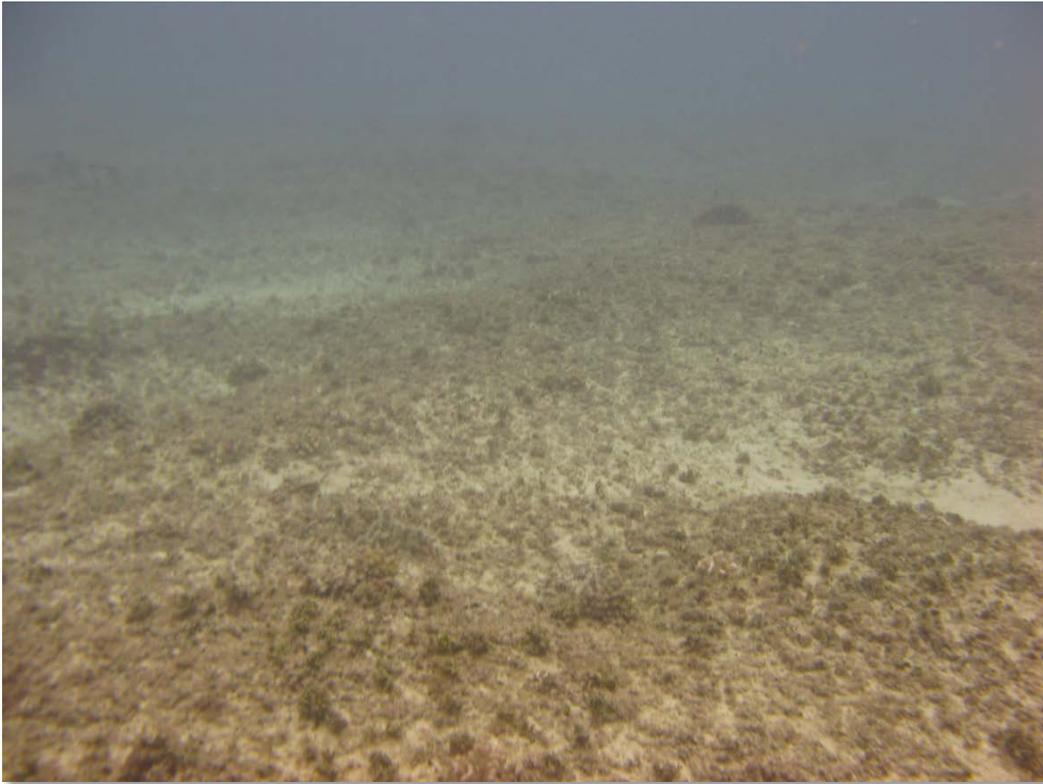


Figure 9. Flat, hard bottom with lower amounts of coral colonies in Work Area B.



Figure 10. An elevated ridge in Work Area B that shows the abundance and density of corals that can occur.

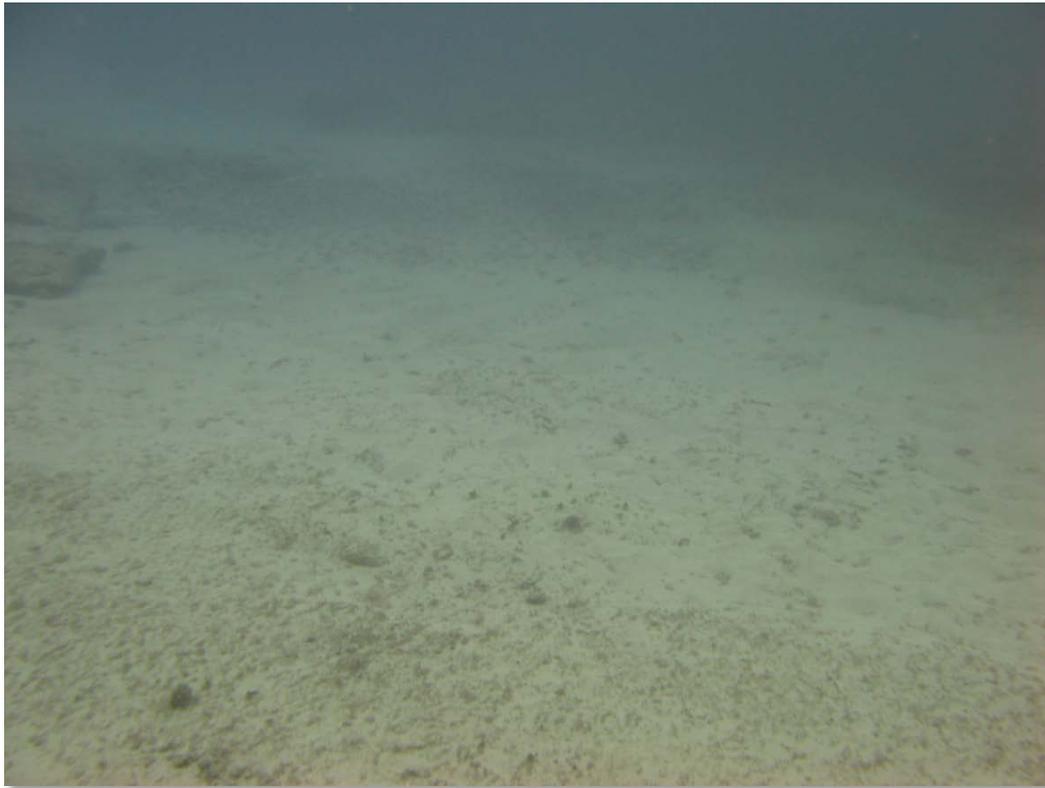


Figure 11. Sand habitat found in Work Area B.

WORK AREA C

Overall, Work Area C is characterized by a flat, hard bottom shelf inshore at roughly 50 to 60 feet of depth. This shelf gives way, moving seaward, to a steep slope down to a deeper plateau at approximately 70 feet of depth. This plateau gradually slopes seaward to depths of approximately 120 to 130 feet of depth (the maximum working depth for the Demonstration).

Work Area C, while having the lowest coral abundances, densities, and complexity of the three areas, still contains substantial habitat heterogeneity and discrete areas with relatively high amounts of corals.

The highest coral presence is located on the shallow shelf (50 to 60 feet of depth) found on the shoreward side of Work Area C ([Figure 12](#)).

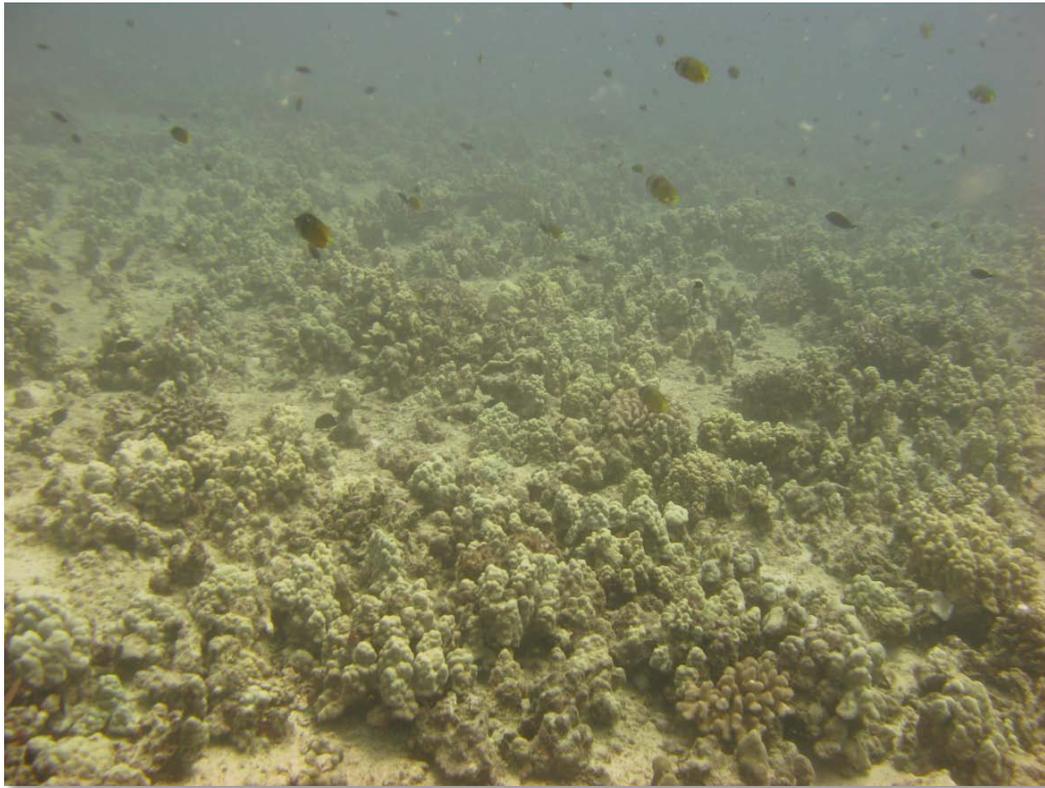


Figure 12. A representative photo showing areas of high coral presence at 50 to 60 feet of depth, on a shelf within Work Area C.

The deeper shelf (70 feet and greater) is characterized by substantial habitat heterogeneity, with habitats ranging from relatively high coral abundance ([Figure 13](#)), to hard bottom with lower coral abundance ([Figure 14](#)), and areas of sand and rubble ([Figure 15](#)).



Figure 13. A section of the deeper plateau with intermittent coral colonies. Cartridge casings can be seen in the sand patch at the upper right of the photograph.



Figure 14. Flat, hard bottom habitat with few coral colonies, located on the deeper plateau. Large munitions can be seen in the center of the photograph as well as farther off in the distance.

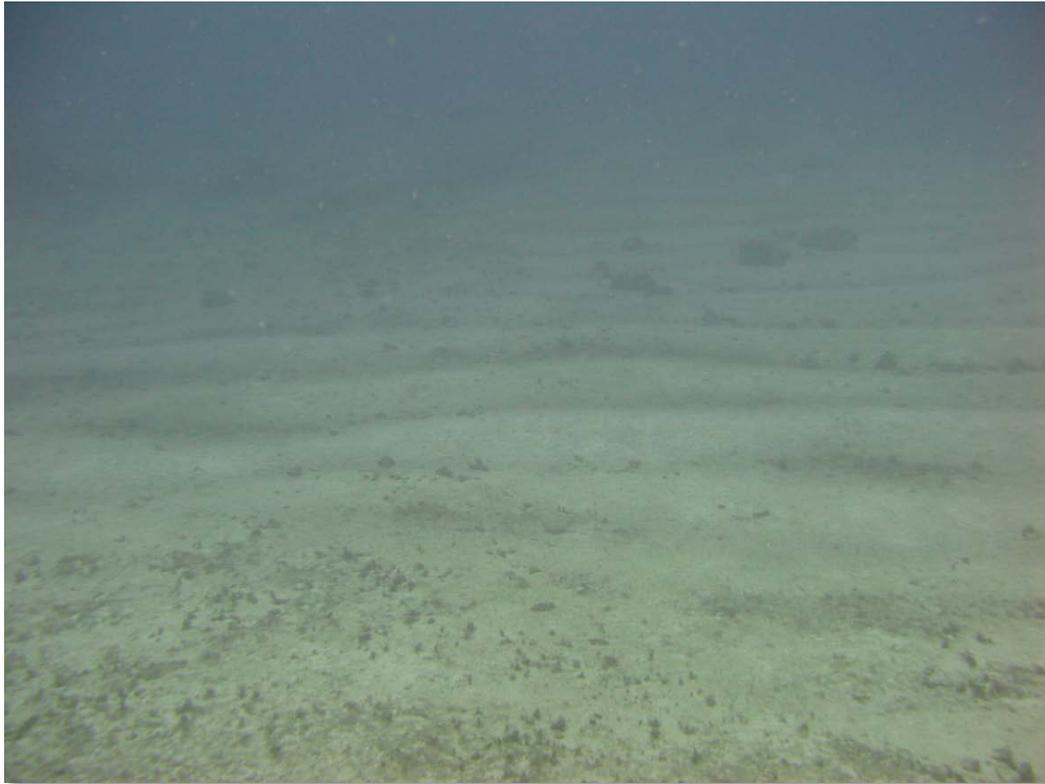


Figure 15. Sand bottom habitat located on the deeper plateau. Large (5 to 8 inch diameter) UWMM can be seen in the in the distance.

Habitats within the three work areas were heterogeneous and made designations of large areas of a specific habitat difficult, given the survey level of effort.

FISH HAVEN

The Fish Haven contains large areas of sand and ranges from approximately 40 to 130 feet of depth and deeper. There are sections within this zone (shoreward to the south) that support high coral density, abundance, and three dimensional complexities.

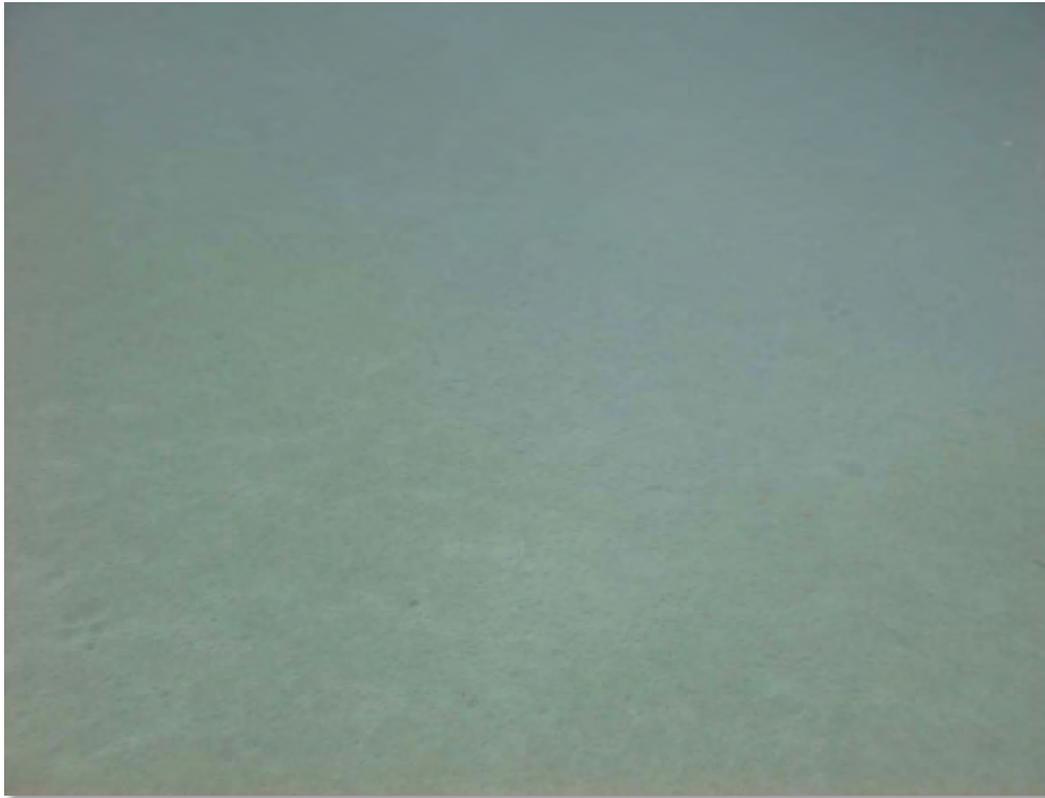


Figure 16. Sand habitat in the Fish Haven area.

Results

The survey work began at coordinates where previous underwater investigations identified munitions and proceeded from there based on the observations of the divers. A total of 78 survey dives, conducted in the Demonstration work areas and Fish Haven, generated 1,862 photographs of UWMM and habitat types (Figure 17). Assuming that an average visibility of roughly 60 feet of horizontal distance (30-foot radius) existed throughout most of the areas, a total area of 72 acres was visually surveyed.

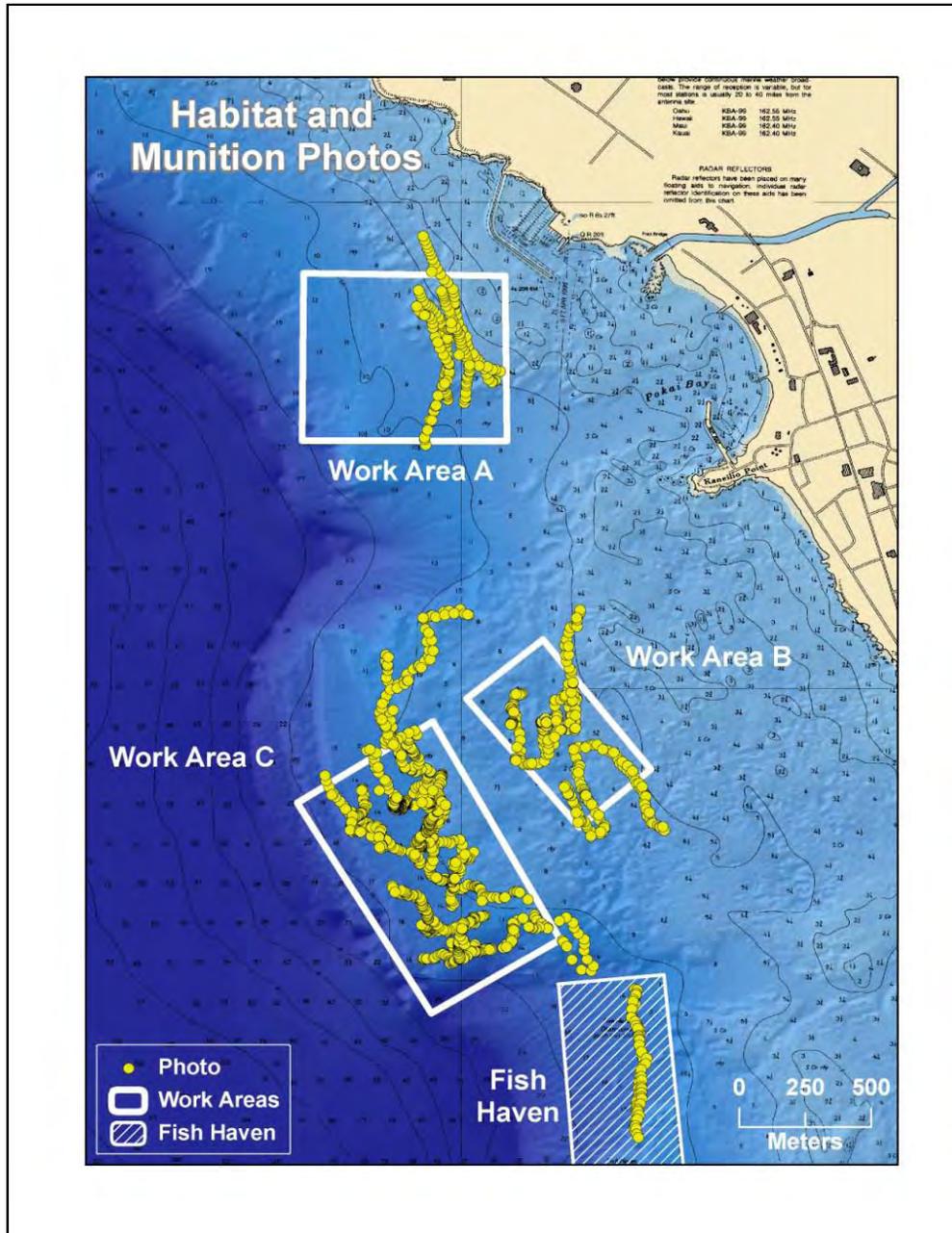


Figure 17. A map showing locations of all photographs taken during the surveys.

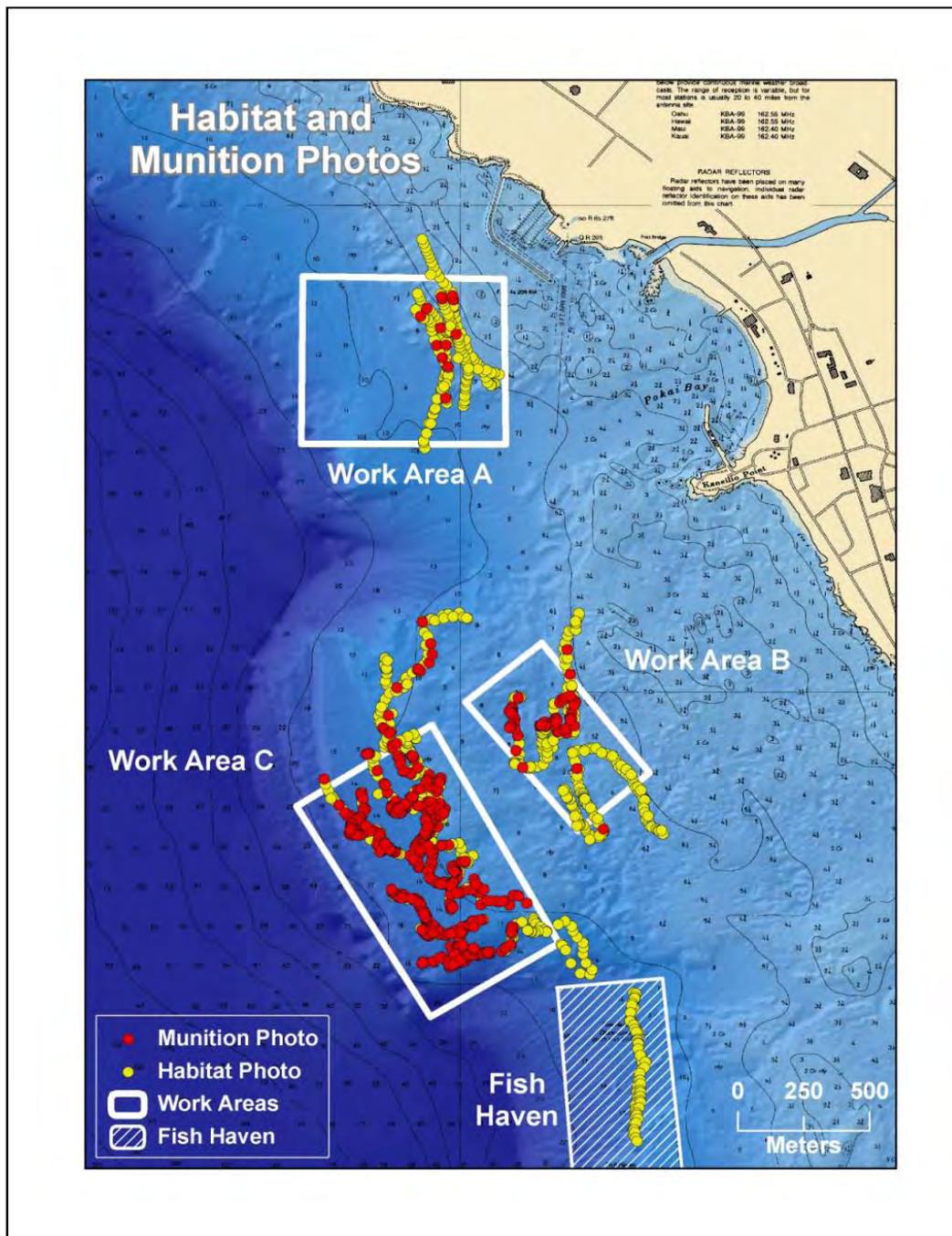


Figure 18. A map showing the locations of munitions and habitat photographs taken during the surveys.

Approximately 21,199 UWMM were documented from the survey dives. The majority of UWMM in all groups were found in Work Area C (Table 2, Figure 18). Munitions were visually identified in the photographs and were categorized into three general types: SAA (ammunition without projectiles containing explosives that are .50 calibers or smaller), medium caliber munitions (munitions above .50 calibers to and including 105 mm), and large caliber and other munitions (munitions larger than 105 mm and bombs, rockets, etc).

Table 2. The number of munitions in all groups, separated by area.

	SAA	Medium Munitions	Large Munitions
Work Area A	14	0	0
Work Area B	229	1464	0
Work Area C	12,557	6,061	874
Total	12,800	7,525	874

RISKS FROM ROV ACTIVITIES

Individual sites where UWMM are present were evaluated based on the potential risk of coral injuries from ROV activities. The assumption that the ROV activities will be controlled, precise, and continuously monitored is supported by the Army and the operational specifications of the ROV itself.

Work Area A

Work Area A contained the smallest quantity of munitions of the three work areas (Table 2, Figure 18). Only SAA were found in this area and these were only found individually ([Figure 19](#)). The SAA found in this area made up approximately 0.1% of the total number of SAA found during the survey.

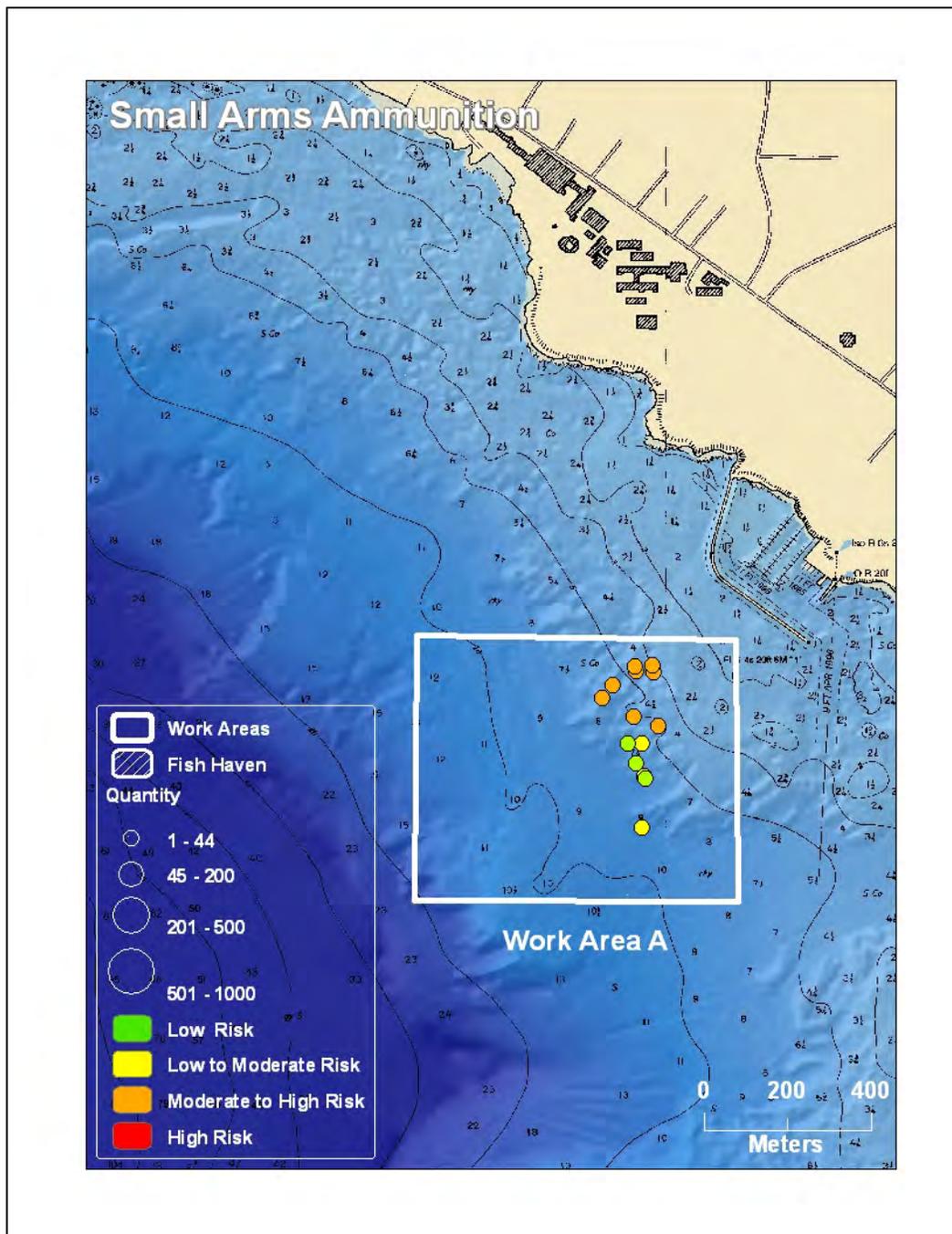


Figure 19. SAA sites in Work Area A showing quantities observed and relative risk values. The cluster of moderate to high risk sites coincide with the large *Porites sp.* colonies observed during the survey.

The risks of coral injury from ROV activities were mostly moderate-to-high in this area, particularly in the north east portion of the work area where the large *Porites sp.* colonies were found (Figure 20, Figure 8).



Figure 20. A SAA found amongst *Porites sp.* colonies in Work Area A. The SAA can be seen in the center of the photograph.

Work Area B

The majority of munitions found in Work Area B were SAA, and medium-sized. Approximately 2% of the total number of SAA surveyed were found in the northern part of Work Area B ([Figure 21](#)), and were mostly found individually or in small piles ([Figure 22](#)).

The risks of coral injury from ROV activities are mostly low; however, due to the spatial heterogeneity of habitats in the area, there are some moderate risks for sites in close proximity to flat, un-colonized hard bottom and sand ([Figure 22](#)).

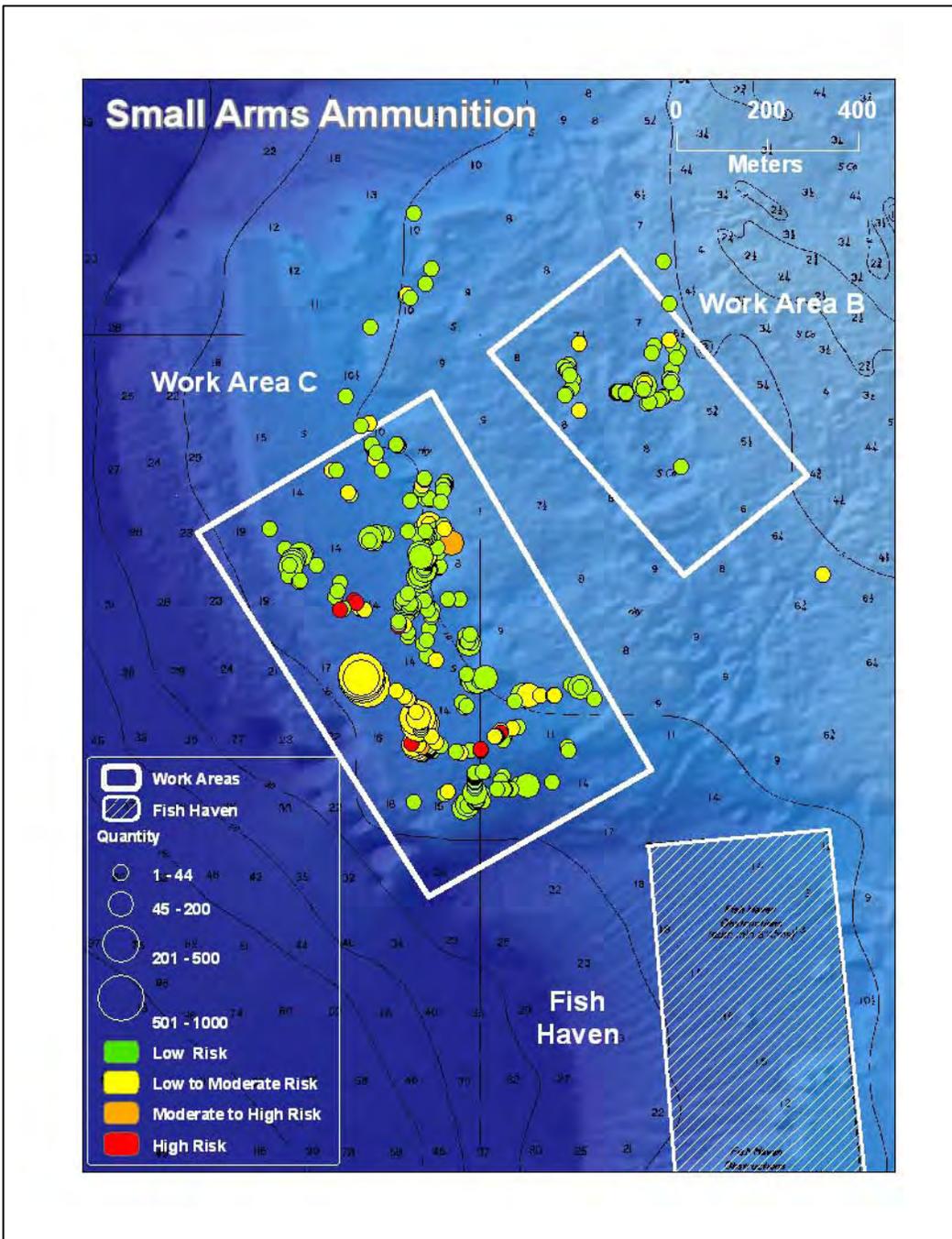


Figure 21. SAA sites in Work Areas B and C showing quantities observed and relative risk values.



Figure 22. Medium caliber munitions in sand and rubble habitat within Work Area B.

The only other area (besides Work Area C) that had any substantial number of UWMM from any group was the northwest section of Work Area B ([Figure 21](#)), which contained approximately 20% of the total number of medium caliber munitions. These UWMM were mostly found in clusters ([Figure 22](#)).

The risks of coral injury from ROV activities are mostly low where UWMM were present; however, there is one moderate site located near the western edge of Work Area B ([Figure 23](#)).

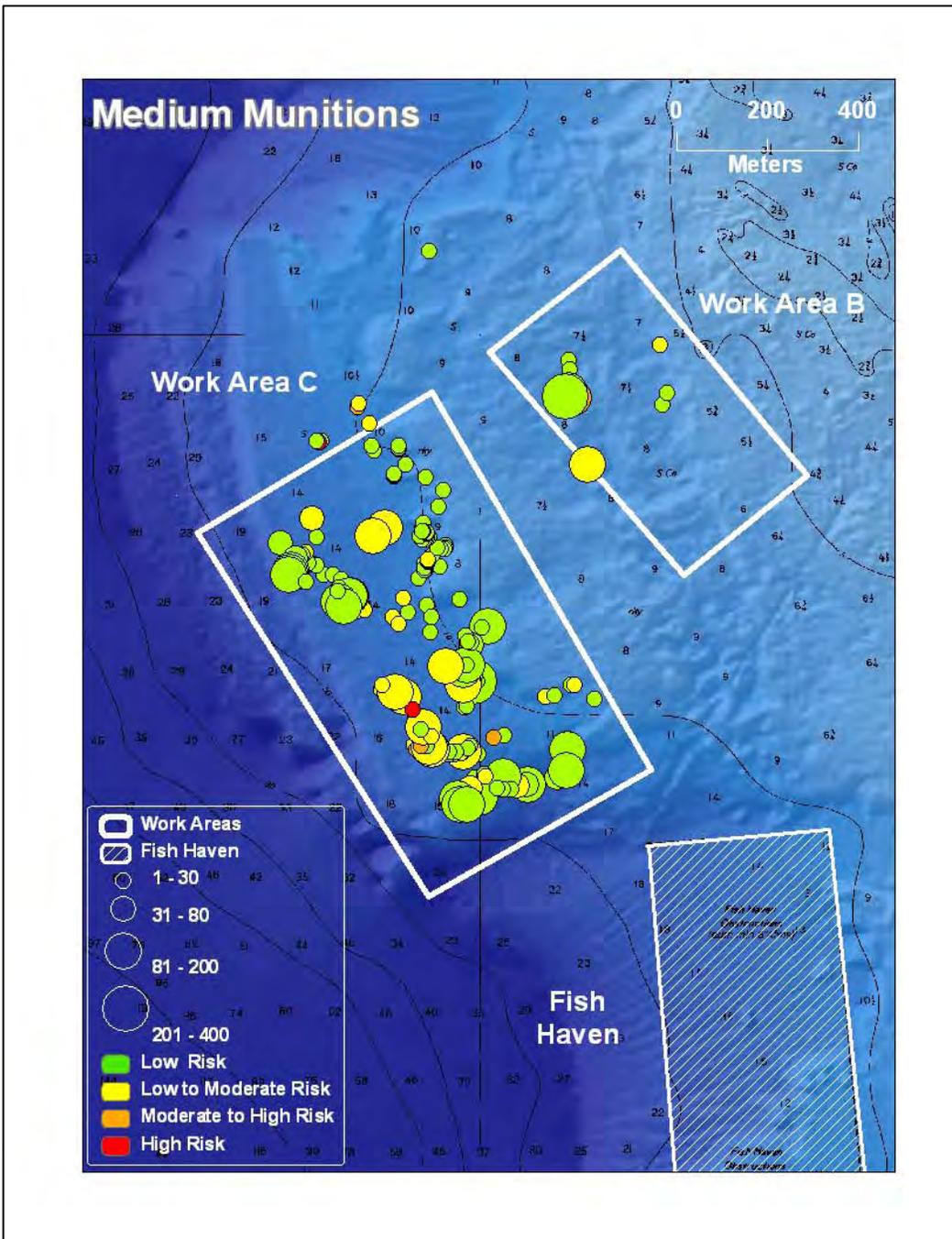


Figure 23. Medium munitions sites in Work Areas B and C showing quantities observed and relative risk values.



Figure 24. A fused block of medium caliber munitions located in Work Area B.

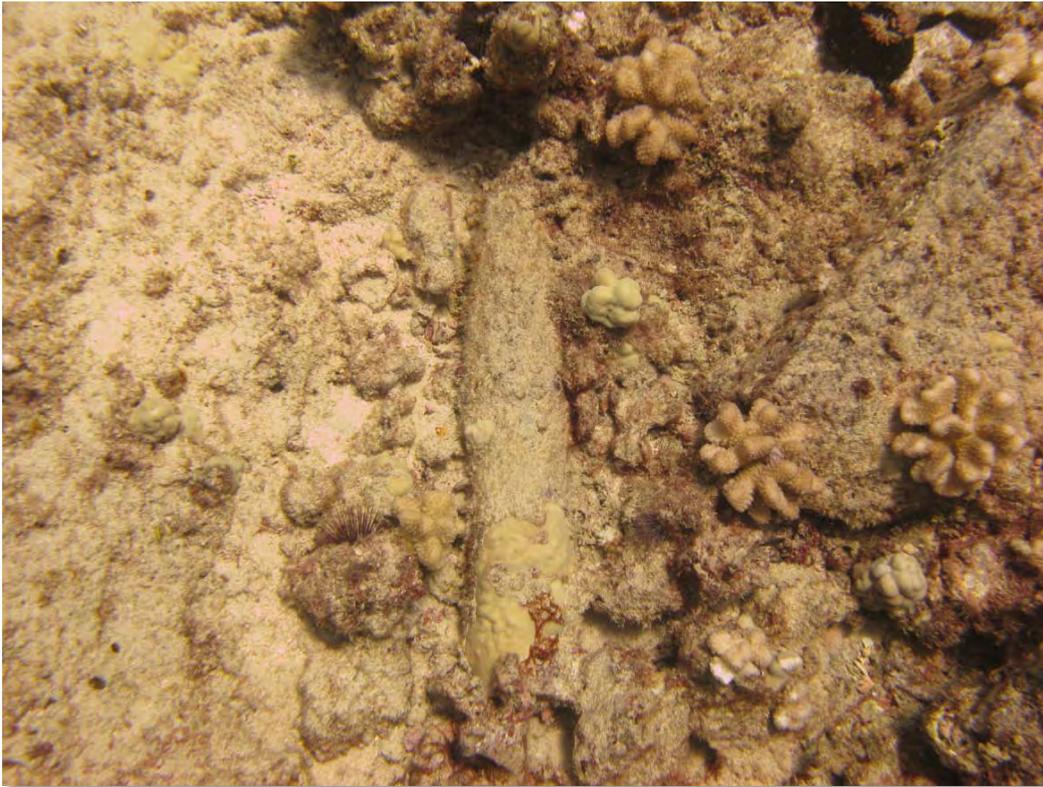


Figure 25. A medium caliber munition imbedded in the substrate of Work Area B.

Work Area C

Approximately 92% of all UWMM found are located in Work Area C ([Figure 17](#)). Work Area C also contained the greatest number of UWMM of all groups observed ([Table 2](#)).

Approximately 98% of all SAA observed were found in Work Area C ([Figure 21](#)), and were in numbers ranging from individual SAA to 1,000 or more SAA (Figure 26).

The risks of coral injury from ROV activities are variable among SAA sites ranging from low risk (where munitions are found on sand or un-colonized hard bottom) to high (where munitions are located in areas of high coral abundances and *P. eydouxi* colonies are present) ([Figure 20](#)). There is an area on the western side of Work Area C that has higher risks, in general, than most other areas ([Figure 21](#)).



Figure 26. A pile of SAA in Work Area C.

Work Area C contained approximately 80% of the total number of UWMM that were the medium caliber munitions ([Figure 23](#)). These medium caliber munitions were consolidated and in clusters ([Figure 27](#)).

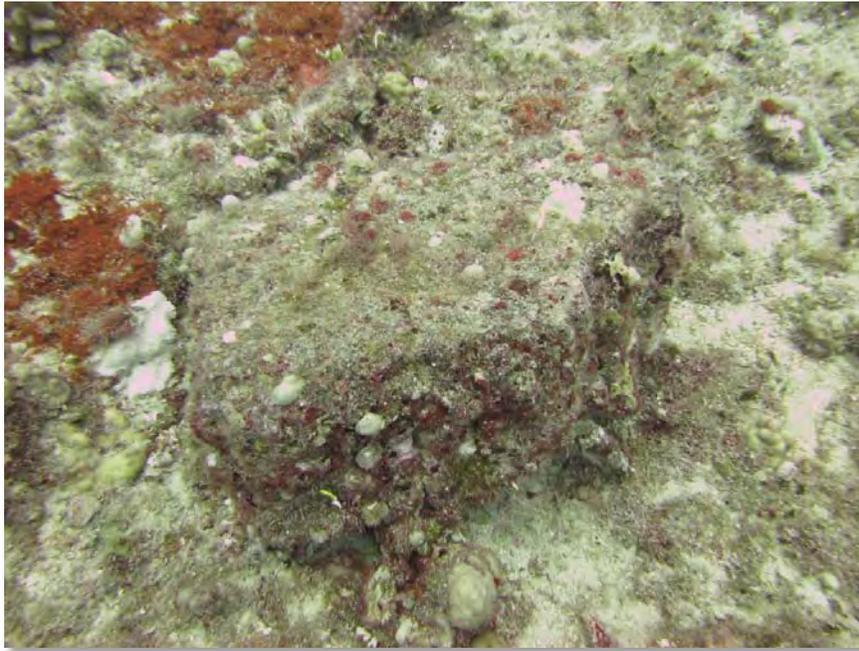


Figure 27. A fused block of medium caliber munitions located in Work Area C.

The risks of coral injury from ROV activities are variable among sites that contain medium caliber munitions. These sites range from low risk (where UWMM are found on sand or uncolonized hard bottom) to high (where UWMM are located in areas of high coral abundances and *P. eydouxi* colonies are present) (Figure 23). There is an area on the western side of Work Area C that has higher risks in general than most other areas (Figure 23).

Work Area C contained over 99% of the total number of large caliber and other munitions found during the survey (Figure 28, Table 2). These were found spread throughout the area and were found individually or in clusters (Figure 27).

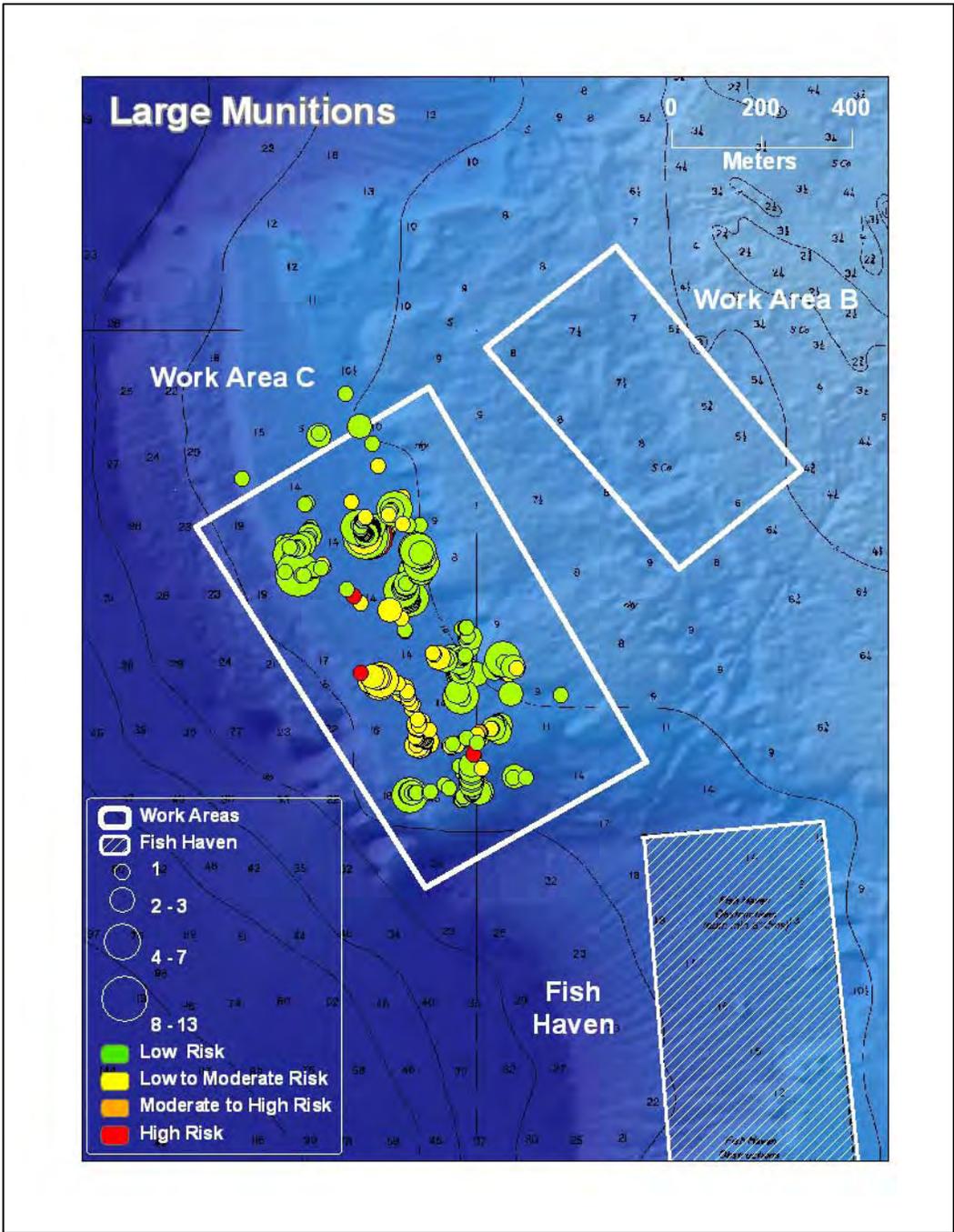


Figure 28. Large caliber and other munitions in Work Area C, showing quantities observed and relative risk values.



Figure 29. A medium munition resting on the bottom in Work Area C. A single SAA can be seen directly to the left of the large caliber and other munition.



Figure 30. Large munitions located on hard bottom substrate in Work Area C. In the center of the photograph are two large munitions while others can be seen in the distance at the top edge.



Figure 31. A large munition located on hard bottom substrate in Work Area C. The projectile can be seen directly under the diver.

RISKS FROM MOORING ACTIVITIES

Individual sites where UWMM are present were evaluated based on the potential risk of coral injuries from ROV activities based on the assumption that the ROV activities will be controlled, precise, and continuously monitored. Mooring activities of both the RSV, and to a greater extent the DSV, are assumed to be much less controlled, precise, and with a larger potential injury footprint; therefore, require a different level of risk assessment.

The level of habitat heterogeneity and coral abundances and densities—shallower than 60 feet of depth in all work areas—presents a substantial potential for coral injury from mooring activities ([Figure 32](#), [Figure 33](#), [Figure 34](#), [Figure 35](#)).



Figure 32. A representative habitat photo from the shallow shelf of Work Area A that shows the abundance and density of corals in the area. Habitats such as this represent a high-risk potential for coral injury from mooring activities.

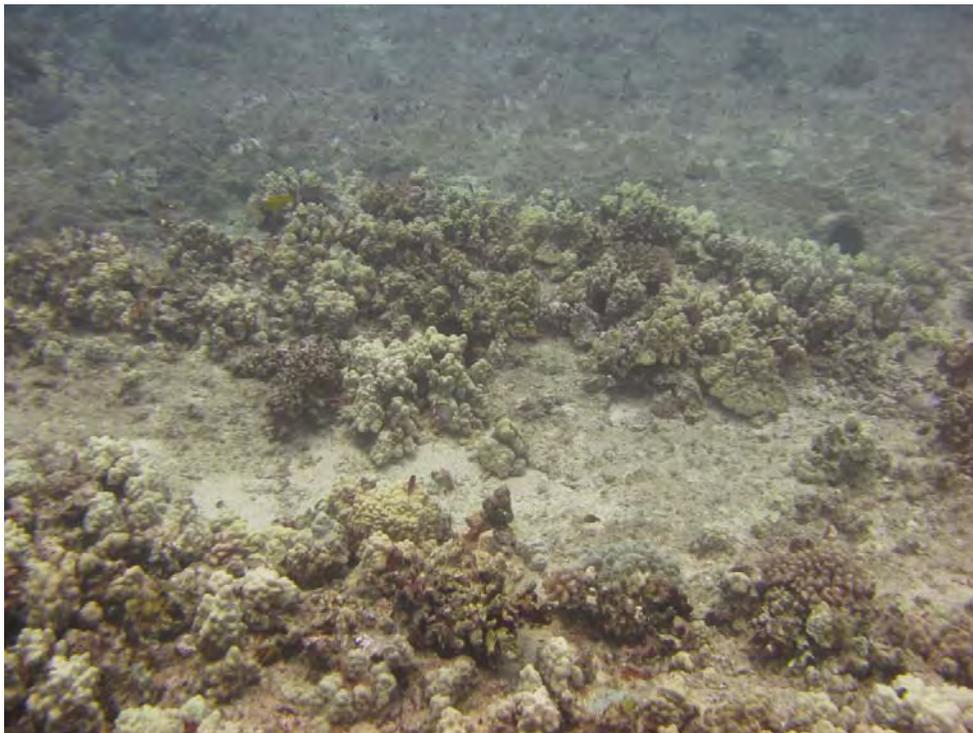


Figure 33. A representative habitat photo from the shallow shelf of Work Area B that shows the abundance and density of corals in the area. Habitats such as this represent a high-risk potential for coral injury from mooring activities.

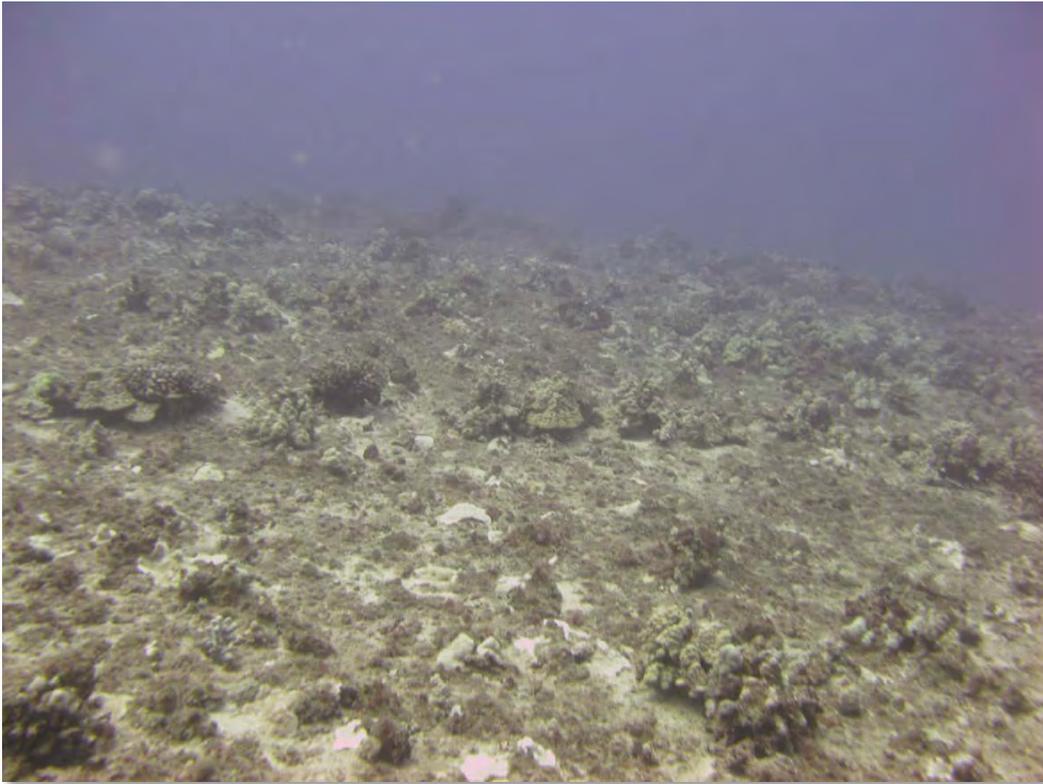


Figure 34. A representative habitat photo from the shallow shelf of Work Area C that shows the abundance and density of corals in the area. Habitats such as this represent a high-risk potential for coral injury from mooring activities.

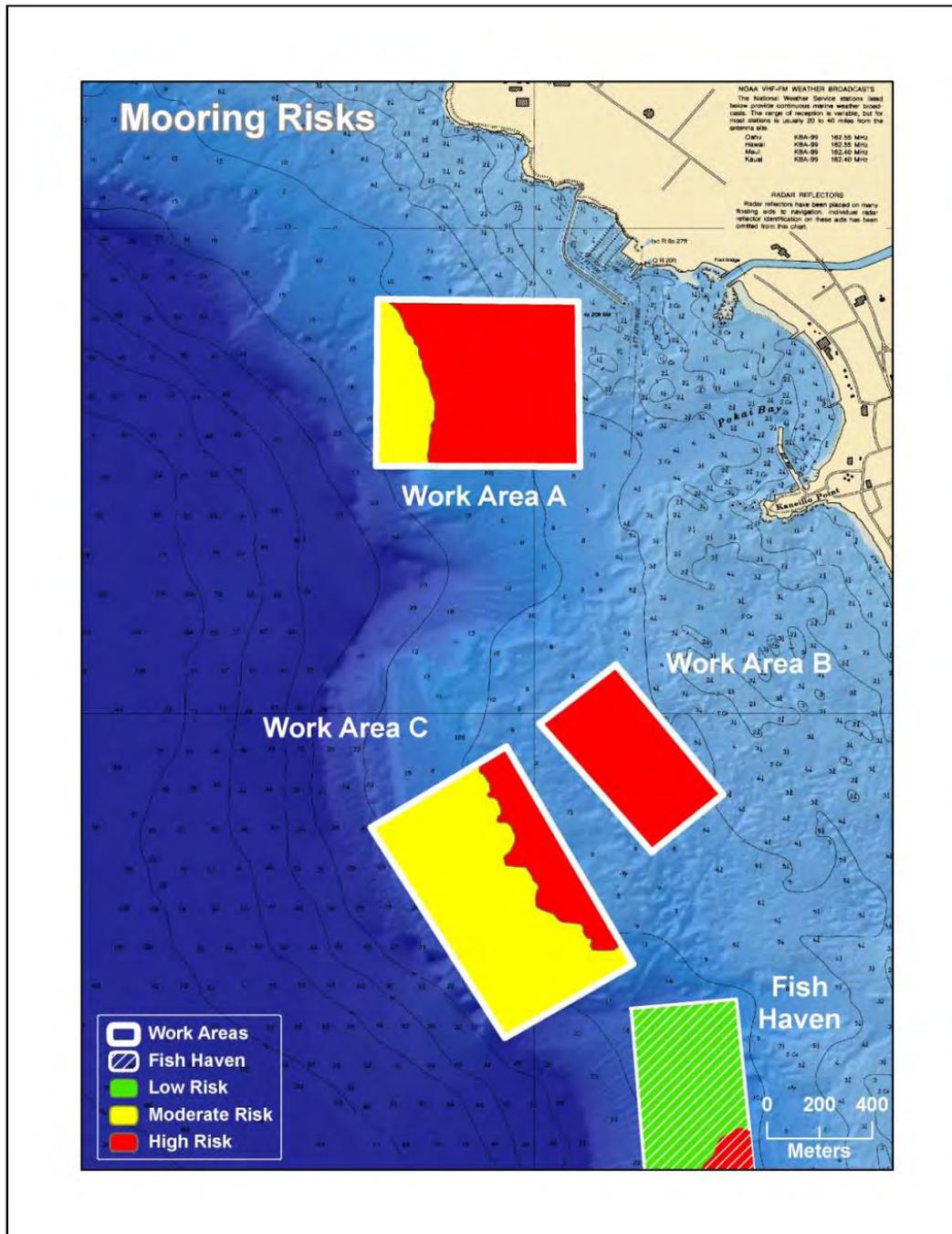


Figure 35. Coral injury risks from mooring activities in the Demonstration's three work areas.

Even the deeper plateau starting at 70 feet of depth in Work Area C contains areas of relatively high coral abundances and densities (Figure 36), although these areas are fewer and farther apart than similar, shallower areas. Given the nature of mooring activities (even on a smaller scale such as the RSV) the deeper plateaus represent a moderate risk of coral injury.

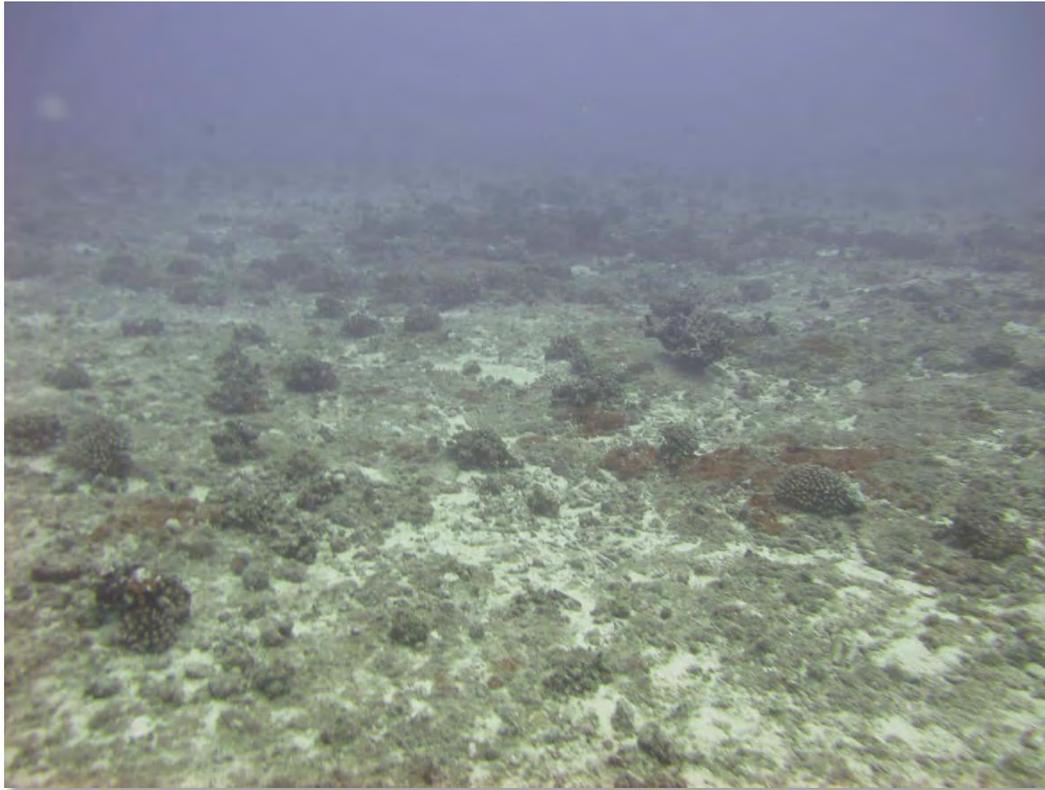


Figure 36. A representative habitat photo from the deep plateau of Work Area C that shows the abundance and density of corals in the area. Habitats such as this represent a moderate-risk potential for coral injury from mooring activities.

The Fish Haven area to the south of the work areas, designated as the mooring area for the DSV, contains a large section of flat sand habitat which would be a low risk area to conduct mooring activities ([Figure 37](#)). South of the low risk area, but still within the Fish Haven, is an area similar to 60 feet of depth shelf in Work Areas A and C where corals are present and abundant. This area represents another high risk potential for coral injury from mooring activities ([Figure 38](#)).

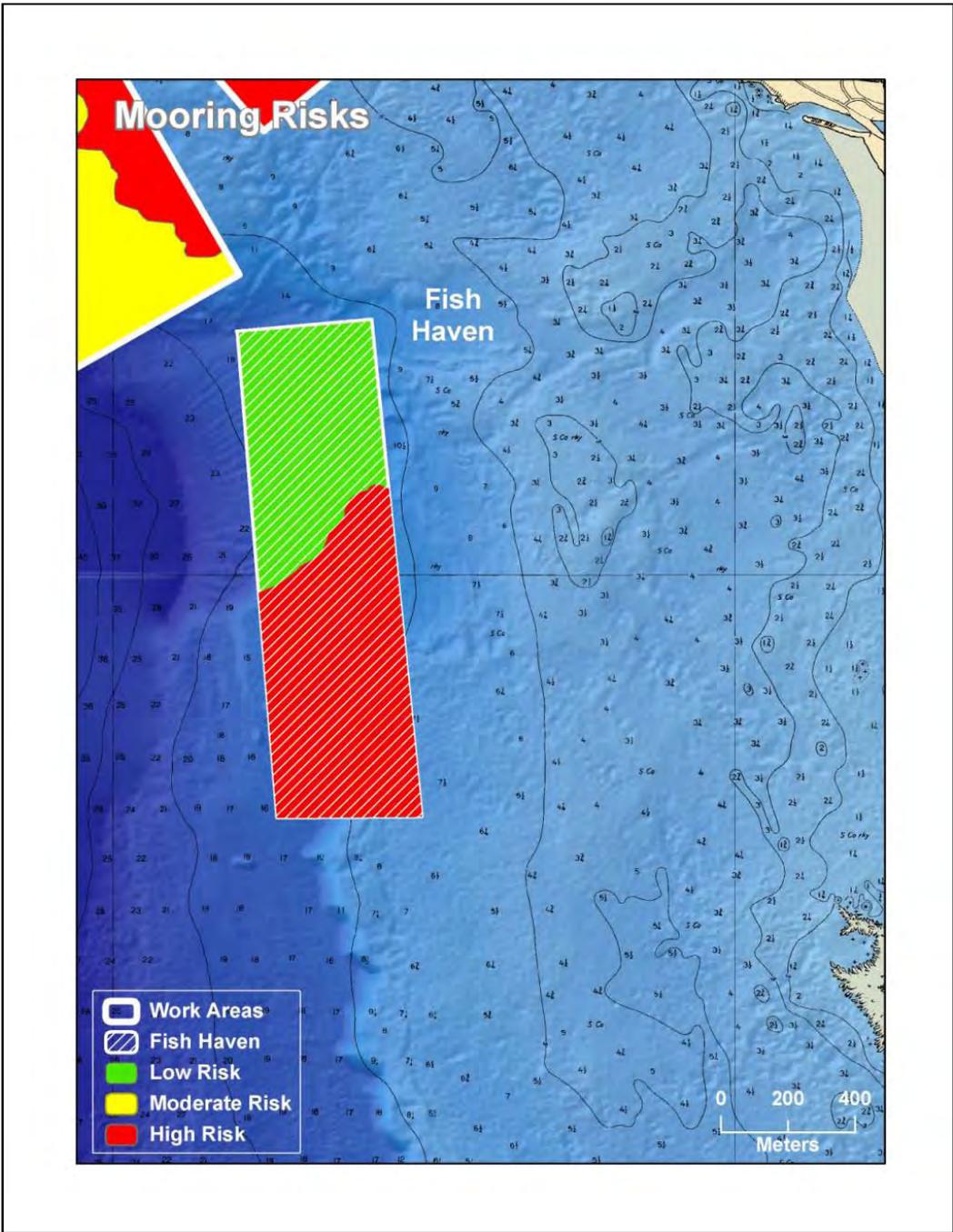


Figure 37. Coral injury risks from mooring activities in the Fish Haven area.

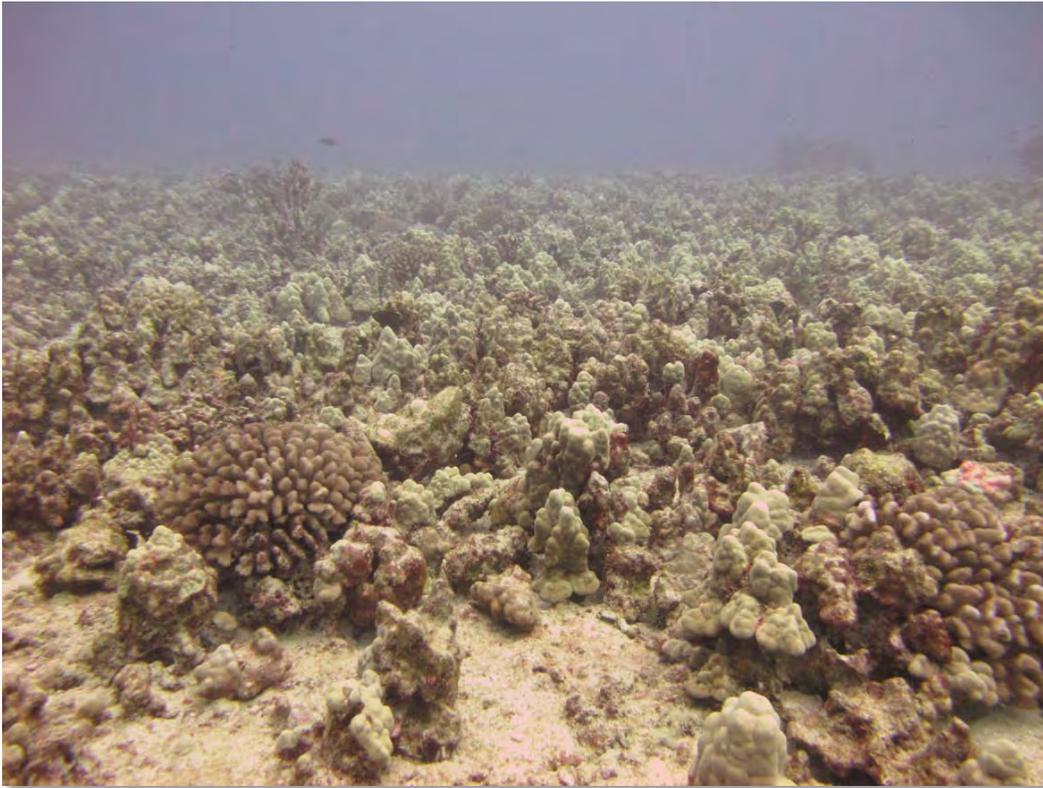


Figure 38. A representative habitat photo from a shallow shelf of the Fish Haven area that shows the abundance and density of corals in the area. Habitats such as this represent a high-risk potential for coral injury from mooring activities.

Conclusions

WORK AREA A

There were 14 SAA found in this area. While fewer dives were conducted here than in Work Areas B or C, there was no indication, from this project or previous surveys, that larger quantities of UWMM are present in the area (Cox, et al, 2007). The relatively high coral abundance and density, and three dimensional habitat complexity of Work Area A makes the ratio of comparative risks of potential for coral injury, versus the quantity of UWMM removed, fairly high.

Risks from RSV mooring activities in Work Area A are potentially high. Because this is a Demonstration rather than the complete recovery of all UWMM, and has a limited amount of operational time (approximately 21 days), Demonstration-related activities in this area might be considered a lower priority than the other work areas.

WORK AREA B

Similar to Work Area A, this area has a relatively high coral abundance, density, and three dimensional habitat complexities. Work Area B also has fewer munitions overall than Work Area C. The one group of UWMM that was found in abundance was the medium caliber munitions (approximately 20% of the total in all areas). These UWMM were found concentrated primarily in the northwestern section of Work Area B. Similar to Work Area A, the ratio of comparative risks potential for coral injury versus the quantity of recovered is relatively high and Work Area B might be considered a lower priority given constraints on the Demonstration. The one exception to the possible low prioritization of Work Area B could be the concentrated area of medium caliber munitions found in the northwestern section ([Figure 22](#)).

Risks from RSV mooring activities in Work Area B are high. Careful planning of mooring sites and staging areas for both the ROV and salvage basket would reduce the potential for coral injury during recovery of the medium caliber munitions in the northwestern section of Work Area B. It may be prudent to leave work in this section until later in the Demonstration's implementation so that the mobility of the ROV and its potential impacts can be further evaluated.

WORK AREA C

Work Area C contains the largest UWMM quantity of the three work areas. This area contains all of the large munitions and about 80% of the medium caliber munitions. While the overall coral abundance and density in the area is lower relative to Work Areas A and B, the amount of heterogeneity in the habitat types is still high.

The shoreward section of this area is represented mostly by a shelf area that is 50 to 60 feet of deep. This shelf supports higher numbers and densities of coral than a deeper plateau starting at 70 feet deep. Additionally, fewer UWMM (relative to the whole) were found in the shelf's habitat. A number of large caliber and other munitions were found on one outcrop of the shallower shelf habitat (Figure 39, [Figure 40](#)).



Figure 39. Large munitions found on the shallow shelf in an area of relatively low coral abundance and three dimensional complexity.

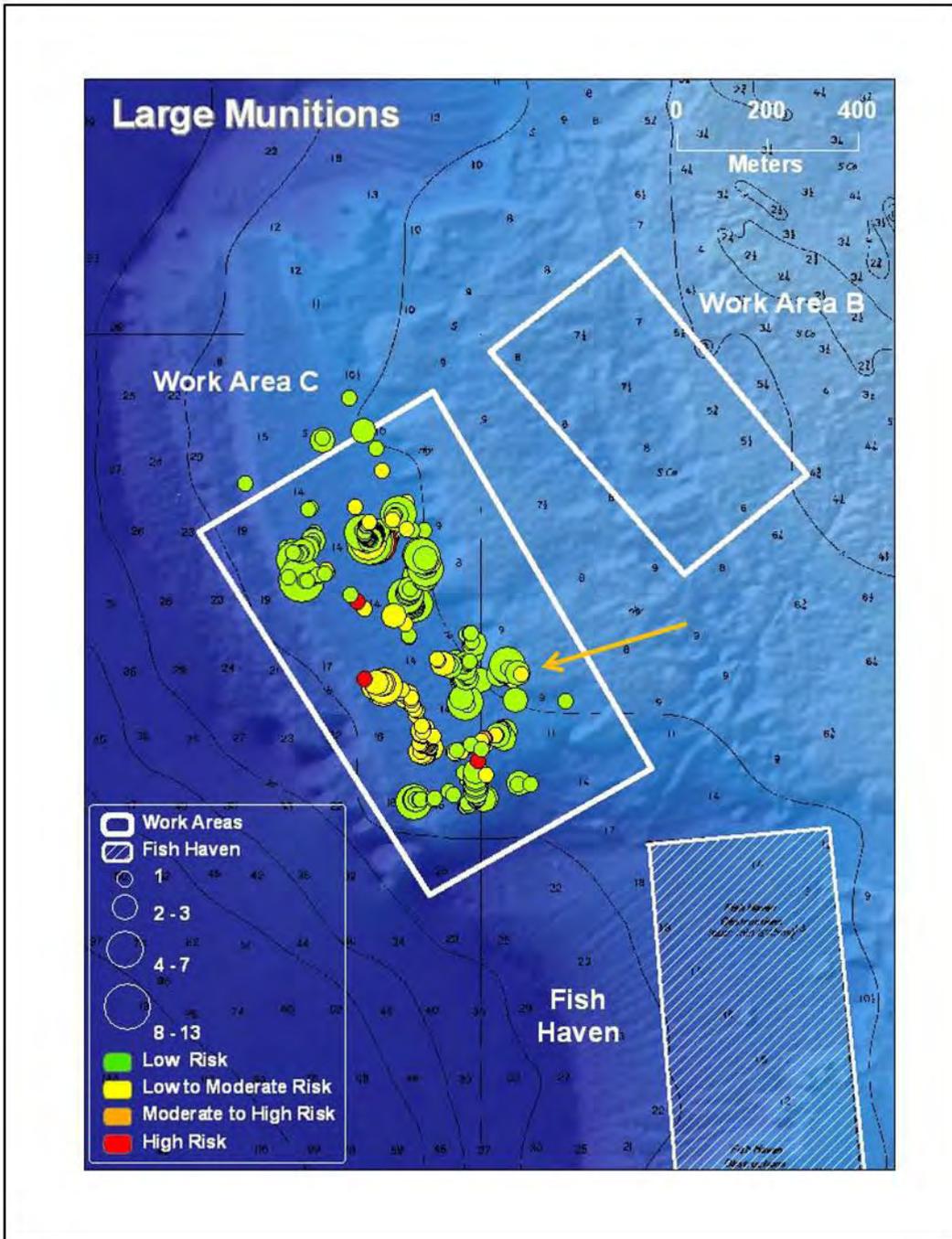


Figure 40. Sites that contain large caliber and other munitions are located in Work Area C showing quantities observed and relative risk values. The arrow designates the area on the shallow shelf where a number of large caliber and other munitions were found.

If the Demonstration attempts to recover shallower UWMM located in Work Area C, one recommendation to avoid the potential for coral injury would be to moor the RSV on the deeper shelf and only use the ROV in this area, thereby minimizing the potential for coral injuries associated with mooring activities on the shallower shelf habitat.

The deeper shelf in Work Area C starts at approximately 70 deep, contains the majority of the UWMM surveyed, and appears to have the lowest relative coral density, abundance, and three

dimensional complexity overall. However, because the habitats in this deep shelf area are patchy, some areas will be relatively lower risk for coral injuries, while others (where coral densities are higher) could be higher risk in terms of the potential for injuring corals.

Risks from RSV mooring activities in Work Area C are potentially high. Care should be taken during the Demonstration to closely follow best management practices for placing moorings and floating mooring lines to avoid the potential for injuries to corals.

FISH HAVEN

The DSV should be moored within large areas of sand, contained within the Fish Haven area, to avoid injury to coral and benthic habitat. Because of operational constraints, NOAA divers were not able to survey the seaward side of the Fish Haven. The Demonstration should use drop cameras, divers, or the ROV to confirm the assumption that the seaward side of this zone is sand habitat.

There are substantial numbers of artificial reef "Z-modules" (4 by 8 foot concrete blocks) in the mooring zone (Figure 41). Care should be taken during DSV mooring to avoid these blocks that are an active part of the State of Hawaii's artificial reef program.



Figure 41. A cluster of concrete and rebar "Z-modules" that are part of the State of Hawaii's artificial reef program.

Emergency Mitigation Measures

Attempts should be made to avoid injury of coral colonies. Should any injuries to large coral colonies (particularly colonies of *P. eydouxi*) occur during the Demonstration, these injuries should be reported to NOAA. The Demonstration ROV has multiple cameras and a real time positioning system onboard that can be used to gather photographs and GPS coordinates for this purpose. NOAA staff will use this information to determine whether to return to the area (once it is safe to do so) and attempt to reattach any colonies that were broken off from the substrate using cement or epoxy. Reattaching any large colonies should enhance their chances of survival and if the colonies do undergo mortality their skeletons would still contribute to local habitat complexity. Immediate action to any significant inadvertent coral injury is likely to reduce mortality and any required mitigation measures.

References

AECOS, Inc. 2002. Inventory Catalogue of Hawai'i's Coral Reefs. Hawai'i Wildlife Fund.
<http://home.hawaii.rr.com/cPie/CoralReefBib.html>

Cox, E., De Carlo, E., Overfield, M. 2007. ORDNANCE REEF, WAI'ANAЕ, HI. : Remote Sensing Survey and Sampling at Discarded Military Munitions Site. Marine Sanctuaries Conservation Series NMSP-07-01. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program, Silver Spring, MD. 112 pp.

Geology of Hawaii Reefs, Ch. 11: Riegl B, Dodge RE (eds) Coral Reefs of the USA. Springer-Verlag, Dordrecht, Fletcher, Charles H., Chris Bochicchio, Chris L. Conger, Mary S. Engels, Eden J. Feirstein, Neil Frazer, Craig R. Glenn, Richard W. Grigg, Eric E. Grossman, Jodi N. Harney, Ebitari Isoun, Colin V. Murray-Wallace, John J. Rooney, Ken H. Rubin, Clark E. Sherman, and Sean Vitousek, 2008.

APPENDIX D

Hawaii State Department of Health Air Permit Exemption

LINDA LINGLE
GOVERNOR OF HAWAII



CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
File:

July 15, 2010

10-519E CAB

Mr. John Coughlin
Director, Engineering and Sciences
ARA Incorporated
7520 Main Street, Suite 103
Sykesville, Maryland 21784

Dear Mr. Coughlin:

**Subject: Air Permit Exemption
Six (6) Radiant/Convective Batch Ovens
Located Approximately One (1) Mile Off-Shore in the Area of Waianae, Oahu**

The Department of Health acknowledges receipt of your letter on June 14, 2010 and emails dated June 8 and July 15, 2010, requesting a determination of whether the subject Radiant/Convective (R/C) Batch Ovens requires an air permit. According to the documents submitted with your letter, the R/C Batch Ovens will be used to dispose of explosive materials recovered in waters off-shore of Oahu, Hawaii.

In accordance with the Hawaii Administrative Rules (HAR), §11-60.1-62(d)(27), the Department has determined that the subject equipment is exempt from air permitting requirements. This exemption is based on the information provided in your letter and emails, including the proposed schedule that the R/C Batch Ovens will be operated during a twenty-one (21) day period (operating fifteen (15) weekdays and four (4) weekend days at eight (8) hours per day).

This exemption does not release the owner or operator from compliance with all applicable provisions of HAR, Chapter 11-60.1. Exemptions are determined on a case-by-case basis, and any changes in equipment, emissions, or location will require a separate determination.

If you have any questions regarding this matter, please contact Ms. Catherine Lopez of my staff at (808) 586-4200.

Sincerely,

A handwritten signature in black ink, appearing to read "Wilfred K. Nagamine".

WILFRED K. NAGAMINE
Manager, Clean Air Branch

CL:nn

c: Paul Kalaiwaa, Solid and Hazardous Waste Branch
CAB Monitoring Section

APPENDIX E

CZMA Consistency Determination



DEPARTMENT OF THE ARMY
ASSISTANT SECRETARY OF THE ARMY
INSTALLATIONS, ENERGY AND ENVIRONMENT
110 ARMY PENTAGON
WASHINGTON DC 20310-0110

15 MAR 2011

Ms. Mary Lou Kobayashi
Planning Program Administrator
Department of Business, Economic Development
and Tourism, Office of Planning
Attention: John Nakagawa
State of Hawaii
P.O. Box 2359,
Honolulu, HI 96804

Dear Ms. Kobayashi,

This letter advises you that the Department of the Army (DA) proposes to conduct a technology demonstration over roughly 21 days. The proposed Demonstration consists of two commercially available technologies that have been adapted for (a) the remote recovery of munitions from the ocean floor; and (b) the demilitarization of recovered munitions on an offshore barge.

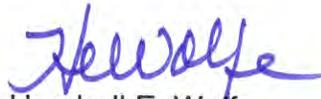
Explosives safety criteria requires a safety zone of 3,727 feet be enforced around the Demilitarization Support Vessel (DSV) on which the proposed demilitarization activities will occur, and a safety zone of 254 feet be maintained during towing of salvage baskets used to move recovered military munitions to the DSV. Additionally, safety procedures require a general safety zone of 500 feet around the remotely operated vehicle (ROV) Support Vessel (RSV) and the DSV. Among other reasons, this safety zone, which will be maintained during the proposed recovery operations, is necessary to prevent fouling of control and tow lines. The safety zones around the DSV may be reduced to about 100 feet on the weekend. The proposed Demonstration, which is described in the attached documents, is scheduled to take place during a roughly 21-day window during the summer of 2011.

DA has reviewed the State of Hawaii's Coastal Zone Management (CZM) Program and determined that the proposed Demonstration is consistent to the maximum extent practicable with the enforceable policies of the State of Hawaii's federally-approved coastal management program. Details of the consistency determination are provided in the enclosed documents that include a summary, the CZM application, a detailed description of the proposed Demonstration, the completed federal consistency assessment form, plans and drawings, and a copy of the DA Section 10 permit application with attachments.

DA requests State Office of Planning, Hawaii CZM Program concurrence in this consistency determination.

DA's points of contact for this matter are J. C. King, Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (ODASA(ESOH)) at 703.697.5564 and jc.king@us.army.mil; and, on-island, Ms. Patricia E. Billington, Honolulu Engineer District, at 808.438.8365 and pat.e.billington@usace.army.mil.

Sincerely,



Hershell E. Wolfe

Acting Deputy Assistant Secretary of the Army
(Environment, Safety, and Occupational Health)

Enclosures:

- 1 - Summary
- 2 - CZM Application Form
- 3 - Detailed Project Description
- 4 - CZM Assessment Form
- 5 - CZM Assessment Form Figures 1 – 5 (Maps and drawings)
- 6 - Copy of Engineer Form 4345, Application for DA Permit, with attachments
- 7 - Copy of consultation letters

ENCLOSURE 1

Enclosure 1 - Summary

1. Recreational Resources – The proposed technology demonstrations of the Remotely Operated Underwater Munitions Recovery System (ROUMRS) and Energetic Hazards Demilitarization System (EHDS) will occur in the near-shore waters off Waianae, Oahu, Hawaii. These demonstrations (referred to collectively as Demonstration) will not include any intentional detonations of munitions, either underwater or as part of the on-barge EHDS demilitarization procedures. Nevertheless, the Army will, on weekdays, maintain a 3,727-foot radius explosives safety quantity distance (ESQD) arc—a safety zone—around the Demilitarization Support Vessel (DSV) on which EHDS will be mounted during this roughly 21-day demonstration. It will also maintain a 254-foot ESQD arc during towing of salvage baskets used to move recovered military munitions to the DSV. Additionally, safety procedures require a general safety zone of 500 feet around the remotely operated vehicle (ROV) Support Vessel (RSV) and the DSV. Among other reasons, this safety zone, which will be maintained during the proposed recovery operations, is necessary to prevent fouling of control and tow lines. The safety zones around the DSV may be reduced to about 100 feet on the weekend. Establishing the ESQD arcs, which along with other protective measures helps ensure public safety, is required by the Department of Defense Explosives Safety Board-approved criteria (DoD Manual 6055.9-M, DOD Ammunition and Explosives Safety Standards). None of the ESQD arcs, which are being discussed with the appropriate State and Federal agencies, and the public, intersect public beaches, lands, or public traffic routes. Additionally, these safety zones will not preclude commercial and recreational use of areas outside the zones or small transient areas maintained to prevent fouling of control and tow lines during operation of underwater recovery equipment.

a. State or County Parks – Although there are State and County parks located along the shoreline near the Ordnance Reef (HI-06), none of these would be affected by the proposed offshore activities.

b. Popular Fishing Areas – The proposed activities could potentially occur in, but will only temporarily affect offshore fishing areas within the ESQD arcs and safety zone during the roughly 21-day demonstration period. Shoreline fishing areas would not be affected.

c. Recreational and Boating Areas – The proposed activities occur in, but will only temporarily affect offshore recreational and boating areas within the ESQD arcs and safety zone during the roughly 21-day demonstration period.

d. Swimming and Other Recreational Uses – The proposed activities could potentially occur in, but will only temporarily affect offshore swimming and other recreational use areas within the ESQD arcs and safety zone during the roughly 21-day demonstration period.

2. Historic Resources – The proposed Demonstration will be located offshore and would not affect archaeological resources, remains, artifacts or historic resources (buildings).

3. Scenic and Open Space Resources - The quality of coastal scenic and open space resources would not be affected by the proposed Demonstration. The proposed off-shore activities are based on the use of an ROV, small boats and barges (the DSV and RSV) offshore of Waianae and Pokai Bay. The proposed Demonstration does not include any construction along the coastline or in, on, or under the water.

4. Coastal Ecosystem

a. Habitat for Endangered Species of Plants, Birds or Mammals – It is possible that corals are living on some or all of the UWMM present on the ocean floor and, where present, such coral could be affected during the ROUMRS demonstration by the proposed activities.

b. The Army has obtained federal interagency support from the National Oceanic and Atmospheric Administration (NOAA) to (1) develop a Coral Avoidance and Minimization of Injury Plan (CAMIP) to help avoid or limit (minimize) injury to coral and other benthic habitats, and (2) identify mitigation measures should coral be affected. The Army has committed to mitigating any effects the proposed activities may have on corals, including replacing habitat that may be lost as UWMM are removed from the ocean's floor. Additionally, the Army is engaged in consultation and discussion with other State and Federal agencies to develop standard operating procedures (SOPs) and best management practices (BMPs) to minimize operational effects on all threatened, endangered or protected mammals (humpback whales, spinner dolphins, green sea turtles and monk seals) that may transit Ordnance Reef (HI-06) during the proposed Demonstration.

5. Economic Uses - Although no facilities or improvements are involved, the proposed activities would support Coastal Zone Management (CZM) Act's objective of improving the State's economy by employing local labor and resources during the Demonstration.

6. Coastal Hazards - Not applicable. No facilities construction or improvements are proposed.

7. Managing Development – The Army does not propose the construction of or improvements to any facilities. The Army has determined that execution of the proposed Demonstration will have the collateral benefit of recovering some of the UWMM present at Ordnance Reef (HI-06) in support of the community's desire that, where possible, they be removed. The proposed Demonstration has been specifically designed to limit and avoid impacts to the environment.

8. Permits or Approvals – The Army will comply with all applicable State and Federal laws and regulations. The Army has determined that the following permits and procedures apply to the proposed Demonstration:

- a. U.S. Army Corps of Engineers, Section 10 – Letter of Permission.
- b. State of Hawaii CZM certification concurrence.
- c. State of Hawaii Research, Development and Demonstration (RD&D) Permit.
- d. State of Hawaii Air Permit Exemption.
- e. Federal Endangered Species Act Section 7 consultation.
- f. Federal Marine Mammal Protection Act consultation.
- g. Federal Magnuson Stevens Fishery Conservation and Management Act consultation on Essential Fish Habitat.
- h. National Historic Preservation Action Section 106 consultation.
- i. Right of Entry – State Department of Land and Natural Resources (DLNR).
- j. Executive Order (EO) 13089 - Coral Reef Protection.

9. Public Notification – In 2006, the Army established the Ordnance Reef Coordinating Council (ORCC). Among other representatives, the ORCC is comprised of representatives from the Wai’anae and Nanakuli Neighborhood Boards, the State DLNR, the City and County of Honolulu, and the US Environmental Protection Agency Region IX. ORCC provides a venue for sharing information on plans for characterizing the potential impact of UWMM at Ordnance Reef (HI-06) on human health and the environment. The ORCC has been invaluable in providing two-way communications between the Army, State, other Federal agencies, and the local community. The plans developed for the proposed Demonstration took into account information shared through the ORCC. In addition, a number of Special Meetings of the Joint Wai’anae and Nanakuli Neighborhood Boards have been held to solicit community input and to provide updates on the status of activities at Ordnance Reef (HI-06). The most recent ORCC meeting was held in November 2010. The last special meeting of the joint neighborhood boards was held in December 2009. There will be a 30-day opportunity for the public to review and comment on the Environmental Assessment currently being prepared in accordance with the Federal National Environmental Policy Act.

10. Environmental Assessment (EA) – The Army is preparing a federal EA and will circulate it, with a draft Finding of No Significant Impact (FONSI), if warranted, for public review and comment in spring of 2011. The Army will provide these documents to your office at that time.

11. Public Participation – See 9. (above).

12. Beach Protection – This Demonstration will occur offshore and is not expected to affect public use and recreational opportunities at beaches along the Waianae coast.

13. Marine Resources – This proposed Demonstration is intended to test alternative procedures to use in addressing UWMM determined to pose an unacceptable risk to human health and the environment. ROUMRS would, where appropriate, provide an alternative to the current practice of using divers to recover UWMM or destroy them in place. The proposed Demonstration of innovative technologies is intended to promote a safer, more environmentally protective and cost-effective means of recovering UWMM from a marine environment and demilitarizing them safely with minimal impact on the public.

ENCLOSURE 2



HAWAII COASTAL ZONE MANAGEMENT PROGRAM FEDERAL CONSISTENCY REVIEW

The basic application submittal for CZM Federal Consistency review includes the items listed below. Additional information may be required before and during the review depending on the project.

1. CZM Application Form
2. Detailed Project Description
3. CZM Assessment Form
4. Site Location Map
5. Project Plans or Drawings
6. Copy of the federal permit application or federal grant application - if applicable to the project.
7. Copy of the application for Section 401 Water Quality Certification - if applicable to the project.
8. Supplemental Information

Include any additional information about the project that will help the review.

For example: an environmental assessment or environmental impact statement, biological surveys, archaeological and historic surveys, physical and environmental surveys of the project site.

QUESTIONS ??? NEED HELP ???

Please call John Nakagawa at 587-2878

SEND APPLICATION TO:

Office of Planning
P.O. Box 2359
Honolulu, Hawaii 96804



HAWAII CZM PROGRAM
APPLICATION FOR CZM FEDERAL CONSISTENCY REVIEW

Project/Activity Title or Description: Technology Demonstration: Remotely Operated Under-
water Munitions Recovery System (ROUMRS) & Energetic Hazard Demil System (EHDS)

Location: Pokai Bay, Ordnance Reef, Waianae Lat N 21 26' 0" Long. W 158 12' 0"

Island: Oahu 96792

Tax Map Key: _____

Applicant and Agent Information

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Name of Applicant

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Deputy District Engineer for PPM

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E-mail Address

CZM Consistency Determination or Certification

x Check the type of application below and sign.

I. Federal Agency Activity

CZM Consistency Determination: "The proposed activity will be undertaken in a manner consistent to the maximum extent practicable with the enforceable policies of the Hawaii Coastal Zone Management Program."

Signature

H. Wolfe
(Applicant or responsible party)

Date

15 MARCH 2011

II. Federal Permit or License (Please sign below)

CZM Consistency Certification: "The proposed activity complies with the enforceable policies of Hawaii's approved management program and will be conducted in a manner consistent with such program."

Signature

(Applicant or responsible party)

Date

III. Federal Grants and Assistance (Please sign below)

CZM Consistency Certification: "The proposed activity complies with the enforceable policies of Hawaii's approved management program and will be conducted in a manner consistent with such program."

Signature

(Applicant or responsible party)

Date

ENCLOSURE 3

**Enclosure 3 – Detailed Description of the Army’s Technology Demonstration
Technology Demonstrations
Ordnance Reef (HI-06), Wai’anae, O’ahu, Hawai’i**

A. Background

Section 314 (Research on Effects of Ocean Disposal of Munitions) of Public Law 109-364 (2007 National Defense Authorization Act) requires the Secretary of Defense to “conduct a historical review of available records to determine the number, size, and probable locations of sites where the Armed Forces disposed of military munitions in coastal waters.” The historical review is to identify the types of munitions at individual sites.

PL 109-364 also states that the Secretary of Defense “shall continue to conduct research on the effects on the ocean environment and those who use it of military munitions disposed of in coastal waters.” This research shall include: “(A) the sampling and analysis of ocean waters and sea beds at or adjacent to military munitions disposal sites ... to determine whether the disposed military munitions have caused or are causing contamination of such waters or sea beds; (B) investigation into the long-term effects of seawater exposure on disposed military munitions, particularly effects on chemical munitions; (C) investigation into the impacts any such contamination may have on the ocean environment and those who use it, including public health risks; (D) investigation into the feasibility of removing or otherwise remediating the military munitions; and (E) the development of effective safety measures for dealing with such military munitions.” The research criteria for this effort provide that the sampling, analysis and investigation are conducted at representative sites, and that “the Secretary shall select at least two representative sites each in the areas of the Atlantic coast, the Pacific coast (including Alaska), and the Hawaiian Islands.”

The Department of Defense (DoD) has completed the historical review required by Section 314 (see https://www.denix.osd.mil/portal/page/portal/ARC/ARCFY2009/10_FY09DEPARC_Sea_Disposal_DENIX.pdf). Although DoD is conducting research related to the other aspects of Section 314, it has not yet determined the representative sites for research to determine the impact of underwater munitions on the ocean environment or of the ocean environment on underwater munitions. To date, no activity has been initiated along the Atlantic or Pacific coasts with regard the characterization of the effects of ocean disposal of munitions at representative sea disposal sites.

However, the Army is undertaking research related to the ocean disposal of munitions in US coastal waters off Oahu’s Wai’anae Coast, as a continuation of an Army- and Navy-funded screening level survey that the National Oceanic and Atmospheric Administration (NOAA) conducted in 2006. The purpose of this research is to safely demonstrate technology to recover and destroy munitions in the event that a sea disposal site is determined, based on site-specific conditions, to pose an unacceptable risk to human health and the environment. The Army, which has

maintained inter-agency and community coordination throughout all of its efforts at Ordnance Reef (HI-06), including the comprehensive planning required for this research, is also completing research required to close data gaps from the screening-level survey related to the safety of consumption of marine life (e.g., fish, sea weed [limu], crabs) from Ordnance Reef (HI-06).

The Army selected Ordnance Reef (HI-06) for this technology demonstration because of the extensive knowledge available about the munitions present, including the depth and grid coordinates of individual and clusters of munitions; the site's characteristics (i.e., close-to-shore, shallow water--less than 120 feet--hard bottom surface); and public and State concerns with the munitions presence in an area heavily used for recreational and commercial purposes.

In the course of assessing the eligibility of this site for the Formerly Used Defense Sites (FUDS) program, the US Army Corps of Engineers first identified the munitions present at Ordnance Reef.¹ This effort resulted in the bounding of the area in which underwater military munitions (UWMM) were present and identifying, to the extent possible, the types of UWMM present. In 2006, the Army funded NOAA to conduct a survey to provide information needed to perform a screening-level assessment of the potential explosives hazards and health risks posed by the UWMM present at Ordnance Reef (HI-06). During this survey, NOAA located all the UWMM identified during the previous investigation and, using state-of-the-art technology located several additional clusters. The totality of the information NOAA gathered, which included sampling of biota, sediments and the water column, indicated that the UWMM present at Ordnance Reef (HI-06) do not pose an unacceptable explosive hazard and appeared not to pose an unacceptable human health risk.

The Army's ability to recover UWMM is limited. At the few sites where UWMM have been addressed as part of an emergency response, actions have typically been restricted to destruction (detonation) of the munitions in place by military Explosive Ordnance Disposal (EOD) divers. Although needed to address UWMM for which the risk of movement is not acceptable, these procedures, which pose risks to the EOD divers and potentially the ocean environment, should only be used under emergency conditions. The proposed controlled technology demonstration at Ordnance Reef (HI-06) could provide the Army with a safer, environmentally protective, and cost-effective means of recovering UWMM where the potential risks to human health and the environment indicate a need for such recovery.

The Army has reviewed a number of commercially available technologies for addressing sea disposed and other UWMM. Under the proposed technology demonstration (Demonstration), the Army will assess the use of a remotely operated vehicle (ROV) adapted for the recovery of UWMM from the sea floor and barge-mounted technology to destroy (demilitarize) any recovered military munitions. The selected recovery system has been designated as the Remotely Operated Underwater

¹ In 2005, the Army determined that this offshore disposal site was not eligible under DoD's FUDS Program because it site was never owned by, leased by, or otherwise possessed by DoD.

Munitions Recovery System (ROUMRS) and the munitions destruction system has been designated as the Energetic Hazards Demilitarization System (EHDS). The technologies (remote cutting and radiant convective thermal treatment of explosive munitions constituents (MC)) behind EHDS are not new. However, these technologies have never been demonstrated on a floating platform on the open ocean. Both demonstrations are proposed to occur at Ordnance Reef (HI-06) and are expected to be completed within a roughly 21-day window during the summer of 2011.

The Army selected Ordnance Reef (HI-06) for this demonstration because (1) the waters are relatively shallow in comparison to another site sea disposal site (HI-05) that is South of Pearl Harbor where depths exceed 1,000 feet; (2) the number, size, and types of UWMM are well characterized; (3) no known chemical munitions are present; and (4) the UWMM appear to be discarded military munitions (DMM) (sea disposed). This last factor is important because DMM are less likely to be fused or, if fused, they have not been through the sequence required to arm the fuze (in contrast to unexploded ordnance (UXO) that can be fused and armed). Finally, the Demonstrations implementation at Ordnance Reef (HI-06) would have a collateral benefit of recovering some of the UWMM present at Ordnance Reef (HI-06) in support of the community's desire that, where possible, they be removed.

B. Demonstration's Location/Bathymetric Information

Vessels working on this Demonstration will operate out of Wai'anae Small Boat Harbor with actual fieldwork occurring at Ordnance Reef (HI-06) south and west of Pokai Bay, and due west of Wai'anae, O'ahu, Hawaii, at and around latitude North 21 degrees 26 minutes 0 seconds, longitude West 158 degrees 12 minutes 0 seconds. The work area is approximately three nautical miles long in the north-south direction and approximately one nautical mile wide in the east-west direction, see Figure 1 (Enclosure 5). Figure 1 shows bathymetric information in the work areas and in the vicinity of Ordnance Reef (HI-06). Working depths at Ordnance Reef (HI-06) are expected to range from 30 to approximately 120 feet. (The figures at Enclosure 5 are also included with the Department of the Army (DA) Section 10 permit application at Enclosure 6).

C. Detailed Description of the Demonstration (Proposed Activities)

1. Remotely Operated Underwater Military Munitions Recovery System (ROUMRS).

The Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (ODASA-ESOH) awarded ARA Inc. (ARA) Contract No. W91WAW-09-C-0168 on 30 September 2009. Under this contract, ARA is to demonstrate ROUMRS at Ordnance Reef (HI-06) (See Figure 1, Enclosure 5).

As shown in Figures 2 and 3 (Enclosure 5), the ROUMRS demonstration will involve the recovery of UWMM from depths of approximately 120 feet and shallower

using an ROV that is adapted for this purpose. ROUMRS is designed to safely recover UWMM while employing practices that limit potential impacts to the environment. The protection of human health and the environment during all stages of this Demonstration are Army's highest priorities. ARA's efforts will be performed in accordance with approved planning documents (e.g., Work Plan, Health and Safety Plan (HASP), a Required Explosive Safety Submittal (RESS), and best management practices (BMPs)). ARA and all of its subcontractors will be responsible for complying with applicable laws and regulations, as well as approved plans and permits.

ROUMRS is designed to allow the careful removal of UWMM from the ocean's floor to return the ocean environment to a more natural state. However, damage to marine life, including some corals may occur during these operations. For this reason, the ODASA-ESOH arranged with NOAA to prepare a Coral Assessment and Minimization of Injury Plan (CAMIP). The Ordnance Reef (HI-06) CAMIP will provide the Army and ARA pre-operational information to help avoid or limit injury to coral and other benthic habitats. NOAA will also provide the Army and ARA post-operational support to assist in mitigating any inadvertent injuries to coral or the benthic habitat restoring injured corals or habitat once the demonstration is completed. NOAA will provide the following in support of the ROUMRS demonstration:

- **Work Plan review and standard operating procedure (SOP) approval** – This pre-operational effort will add efficiency to ROUMRS recovery processes by alerting ROV operators of the types of coral present and the relative risk for injury to coral or benthic habitat from ROV operations, particularly the recovery of munitions. NOAA will also outline operational procedures to limit any inadvertent injury to corals through avoidance and mitigation.
- **Pre-screen** – This pre-operational effort will allow NOAA to catalog the types of corals present at Ordnance Reef (HI-06) and its environs. NOAA is coordinating its efforts with the State of Hawaii Department of Land and Natural Resources (DLNR). This survey will provide the Army, ARA and ARA's subcontractors with the relative risk of various locations for mooring, staging equipment and ROV operations. The presence of any other marine life of concern will also be documented. NOAA completed the field portion of this pre-screening in October 2010. This effort will also provide the State of Hawaii with a unique glimpse into the types and quantities of marine life at Ordnance Reef (HI-06).
- **Real time characterization** – During the Demonstration, NOAA will be able to review digital images that ROUMRS records during recovery operations, providing for post recovery verification. These images will allow NOAA to determine whether injury occurred within Ordnance Reef (HI-06) during the Demonstration. NOAA will also be available to perform emergency restoration of corals should injury occur, if deemed necessary and feasible.

- **Post-inspection/restoration** – This post-operational effort will allow NOAA to both assess any ROUMRS-related impacts to corals and benthic habitat and determine the need for a coral reef restoration or mitigation plan. If ROUMRS-related impacts warrant a restoration or mitigation plan, restoration projects will be scaled to compensate for the loss of coral resources and aid in the recovery rate of those coral resources to a more natural state.

Figure 4 (Enclosure 5), depicts Ordnance Reef (HI-06) with the locations of UWMM to be addressed and mooring locations that are required during the ROUMRS demonstration. Each circle represents a four-point mooring location that will be required by the ROV support vessel (RSV). Under no circumstances will the dragging of anchors be permitted. Mooring lines, cables, and chains, which will be suspended above the bottom, will not be allowed to impact the benthic substrate. If relocation is necessary, anchors will be raised well off the bottom and lowered back to the new mooring location. Pre- and post-mooring inspections using the ROV or resource divers will be performed in all instances to digitally record the bottom conditions. The umbilical for the ROV and all associated lines will be floated to eliminate any potential damage to reef structures on the sea bottom that could be caused by dragging lines.

2. Energetic Hazards Demilitarization System (EHDS)

The Energetic Hazards Demilitarization System (EHDS) process and equipment involves remotely cutting each recovered munition, with the exception of small arms ammunition (SAA) and fuzes, using wet-band saws and thermally treating all unconfined explosive MC using six radiant convective heat batch ovens (RCBO). SAA and fuzes will be treated in the RCBO, but they will not be cut remotely. Although radiant convective heat, which allows for accurate temperature controls, uses heat to decompose explosive MC just as effectively as open burning or incineration, it is not incineration. The EHDS also allows for the demilitarization of military munitions at environmentally and culturally sensitive locations. Conceptually, the 5-step process is as follows:

- **Locate, identify, classify and X-ray material potentially presenting an explosive hazard** – X-raying recovered munitions that are unidentified, whether due to age, corrosion, or the growth of marine life adds an additional safety step to ensure that white phosphorus (WP) rounds and liquid filled munitions are not processed. This step helps to protect site personnel, the environment, and equipment from injury, exposure or damage.
- **Segregate** – Munitions are segregated by type and size.
- **Remotely open (cut) munitions containing explosive MC and sample the explosives fill** –SAA and fuzes are placed into specially designed popping trays without remotely opening them.
- **Thermally dispose of explosive MC using electrically-operated RCBO** – The thermal decomposition of explosives is an irreversible

reaction that breaks the chemical bonds of the compounds and does not generate explosive gases. The byproducts of this process are CO, CO₂, NO_x, VOHs, water and other chemical components.

- **Inspect and recycle munitions debris (MD)** – After treatment, all MD (metal scrap) will be inspected. Material documented as safe (MDAS) will be released for recycling or will be retained by DA for scientific study. Any MD that is determined to pose an explosive hazard (MDEH (material documented as an explosive hazard) will be re-treated.

ARA has provided Figure 5 (Enclosure 5) to show the likely location for the Demilitarization Support Vessel (DSV) and conservative explosive safety quantity distance (ESQD) zones—a safety zone, around the DSV and around the salvage basket during towing. Although no intentional detonations are planned for this operation, the safety zone is required and will be approved by the Department of Defense Explosives Safety Board (DDESB). The safety zone will be maintained in case of an unintentional detonation. During all RSV and DSV operations, a 500-foot a general safety zone will be maintained around these support vessels. The general safety zone around the DSV may be reduced to about 100 feet on the weekend. This zone, which is necessary to prevent fouling of control and tow lines, will be maintained during recovery operations. ARA will maintain all safety zones by use of small contracted craft to keep people and vessels a safe distance from the demilitarization operations.

D. Timeframe/Working Hours

The Demonstration (ROUMRS and EHDS) at Ordnance Reef (HI-06) are scheduled for a roughly 21-day period during the summer of 2011. The working hours, on the water, are anticipated to be 12-hour days beginning at 0600 and ending by about 1800 hours. To minimize inconvenience to those that use Ordnance Reef (HI-06) for recreational or commercial purposes, the DSV will only conduct operations requiring an ESQD of 3,727 feet 5 days a week. On weekends, a general safety zone extending between 100 and 500 feet beyond the DSV may be maintained; however, the Army expects this safety zone to normally be 100 feet or less. The location of the DSV is subject to change based on (1) the review and approval of the US Army Technical Center for Explosives Safety and independently by the DDESB; (2) mooring limitations related to water depth; and (3) recommendations from NOAA.

The Army demilitarization contractor will make every attempt to position the DSV so as not to interfere or impede beach access, public lands, traffic on public roads, and to minimize overlap with the one mile Konihiki Fishing Rights Boundary.

E. Summary of ROUMRS and EHDS Features

1. Remotely Operated Underwater Munitions Recovery System (ROUMRS)

- ROUMRS is designed to work offshore and recover UWMM while limiting any impacts to the undersea environment. (This demonstration will be performed at depths of 30 to 120 feet, does not involve the shore or beach, and no equipment will be staged on public beaches.)
- The ROV is electrically operated through a tether providing power and remote guidance from a support vessel.
- A generator on the support vessel will provide the power needed to navigate and operate the ROV.
- NOAA is supporting this effort with a multifaceted coral impact assessment, and mitigation plan.
- NOAA is pre-screening the Ordnance Reef (HI-06) area to inventory and document coral resources and is coordinating with DLNR in that effort.
- The operational plan will include SOPs concurred with by NOAA and USFWS to limit impacts to the marine environment and compensate for impacts as necessary.
- Intentional underwater detonations will not be authorized during this demonstration and the demilitarization of the recovered munitions will not involve blasting on or near the water.
- Safety procedures require a zone of 500 feet around the ROV deployed to robotically recover UWMM. This safety zone, which is necessary to prevent fouling of control and tow lines, will be maintained during recovery operations.
- The communities of Wai'anae and Nanakuli are well informed about the Demonstration. These communities support the effort, and Army has solicited and considered their concerns during planning for this operation.
- The Army's Demonstration is environmentally beneficial and is intended to test and validate off-the-shelf technologies adapted for the remote recovery of UWMM from the ocean environment. It is designed to recover UWMM remotely while minimizing the release of MC, disturbance of the sea bottom, and injury to coral and benthic habitats. Any munitions recovered will be brought to the surface for final disposition during a related technology demonstration.

2. Energetic Hazards Demilitarization System (EHDS)

- The 3,727-foot ESQD arc around the DSV supporting the EHDS operations does not intersect the beach, public lands, or any roads. During towing, a 254-foot ESQD arc will be maintained around the salvage basket.
- A generator on the DSV will provide the power needed to operate the electrical RCBO used to decompose the explosive MC compounds in

- There will be a series of RCBO that are used to decompose explosive MC compounds (e.g., explosives and propellants) contained in the munitions sections, base plates and fuzes, and SAA.
- The temperatures within the RCBO will be maintained below temperatures that would cause an explosive hazard (e.g., 300 °C for Explosive D [ammonium picrate], 295-300 °C for TNT, 255-260 °C for RDX, and 230 °C for nitrocellulose (NC)).
- Air emissions anticipated from the thermal processing of explosive MC are the basic chemical components of explosives (CO, CO₂, NO_x, VOHs, water, etc.). (The State of Hawaii's Department of Health determined (15 July 2010) that the equipment to be used is exempt from Hawaii Administrative Rules (HAR), §11-60.1-62(d)(27)
- The EHDS process is basically a recycling process for metals (munitions casing and shells). The Army is consulting with the State of Hawaii Department of Health to determine whether a hazardous waste permit application to authorize the treatment of explosive MC during the recycling process is necessary.
- There will be little if any interference with the one mile Konihiki Fishing Rights Boundary. Part of the EQSD arc will limit ingress and egress within the Konihiki Fishing Rights Boundary Monday through Friday during daytime hours only.

3. General

- An Environmental Assessment (EA) is currently in preparation.
- Required consultations with other federal agencies are being conducted.
- The data provided as a result of NOAA's 2006 screening-level survey do not indicate an unacceptable risk to human health or the environment from the munitions present at Ordnance Reef (HI-06).
- The Army has taken and continues to take actions believed necessary to address the potential explosive risks from these munitions. For example, the Army has implemented a comprehensive explosives safety education program to address potential explosives safety hazards.

² Demilitarization – The act of destroying the military offensive or defensive advantages inherent in certain types of equipment and material. The term comprehends mutilation, cutting, crushing, scrapping, melting, burning or alteration designed to prevent the further use of this equipment and material for its originally intended military or lethal purpose and applies equally to material in unserviceable or serviceable condition – DoD 4160.21-M-1, "Defense Demilitarization Manual".

F. Enclosure 5: Index – Maps and Figures

- Figure 1 - Ordnance Reef (HI-06) - Location
- Figure 2 - ROUMRS ROV
- Figure 3 - ROUMRS Conceptual Operations
- Figure 4 - Ordnance Reef (HI-06) - Layout and Mooring Locations
- Figure 5 - Potential Location of Demilitarization Support Vessel

ENCLOSURE 4

**HAWAII CZM PROGRAM
FEDERAL CONSISTENCY ASSESSMENT FORM**

RECREATIONAL RESOURCES

Objective: Provide coastal recreational opportunities accessible to the public.

Policies:

- 1) Improve coordination and funding of coastal recreation planning and management.
- 2) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:
 - a) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;
 - b) Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites and sandy beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;
 - c) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;
 - d) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;
 - e) Encouraging expanded public recreational use of county, State, and Federally owned or controlled shoreline lands and waters having recreational value;
 - f) Adopting water quality standards and regulating point and non-point sources of pollution to protect and where feasible, restore the recreational value of coastal waters;
 - g) Developing new shoreline recreational opportunities, where appropriate, such as artificial reefs for surfing and fishing; and
 - h) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, County planning commissions; and crediting such dedication against the requirements of section 46-6.

RECREATIONAL RESOURCES (continued)

Check either "Yes" or "No" for each of the following questions:

	<u>Yes</u>	<u>No</u>
1. Will the proposed action involve or be near a dedicated public right-of-way?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Does the project site abut the shoreline?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Is the project site near a State or County park?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Is the project site near a perennial stream?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Will the proposed action occur in or affect a surf site?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. Will the proposed action occur in or affect a popular fishing area?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Will the proposed action occur in or affect a recreational or boating area?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. Is the project site near a sandy beach?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9. Are there swimming or other recreational uses in the area?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Discussion:

The proposed demonstration of the Remotely Operated Underwater Munitions Recovery System (ROUMRS) and Energetic Hazards Demilitarization System (EHDS) at Ordnance Reef (HI-06) are scheduled for a roughly 21-day window during the summer of 2011. ROUMRS will be supported by a Remotely Operated Vehicle (ROV) Support Vessel (RSV) with the EHDS mounted on a barge referred to as the Demilitarization Support Vessel (DSV). Explosives safety criteria requires a safety zone of 3,727 feet be enforced around the DSV on which the proposed demilitarization activities will occur, and a safety zone of 254 feet be maintained during towing of salvage baskets used to move recovered military munitions to the DSV. During all RSV and DSV operations, a 500-foot safety zone will be maintained around the support vessels. The safety zone around the DSV may be reduced to about 100 feet on the weekend. This safety zone, which is necessary to prevent fouling of control and tow lines, will be maintained during recovery operations. The working hours, on the water, are anticipated to be 12-hour days beginning at 0600 and ending by about 1800 hours. To minimize inconvenience to those that use Ordnance Reef (HI-06) for recreational or commercial purposes, the DSV will only conduct operations requiring an EQSD that extends more than approximately 100 feet beyond the DSV five days a week, and the larger ESQD (3,727 foot) will not be in place during most evening hours or on weekends. However, a general safety zone extending between 100 and 500 feet may be maintained on weekends. This Demonstration may temporarily interfere with some boating, fishing, and other in-water activities during work hours.

HISTORIC RESOURCES

Objective: Protect, preserve, and where desirable, restore those natural and man-made historic and pre-historic resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:

- 1) Identify and analyze significant archaeological resources;
- 2) Maximize information retention through preservation of remains and artifacts or salvage operations; and
- 3) Support State goals for protection, restoration, interpretation, and display of historic resources.

Check either "Yes" or "No" for each of the following questions:

	<u>Yes</u>	<u>No</u>
1. Is the project site within a historic/cultural district?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Is the project site listed on or nominated to the Hawaii or National register of historic places?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Does the project site include undeveloped land which has not been surveyed by an archaeologist?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Has a site survey revealed any information on historic or archaeological resources?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Is the project site within or near a Hawaiian fishpond or historic settlement area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion:

The Demonstration's area of effects is in water at depths of approximately 30 to 120 feet. There is no evidence of historic or cultural properties in the vicinity of Ordnance Reef (HI-06). The proposed Demonstration is not expected to affect any historic or cultural properties. The Army initiated consultation under Section 106 of the National Historic Preservation Act with the Hawaii State Historic Preservation Division and other potentially interested parties and organizations by letters dated December 2, 2010. The Army is seeking comments on its determination that there will be no effect on historic or cultural properties resulting from this proposed Demonstration that will occur over a roughly 21-day window during the summer of 2011. Copies of the letters initiating consultation can be found in Enclosure 7.

SCENIC AND OPEN SPACE RESOURCES

Objective: Protect, preserve and where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies:

- 1) Identify valued scenic resources in the coastal zone management area;
- 2) Insure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;
- 3) Preserve, maintain and where desirable, improve and restore shoreline open space and scenic resources; and
- 4) Encourage those developments that are not coastal dependent to locate in inland areas.

Check either "Yes" or "No" for each of the following questions:

	<u>Yes</u>	<u>No</u>
1. Does the project site abut a scenic landmark?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Does the proposed action involve the construction of a multi-story structure or structures?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Is the project site adjacent to undeveloped parcels?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Does the proposed action involve the construction of structures visible between the nearest coastal roadway and the shoreline?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Will the proposed action involve construction in or on waters seaward of the shoreline? On or near a beach?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion:

This is not a construction project, rather it is a technology demonstration to be conducted over roughly 21-days. The proposed Demonstration consists of two commercially available technologies that have been adapted for (a) the remote recovery of munitions from the ocean floor; and (b) the demilitarization of recovered munitions on an offshore barge. In addition to small boats, the proposed Demonstration will involve two support vessels (the ROV Support Vessel (RSV), which will support ROURMS, and the Demilitarization Support Vessel (DSV), a barge, on which the EHDS will be mounted). During the Proposed Action, these vessels and supporting small boats will be staged off the Wai'anae Coast at Ordnance Reef (HI-06). The Demonstration's vessels will access the site from the Wai'anae and Barbers Point Harbors for the roughly 21-day duration.

COASTAL ECOSYSTEMS

Objective: Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:

- 1) Improve the technical basis for natural resources management;
- 2) Preserve valuable coastal ecosystems of significant biological or economic importance;
- 3) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land water uses, recognizing competing water needs; and
- 4) Promote water quantity and quality planning and management practices, which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses, which violate State, water quality standards.

Check either "Yes" or "No" for each of the following questions:

	<u>Yes</u>	<u>No</u>
1. Does the proposed action involve dredge or fill activities?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Is the project site within the Shoreline Setback Area (20 to 40 feet inland of the shoreline)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Will the proposed action require some form of effluent discharge into a body of water?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Will the proposed action require earthwork beyond clearing and grubbing?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Will the proposed action include the construction of special waste treatment facilities, such as injection wells, discharge pipes, or cesspools?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. Is an intermittent or perennial stream located on or near the project site?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7. Does the project site provide habitat for endangered species of plants, birds, or mammals?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. Is any such habitat located nearby?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. Is there a wetland on the project site?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10. Is the project site situated in or abutting a Natural Area Reserve?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
11. Is the project site situated in or abutting a Marine Life Conservation District?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
12. Is the project site situated in or abutting an estuary?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion:

The demonstration will occur at Ordnance Reef off the Wai'anae Coast at and adjacent to the Pokai Bay Protected Fishing Area. The Army consulted with the National Oceanic and Atmospheric Administration (NOAA) under the Endangered Species Act, the Marine Mammals Protection Act, and the Magnuson-Stevens Fishery Conservation and Management Act, and entered into a Memorandum of Agreement with NOAA to prepare a Coral Avoidance and Minimization of Injury Plan to avoid, minimize and mitigate potential injury to coral and benthic habitats. The Army has applied for a DA Section 10 permit with the USACE, Honolulu District, see Enclosure 6. Copies of

ECONOMIC USES

Objective: Provide public or private facilities and improvements important to the State's economy in suitable locations.

Policies:

- 1) Concentrate in appropriate areas the location of coastal dependent development necessary to the State's economy;
- 2) Insure that coastal dependent development such as harbors and ports, visitor industry facilities, and energy generating facilities are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and
- 3) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such development and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:
 - a) Utilization of presently designated locations is not feasible;
 - b) Adverse environmental effects are minimized; and
 - c) Important to the State's economy.

Check either "Yes" or "No" for each of the following questions:

	<u>Yes</u>	<u>No</u>
1. Does the project involve a harbor or port?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Is the project site within a designated tourist destination area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Does the project site include agricultural lands or lands designated for such use?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Does the proposed activity relate to commercial fishing or seafood production?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Does the proposed activity related to energy production?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. Does the proposed activity relate to seabed mining?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion:

The Proposed Action will use small boats and barges that launch from the Wai'anae and Barbers Point Harbors. This Demonstration, of roughly 21 days, will assess two commercially available technologies that have been adapted for (a) the remote recovery of munitions from the ocean floor; and (b) the demilitarization of recovered munitions on an offshore barge. The Demonstration will require safety zones of various distances, which may interfere with some activities at Ordnance Reef (HI-06), during operations; however, operations have been designed to any limit impacts.

COASTAL HAZARDS

Objective: Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, and subsidence.

Policies:

- 1) Develop and communicate adequate information on storm wave, tsunami, flood erosion, and subsidence hazard;
- 2) Control development in areas subject to storm wave, tsunami, flood, erosion, and subsidence hazard;
- 3) Ensure that developments comply with requirements of the Federal Flood Insurance Program; and
- 4) Prevent coastal flooding from inland projects.

Check either "Yes" or "No" for each of the following questions:

	<u>Yes</u>	<u>No</u>
1. Is the project site on or abutting a sandy beach?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Is the project site within a potential tsunami inundation area as depicted on the National Flood Insurance Program flood hazard map?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Is the project site within a potential flood inundation area according to a flood hazard map?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Is the project site within a potential subsidence hazard areas according to a subsidence hazard map?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Has the project site or nearby shoreline areas experienced shoreline erosion?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion:

The Proposed Action (Demonstration) is scheduled for a roughly 21-day window during the summer of 2011 at Ordnance Reef (HI-06) offshore the Wai'anae Coast, Oahu, Hawaii. The in-water work will occur at depths between approximately 30 and 120 feet. There will be no construction.

PUBLIC PARTICIPATION

Objective: Stimulate public awareness, education, and participation in coastal management.

Policies:

- 1) Maintain a public advisory body to identify coastal management problems and to provide policy advice and assistance to the coastal zone management program;
- 2) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal-related issues, developments, and government activities; and
- 3) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Discussion. Please provide information about the proposal relevant to the Objective and Policies No. 2 and No. 3 above:

The Army has made presentations to the Wai'anae and Nanakuli Neighborhood Boards and has helped establish and participate in the Ordnance Reef Coordinating Council over the past four years. This effort is described in the Detailed Project Description (Enclosure 3).

BEACH PROTECTION

Objective: Protect beaches for public use and recreation.

Policies:

- 1) Locate new structures inland from the shoreline setback to conserve open space and to minimize loss of improvements due to erosion;
- 2) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and
- 3) Minimize the construction of public erosion-protection structures seaward of the shoreline.

Discussion. Please provide information about the proposal relevant to the Objective and Policies above:

There is no construction proposed during this roughly 21-day technology demonstration. The Army does not anticipate any impact to the shoreline from the Proposed Action.

MARINE RESOURCES

Objective: Implement the State's ocean resources management plan.

Policies:

- 1) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;
- 2) Assure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;
- 3) Coordinate the management of marine and coastal resources and activities management to improve effectiveness and efficiency;
- 4) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;
- 5) Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and
- 6) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Discussion. Please provide information about the proposal relevant to the Objective and Policies above:

The proposed Demonstration may provide the Army and the Department of Defense with a means to remove underwater military munitions (UWMM) and destroy recovered munitions at reduced risk to human health and the environment. While the UWMM to be addressed during this Demonstration do not pose an unacceptable risk to human health and safety and the environment, the technology to be demonstrated could be used to address such such risks in the future. The demonstrated technologies could be used to diminish or eliminate underwater hazards (i.e., UWMM) and has the potential to help ensure the protection and safety of human health and the environment worldwide.

ENCLOSURE 5

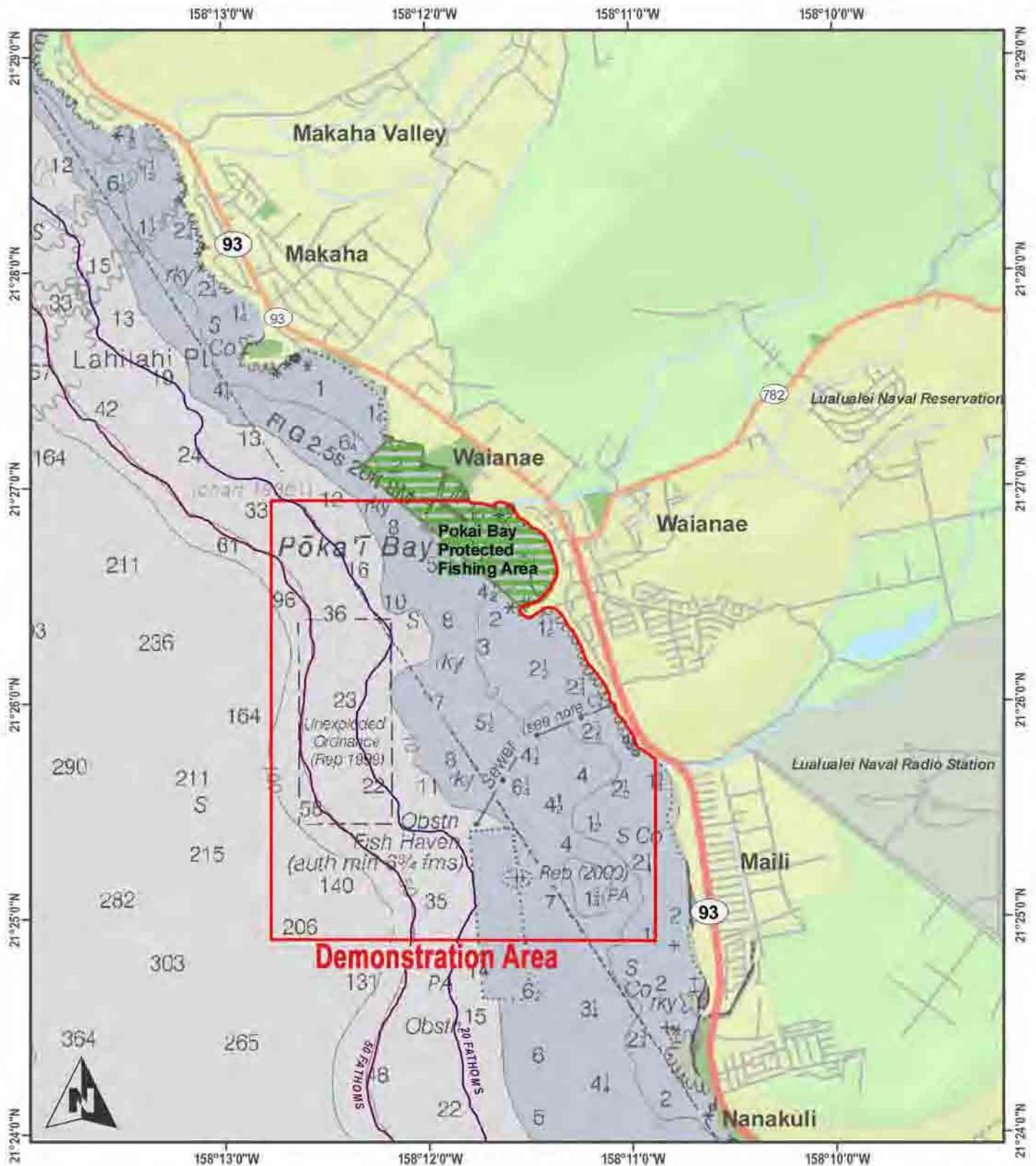


Figure 1: Ordnance Reef (HI-06) Location

Figure 2

ROUMRS Capabilities

ROV Features

Manipulators

- Dual 7-function arms w/ force-feed back

Hydraulics

- 15kW HPU with 16 function valve pack

Vehicle rated for 300m operations

- Upgradable to 2000m – requires floatation change

Thrusters

- (3) vertical 496LB up/down thrust
- (4) horizontal 496 LB fwd/rev/lateral thrust

Recovery Skid w/ Hopper

- 200LB lift capacity with a 5.8 FT³ fill volume

Suction/jetting pump with Canister Filter

- .125" filter-passes sand/retains propellant grains
- Suction nozzle carried by manipulator
- Canister Filters are jettisoned and later recovered in Salvage Basket

Onboard Sensors

- Scanning Sonar, depth, heading, roll/pitch

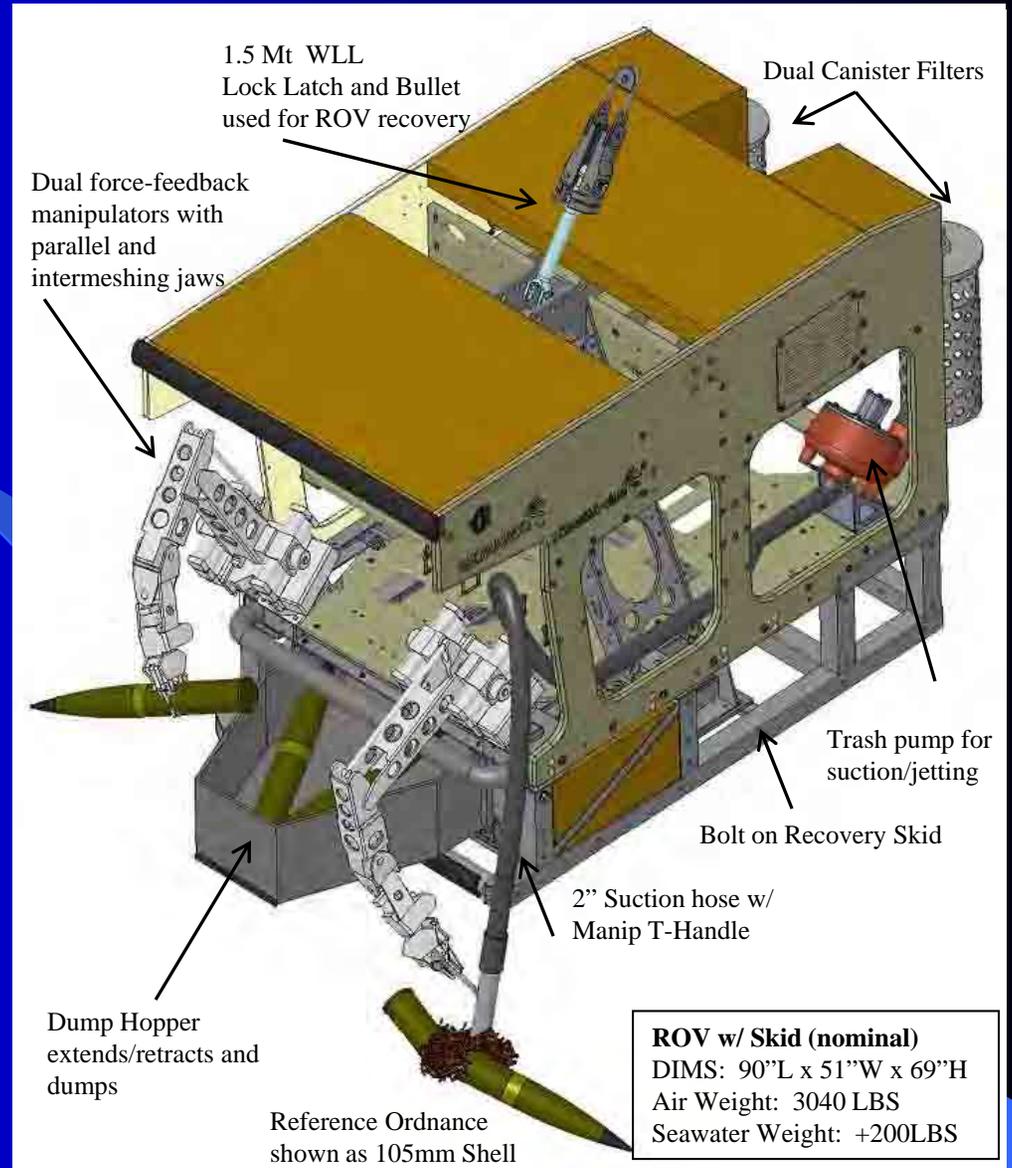


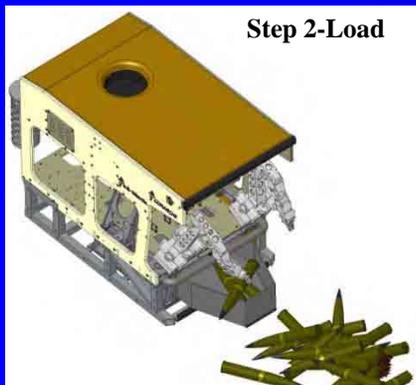
Figure 3 ROUMRS Conceptual Operations

Step 1-Spot Basket



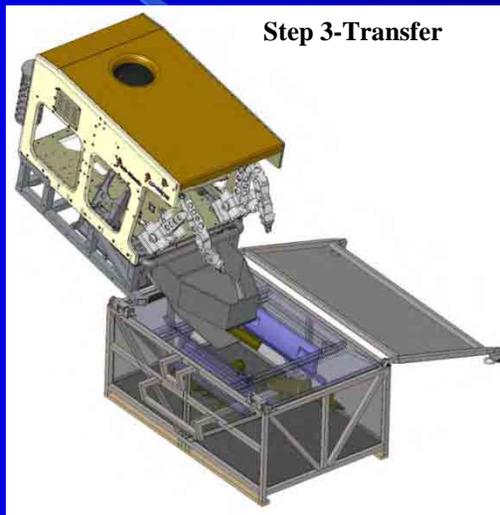
- Landing site inspected for coral/live rock
- Salvage Basket lowered to bottom and released
- ROV positions Basket near concentrated UXO, un-pins and opens upper door

Step 2-Load



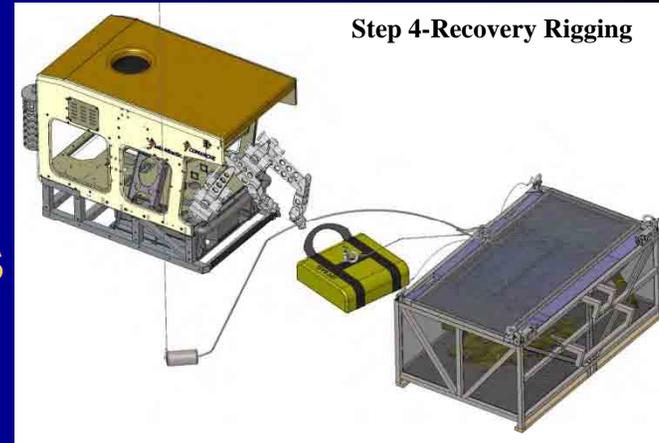
- Hopper is extended out of Recovery Skid
- UXO is documented (video, laser scaling)
- Manipulators/tooling used to pickup UXO
- Small debris vacuumed into Canister Filters
- Retract Hopper

Step 3-Transfer



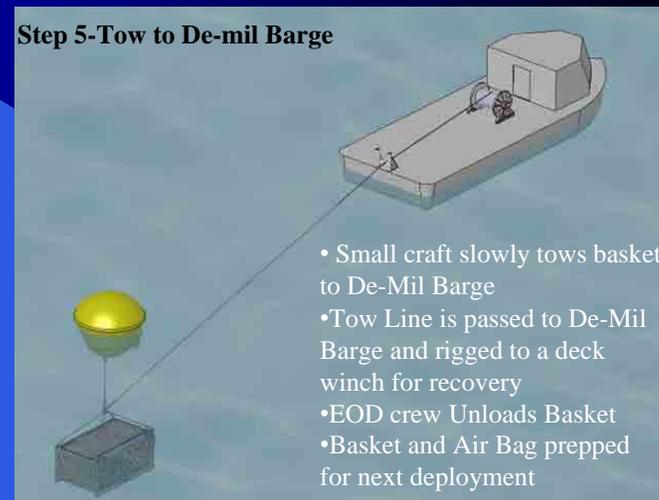
- ROV transits to and lands on Salvage Basket
- Hopper extended, contents emptied, and Hopper retracted
- Canister Filters jettisoned and recovered
- ROV transits to next Recovery Site

Step 4-Recovery Rigging

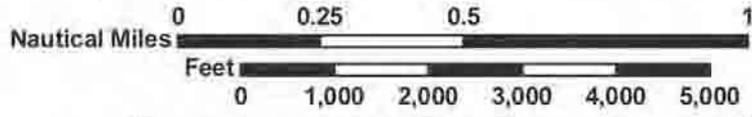
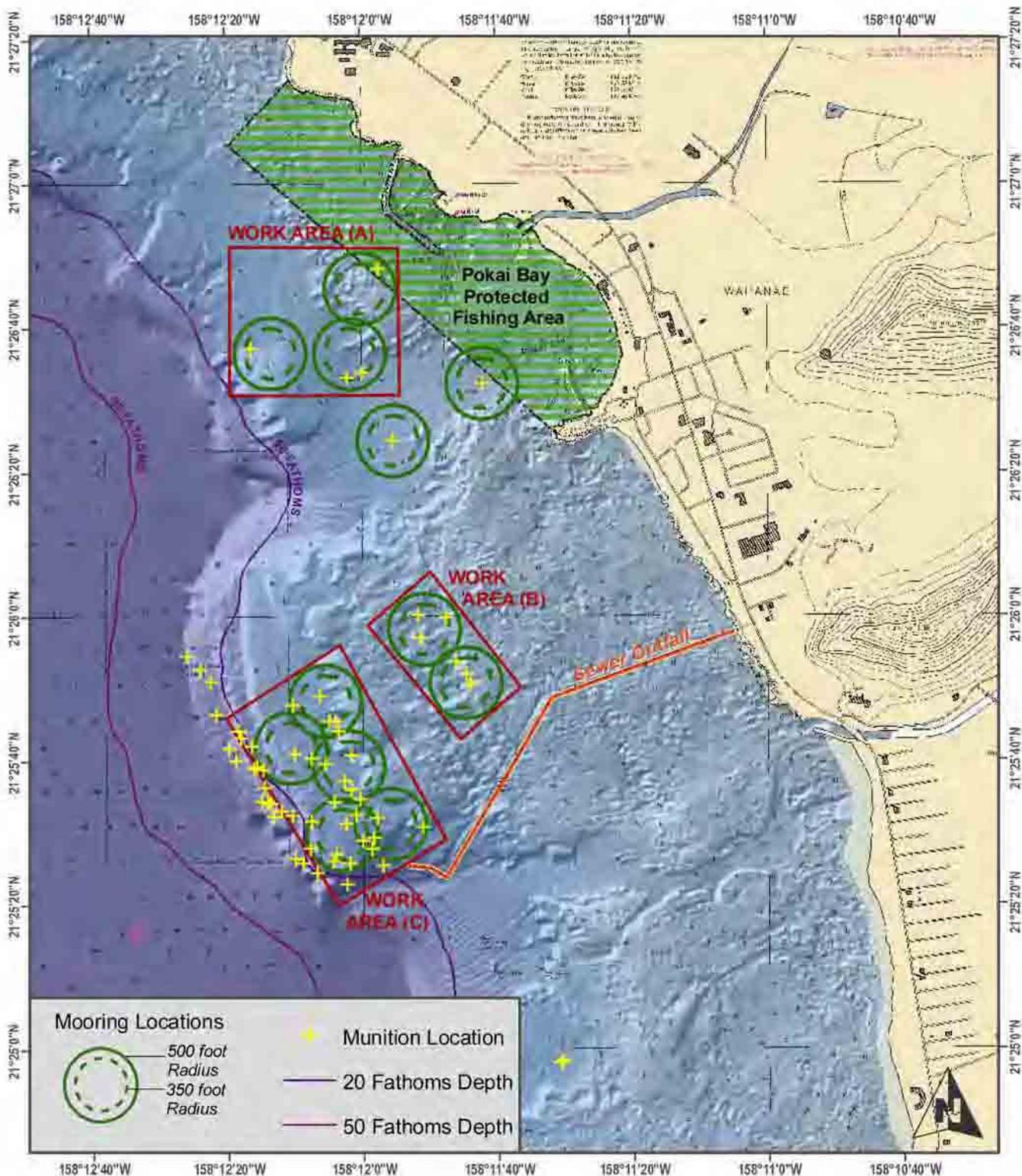


- Air Lift Valve is lowered, ROV moves it to Basket
- Air Lift rigging and Tow/Recovery Line connected
- ROV turns ON air valve and inflates Lift Bag
- Salvage Basket ascends to surface

Step 5-Tow to De-mil Barge



- Small craft slowly tows basket to De-Mil Barge
- Tow Line is passed to De-Mil Barge and rigged to a deck winch for recovery
- EOD crew Unloads Basket
- Basket and Air Bag prepped for next deployment



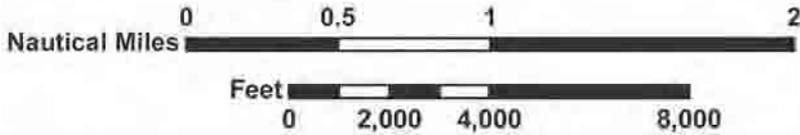
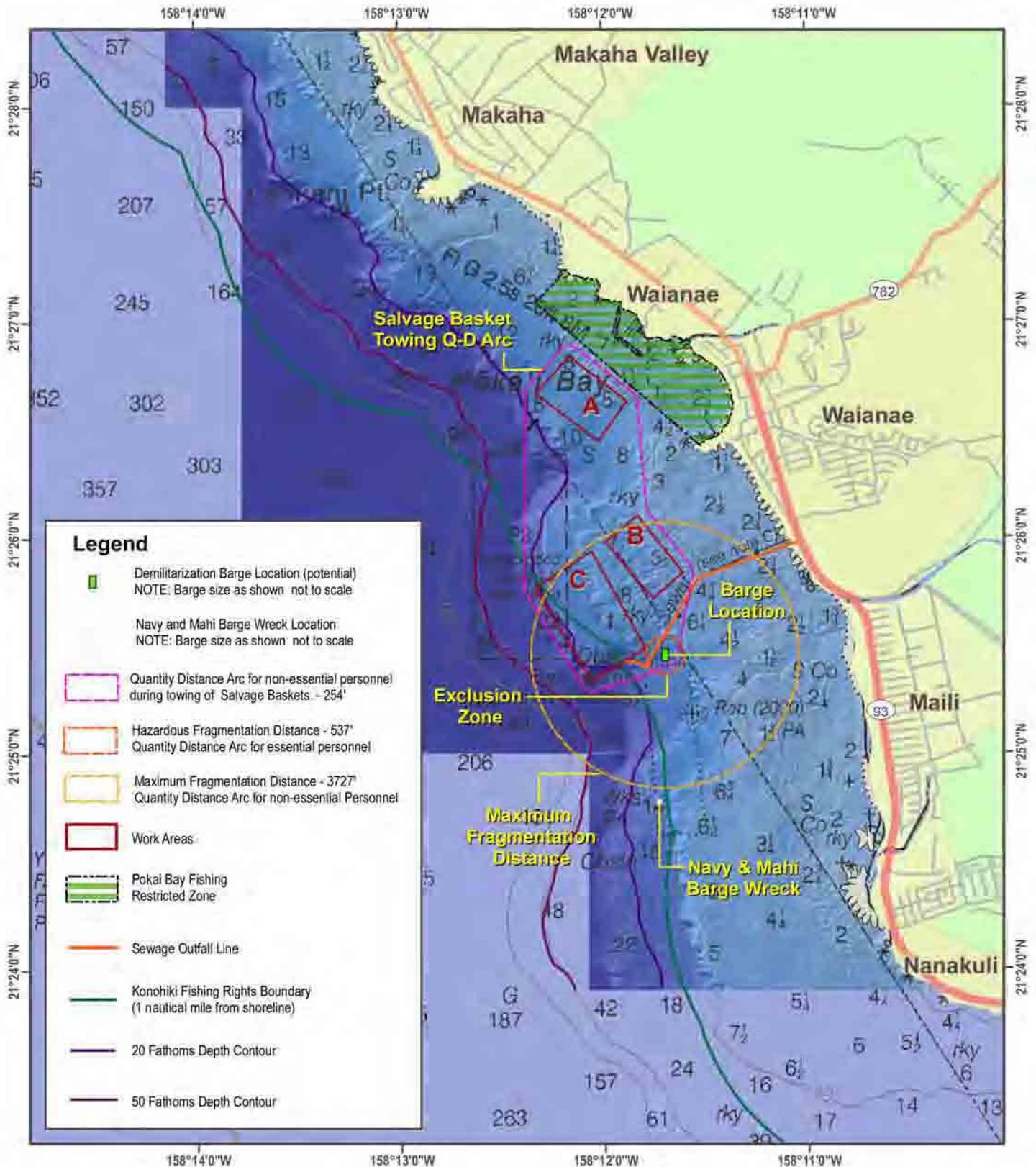
SPATIAL INFORMATION
 MAIN MAP - Scale 1:25,000, Datum: NAD83, Projection: UTM Zone 4N
 OAHU MAP - Scale 1:2,000,000, Datum: WGS84, Projection: Geographic



DATA RESOURCES: ESRI, NOAA, USGS, Natural Earth.com, Hawaii Dept. of Natural Resources

Figure 4: Ordnance Reef (HI-06) Layout and Mooring Locations





SPATIAL INFORMATION
 MAIN MAP - Scale 1:50,000, Datum: NAD83, Projection: UTM Zone 4N
 OAHU MAP - Scale 1:2,000,000, Datum: WGS84, Projection: Geographic



DATA RESOURCES: ESRI, NOAA, USGS, Natural Earth.com, Hawaii Dept. of Natural Resources

Figure 5: Explosive Safety Quantity Distance Arcs (Safety Zones)

ENCLOSURE 6

18. Nature of Activity (Description of project, include all features)

Deployment of a Remotely Operated Underwater Munitions Recovery System (ROUMRS) vehicle to retrieve military munitions within Pokai Bay. Recovered munitions to be transported to a nearby off-shore barge, housing the Energetic Hazards Demilitarization System (EHDS), for destruction. The EHDS uses a thermal decomposition technique which does not involve open burning, open detonation, or incineration. Remaining components of the munitions are to be recycled as scrap metal to the maximum extent possible.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

The project purpose is to address community concerns regarding military munitions within Pokai Bay. The project is also intended to demonstrate that ROUMRS and EHDS technology can be used to maximize safety, and minimize environmental impacts, when demilitarizing underwater munitions.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

N/A

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
N/A		

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres
Or
Liner Feet N/A

23. Description of Avoidance, Minimization, and Compensation (see instructions)

N/A

24. Is Any Portion of the Work Already Complete? Yes No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list)

Address - See attached "List of Adjoining Property Owners".
City - Waianae State - HI Zip - 96792

26. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
See attached "Other Certifications"					

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

_____ _____ Mark R. Arakaki 17 Nov 2010
 SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than \$10,000 or imprisoned not more than five years or both.

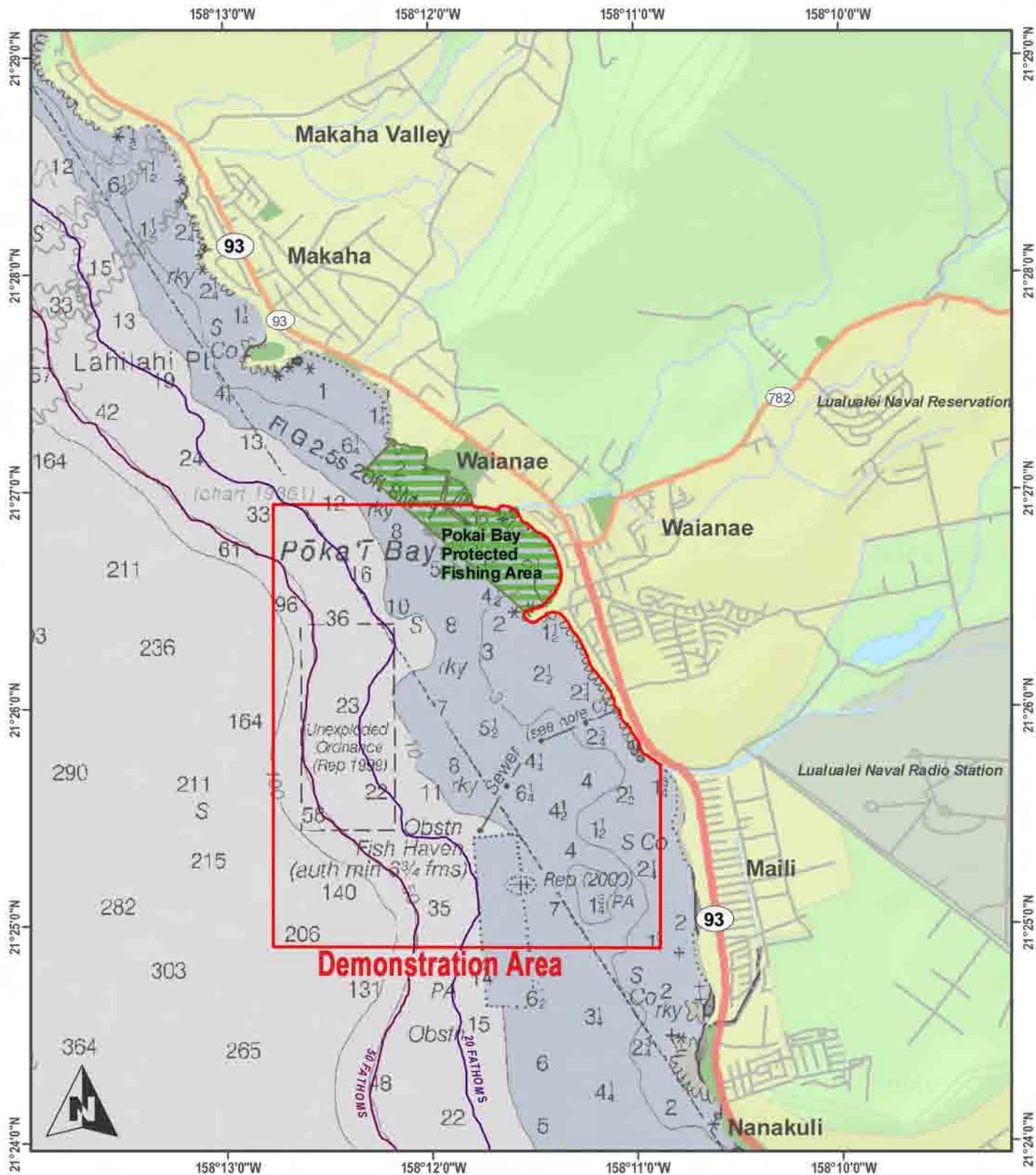
List of Adjoining Property Owners

Owner - Tax Records	Address	TMK				
		Division	Zone	Section	Plat	Parcel/Lot
United States of America	85-10 Army St	8	5	1	9	0
State of Hawaii	Waianae Valley Rd	8	5	1	45	0
United States of America	Plantation Rd	8	5	1	46	0
State of Hawaii	85-601 Farrington Hwy	8	5	2	49	0
State of Hawaii	85-491 Farrington Hwy	8	5	2	44	0
State of Hawaii	85-471 Farrington Hwy	8	5	2	11	0
State of Hawaii	85-251 Farrington Hwy	8	5	2	18	0
United States of America	85-10 Army St	8	5	1	8	0
State of Hawaii	Pokai Bay St	8	5	1	62	0
State of Hawaii	86-81 Farrington Hwy	8	6	1	7	0

Other Certifications

Other Certifications or Approvals/Denials Received						
<u>Agency</u>	<u>Type Approval</u>	<u>Identification Number</u>	<u>Date Applied</u>	<u>Date Approved</u>	<u>Date Denied</u>	<u>Result</u>
Hawaii DBEDT	CZM Federal Consistency		In Progress			
Hawaii DLNR	Right of Entry Permit		In Progress			
Hawaii DLNR	Mooring,		12 Aug 10			Permit Not Required
Hawaii DLNR	Coral/Live Rock Permit		12 Aug 10			Permit Not Required
Hawaii DLNR	CDUP		12 Aug 10			Permit Not Required
Hawaii DOH	90-day Haz Waste Permit		In Progress			
Hawaii DOH	Air Permit		14 Jun 10			Permit Not Required
NOAA	Essential Fish Habitat		In Progress			
NOAA	Endangered Species Act		In Progress			
FWS	Fish and Wildlife Coordination Act		In Progress			

Maps
Ordnance Reef

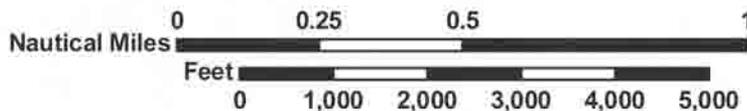
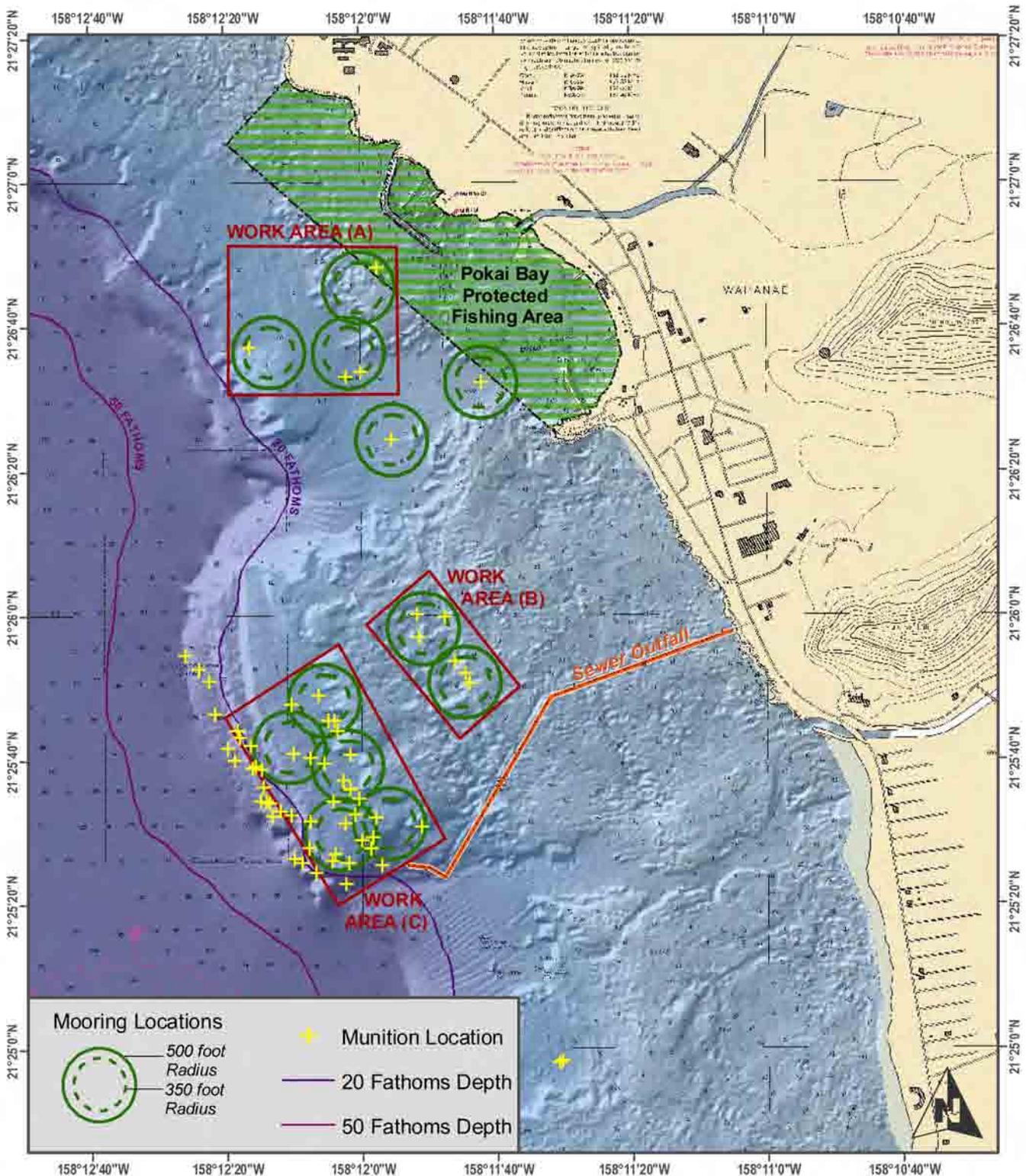


SPATIAL INFORMATION
 MAIN MAP - Scale 1:50,000. Datum: NAD83. Projection: UTM Zone 4N
 OAHU MAP - Scale 1:2,000,000. Datum: WGS84. Projection: Geographic

DATA RESOURCES: ESRI, NOAA, USGS, Natural Earth.com, Hawaii Dept. of Natural Resources



Figure 1: Ordnance Reef (HI-06) Location



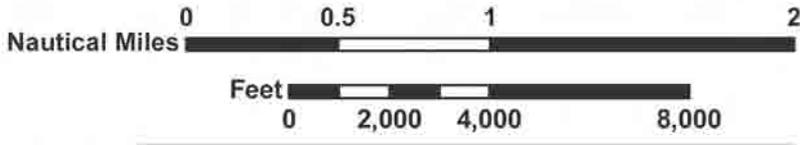
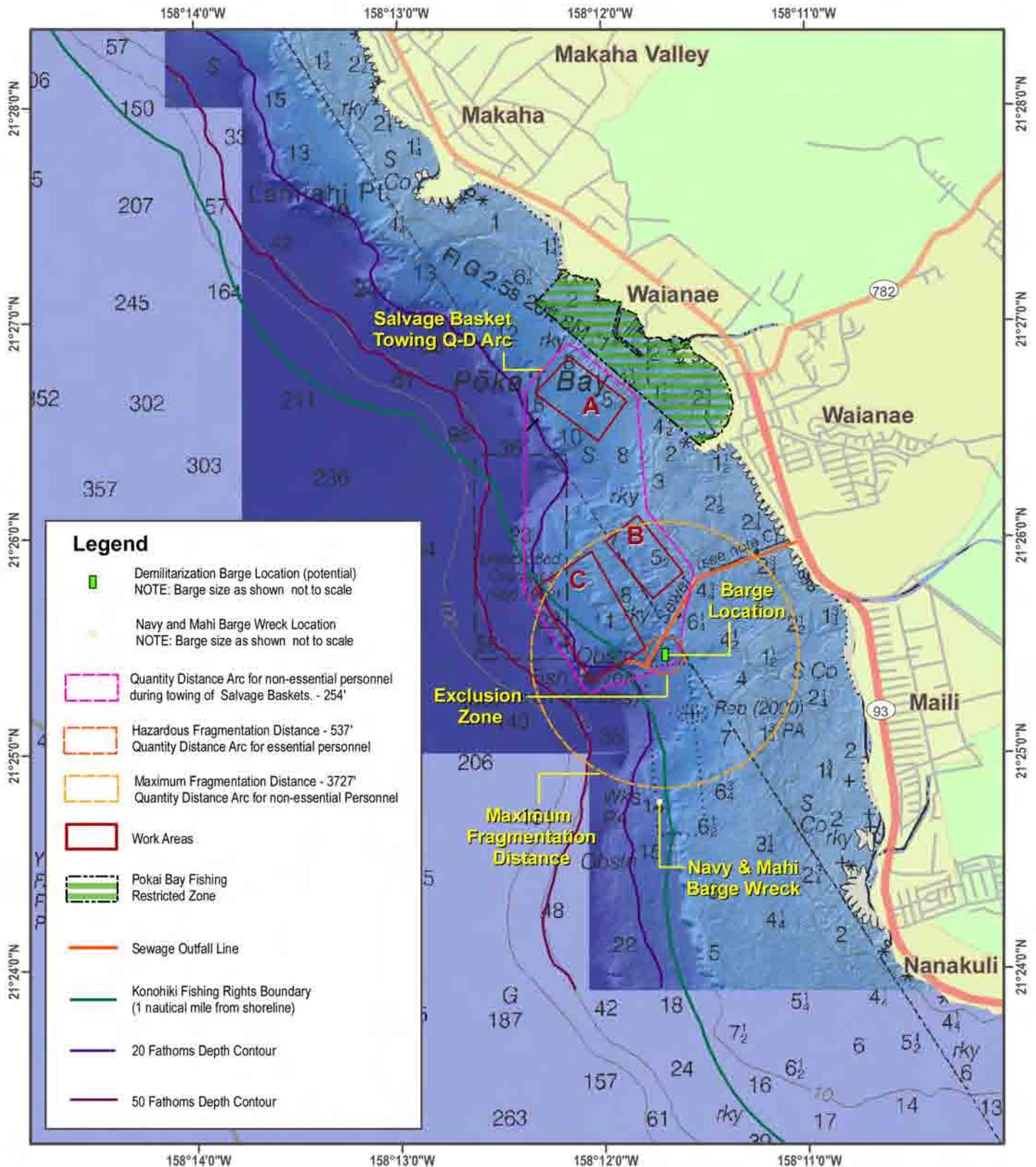
SPATIAL INFORMATION

MAIN MAP - Scale 1:25,000, Datum: NAD83, Projection: UTM Zone 4N
 OAHU MAP - Scale 1:2,000,000, Datum: WGS84, Projection: Geographic

DATA RESOURCES: ESRI, NOAA, USGS, Natural Earth.com, Hawaii Dept. of Natural Resources



Figure 2: Ordnance Reef (HI-06) Layout and Mooring Locations



SPATIAL INFORMATION
 MAIN MAP - Scale 1:50,000. Datum: NAD83. Projection: UTM Zone 4N
 OAHU MAP - Scale 1:2,000,000. Datum: WGS84. Projection: Geographic



DATA RESOURCES: ESRI, NOAA, USGS, Natural Earth.com, Hawaii Dept. of Natural Resources

Figure 3: Explosive Safety Quantity Distance Arcs (Safety Zones)

ARA Incorporated
Technology Demonstration
at Ordnance Reef (HI-06), Waianae, Oahu, Hawaii
Best Management Practices (BMP)

The technology demonstrations (the Demonstration) that are proposed to occur at Ordnance Reef (HI-06) consists of two commercially available technologies that have been adapted for (a) the remote recovery of munitions from the ocean floor; and (b) the demilitarization of recovered munitions on an offshore barge. These technologies (the Remotely Operated Underwater Munitions Recovery System (ROUMRS) and Energetic Hazards Demilitarization System (EHDS)) will be assessed concurrently at Ordnance Reef (HI-06)). These Best Management Practices (BMP) are focused on the ROUMRS technology demonstration. ROUMRS is designed to demonstrate its capabilities to recover underwater military munitions (UWMM) in a manner protective of the public and environment. ARA's BMP describe procedures ARA will employ to protect human health and the environment, including to help avoid or limit injury to coral and other benthic habitats, and protecting sensitive marine life (e.g., marine species listed under the Endangered Species Act (ESA) or Protected Under the Marine Mammal Protection Act (MMPA), during field operations.

During or as a result of this Demonstration:

- Remedial or corrective actions will not be required. However, should inadvertent damage to coral or other benthic habitats occur, the Army will implement mitigation measures.
- Hazardous waste will not be generated.
- Managed solid waste will not be disposed at Ordnance Reef (HI-06).

The BMP to be used are:

1. General
2. Briefings
3. Pre-dive Checks
4. Placement of Anchorages, Moorings and Staging Areas In Environmentally Sensitive Areas
5. Subsea Investigation and Classification Munitions and Munitions Debris

6. Recovery of Munitions and Munitions Debris
7. Salvage Basket Operations
8. Lift Bag Operations
9. Operations in Sensitive Areas
10. Marine Species - Endangered Species Act (ESA)
11. Spill Contingency Plans

The steps taken to help avoid or limit injury to coral and other benthic habitats are addressed in BMP 2, 4, 5, and 6.

FINAL

Best Management Practice 1: General

Systematic planning and execution is essential for the efficient demonstration of ROURMS and for the safe and effective operation of ROURMS' remotely operated vehicle (ROV). The Demonstration's overall objectives will be accomplished by performing a number of general tasks. At a minimum these tasks will include:

- All required permits for topside and subsea activities will be secured from State, Federal, Port, and Local authorities as required. These permits may include:
 - Rights of Entry
 - Section 10 Permits
 - Anchorage Authorizations
 - To be determined, as required and listed in the work plans
- The Project Engineer for ROURMS Operations will
 - Ensure all required equipment is scheduled, available and prepared for use (sea and topside operations).
 - Ensure all parties directly involved with topside and subsea operations are briefed on planned operations and emergency procedures.
- Each crew member will review the work plans to develop a complete understanding of the overall operation and mission. This includes a thorough review of any customer-produced documentation (e.g., scope, photographs, previous reports).
- The ARA team will:
 - Mobilize all equipment allocated and scheduled for topside and subsea operations.
 - Transport all equipment, personnel, and spares to the work site.
 - Check, prepare, and confirm operability of all equipment for the individual tasks in proper order of use.
 - Minimize any turbidity and siltation from landward Demonstration-related work and contain it, to the extent possible, within the vicinity of the site through the appropriate use of effective containment devices and the curtailment of work during adverse tidal and weather conditions.
 - Compare and coordinate all pre-dive functionality tests as well as checklists for deployment.
 - Inspect, prior to use, all demonstration-related materials and equipment (barges, ROVs, etc.) to be placed in the water to ensure it is free of visible pollutants.

- Prevent the stockpiling of demonstration-related materials in the water (intertidal zones, reef flats, stream channels, sea grass beds, etc.).
- Dispose of all demonstration related waste that is not recyclable at approved properly permitted facility.
- Prevent the contamination (e.g., trash or debris disposal, the introduction of non-native species, the attraction of non-native pests) of adjacent habitats (e.g., reef flats, channels, open ocean, stream channels, sea grass beds) by demonstration-related activities.
- Ensure fueling of Demonstration-related vehicles and equipment occurs away from the water.
- Prepare a contingency plan to control petroleum products accidentally spilled during the Demonstration and have absorbent pads and containment booms on-site, if appropriate, to facilitate the clean-up of accidental petroleum releases.
- Deploy equipment; locate the work site, and begin work.
- At the completion of the work task, recover equipment (per detailed procedures).
- Perform post-dive functionality checks as well as visual condition inspections.
- Clean, pack, and demobilize equipment, upon completion of the Demonstration.

Best Management Practice 2: Briefing

The operation of an ROV is a team effort. Each day, prior to starting ROV operations, a full crew briefing is essential to ensure efficient tasking and enhance team synergies. The crew briefing, at a minimum, will include:

- Mission tasking and/or threat outline, detailing the specific tasks assigned to each crewmember.
- A thorough and complete explanation of the individual tasks for each day's mission.
- A safety briefing.
- The scope of work and specific goals to be accomplished during individual tasks.
- Ingress and egress routes to the work site.
- Crew positions and specific responsibilities during the tasks.
- Tactics, techniques, and procedures for accomplishing each individual task and completing the mission.
- Specific information needed as well as methods of documentation.
- Relevant information about munitions to be inspected and recovered including, but not limited to drawings, photographs, damage reports, witness statements and any other information that will assist in the work task.
- Work area coordinates.
- Topographic maps, bathymetric data, tide tables, underwater obstruction analysis, prior surveys and any other environmental information that will assist in accessing the work areas.
- Summary of previous work performed at Ordnance Reef (HI-06) to include the Oceanic and Atmospheric Administration (NOAA) Coral Avoidance and Minimization of Injury Plan (CAMIP) detailing the locations of sensitive corals and other benthic habitats.
- Schedule for completion of mission objectives including the best and worst case scenarios, with consideration of potential delays.

Best Management Practice 3: Pre-Dive Checks

The following pre-dive check should be carried out prior to every dive:

- Visually inspect the ROV to ensure the propellers are not fouled, all components are secured, and there is no mechanical damage to the frame or other components.
- Check the tether for scrapes, nicks, or other visible damage. The ROV will not be used, if the tether jacket is broken through.
- Verify correct operation of the ROV's thrusters. (CAUTION: ROV thrusters should only run for a few seconds when not submerged in water.)
- Ensure:
 - All fasteners are in place and secure.
 - Whip connectors at the electronics and tether termination cans are connected securely. (Note: Dielectric silicone grease will be used to lubricate electrical connections, as necessary.)
 - Unused vehicle connectors are capped securely with dummy plugs.
 - Surface cables are securely connected.
- The Auto Depth switch on the control panel will be switched to OFF, the Manual Depth Control knob will be centered, and the Auto Heading selector will be OFF prior to powering up the system.
- Lights, camera, manipulators, tooling functions, and thrusters will be tested. The data recorders and documentation processes will be tested to ensure they are operating properly. (CAUTION: Lights should only be tested for a few seconds if not submerged in water seconds to prevent heat buildup.)
- After the vehicle is placed into the water confirm the operability of the ballast and trim.
- If any instruments or equipment are not functioning properly, the Project Engineer will determine the potential impact and implement actions necessary to achieve mission objectives. Any maintenance performed will be documented.

Best Management Practice 4: Placement of Anchorages, Moorings and Staging Areas in Environmentally Sensitive Areas.

This section contains the detailed BMP for anchoring watercraft and the staging of subsea equipment. Special considerations are included to avoid injury to coral and other benthic habitats and to minimize such injury during remote operations. Every operational situation is unique with special needs and requirements.

- If available, the coordinates for each potential mooring, anchorage, and staging area must be confirmed prior to contacting the bottom.
- Mooring, anchorage and staging areas will be located using global positioning systems.
- A crew briefing will be conducted prior to ROV operations, with the ROV and topside crew be briefed about:
 - Coral growth, reefs, marine life, protected marine species, and habitat, that must be avoided.
 - Culturally important structures and locations.
 - Photographs, drawings, previous reports, and the NOAA CAMIP documenting the relative level of concern for each area at Ordnance Reef (HI-06).
- The ROV will only be operated by approved and qualified operators.
- The pre-dive checklist will be followed prior to launching the ROV.
- Watercraft will not be allowed in the ROV operating area
- The RSV will not move without the prior knowledge of the ROV operator.
- The ROV will be launched as far away as practical from propellers and any overboard obstructions.
- The ROV tether will:
 - Be manned at all times.
 - Have positive buoyancy to minimize bottom contact and possible disturbance of reef structures.
- The ROV will:
 - Be used to reconnoitered the position of mooring, anchorages and staging areas prior to contacting the bottom to confirm these areas are acceptable based on criteria provided the CAMIP.
 - Approach the mooring, anchorage, or staging areas, exercise caution and avoid contact with the bottom, environmental features, coral, or structures.
 - Digitally record, document and save an image of the target location (e.g., mooring, anchorage, staging locations) prior to contacting the bottom.

- Avoid coral species, protected marine species, reefs, habitats of concern, and culturally important structures and locations to prevent damage prior to and following placement of the mooring, anchorage, or equipment on the bottom.
- Used to lower moorings, anchorages, and equipment to the bottom or such will be lowered using lines – **moorings, anchorages, and equipment will not be dropped or released freely from the surface!**
- Good communications will be maintained between the ROV operator and the helm to ensure the ROV operator is aware of the relative positions of the ROV to the vessel, and is informed of the vessel's anticipated.
- Moorings and anchorages in sensitive locations will employ floated lines.
- Upon completion of work at the site, the condition of the target location will be digitally recorded and saved after the mooring, anchorage, or staged equipment is removed. **Injury to sensitive areas will be reported to the Army's lead.**

Best Management Practice 5: Subsea Investigation and Classification Munitions and Munitions Debris

This section contains the detailed BMP for investigating munitions and munitions debris. Some steps describe precautions to be taken during ROV operations in environmentally and culturally sensitive areas. Every operational situation is unique with special needs and requirements.

- A crew briefing will be conducted prior to ROV operations, with the ROV and topside crew be briefed about:
 - Coral growth, reefs, marine life, protected marine species, and habitat, that must be avoided.
 - Culturally important structures and locations
 - Photographs, drawings, previous reports, and the NOAA CAMIP documenting the relative level of concern for each area at Ordnance Reef (HI-06).
- ROV will only be operated by approved and qualified operators.
- The pre-dive checklist will be followed prior to launching the ROV.
- Watercraft will not be allowed in the ROV operating area.
- The RSV will not move without the prior knowledge of the ROV operator.
- The ROV will be launched as far away as practical from propellers and any overboard obstructions.
- The ROV tether will:
 - Be manned at all times.
 - Have positive buoyancy to minimize bottom contact and possible disturbance of reef structures.
- Care will be taken to ensure the ROV tether does not foul or contact the bottom.
- The ROV will circumnavigate the munitions and munitions debris, collecting and recording digital images of the area.
- If needed, unique markers may be placed next to individual munitions, clusters of munitions, and other materials of interest and digitally recorded.
- Coordinates of the identified munitions and other materials of interest will be documented and saved.
- Images of the munitions and munitions debris will be digitally recorded and assigned a unique identifier. Co-located or multiple munitions may be recorded with a single identifier. Target identifiers will include at a minimum an alpha numeric identifier, coordinates, and a description of the munition or material.

- All coral species, including any Branching Corals (*Pocillopora meandrina*, *Pocillopora eydouxi*, etc) or Lobate Corals (*Porities lobata*, *Porities evermanni*, *Porities duerdeni*, etc) greater than 12 inches in vertical growth that is either growing on a munition or in a location where it could be damaged during recovery of the target (munition) will be documented. Recovery of munitions or munitions debris with corals having greater than 12 inches of vertical growth will not occur until NOAA has been consulted about coral mitigation options (e.g., transplantation, habitat replacement) and the Army concurs with the recovery. Any munitions intentionally not recovered will be documented as to type, location, and the reason for leaving it in place.
- Encrusting Corals (e.g., *Leptastrea*, *Montipora captata*, *Montipora patula*) commonly grow on targets at Ordnance Reef (HI-06), but will not be noted.
- **Injury to sensitive areas will be identified and reported to the Army Lead.**

Best Management Practice 6: Recovery of Munitions and Munitions Debris

This section contains the detailed BMP for recovering munitions and munitions debris from the bottom. Munitions and munitions debris selected for recovery will be interrogated and classified per the appropriate ARA BMP and the work plan. Every operational situation is unique with special needs and requirements.

- The selection and prioritization of munitions and munitions debris for recovery will be performed prior to initiating ROV dive operations.
- Selected munitions and munitions debris will be prioritized and placed onto a Recovery Sheet that is presented to the field crew prior to initiating ROV operations.
- At a minimum, Recovery Sheets will include the Identification number of the munitions and munitions debris, its description and the coordinates from which it was recovered.
- If needed, salvage baskets will be staged near munitions and munitions debris being recovered per the appropriate BMP. Prior to beginning ROV recovery operations, the ROV operator will:
 - Confirm the salvage basket's operational status.
 - Confirm the ROV's navigation corridor to and from the salvage baskets to limit potential impacts to all coral species.
- The ROV will limit, to the extent possible, contact with and avoid disturbance of the bottom while collecting munitions and munitions debris
- When contact with the bottom is necessary, the ROV operator will ensure that corals and reef structures are avoided using the following checklist to minimize impact.
 - Transit route to the target must be established to help avoid or limit injury to coral and/or other benthic habitats, and navigate to the target safely without damaging the ROV.
 - Remove the target (munition or munitions debris) from the bottom without causing injury to coral or other benthic habitats.
 - If there is a release of munitions constituents (MC) to the environment, the MC will be recovered to the extent possible using the ROV mounted vacuum and trash pump.

- The ROV will be set down and perform any required work without damaging coral or other benthic habitats.
- If these activities cannot be performed, consult with NOAA and the Army concerning alternatives.
- All coral species, including any Branching Corals (*Pocillopora meandrina*, *Pocillopora eydouxi*, etc) or Lobate Corals (*Porities lobata*, *Porities evermanni*, *Porities duerdeni*, etc) greater than 12 inches in vertical growth that is either growing on a munition or in a location where it could be damaged during recovery of the target (munition) will not be removed until NOAA has been consulted about coral mitigation options (e.g., transplantation, habitat replacement) and the Army concurs with the recovery. Any targets intentionally not recovered will be documented as to type, location, and the reason for leaving it in place.
- Once a munition has been collected, it will be placed into the ROV's hopper or, if necessary, transferred directly to the salvage basket at a nearby staging area.
- The ROV hopper will be unloaded into the salvage baskets as necessary.
- After a munition has been recovered from the bottom, images of its former location will be digitally recorded.
- Any munitions debris recovered from underwater and from munitions processed by the EHDS will be hauled off site, and be recycled or disposed per applicable laws and regulations. The Army may retain some munitions debris for scientific study.

Best Management Practice 7: Salvage Basket Operations

- Inspect the salvage basket per ARA Salvage Basket's Pre and Post Dive Checklist.
- Confirm using the ROV that the location and placement of the salvage basket is in an area that will not injure coral or other benthic habitats as noted in NOAA's CAMIP.
- Perform salvage basket preparation and maintenance topside. Confirm that the:
 - Salvage basket does not have damage that would effect its operation (e.g., broken structural elements, holes that would allow release of contents).
 - The hopper doors open and operate correctly.
 - Lifting points and rigging are in good condition.
 - Side and top salvage gates open and operate correctly.
 - Air bottles of the lift system are filled and ready for deployment.
- Perform salvage basket launch and recovery per BMP 4 and BMP 8.
- Tow the salvage basket.

Best Management Practice 8: Lift Bag Operations

- Confirm that lift rigging and tow bridle are operable, correct if inoperable noting any maintenance performed.
- Confirm that lift bag and air system are operable, correct if inoperable noting any maintenance performed.
- Perform ascent and descent preparation by:
 - Confirming:
 - ✓ All personnel are ready for a lift.
 - ✓ The ascent corridor is free and clear of personnel, watercrafts, and marine life.
 - Communicating with salvage basket recovery team regarding the lift.
 - Activating air system remotely using the ROV.

Best Management Practice 9: Operations in Sensitive Areas

A Demonstration-Specific Work Plan (WP) will be prepared and submitted to responsible parties before in-water activities begin. The name and contact information for the designated Demonstration points of contact (POC) for all in-water activities are included in the Health and Safety Plan portion of the WP. The designated POC will ensure that daily visual inspection of Ordnance Reef (HI-06) and its environs are conducted to verify that Demonstration-related activities do not result in uncontrolled adverse environmental impacts and that should environmental injury occur, such injury is minimized to the maximum extent practicable. Visual inspections will be documented with photographs and written descriptions, if necessary. Full water column silt curtains are not needed for this Demonstration because there are no anticipated effects from the suspension of disturbed sediments and turbidity. The WP will include measures to help ensure:

- In-water activities employ sound attenuation measures that will minimize the intensity and duration of percussion impacts through the aquatic environment to the extent practical and feasible.
- The ROV, any mechanized equipment and other materials used during the Demonstration will be clean and free of obvious contamination and deleterious substances that might include toxic chemicals and clay-coated material.
- A Spill Contingency Plan (BMP #11) is in place on landside platforms and in all support vessels associated with the demonstration. The Project Manager or ship's Captain will detail procedures for managing the accidental release of petroleum products to the aquatic environment, if there is a release. Particular care per the site-specific planning documents must be taken to ensure that no petroleum products, trash, or other debris enter near-shore waters. When such material is found within the operating area, the material will be collected and disposed of at a permitted facility. Additionally, spill containment kits will be kept on hand.
- Watercraft will be piloted by licensed people who are familiar with operating in Hawaiian waters.
- Visual surveys will occur prior to the start of work each day, and periodically during the day, including prior to resumption of work following a break of more than 30 minutes.

- All in-water work will be postponed or halted when an ESA-listed marine species or a species protected under the MMPA is within 210 feet (i.e., 63 meters) of the proposed work, and will only begin or resume after these marine species has voluntarily departed the area. If ESA-listed marine species are noticed within 210 feet after work has already begun, that work may continue only if, in the best judgment of the Project Manager, there is no way for the activity to adversely affect the ESA-listed or MMPA-protected species.
- Protocol and operations measures for the avoidance and protection of protected species that include, but may not be limited to green sea and hawksbill turtles, Hawaiian monk seals, humpback whales and other protected species in active, mechanized equipment and boat areas of operation will incorporate the following site-specific avoidance and minimization measures:
 - When piloting watercrafts, operators will alter course to remain a minimum of 300 feet from whales and 210 feet from other marine mammals and sea turtles,
 - Reduce watercraft speed to 10 knots or less when piloting watercrafts at or within the ranges described above from marine mammals and turtles. Operators will be particularly vigilant to watch for turtles at or near the surface in areas of known or suspected marine mammal or turtle activity, and if practicable, reduce watercraft speed to 5 knots or less,
 - If despite efforts to maintain the distances and speeds described above, a marine mammal or turtle approaches a watercraft, put the engine in neutral until the animal is at least 50 feet away, and then slowly move away to the prescribed distance,
 - Marine mammals and sea turtles will not be encircled or trapped between multiple watercrafts or between vessels and the shore,
 - Do not attempt to feed, touch, ride, or otherwise intentionally interact with any ESA-listed or MMPA-protected marine species,
 - All on-site demonstration personnel must be apprised of the status of any ESA-listed species potentially present in the demonstration area and the protections afforded to those species under Federal laws. Information explaining laws and regulations for listed species in Hawaii may be downloaded at <http://www.nmfs.noaa.gov/protres/MMWatch/hawaii.htm>. The POC will ensure that protocols and observers in place to avoid the potential contact with or harassment of ESA-listed or MMPA-protected species are followed during all periods of in-water work,

- Records any protected species observed in the demonstration areas for the duration of in-water activities will be maintained and submitted at the close of in-water activities.
- Immediate notification to Don Hubner (808-944-2233) Protected Resources Division, NMFS, PIRO, if:
 - A take occurs;
 - New information reveals the action has affected listed species in a manner or to an extent not previously evaluated;
 - If the action is subsequently modified and causes effects to listed species in a manner or to an extent not previously considered or evaluated; or
 - A new species is listed or critical habitat is designated that may be affected by the authorized work.
- For stranded sea turtles, contact 808-983-5730 (M-F 0700-1600) or the pager number 808-288-5685/0023 after hours and weekends for a fast call back.
- For concerns relating to marine mammals contact 888-256-9840.

Best Management Practice: 10. Marine Species Listed Under the Endangered Species Act (ESA) or Protected Under the Marine Mammal Protection Act (MMPA)

The following BMPs are intended to ensure that the proposed action would have insignificant impacts on ESA-listed or MMPA protected marine species, or to diminish the likelihood of impact below the threshold of discountable.

Note: Any concurrence by National Marine Fisheries Service (NMFS) Protected Resources Division that the proposed action is not likely to adversely affect ESA-listed marine species would be based in large part on the expectation that as a minimum the following BMPs would be implemented. These BMPs are in no way intended to supersede or replace measures required by any other agency including, but not limited to the USFWS, USEPA, or NMFS Habitat Conservation Division.

Constant vigilance will be kept for the presence of ESA-listed or MMPA protected marine species during all aspects of the proposed action, particularly in-water activities such as dredging, boat operations, diving, or ROV operations.

- A competent observer will be designated to survey the marine areas adjacent to the proposed action for ESA-listed or MMPA protected marine species.
- Visual surveys will occur prior to the start of work each day, and periodically during the day, including prior to resumption of work following any break of more than one half hour.
- All in-water work will be postponed or halted when an ESA-listed marine species is within 210 feet of the proposed work, and will only begin or resume after the ESA-listed marine species has voluntarily departed the area. If ESA-listed or MMPA-protected marine species are noticed within 210 feet after work has already begun, that work may continue only if, in the best judgment of the Project Manager, there is no way for the activity to adversely affect the ESA-listed or MMPA-protected marine species. For example; the ROV performing surveys or underwater work is likely safe, whereas the air-lifting of the salvage baskets may not be prudent.
- When piloting watercraft, operators will alter course to remain a minimum of 300 feet from whales and 210 feet from other marine mammals and sea turtles.
- Reduce speed to 10 knots or less when piloting watercraft at or within the ranges described above from marine mammals and sea turtles. Operators will be particularly vigilant to watch for turtles at or near the surface in areas of known

or suspected marine mammal or turtle activity, and if practicable, reduce watercraft speed to 5 knots or less.

- If despite efforts to maintain the distances and speeds described above, a marine mammal or turtle approaches the watercraft, put the engine in neutral until the animal is at least 50 feet away, and then slowly move away to the prescribed distance.
- Marine mammals and sea turtles will not be encircled or trapped between multiple vessels or between vessels and the shore.
- Do not attempt to feed, touch, ride, or otherwise intentionally interact with any ESA-listed or MMPA-protected marine species.

No contamination of the marine environment is anticipated from demonstration-related activities.

- To control petroleum products accidentally spilled during the demonstration, appropriate materials to contain and clean potential spills will be stored and readily available at the work site.
- All demonstration-related materials and equipment to be placed in the water will be free of visible pollutants prior to use. The Project Engineer responsible for operations or his designated person will perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations will be postponed or halted should a leak be detected, and will not proceed until the leak is repaired and equipment cleaned.
- Turbidity and siltation from demonstration-related work will be minimized. Silt containment devices are not applicable for this technology demonstration.
- Although no construction debris will be generated during the ROUMRS demonstration, all waste, debris, and litter on the watercraft will be controlled and not allowed to enter or remain in the marine environment during the demonstration.

Best Management Practice 11: Spill Contingency Plan

This Spill Contingency Plan is designed to identify and prevent potential spill hazards, and outline protocols to respond to spill hazards at ARA Incorporated Field Operations on Oahu, Hawaii. ARA will have a spill containment kit onboard the RSV and the DSV.

- All watercraft used in the demonstration will have their own spill contingency plans, and personnel involved with the demonstration will be briefed on those plans.
- Define the severity and type of the spill – A chemical spill during the technology demonstration is highly unlikely because the storage of hazardous chemicals, other than petroleum products onsite is not anticipated. The most of any one chemical being stored is a one gallon in a container approved for commercial products.
 - All chemicals are stored in containers of one gallon or less causing minimal problems in the event of a container breaking or tipping over.
 - All watercraft fueling operations will occur at approved marina fueling locations.
 - Fueling of all other approved portable fuel receptacles (gas cans) will occur at licensed facilities
- Response to an accidental release of a petroleum product or other hazardous material:
 - Evacuate the immediate vicinity of affected areas if exposure puts you and others in imminent danger.
 - If the spill is in a building, close all doors and open windows if substance is volatile and initiate emergency actions (see below).
 - If the spill is on a watercraft, use spill kits to control spill and prevent an overboard release.
 - Activate actions listed in the Demonstration Health and Safety Plan if serious bodily injury or property damage has occurred or is imminent. Call 911.
 - Administer first aid to victim(s), taking the appropriate personal protective equipment (PPE) and other necessary precautions to prevent rescuers exposure. Identification of specific hazard is essential.
 - **Contact Watercraft Captain, Operations, and Project Manager.**

- Actions to take in the event of a petroleum spill, bodily injury:
 - Flush affected eyes, skin and clothing with water using eyewash station, sinks or safety shower. Remove contaminated clothing.
 - If possible and safe to do so, use petroleum or chemical spill kits to and absorb the spill. Wear appropriate PPE, including respirator, if necessary. Sweep up and bag the absorbent. Dispose of material properly. Refer to material safety and data sheets (MSDS).
 - If spill occurs in an enclosed area, leave and close the door behind you.
 - Pull Fire Alarm switch to activate the occupant emergency plan.
 - Assemble in a designated area.
 - Take a head count. Notify the Captain, Project Manager, or Facilities Manager on the nature of the emergency.
 - Activate Emergency Response Plan, if necessary.
 - Stay away from the affected area or building and do not re-enter until it is cleared by the safety officer.

Emergency Telephone Numbers

Emergency Telephone	911
US Coast Guard, NRC	800.424.8802
Fire Department Honolulu	808.523.4411
State Spill Response (business hours only)	808.586.4249
24 Hour State Spill Hotline	808.247.2191

Once contact is made report:

- Your Name
- Location of Emergency
- Type of Emergency
- Type of Help Required

ARA Emergency Contact Numbers:

- ROUMRS Program Manager –John Coughlin – 443.745.4163
- ROUMRS Project Manager – Josh Bowers – 814.243.9460
- ROV Support Vessel Captain –TBD
- Demilitarization Support Vessel Operations Manager -TBD

Figure 2

ROUMRS Capabilities

ROV Features

Manipulators

- Dual 7-function arms w/ force-feed back

Hydraulics

- 15kW HPU with 16 function valve pack

Vehicle rated for 300m operations

- Upgradable to 2000m – requires floatation change

Thrusters

- (3) vertical 496LB up/down thrust
- (4) horizontal 496 LB fwd/rev/lateral thrust

Recovery Skid w/ Hopper

- 200LB lift capacity with a 5.8 FT³ fill volume

Suction/jetting pump with Canister Filter

- 125" filter-passes sand/retains propellant grains
- Suction nozzle carried by manipulator
- Canister Filters are jettisoned and later recovered in Salvage Basket

Onboard Sensors

- Scanning Sonar, depth, heading, roll/pitch

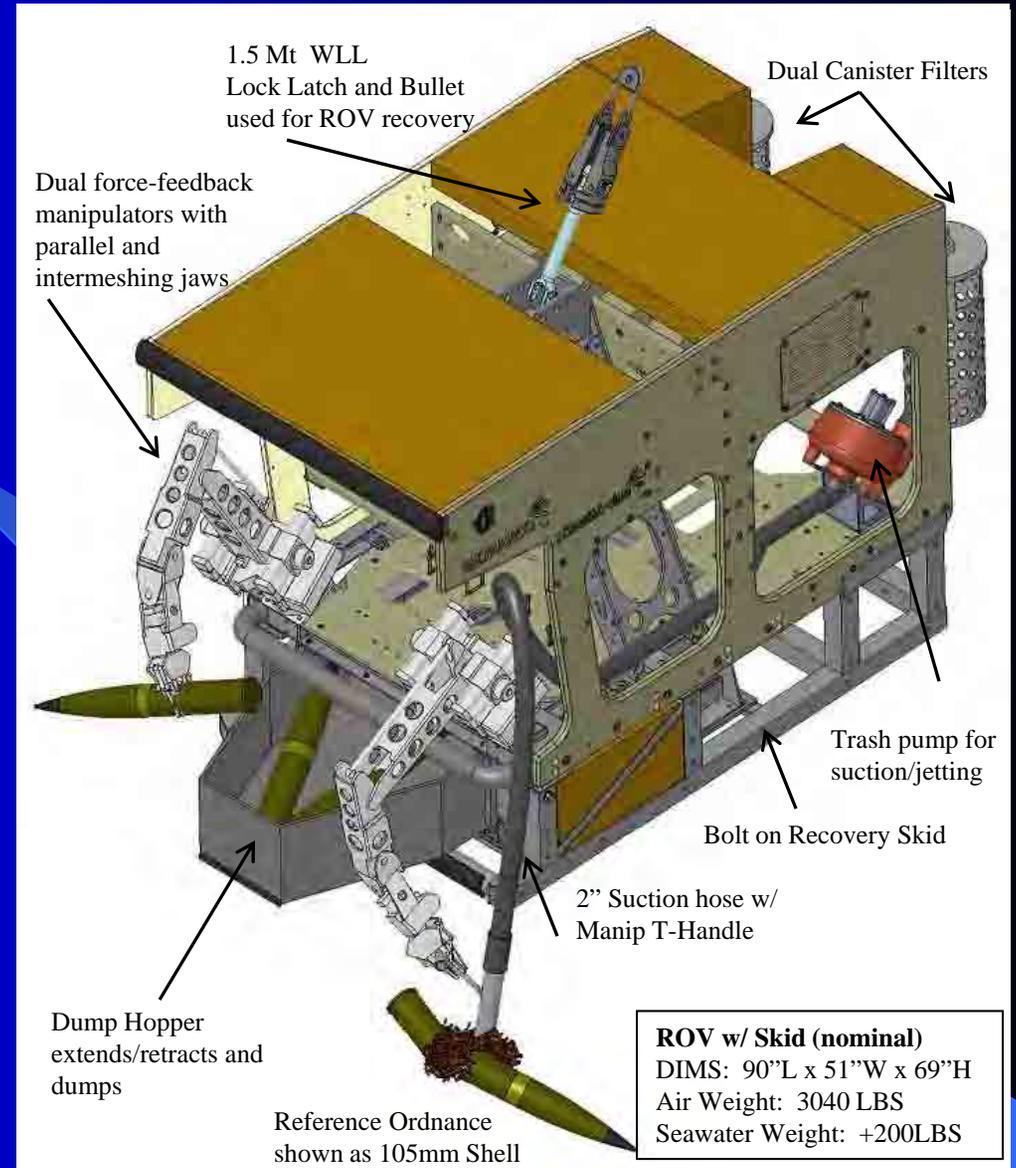
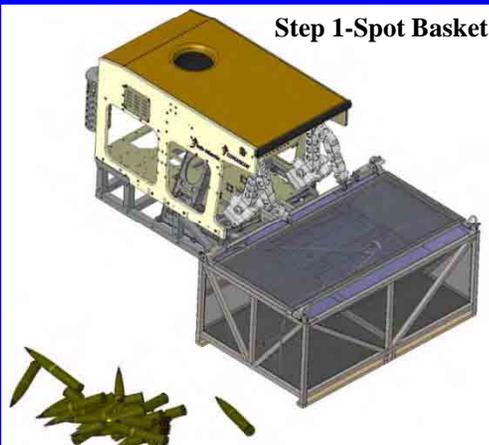


Figure 2 – SMA Permit Application

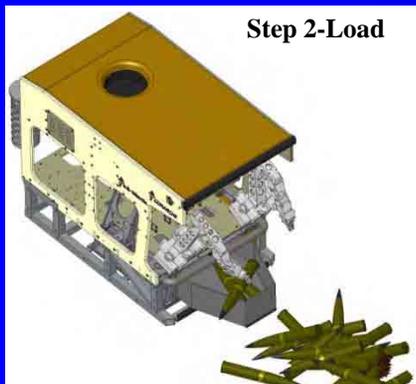
Figure 3 ROUMRS Conceptual Operations

Step 1-Spot Basket



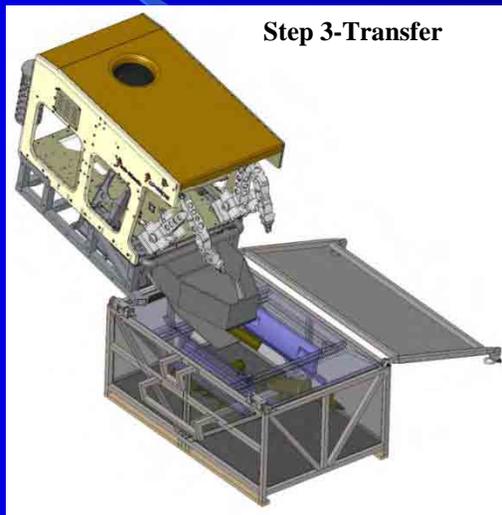
- Landing site inspected for coral/live rock
- Salvage Basket lowered to bottom and released
- ROV positions Basket near concentrated UXO, un-pins and opens upper door

Step 2-Load



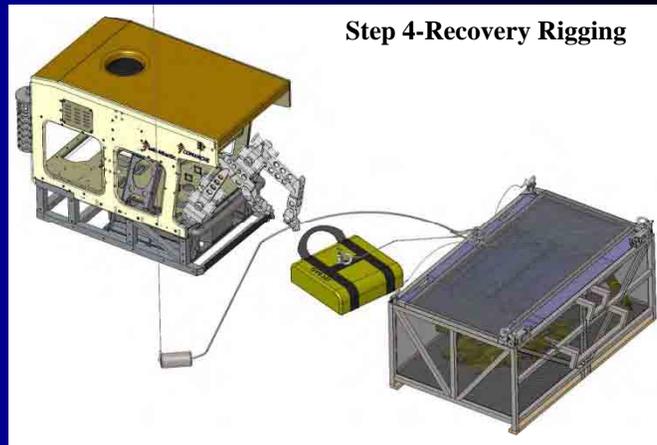
- Hopper is extended out of Recovery Skid
- UXO is documented (video, laser scaling)
- Manipulators/tooling used to pickup UXO
- Small debris vacuumed into Canister Filters
- Retract Hopper

Step 3-Transfer



- ROV transits to and lands on Salvage Basket
- Hopper extended, contents emptied, and Hopper retracted
- Canister Filters jettisoned and recovered
- ROV transits to next Recovery Site

Step 4-Recovery Rigging



- Air Lift Valise is lowered, ROV moves it to Basket
- Air Lift rigging and Tow/Recovery Line connected
- ROV turns ON air valve and inflates Lift Bag
- Salvage Basket ascends to surface

Step 5-Tow to De-mil Barge



- Small craft slowly tows basket to De-Mil Barge
- Tow Line is passed to De-Mil Barge and rigged to a deck winch for recovery
- EOD crew Unloads Basket
- Basket and Air Bag prepped for next deployment

Figure 3 – SMA Permit Application

ENCLOSURE 7



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

December 1, 2010

REPLY TO
ATTENTION OF:

Environmental Programs Branch
Programs and Project Management Division

Mr. Gerry Davis
Assistant Regional Administrator - Habitat
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Pacific Islands Regional Office
1601 Kapi'olani Blvd., Suite 1110
Honolulu, Hawai'i 96814-4700

Dear Mr. Davis:

The U.S. Army Corps of Engineers, Honolulu District (POH), on behalf of the Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (DASA-ESOH), seeks your concurrence with our determination that Essential Fish Habitat (EFH) identified and conserved under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) of 1976, as amended, (16 U.S.C. 1801 *et. seq.*) will not be adversely affected by DASA-ESOH's proposed demonstration project.

DASA-ESOH is proposing to conduct a demonstration project to assess the feasibility of adapting and using a remotely operated technology for the recovery of munitions from the ocean floor and their contained thermal destruction (demilitarization) on an offshore barge within the project area. This action is funded by DASA-ESOH's Research, Development, Test, and Evaluation appropriation and supports activities authorized and directed by the National Defense Authorization Act of 2007. This project would be conducted for approximately twenty-one (21) days starting on or about May 2011 in waters off the coast of Wai'anae, O'ahu, Hawai'i. Enclosure 1 is an internal working draft of the Environmental Assessment developed for this project. We are providing the document to give you a complete description of the project, its implementation, and anticipated impacts.

The MSFCMA defines EFH as "those waters and substrate necessary for spawning, breeding, feeding, or growth to maturity." Waters of the State of Hawai'i that are delineated as EFH include all nearshore waters to varying distances from the shore and to various depths in the water column because of the importance of these waters for the developmental stages of several species. The proposed project site is located within the State's EFH.

Impacts to EFH at the proposed project site could result from turbidity as well as direct damage to corals from placement of anchors and from anchor chain drag. In support of this project, the National Oceanic and Atmospheric Administrations' Office of Response and Restoration is in the process of surveying the marine and benthic resources at the project site to provide recommendations on where to moor and on different levels of caution that will need to be undertaken when recovering munitions from within various regions of the project area that DASA-ESOH's contractors will use to maximize avoidance and minimize impacts to these resources. We also recently received the attached list of Best Management Practices (BMP) for protected marine species (Enclosure 2) from the NOAA staff. Adherence to these BMPs – especially those in Section B – will be required during project execution. We believe these BMPs will avoid or minimize possible adverse effects from project activities on EFH.

We are also mindful and aware of the impacts that accidental in-water detonation of any munitions can have on EFH. However, the munitions at the project site are unfired, unarmed, and largely unfused; therefore, there is very little potential for an accidental in-water detonation. In addition, all demilitarization operations will be performed onboard a barge inside 20-foot connex boxes that are shielded with blast and fragmentation barriers, thus, there will be no in-water explosive impacts to EFH.

Therefore, we have determined that the proposed action will not adversely affect designated EFH for federally-managed fisheries in the Pacific Ocean and seek your concurrence. We welcome any additional conservation measures you may recommend that will supplement the BMPs. If you have any questions please contact Mr. Kevin Nishimura, Environmental Protection Specialist, of my Environmental Programs Branch, at (808) 438-3832, or by e-mail at kevin.h.nishimura@usace.army.mil.

Sincerely,



Anthony J. Paresa, P.E.
Deputy District Engineer for
Programs and Project Management

Enclosures

From: [Nishimura, Kevin H POH](#)
To: [Lleces, Dawn A POH](#)
Subject: FW: EA/EFH Assmt. Tech. Demonstration: ROUMRS, Waianae (UNCLASSIFIED)
Date: Thursday, January 20, 2011 2:36:56 PM

Classification: UNCLASSIFIED
Caveats: FOUO

Dawn,
NOAA's position on EFH

V/R,
Kevin

-----Original Message-----

From: Robert Schroeder [<mailto:Robert.Schroeder@noaa.gov>]
Sent: Thursday, January 20, 2011 2:34 PM
To: Nishimura, Kevin H POH
Subject: Re: EA/EFH Assmt. Tech. Demonstration: ROUMRS, Waianae (UNCLASSIFIED)

Kevin,

Provided the extensive BMPs listed in the Army's draft EA/FONSI are fully and properly implemented, including any additional BMPs that may come from the final CAMP, NOAA-NMFS does not object to the determination that the preferred proposed action for this demonstration project will not cause greater than minimal adverse effects on EFH.

Please let us know if you need anything additional from us, or have questions.

Mahalo,

Bob

Nishimura, Kevin H POH wrote:

> Classification: UNCLASSIFIED
> Caveats: FOUO
>
> Hey Bob,
> Sorry to get back to you so late. I don't think we need a formal
> letter. I just need to confirm with you that there will be no adverse effect on EFH.
>
> V/R,
> Kevin
>
> -----Original Message-----
> From: Robert Schroeder [<mailto:Robert.Schroeder@noaa.gov>]
> Sent: Thursday, January 13, 2011 3:02 PM
> To: Nishimura, Kevin H POH
> Subject: Re: EA/EFH Assmt. Tech. Demonstration: ROUMRS, Waianae
> (UNCLASSIFIED)
>
> Kevin,
>
> Nothing in the mail and didn't plan to send anything else at this
> time, but if you need our comments in the form of a formal letter, we can do.
>



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

December 1, 2010

REPLY TO
ATTENTION OF:

Environmental Programs Branch
Programs and Project Management Division

Ms. Alecia Van Atta
Assistant Regional Administrator - Protected Resources
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Pacific Islands Regional Office
1601 Kapi'olani Blvd., Suite 1110
Honolulu, Hawai'i 96814-4700

Dear Ms. Van Atta:

The U.S. Army Corps of Engineers, Honolulu District (POH), on behalf of the Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (DASA-ESOH), requests consultation with your agency in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended, (16 U.S.C. 1531 *et. seq.*) and the Marine Mammal Protection Act (MMPA) of 1972, as amended (16 U.S.C 1361 *et. seq.*).

DASA-ESOH, with the support of the National Oceanic and Atmospheric Administration's Office of Response and Restoration, is proposing to conduct a demonstration project to assess the feasibility of adapting and using a Remotely Operated Underwater Munitions Recovery System (ROUMRS) for the recovery of munitions from the ocean floor and their contained thermal destruction (demilitarization) on an offshore barge within the project area. This action is funded by DASA-ESOH's Research, Development, Test, and Evaluation appropriation and supports activities authorized and directed by the National Defense Authorization Act of 2007. This project would be conducted for approximately twenty-one (21) days starting on or about May 2011, in waters off the coast of Wai'anae, O'ahu, Hawai'i. Enclosure 1 is an internal working draft of the Environmental Assessment that provides a description of the project, its operation and anticipated impacts to facilitate meaningful consultation.

ESA-listed species that could be expected to occur in or near the action area include the Green and Hawksbill Sea Turtles, the Hawaiian Monk Seal, and Humpback Whales. Spinner and Bottle Nose Dolphins, species protected under the MMPA, may also occur in the project area. Request your concurrence with this listing of species that would be the subject of the consultation. The potential effects of the proposed project to these protected species could result from:

1. Disturbance from human activity and equipment operation.
2. Acoustic disturbance from sonar and transmitter equipment.

3. Collision with vessels.
4. Entanglement with mooring lines, ROUMRS cables, or associated lines.
5. Loss of forage habitat.
6. Exposure to vessel/heavy equipment wastes, fuels and lubricants.

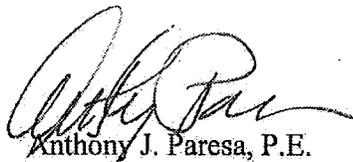
During ongoing informal discussions with your staff, we received the attached list of Best Management Practices (BMPs) for protected marine species (Enclosure 2). We will adhere to these BMPs during execution of this project. We believe that adherence to these BMPs and commencing the project after the end of the whale season will minimize the magnitude and possibility of effects upon protected species, such that they would not reach the scale where a take may occur, and can therefore be considered insignificant or discountable effects.

In addition to the above, we are mindful and aware of the impacts that accidental in-water detonation of any munitions or on the demilitarization vessel can have on the protected species, as well as human life. However, the munitions at the project site are unfired, unarmed, and largely unfused. Therefore, there is very little potential of an accidental in-water or in-oven detonation. Further, all of the demilitarization operations will be performed inside 20-foot connex boxes that are shielded with blast and fragmentation barriers that would muffle any potential acoustic sources. As such, we believe that detonation of any munitions and accompanying acoustic effects would be extremely unlikely to occur, and this possible effect on the listed species can be considered discountable.

Based on the above, we feel that informal consultation with your office is appropriate and sufficient to insure that the proposed activities may affect, but are not likely to adversely affect federally listed species or their designated critical habitat. Your concurrence with this determination is requested within 30 days, in accordance with the consultation requirements of Section 7 of the ESA.

A copy of this letter is being sent to Mr. Gerry Davis, Assistant Regional Administrator – Habitat, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Regional Office, 1601 Kapi'olani Blvd., Suite 1110, Honolulu, Hawai'i 96814-4700 and Dr. Loyal Mehrhoff, Field Supervisor, U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, 300 Ala Moana Boulevard, Room 3-122, Box 50088, Honolulu, Hawai'i 96850. Should you have any questions or require additional information, please contact Mr. Kevin Nishimura, Environmental Protection Specialist, of my Environmental Programs Branch, at (808) 438-3832, or by e-mail at kevin.h.nishimura@usace.army.mil

Sincerely,



Anthony J. Paresa, P.E.
Deputy District Engineer for
Programs and Project Management

Enclosures

UXO Tech Demo Site HI-06 (Ordnance Reef) Waianae, Oahu Best management practices (BMPs) for marine species listed under the Endangered Species Act (ESA).

July 28, 2010

The following BMPs are intended to ensure that the proposed action would have insignificant impacts on ESA-listed marine species, or to diminish the likelihood of impact below the threshold of discountable. Any concurrence by NMFS Protected Resources Division that the proposed action is not likely to adversely affect ESA-listed marine species would be based in large part on the expectation that as a minimum the following BMPs would be implemented. These BMPs are in no way intended to supersede or replace measures required by any other agency including, but not limited to the USFWS, USEPA, or NMFS Habitat Conservation Division.

A. Constant vigilance shall be kept for the presence of ESA-listed marine species during all aspects of the proposed action, particularly in-water activities such as dredging, boat operations, or diving.

1. The project manager shall designate a competent observer to survey the marine areas adjacent to the proposed action for ESA-listed marine species.
2. Surveys shall be made prior to the start of work each day, and prior to resumption of work following any break of more than one half hour. Periodic additional surveys throughout the work day are strongly recommended.
3. All in-water work shall be postponed or halted when ESA-listed marine species are within 50 yards of the proposed work, and shall only begin/resume after the animals have voluntarily departed the area. If ESA-listed marine species are noticed within 50 yards after work has already begun, that work may continue only if, in the best judgment of the project supervisor, that there is no way for the activity to adversely affect the animal(s). For example; divers performing surveys or underwater work (excluding the use of toxic chemicals) are likely safe, whereas the manipulation of UXO by the ROV is likely not.
4. When piloting vessels, vessel operators shall alter course to remain at least 100 yards from whales, and at least 50 yards from other marine mammals and sea turtles.
5. Reduce vessel speed to 10 knots or less when piloting vessels at or within the ranges described above from marine mammals and sea turtles. Operators shall be particularly vigilant to watch for turtles at or near the surface in areas of known or suspected turtle activity, and if practicable, reduce vessel speed to 5 knots or less.
6. If despite efforts to maintain the distances and speeds described above, a marine mammal or turtle approaches the vessel, put the engine in neutral until the animal is at least 50 feet away, and then slowly move away to the prescribed distance.
7. Marine mammals and sea turtles shall not be encircled or trapped between multiple vessels or between vessels and the shore.

8. Do not attempt to feed, touch, ride, or otherwise intentionally interact with any ESA-listed marine species.

B. No contamination of the marine environment shall result from project-related activities.

9. A contingency plan to control petroleum products accidentally spilled during the project shall be developed and followed. Appropriate materials to contain and clean potential spills shall be stored and readily available at the work site.
10. All project-related materials and equipment placed in the water shall be free of pollutants. The project manager and the heavy equipment operator shall perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations shall be postponed or halted should a leak be detected, and will not proceed until the leak is repaired and equipment cleaned.
11. Fueling of project-related vehicles and equipment shall take place at least 50 feet away from the water, preferably over an impervious surface.
12. Turbidity and siltation from project-related work shall be minimized and contained through the appropriate use of effective silt containment devices and the curtailment of work during adverse tidal and weather conditions.
13. A plan shall be developed and followed to prevent construction debris from entering or remaining in the marine environment during the project.



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

December 2, 2010

REPLY TO
ATTENTION OF:

Environmental Programs Branch
Programs and Project Management Division

Pua Aiu, Ph.D., Administrator
Hawai'i State Historic Preservation Division
Department of Land and Natural Resources
601 Kamokila Boulevard, Suite 555
Kapolei, Hawai'i 96707

Dear Dr. Aiu:

The U.S. Army Corps of Engineers, Honolulu District (POH), on behalf of the Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (DASA-ESOH), is proposing to conduct an undertaking to assess the feasibility of adapting and using remotely operated technology for the recovery of munitions from the ocean floor. This action is funded by DASA-ESOH's Research, Development, Test and Evaluation appropriation and supports activities authorized and directed by the National Defense Authorization Act of 2007. The undertaking consists of a technological demonstration and would be conducted for approximately 21 days starting on or about May 2011 in waters off the coast of Wai'anae, O'ahu, Hawai'i.

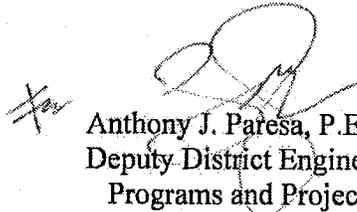
The proposed site for the technology demonstration is identified as Ordnance Reef (Site HI-06), in the FY09 Defense Environmental Programs Annual Report to Congress. Ordnance Reef lies on the western, leeward side of O'ahu and covers an area of approximately 1 nautical mile in length by one-half nautical mile in width (Enclosure 1). The depth of the proposed work area is 30 to 230 feet underwater. The nearest populated settlement areas on O'ahu are Wai'anae, approximately 3 miles to the northeast, and Mā'ili, approximately 5 miles to the east.

The purpose of the technology demonstration is to determine if the new technology of the Remotely Operated Underwater Munitions Recovery System (ROUMRS) is viable for use in the recovery of munitions from the ocean floor off the coast of Wai'anae. The Wai'anae community and elected officials have explicitly expressed their desire for the recovery and destruction of as many of the ocean disposed munitions as can be done. ROUMRS is a remotely operated technology normally used in oil exploration and it has been adapted for the recovery of munitions from the ocean floor. In addition to the recovery operations, DASA-ESOH proposes to destroy (demilitarize) the recovered munitions onsite on a barge. Enclosure 2 provides a brief technical description of the ROUMRS recovery and destruction operations. It is anticipated that the results of this undertaking will also provide the Department of Defense with the technology

and procedures to address other underwater munitions and sites posing an unacceptable risk to human health or the environment.

POH is of the opinion that no significant cultural resources, including ship wrecks, are likely to be present in the project locations. Based on the above project description, POH has made the determination that the project will have 'no effect to historic properties.' In compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and implementing regulations 36 CFR Part 800, POH seeks your office's concurrence with its determination. POH is also consulting, in accordance with the NHPA, the Office of Hawaiian Affairs, and other interested Native Hawaiian organizations and requesting their review comments as well as their *mana'o*. If you have any questions please contact Mr. Kanalei Shun, Senior Archaeologist, of my Environmental Programs Branch, at (808) 438-7000, or by e-mail at kanalei.shun@usace.army.mil.

Sincerely,


Anthony J. Paresa, P.E.
Deputy District Engineer for
Programs and Project Management

Enclosures

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

WILLIAM J. AILA, JR.
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

GUY KAULUKUKUI
INTERIM FIRST DEPUTY

LENORE N. OHYE
ACTING DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

December 22, 2010

Anthony Paresa
Deputy District Engineer
US Army Corps of Engineers
Fort Shafter, Hawaii 96858-5440

LOG NO: 2010.3891
DOC NO: 1012MV09
Archaeology
History & Culture

Dear Mr. Paresa,

**SUBJECT: National Historic Preservation Act (NHPA) Section 106 Review –
Proposed Removal of Military Munitions at Ordinance Reef
Pacific Ocean, Offshore from Poka‘i Bay
Waiānae Ahupua‘a, Waiālua District, Island of O‘ahu
TMK: (1) 8-5 (Offshore)**

Thank you for the opportunity to review this project that was received by our office on December 6, 2010. According to the letter, this project involves the demonstration of using remotely operated technology to retrieve munitions from the ocean floor. The undertaking will be conducted off the Wai‘ānae Coast for approximately 21 days, starting on or near May 2011.

Archaeological Concerns:

Because this project will occur entirely within the offshore waters it is highly unlikely that there are any historic properties located within the area of potential effect. Therefore, we concur with your determination **that no historic properties will be affected** by this undertaking. However, in the event that historic shipwrecks, aviation artifacts, or aids to navigation are encountered during this project please cease work in the immediate vicinity of the find, protect the find from additional disturbance, and contact the State Historic Preservation Division at (808) 692-8015.

History & Culture Concerns:

We are pleased to see that interested Native Hawaiian Organizations are being consulted. The SHPD History & Culture Branch requests additional information regarding potential cultural practices in this area. Is this area a known Ko‘a (fishing ground) where cultural practitioners gather ocean resources for subsistence or recreation? Will this project interfere with fishing practices in the area, either temporarily or long-term? Will the area remain open to the public during project activity? We would appreciate it if you would address these questions prior to receiving a formal concurrence on this undertaking from our division.

Please contact Mike Vitousek at (808) 692-8029 or Michael.Vitousek@Hawaii.gov if you have any questions or comments about this letter,

Aloha,

A handwritten signature in black ink, appearing to read "Theresa K. Donham".

Theresa K. Donham
Acting Archaeology Branch Chief & Deputy SHPO
State Historic Preservation Division

cc: Phyllis Cayan, History & Culture Branch Chief
William Aila, Interim Chairperson DLNR



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96868-6440

December 2, 2010

REPLY TO
ATTENTION OF:

Environmental Programs Branch
Programs and Project Management Division

Mr. Clyde Nāmu'o
Chief Executive Officer
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawai'i 96813

Dear Mr. Nāmu'o:

The U.S. Army Corps of Engineers, Honolulu District (POH), on behalf of the Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (DASA-ESOH), is proposing to conduct an undertaking to assess the feasibility of adapting and using remotely operated technology for the recovery of munitions from the ocean floor. This action is funded by the Army's Research, Development, Test and Evaluation appropriation and supports activities authorized and directed by the National Defense Authorization Act of 2007. The undertaking consists of a technological demonstration and would be conducted for approximately 21 days starting on or about May 2011 in waters off the coast of Wai'anae, O'ahu, Hawai'i.

The proposed site for the technology demonstration is identified as Ordnance Reef (Site HI-06), in the FY09 Defense Environmental Programs Annual Report to Congress. Ordnance Reef lies on the western, leeward side of O'ahu and covers an area of approximately 1 nautical mile in length by one-half nautical mile in width (Enclosure 1). The depth of the proposed work area is 30 to 230 feet underwater. The nearest populated settlement areas on O'ahu are Wai'anae, approximately 3 miles to the northeast, and Mā'ili, approximately 5 miles to the east.

The purpose of the technology demonstration is to determine if the new technology of the Remotely Operated Underwater Munitions Recovery System (ROUMRS) is viable for use in the recovery of munitions from the ocean floor off the coast of Wai'anae. The Wai'anae community and elected officials have explicitly expressed their desire for the recovery and destruction of as many of the ocean disposed munitions as can be done. ROUMRS is a remotely operated technology normally used in oil exploration and it has been adapted for the recovery of munitions from the ocean floor. In addition to the recovery operations, DASA-ESOH proposes to destroy (demilitarize) the recovered munitions onsite on a barge. Enclosure 2 provides a brief technical description of the ROUMRS recovery and destruction operations. It is anticipated that the results of this undertaking will also provide the Department of Defense with the technology

and procedures to address other underwater munitions and sites posing an unacceptable risk to human health or the environment.

POH is of the opinion that no significant cultural resources, including ship wrecks, are likely to be present in the project locations. Based on the above project description, POH has made the determination that the project will have 'no effect to historic properties.' In compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and implementing regulations 36 CFR Part 800, POH seeks your office's review comments on its determination. POH is also consulting, in accordance with the NHPA, Hawai'i State Historic Preservation Division, and other interested Native Hawaiian organizations and requesting their review comments as well as their *mana'o*. If you have any questions please contact Mr. Kanalei Shun, Senior Archaeologist, of my Environmental Programs Branch, at (808) 438-7000, or by e-mail at kanalei.shun@usace.army.mil.

Sincerely,


* Anthony J. Paresa, P.E.
Deputy District Engineer for
Programs and Project Management

Enclosures



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAII 96813

COPY

HRD10/5429

December 9, 2010

Anthony Paresa, Deputy District Engineer
Department of the Army
U.S. Army Corps of Engineers, Honolulu District
Fort Shafter, Hawaii 96858-5440

**Re: National Historic Preservation Act consultation
Munitions Removal Technology Testing
Wai'anae Coast, Island of O'ahu**

Aloha e Mr. Paresa,

The Office of Hawaiian Affairs (OHA) is in receipt of your December 2, 2010 letter requesting comments on a proposal consisting of a 21 day technological demonstration to assess the feasibility of adapting and using remotely operated technology (technology) for the recovery of munitions from the ocean floor (undertaking) proposed by the Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (DASA-ESOH). Funding from the Army's Research, Development, Test and Evaluation appropriation will support the undertaking which is authorized by the National Defense Authorization Act of 2007.

The undertaking will occur along the Wai'anae Coast of the Island of Oa'hu in water ranging in depths from 30 to 230 feet in an area measuring 1 nautical mile by 0.5 nautical mile in size which is indentified as "Ordinance Reef" (depicted in "Enclosure 1" of your letter). The 21 day demonstration period will determine whether the technology is viable for use in the continued recovery of munitions from the ocean floor off of the Wai'anae Coast and other areas in the future. Munitions recovered during the demonstration period will be destroyed on a barge onsite. "Enclosure 2" of your letter provides details on the technology.

The undertaking is part of the response from the DASA-ESOH to the Wai'anae community's expressed desire for the removal of ocean disposed munitions. OHA offers our complete support to the Wai'ane Community on this matter.

Your letter details a determination that the undertaking will have "no adverse effect" on historic properties pursuant to the provisions of the National Historic Preservation Act. While the information available to us at this time indicates that the area of potential effect for the undertaking is along the ocean floor and thus, the "no adverse" effect determination appears to be appropriate, OHA would like to see consultation with the Wai'anae community completed

before concurring as we want to ensure any of their concerns have been adequately addressed. Please keep us updated on the status of your consultation and whether any public meetings on the undertaking will be held.

OHA appreciates the DASA-ESOH and U.S. Army Corps of Engineers taking steps to address this most important matter. Should you have any questions, please contact Keola Lindsey, at (808) 594-1904 or keolal@oha.org.

'O wau iho nō me ka 'oia'i'o,



Clyde W. Nāmu'o
Chief Executive Officer

C: William Aila, Jr.- State of Hawai'i Historic Preservation Officer

APPENDIX F

ESA and MMPA Consultation



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Pacific Islands Regional Office
1601 Kapiolani Blvd., Suite 1110
Honolulu, Hawaii 96814-4700
(808) 944-2200 • Fax (808) 973-2941

JAN 19 2011

Mr. Anthony J. Paresa, P.E.
Deputy District Engineer for
Programs and Project Management
Department of the Army
U.S. Army Corps of Engineers, Honolulu District
Ft. Shafter, Hawaii 96858-5440

Dear Mr. Paresa:

This letter responds to the Department of the Army's (DOA) December 1, 2010 letter concerning the demonstration project to assess the feasibility of adapting and using a Remotely Operated Underwater Munitions Recovery System (ROUMRS) for the recovery of munitions from the ocean floor and the contained thermal destruction of recovered munitions on a barge, anchored off the coast of Waianae, Oahu (DOA 2010a). In the letter, you determined that the proposed action is not likely to adversely affect green and hawksbill sea turtles, Hawaiian monk seals, and humpback whales. The letter also requested our concurrence under section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. §1531 et seq.), with that determination.

Proposed Action/Action Area: The action is described in your letter (DOA 2010) and in the attached Environmental Assessment (DOA 2010b). In summary, the proposed action consists of the DOA Office of Environmental, Safety and Occupational Health, with the support of the National Oceanic and Atmospheric Administration's Office of Response and restoration, operating the ROUMRS remotely operated vehicle (ROV) at three locations adjacent to the Waianae Small Boat Harbor, to remove previously disposed munitions from the nearshore reef. Recovered munitions would be taken to an offshore barge where they would be opened and the explosive agents rendered non-explosive within special chambers. The evaluation is expected to begin in May 2011 and take about 21 days to complete. The project includes best management practices (BMPs) specifically requested by the Protected Resources Division of the National Marine Fisheries Service's Pacific Islands Regional Office, including a safety range of 63 meters between ROV operations and protected species. The action area for this project is estimated to be the in-water area within a 160-meter radius arc around the ROV, within which, the acoustic signature could reach 120 dB re 1 μ Pa. The action area also includes the down-current extent of any plumes that may result from discharges of sediments, wastes, or toxic chemicals such as fuels and/or lubricants associated with any machinery used for this activity.

Species That May Be Affected: Based on preferred habitats, sighting information, and project location and scope, green sea turtles (*Chelonia mydas*), hawksbill sea turtles (*Eretmochelys imbricata*), humpback whales (*Megaptera novaeangliae*), and Hawaiian monk seals (*Monachus schauinslandi*) are the only ESA-listed species under NMFS jurisdiction that are known to occur,



or could reasonably be expected to occur in the vicinity of the proposed action area. Detailed information to describe the biology, habitat, and conservation status for these animals can be found in their recovery plans and other sources at <http://www.nmfs.noaa.gov/pr/species/turtles/> and <http://www.nmfs.noaa.gov/pr/species/mammals/>.

Critical Habitat: There is no designated or proposed critical habitat for any listed marine species within or adjacent to the action area. Therefore, this project would have no effect on designated or proposed critical habitat for marine species.

Analysis of Effects: In order to determine that a proposed action is not likely to adversely affect listed species, NMFS must find that the effects of the proposed action are expected to be insignificant, discountable, or beneficial as defined in the joint USFWS-NMFS Endangered Species Consultation Handbook: (1) insignificant effects relate to the size of the impact and should never reach the scale where take occurs; (2) discountable effects are those that are extremely unlikely to occur; and (3) beneficial effects are positive effects without any adverse effects (USFWS & NMFS 1998). This standard, as well as consideration of the probable duration, frequency, and severity of potential interactions between the marine listed species and the proposed action, were applied during the analysis of effects on ESA-listed marine species, as is described in detail in your letter and the attached Environmental Assessment. The analysis considered potential stressors and impacts to marine listed species, the most likely of which are: 1) Disturbance from human activity and equipment operation; 2) Acoustic disturbance from ROV operation; 3) Collision with vessels; 4) Entanglement with cables and lines; 5) Loss of forage habitat; 6) Exposure to wastes and discharges; and 7) Effects of accidental detonation.

The DOA based its effects determination on the impact analysis provided in the EA (DOA 2010b), which with the exception of acoustic impacts, adequately assessed potential impacts on protected marine species. Based on the impact analysis provided in the EA, NMFS agrees that potential stressors 1, and 3 through 7 would result in insignificant impacts, or the likelihood of impacts would be discountable. The EA's acoustic impact analysis focused solely on the sonar and transmitter equipment, ignoring potential acoustic impacts from ROV operation in general, which are analyzed below.

Acoustic disturbance from ROV operation: The information provided to describe the sonars that would be employed (Tritech 2010a & b) indicates that the operating frequencies are at or above 300 kHz. As described below, this is well above the expected hearing range of the species considered in this consultation. Based on the information provided in the Final Acoustic Test Report for the Comanche ROV (ATI 2010), the loudest sounds would be caused by the thrusters and by hydraulic pumps. The noise from these systems is continuous in nature (non-impulsive), suggesting that 120 dB re 1 μ Pa is the appropriate threshold for temporary threshold shifts (TTS) and behavioral disturbance for marine mammals (Southall et. al. 2007). Although no similar threshold has yet been established for sea turtles, NMFS expects that the use of this threshold would be conservative in favor of the turtles. The overall acoustic signature of the ROUMRS ROV, above 120 dB re 1 μ Pa, is between about 100 Hz and 79 kHz. At its loudest (100% thruster power), the maximum reported source level is 152.6 dB re 1 μ Pa. At 75% thruster power, the source level drops to 147.3 dB re 1 μ Pa. The thrusters are quieter than the hydraulic pumps at idle at power settings of 50% and lower. With the thrusters at 0 % and the hydraulic

pumps at 0 psi (quietest operational setting), the maximum reported source level drops to 145.7 dB re 1 μ Pa.

Accurately predicting received noise levels at a given range (isopleth) requires complex equations and detailed information that is rarely available. The equation “ $RL = SL - 20\text{Log}R$ ” is used to calculate spherical spreading loss, and “ $RL = SL - 10\text{Log}R$ ” is used for cylindrical spreading (RL = received level; SL = source level; and R = range in meters). Actual spreading loss is typically somewhere between spherical and cylindrical, with absorption and scattering increasing the loss. Consequently, predictions are often made by estimating transmission loss using an equation with a spreading coefficient between -20 and -10. To account for the acoustic environment expected within the action area, $RL = SL - 15\text{Log}R$ was used to estimate transmission loss and ranges to threshold isopleths, resulting in 159 meters to the 120 dB isopleth for 100% power, 63 meters for 75% power, and 54 meters for 0% thruster power and hydraulic pumps at idle. The contractors expect that ROV operations would occasionally require thrusters to be operated at 50 - 75 %, but the majority of the time thrusters would be operated between 0 and 50% power. ROV operations above 75% power are not expected but could occur if operational safety requires it (DOA 2011).

Southall (et. al. 2007) divides marine mammals into five functional hearing groups: Low-frequency cetaceans (7 Hz to 22 kHz); Mid-frequency cetaceans (150 Hz to 160 kHz); High-frequency cetaceans (200 Hz to 180 kHz); Pinnipeds in water (75 Hz to 75 kHz); and pinnipeds in air (75 Hz to 30 kHz). Humpback whales are in the Low-frequency group. Hawaiian monk seals are in-water pinnipeds. Turtle hearing research is limited, but available information suggests that they are low frequency specialists. Greens are thought to be most acoustically sensitive between 200 and 700 hertz (Hz) (Ridgway *et al.* 1969). Loggerhead turtle (*Caretta carretta*) hearing is very similar to that of greens, being most sensitive between 250 and 1,000 Hz (Bartol *et al.* 1999). No specific information is available for hawksbills. However, based on the similarity in hearing between greens and loggerheads, and the hawksbill’s close taxonomic relationship to these species, NMFS considers it likely that hawksbill hearing is also similarly specialized for low frequencies. Existing information about sea turtle sensory biology also suggests that sea turtles rely more heavily on visual cues, rather than auditory, to initiate threat avoidance (Hazel *et al.* 2007). This suggests that sea turtles are less acoustically dependant than marine mammals. However, because the hearing range of the four species considered in this analysis overlaps with the expected frequency range of the ROUMRS ROV, NMFS considers it likely that they can all hear and respond to ROV noise.

Few humpback whales are expected to remain in the Hawaiian Islands when this project is expected to take place in May, and monk seals are uncommon in the area. Thus the potential for ESA-listed marine mammals to be exposed is expected to be low. Additionally, the 63-meter stand off from the ROV for protected species would ensure that no ESA-listed species are exposed to continuous noise above 120 dB. Based on the available information NMFS expects that exposure to ROV noise will be non-injurious to the marine mammals and sea turtles considered in this consultation, and further expects that at most, any exposures could result in an insignificant level of behavioral disturbance in the form of temporary avoidance of areas within 63 meters of the ROV. Based on this, NMFS agrees that acoustic disturbance from ROV operation would result in insignificant impacts for ESA-listed sea turtles and marine mammals.

Conclusion: NMFS concurs with your determination that performance of the technical demonstration of the ROUMRS, including the thermal destruction of recovered munitions, off Waianae, Oahu, Hawaii is not likely to adversely affect ESA-listed marine species or their designated critical habitat. Our concurrence is based on the finding that the effects of the proposed action are expected to be insignificant, discountable, or beneficial as defined in the joint USFWS-NMFS Endangered Species Consultation Handbook (USFWS-NMFS 1998) and summarized at the beginning of the Analysis of Effects section above. This concludes your consultation responsibilities under the ESA for species under NMFS jurisdiction. However, this consultation focused solely on compliance with the ESA. Additional compliance review that may be required of NMFS for this action (such as assessing impacts on Essential Fish Habitat) would be completed by NMFS Habitat Conservation Division in separate communication, if applicable.

ESA Consultation must be reinitiated if: 1) a take occurs; 2) new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent not previously considered; 3) the identified action is subsequently modified in a manner causing effects to listed species or designated critical habitat not previously considered; or 4) a new species is listed or critical habitat designated that may be affected by the identified action.

If you have further questions please contact Donald Hubner on my staff at (808) 944-2233. Thank you for working with NMFS to protect our nation's living marine resources.

Sincerely,



Michael D. Tosatto
Regional Administrator

Cc: Alan Everson, Habitat Conservation Division, NMFS/PIRO, Honolulu
Patrice Ashfield, ESA Section 7 Program Coordinator, USFWS, Honolulu
Paula Levin, Coastal Conservation, USFWS, Honolulu

NMFS File No. (PCTS): I/PIR/2010/06136
PIRO Reference No.: I-PI-10-836-LVA

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---. 2010b. Environmental Assessment and Draft Finding of No Significant Impact [for] Technology Demonstration: Remotely Operated Underwater Munitions Recovery System (ROUMRS) and Energetic Hazard Demilitarization System (EHDS) at Site HI-06, Ordnance Reef Waianae, Oahu, Hawaii. November 18, 2010.

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http://www.nmfs.noaa.gov/pr/pdfs/laws/esa_section7_handbook.pdf



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

December 1, 2010

REPLY TO
ATTENTION OF:

Environmental Programs Branch
Programs and Project Management Division

Ms. Alecia Van Atta
Assistant Regional Administrator - Protected Resources
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Pacific Islands Regional Office
1601 Kapi'olani Blvd., Suite 1110
Honolulu, Hawai'i 96814-4700

Dear Ms. Van Atta:

The U.S. Army Corps of Engineers, Honolulu District (POH), on behalf of the Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (DASA-ESOH), requests consultation with your agency in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended, (16 U.S.C. 1531 *et. seq.*) and the Marine Mammal Protection Act (MMPA) of 1972, as amended (16 U.S.C 1361 *et. seq.*).

DASA-ESOH, with the support of the National Oceanic and Atmospheric Administration's Office of Response and Restoration, is proposing to conduct a demonstration project to assess the feasibility of adapting and using a Remotely Operated Underwater Munitions Recovery System (ROUMRS) for the recovery of munitions from the ocean floor and their contained thermal destruction (demilitarization) on an offshore barge within the project area. This action is funded by DASA-ESOH's Research, Development, Test, and Evaluation appropriation and supports activities authorized and directed by the National Defense Authorization Act of 2007. This project would be conducted for approximately twenty-one (21) days starting on or about May 2011, in waters off the coast of Wai'anae, O'ahu, Hawai'i. Enclosure 1 is an internal working draft of the Environmental Assessment that provides a description of the project, its operation and anticipated impacts to facilitate meaningful consultation.

ESA-listed species that could be expected to occur in or near the action area include the Green and Hawksbill Sea Turtles, the Hawaiian Monk Seal, and Humpback Whales. Spinner and Bottle Nose Dolphins, species protected under the MMPA, may also occur in the project area. Request your concurrence with this listing of species that would be the subject of the consultation. The potential effects of the proposed project to these protected species could result from:

1. Disturbance from human activity and equipment operation.
2. Acoustic disturbance from sonar and transmitter equipment.

3. Collision with vessels.
4. Entanglement with mooring lines, ROUMRS cables, or associated lines.
5. Loss of forage habitat.
6. Exposure to vessel/heavy equipment wastes, fuels and lubricants.

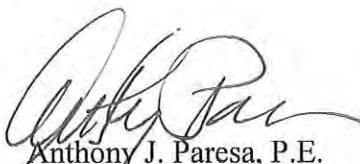
During ongoing informal discussions with your staff, we received the attached list of Best Management Practices (BMPs) for protected marine species (Enclosure 2). We will adhere to these BMPs during execution of this project. We believe that adherence to these BMPs and commencing the project after the end of the whale season will minimize the magnitude and possibility of effects upon protected species, such that they would not reach the scale where a take may occur, and can therefore be considered insignificant or discountable effects.

In addition to the above, we are mindful and aware of the impacts that accidental in-water detonation of any munitions or on the demilitarization vessel can have on the protected species, as well as human life. However, the munitions at the project site are unfired, unarmed, and largely unfused. Therefore, there is very little potential of an accidental in-water or in-oven detonation. Further, all of the demilitarization operations will be performed inside 20-foot connex boxes that are shielded with blast and fragmentation barriers that would muffle any potential acoustic sources. As such, we believe that detonation of any munitions and accompanying acoustic effects would be extremely unlikely to occur, and this possible effect on the listed species can be considered discountable.

Based on the above, we feel that informal consultation with your office is appropriate and sufficient to insure that the proposed activities may affect, but are not likely to adversely affect federally listed species or their designated critical habitat. Your concurrence with this determination is requested within 30 days, in accordance with the consultation requirements of Section 7 of the ESA.

A copy of this letter is being sent to Mr. Gerry Davis, Assistant Regional Administrator – Habitat, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Regional Office, 1601 Kapi'olani Blvd., Suite 1110, Honolulu, Hawai'i 96814-4700 and Dr. Loyal Mehrhoff, Field Supervisor, U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, 300 Ala Moana Boulevard, Room 3-122, Box 50088, Honolulu, Hawai'i 96850. Should you have any questions or require additional information, please contact Mr. Kevin Nishimura, Environmental Protection Specialist, of my Environmental Programs Branch, at (808) 438-3832, or by e-mail at kevin.h.nishimura@usace.army.mil

Sincerely,



Anthony J. Paresa, P.E.
Deputy District Engineer for
Programs and Project Management

Enclosures

UXO Tech Demo Site HI-06 (Ordnance Reef) Waianae, Oahu Best management practices (BMPs) for marine species listed under the Endangered Species Act (ESA).

July 28, 2010

The following BMPs are intended to ensure that the proposed action would have insignificant impacts on ESA-listed marine species, or to diminish the likelihood of impact below the threshold of discountable. Any concurrence by NMFS Protected Resources Division that the proposed action is not likely to adversely affect ESA-listed marine species would be based in large part on the expectation that as a minimum the following BMPs would be implemented. These BMPs are in no way intended to supersede or replace measures required by any other agency including, but not limited to the USFWS, USEPA, or NMFS Habitat Conservation Division.

A. Constant vigilance shall be kept for the presence of ESA-listed marine species during all aspects of the proposed action, particularly in-water activities such as dredging, boat operations, or diving.

1. The project manager shall designate a competent observer to survey the marine areas adjacent to the proposed action for ESA-listed marine species.
2. Surveys shall be made prior to the start of work each day, and prior to resumption of work following any break of more than one half hour. Periodic additional surveys throughout the work day are strongly recommended.
3. All in-water work shall be postponed or halted when ESA-listed marine species are within 50 yards of the proposed work, and shall only begin/resume after the animals have voluntarily departed the area. If ESA-listed marine species are noticed within 50 yards after work has already begun, that work may continue only if, in the best judgment of the project supervisor, that there is no way for the activity to adversely affect the animal(s). For example; divers performing surveys or underwater work (excluding the use of toxic chemicals) are likely safe, whereas the manipulation of UXO by the ROV is likely not.
4. When piloting vessels, vessel operators shall alter course to remain at least 100 yards from whales, and at least 50 yards from other marine mammals and sea turtles.
5. Reduce vessel speed to 10 knots or less when piloting vessels at or within the ranges described above from marine mammals and sea turtles. Operators shall be particularly vigilant to watch for turtles at or near the surface in areas of known or suspected turtle activity, and if practicable, reduce vessel speed to 5 knots or less.
6. If despite efforts to maintain the distances and speeds described above, a marine mammal or turtle approaches the vessel, put the engine in neutral until the animal is at least 50 feet away, and then slowly move away to the prescribed distance.
7. Marine mammals and sea turtles shall not be encircled or trapped between multiple vessels or between vessels and the shore.

APPENDIX G

Fish and Wildlife Coordination Act Consultation



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

December 1, 2010

REPLY TO
ATTENTION OF:

Environmental Programs Branch
Programs and Project Management Division

Dr. Loyal Mehrhoff
Field Supervisor
U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Box 50088
Honolulu, Hawai'i 96850

Dear Dr. Mehrhoff:

The U.S. Army Corps of Engineers, Honolulu District (POH), on behalf of the Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (DASA-ESOH), requests consultation with your agency and a Planning Aid Letter (PAL) in accordance with the Fish and Wildlife Coordination Act of 1934, as amended (16 U.S.C. 661 *et seq.*).

DASA-ESOH is proposing to conduct a demonstration project to assess the feasibility of adapting and using a Remotely Operated Underwater Munitions Recovery System (ROUMRS) for the recovery of munitions from the ocean floor and their contained thermal destruction (demilitarization) on an offshore barge within the project area. This action is funded by DASA-ESOH's Research, Development, Test, and Evaluation appropriation and supports activities authorized and directed by the National Defense Authorization Act of 2007. This project would be conducted for approximately twenty-one (21) days starting on or about May 2011 in waters off the coast of Wai'anae, O'ahu, Hawai'i. Enclosure 1 is an internal working draft of the Environmental Assessment that provides a description of the project, its operation and anticipated impacts to facilitate meaningful consultation.

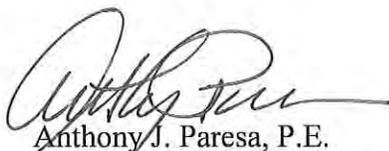
In support of this project, the National Oceanic and Atmospheric Administrations' Office of Response and Restoration (NOAA-OR&R) is in the process of surveying the marine and benthic resources at the project site to provide recommendations on where to moor and on different levels of caution that will need to be undertaken when recovering munitions from within various regions of the project area. DASA-ESOH's contractors will use this survey information to maximize avoidance and minimize impacts to these resources. We also recently received the attached list of best management practices (BMPs) from NOAA Office of Protected Resources for protecting marine species. We will adhere to these BMPs and commence the project after the

whale season in order to further avoid or minimize possible adverse effects of the proposed activity on marine species. In addition to NOAA-OR&R, we are also consulting with the following agencies for the necessary permits and authorizations:

<u>Agency</u>	<u>Permit/Authorization</u>
NOAA- National Marine Fisheries Service	Essential Fish Habitat
POH Regulatory Branch	Section 10 Permit
Hawai'i Dept of Business, Economic Development and Tourism Office of Planning	CZM Consistency
Hawai'i Dept of Land & Natural Resources	Right of Entry
Hawai'i Dept. of Health	Air Permit

Your prompt attention to issuance of the PAL would be appreciated. A copy of this letter will be furnished to the following NOAA personnel; Mr. Gerry Davis, Assistant Regional Administrator – Habitat and Ms. Alecia Van Atta, Assistant Regional Administrator – Protected Resources, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Regional Office, 1601 Kapi'olani Boulevard, Suite 1110, Honolulu, Hawai'i 96814-4700. If you have any questions or require additional information, please contact Mr. Kevin Nishimura, Environmental Protection Specialist, of my Environmental Programs Branch, at (808) 438-3832, or by e-mail at kevin.h.nishimura@usace.army.mil.

Sincerely,



Anthony J. Paresa, P.E.
Deputy District Engineer for
Programs and Project Management

Enclosures

APPENDIX H

Magnuson-Stevens Fishery Conservation and Management Act – EFH Consultation



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

December 1, 2010

REPLY TO
ATTENTION OF:

Environmental Programs Branch
Programs and Project Management Division

Mr. Gerry Davis
Assistant Regional Administrator - Habitat
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Pacific Islands Regional Office
1601 Kapi'olani Blvd., Suite 1110
Honolulu, Hawai'i 96814-4700

Dear Mr. Davis:

The U.S. Army Corps of Engineers, Honolulu District (POH), on behalf of the Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (DASA-ESOH), seeks your concurrence with our determination that Essential Fish Habitat (EFH) identified and conserved under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) of 1976, as amended, (16 U.S.C. 1801 *et. seq.*) will not be adversely affected by DASA-ESOH's proposed demonstration project.

DASA-ESOH is proposing to conduct a demonstration project to assess the feasibility of adapting and using a remotely operated technology for the recovery of munitions from the ocean floor and their contained thermal destruction (demilitarization) on an offshore barge within the project area. This action is funded by DASA-ESOH's Research, Development, Test, and Evaluation appropriation and supports activities authorized and directed by the National Defense Authorization Act of 2007. This project would be conducted for approximately twenty-one (21) days starting on or about May 2011 in waters off the coast of Wai'anae, O'ahu, Hawai'i. Enclosure 1 is an internal working draft of the Environmental Assessment developed for this project. We are providing the document to give you a complete description of the project, its implementation, and anticipated impacts.

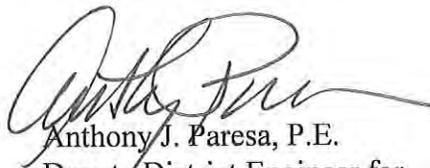
The MSFCMA defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Waters of the State of Hawai'i that are delineated as EFH include all nearshore waters to varying distances from the shore and to various depths in the water column because of the importance of these waters for the developmental stages of several species. The proposed project site is located within the State's EFH.

Impacts to EFH at the proposed project site could result from turbidity as well as direct damage to corals from placement of anchors and from anchor chain drag. In support of this project, the National Oceanic and Atmospheric Administrations' Office of Response and Restoration is in the process of surveying the marine and benthic resources at the project site to provide recommendations on where to moor and on different levels of caution that will need to be undertaken when recovering munitions from within various regions of the project area that DASA-ESOH's contractors will use to maximize avoidance and minimize impacts to these resources. We also recently received the attached list of Best Management Practices (BMP) for protected marine species (Enclosure 2) from the NOAA staff. Adherence to these BMPs – especially those in Section B – will be required during project execution. We believe these BMPs will avoid or minimize possible adverse effects from project activities on EFH.

We are also mindful and aware of the impacts that accidental in-water detonation of any munitions can have on EFH. However, the munitions at the project site are unfired, unarmed, and largely unfused; therefore, there is very little potential for an accidental in-water detonation. In addition, all demilitarization operations will be performed onboard a barge inside 20-foot connex boxes that are shielded with blast and fragmentation barriers, thus, there will be no in-water explosive impacts to EFH.

Therefore, we have determined that the proposed action will not adversely affect designated EFH for federally-managed fisheries in the Pacific Ocean and seek your concurrence. We welcome any additional conservation measures you may recommend that will supplement the BMPs. If you have any questions please contact Mr. Kevin Nishimura, Environmental Protection Specialist, of my Environmental Programs Branch, at (808) 438-3832, or by e-mail at kevin.h.nishimura@usace.army.mil.

Sincerely,



Anthony J. Paresa, P.E.
Deputy District Engineer for
Programs and Project Management

Enclosures

APPENDIX I *

NHPA Section 106 Consultation

* Note: Some of the information presented in this appendix has since been revised. All current information is contained in the Environmental Assessment and Draft Finding of No Significant Impact.



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

February 24, 2011

REPLY TO
ATTENTION OF:

Environmental Programs Branch
Programs and Project Management Division

Mr. Clyde Nāmu'o
Chief Executive Officer
Office of Hawaiian Affairs
711 Kapi'olani Blvd., Suite 500
Honolulu, Hawai'i 96813

Dear Mr. Nāmu'o:

Thank you for your response to our letter dated December 9, 2010, in regards to the proposed undertaking to assess the feasibility of adapting and using remotely operated technology for the recovery of munitions from the ocean floor at Ordnance Reef (Site HI-06), off the Wai'anae Coast on the Island of O'ahu (Wai'anae ahupua'a, District of Wai'anae) (reference HRD10/5429). In the response letter, the Office of Hawaiian Affairs requested that consultation with the Wai'anae Community be completed before issuing a formal concurrence to ensure community concerns have been adequately addressed.

Throughout the entire process of this project, public outreach efforts have been extensive and public response and input has been consistent. To ensure that the Wai'anae Community was involved with the proposed undertaking, the Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (DASA-ESOH) and the community formed the Ordnance Reef Community Council (ORCC), which is composed of representatives from other federal agencies, the State of Hawai'i, and leaders and community members from local communities potentially affected by the underwater military munitions (UWMM) present at Ordnance Reef. The ORCC has been an active vehicle for public participation, providing a forum for the exchange of information regarding community concerns and activities at the site.

The first ORCC meeting was held in May 2007. ORCC meetings held to date include:

- May 25, 2007 (Hale 'Ikena, Fort Shafter)
- September 18, 2007 (Hale 'Ikena, Fort Shafter)
- January 31, 2008 (Pililā'au Beach Club, Wai'anae)
- February 13, 2008 (Kapolei Hale)
- April 16, 2008 (JW Marriott Ihilani)
- October 29, 2009 (JW Marriott Ihilani)

- February 24, 2009 (Kapolei Hale)
- August 5, 2009 (Kamehameha Schools Community Learning Center, Nānākuli)
- December 2, 2009 (Pililā'au Army Recreation Center)
- June 3, 2010 (Pililā'au Army Recreation Center)
- November 17, 2010 (Wai'anae District Park)

Due to the large geographical area that the Wai'anae Neighborhood Board represented, it recently split into two boards to better represent the various constituencies along the leeward coast. The Wai'anae Coast Neighborhood Board and the newly-formed Nānākuli-Mā'ili Neighborhood Board are both represented on the ORCC. Joint neighborhood board meetings of the Wai'anae Coast and Nānākuli-Mā'ili Neighborhood Boards have been held on October 29, 2008; August 5, 2009; December 3, 2009; and November 18, 2010. The next ORCC meeting is tentatively scheduled for the spring of 2011.

The DASA-ESOH has conducted outreach through various community groups (e.g., churches, civic organizations, schools) and through its presence at community events. Among the information the DASA-ESOH has and continues to distribute are 3Rs (Recognize, Retreat, Report) Explosives Safety Educational material, Fact Sheets, and both the Defense Information Exchange and USACE websites.

Public involvement activities include surveys, and solicitation of comments, questions, and suggestions. These activities take place at community events, neighborhood meetings, and at educational presentations to various community and/or civic groups. Information gathered is shared with the ORCC to keep them abreast of community issues and concern.

In addition to establishing the ORCC, the DASA-ESOH has taken an inclusive and collaborative approach to addressing UWMM in Hawai'i. For example, the University of Hawai'i and the State of Hawai'i Department of Land and Natural Resources' Division of Aquatic Resources were involved in National Oceanic and Atmospheric Administration (NOAA) surveys as supporting agencies and continue to be involved with an ongoing remedial investigation. In addition to direct involvement, the DASA-ESOH has also coordinated and consulted with various government agencies and private organizations regarding the demonstration projects.

Also, through ongoing public outreach with the ORCC and oral interviews conducted with community members, participants, including Mr. William Aila, Jr., cultural practitioner on the Wai'anae Coast, expressed their belief that the demonstration project would have no significant impact on any cultural resources. The offshore work areas do not hold any particular cultural significance to Native Hawaiians. Most activities such as fishing, diving, canoeing and gathering of limu take place closer to the shore. Interviewees also said that they did not know of the presence of any significant cultural resources in any of the offshore work area, adding that the cultural legacy lives on in legends and chants. Participants also acknowledge that the project

might pose a temporary inconvenience to cultural and recreation activities, specifically fishing and tour boat operations but have, nevertheless, lobbied for the proposed project to be done.

Lastly, the U.S. Army Corps of Engineers, Honolulu District, on behalf of the DASA-ESOH is currently preparing an environmental assessment for the proposed project in which historic and cultural resource impacts are considered. A literature review of cultural impact assessments conducted for projects located along the Wai'anāe coast revealed no offshore historic, cultural or archaeological resources within the offshore areas that comprise the project site. Surveys conducted by NOAA, in support of the technology demonstration, have not encountered any evidence that would suggest that sensitive historic, archaeological or cultural sites exist at Ordnance Reef.

The DASA-ESOH will incorporate into their work plan, the community members' requests to locate the demilitarization support vessel away from the artificial reef in the area to avoid affecting recreational activities and commercial tour operations there. Other requests will be considered and may be incorporated pending safety requirements and restrictions.

If you have any questions please contact Mr. Kanalei Shun, Senior Archaeologist, of my Environmental Programs Branch, at (808) 438-7000 or by e-mail at kanalei.shun@usace.army.mil.

Sincerely,



Anthony J. Paresa, P.E.
Deputy District Engineer for
Programs and Project Management

Enclosure



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAII 96813

COPY

HRD10/5429

December 9, 2010

Anthony Paresa, Deputy District Engineer
Department of the Army
U.S. Army Corps of Engineers, Honolulu District
Fort Shafter, Hawaii 96858-5440

**Re: National Historic Preservation Act consultation
Munitions Removal Technology Testing
Wai'anae Coast, Island of O'ahu**

Aloha e Mr. Paresa,

The Office of Hawaiian Affairs (OHA) is in receipt of your December 2, 2010 letter requesting comments on a proposal consisting of a 21 day technological demonstration to assess the feasibility of adapting and using remotely operated technology (technology) for the recovery of munitions from the ocean floor (undertaking) proposed by the Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (DASA-ESOH). Funding from the Army's Research, Development, Test and Evaluation appropriation will support the undertaking which is authorized by the National Defense Authorization Act of 2007.

The undertaking will occur along the Wai'anae Coast of the Island of Oa'hu in water ranging in depths from 30 to 230 feet in an area measuring 1 nautical mile by 0.5 nautical mile in size which is indentified as "Ordinance Reef" (depicted in "Enclosure 1" of your letter). The 21 day demonstration period will determine whether the technology is viable for use in the continued recovery of munitions from the ocean floor off of the Wai'anae Coast and other areas in the future. Munitions recovered during the demonstration period will be destroyed on a barge onsite. "Enclosure 2" of your letter provides details on the technology.

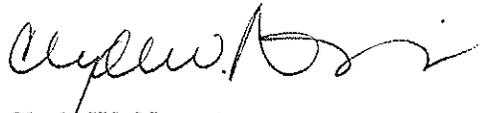
The undertaking is part of the response from the DASA-ESOH to the Wai'anae community's expressed desire for the removal of ocean disposed munitions. OHA offers our complete support to the Wai'ane Community on this matter.

Your letter details a determination that the undertaking will have "no adverse effect" on historic properties pursuant to the provisions of the National Historic Preservation Act. While the information available to us at this time indicates that the area of potential effect for the undertaking is along the ocean floor and thus, the "no adverse" effect determination appears to be appropriate, OHA would like to see consultation with the Wai'anae community completed

before concurring as we want to ensure any of their concerns have been adequately addressed. Please keep us updated on the status of your consultation and whether any public meetings on the undertaking will be held.

OHA appreciates the DASA-ESOH and U.S. Army Corps of Engineers taking steps to address this most important matter. Should you have any questions, please contact Keola Lindsey, at (808) 594-1904 or keolal@oha.org.

'O wau iho nō me ka 'oia'i'o,



Clyde W. Nāmu'o
Chief Executive Officer

C: William Aila, Jr.- State of Hawai'i Historic Preservation Officer



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

February 3, 2011

REPLY TO
ATTENTION OF:

Environmental Programs Branch
Programs and Project Management Division

Pua Aiu, Ph.D., Administrator
Hawaii State Historic Preservation Office
Department of Land and Natural Resources
History & Culture Branch
601 Kamokila Boulevard, Suite 555
Kapolei, Hawaii, 96707

Dear Dr. Aiu:

Thank you for your response to our letter dated 3 Dec 10, in regards to the proposed undertaking to assess the feasibility of adapting and using remotely operated technology for the recovery of munitions from the ocean floor at Ordnance Reef (Site HI-06), off the Wai'anae Coast on the Island of O'ahu (Wai'anae ahupua'a, District of Wai'anae) (reference LOG No: 2010.3891; DOC No: 1012MV09). In the response letter, the State Historic Preservation Division History & Culture Branch requested that the U.S. Army Corps of Engineers, Honolulu District (POH), provide additional information before issuing a formal concurrence.

The proposed technology demonstration may temporarily interfere with boating, fishing, and other in-water activities during work hours. It will be conducted during daylight hours, 5 days a week for roughly 21 days. The technology demonstration involves the robotic recovery of underwater military munitions (UWMM) and their demilitarization on a barge 2 miles offshore of the Wai'anae Coast. These UWMM are not expected to be an explosive risk. However, during demilitarization activities, a conservative explosive safety quantity distance zone of about 3,200 feet will be maintained around the demilitarization support vehicle. Although no intentional detonations are planned for this operation, the safety zone is required in case of an unintentional detonation, and will be approved by the Department of Defense Explosives Safety Board based on the quantity and type of munitions expected to be recovered at Ordnance Reef. The safety zone will be maintained by using small craft to keep people and vessels a safe distance from demilitarization operations.

POH, on behalf of the Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health DASA-ESOH is currently preparing an environmental assessment for the proposed project in which historic and cultural resource impacts are considered. A literature review of cultural impact assessments conducted for projects located along the Wai'anae coast revealed no offshore historic, cultural or archaeological resources within the offshore areas that comprise the project site. Surveys

conducted by the National Ocean and Atmospheric Administration, in support of the technology demonstration, have not encountered any evidence that would suggest that sensitive historic, archaeological or cultural sites exist at Ordnance Reef.

In addition, through ongoing public outreach and oral interviews conducted with community members, participants, including Mr. William Aila, Jr., cultural practitioner on the Wai'anae Coast, expressed their belief that the demonstration project would have no significant impact on any cultural resources. The offshore work areas do not hold any particular cultural significance to native Hawaiians. Most activities such as fishing, diving, canoeing and gathering of limu take place closer to the shore. Interviewees also said that they did not know of the presence of any significant cultural resources in any of the offshore work area, adding that the cultural legacy lives on in legends and chants. Participants also acknowledge that the project might pose a temporary inconvenience to cultural and recreation activities, specifically fishing and tour boat operations but have, nevertheless, lobbied for the proposed project to be done.

DASA-ESOH will incorporate into their work plan, the community members' requests to locate the demilitarization support vessel away from the artificial reef in the area to avoid affecting recreational activities and commercial tour operations there.

If you have any questions please contact Mr. Kanalei Shun of my Environmental Programs Branch at (808) 438-7000, or by e-mail at kanalei.shun@usace.army.mil.

Sincerely,


for Anthony J. Paresa, P.E.
Deputy District Engineer for
Programs and Project Management

Enclosure

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

WILLIAM J. AILA, JR.
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

GUY KAULUKUKUI
INTERIM FIRST DEPUTY

LENORE N. OHYE
ACTING DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAIHIOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

December 22, 2010

Anthony Paresa
Deputy District Engineer
US Army Corps of Engineers
Fort Shafter, Hawaii 96858-5440

LOG NO: 2010.3891
DOC NO: 1012MV09
Archaeology
History & Culture

Dear Mr. Paresa,

**SUBJECT: National Historic Preservation Act (NHPA) Section 106 Review –
Proposed Removal of Military Munitions at Ordinance Reef
Pacific Ocean, Offshore from Poka‘i Bay
Waiānae Ahupua‘a, Waialua District, Island of O‘ahu
TMK: (1) 8-5 (Offshore)**

Thank you for the opportunity to review this project that was received by our office on December 6, 2010. According to the letter, this project involves the demonstration of using remotely operated technology to retrieve munitions from the ocean floor. The undertaking will be conducted off the Wai‘anae Coast for approximately 21 days, starting on or near May 2011.

Archaeological Concerns:

Because this project will occur entirely within the offshore waters it is highly unlikely that there are any historic properties located within the area of potential effect. Therefore, we concur with your determination **that no historic properties will be affected** by this undertaking. However, in the event that historic shipwrecks, aviation artifacts, or aids to navigation are encountered during this project please cease work in the immediate vicinity of the find, protect the find from additional disturbance, and contact the State Historic Preservation Division at (808) 692-8015.

History & Culture Concerns:

We are pleased to see that interested Native Hawaiian Organizations are being consulted. The SHPD History & Culture Branch requests additional information regarding potential cultural practices in this area. Is this area a known Ko‘a (fishing ground) where cultural practitioners gather ocean resources for subsistence or recreation? Will this project interfere with fishing practices in the area, either temporarily or long-term? Will the area remain open to the public during project activity? We would appreciate it if you would address these questions prior to receiving a formal concurrence on this undertaking from our division.

Please contact Mike Vitousek at (808) 692-8029 or Michael.Vitousek@Hawaii.gov if you have any questions or comments about this letter,

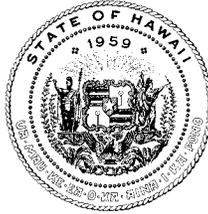
Aloha,

A handwritten signature in black ink, appearing to read "Theresa K. Donham".

Theresa K. Donham
Acting Archaeology Branch Chief & Deputy SHPO
State Historic Preservation Division

cc: Phyllis Cayan, History & Culture Branch Chief
William Aila, Interim Chairperson DLNR

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

WILLIAM J. AILA, JR.
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

GUY KAULUKUKUI
INTERIM FIRST DEPUTY

LENORE N. OHYE
ACTING DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

December 22, 2010

Anthony Paresa
Deputy District Engineer
US Army Corps of Engineers
Fort Shafter, Hawaii 96858-5440

LOG NO: 2010.3891
DOC NO: 1012MV09
Archaeology
History & Culture

Dear Mr. Paresa,

**SUBJECT: National Historic Preservation Act (NHPA) Section 106 Review –
Proposed Removal of Military Munitions at Ordinance Reef
Pacific Ocean, Offshore from Poka'i Bay
Waianae Ahupua'a, Waialua District, Island of O'ahu
TMK: (1) 8-5 (Offshore)**

Thank you for the opportunity to review this project that was received by our office on December 6, 2010. According to the letter, this project involves the demonstration of using remotely operated technology to retrieve munitions from the ocean floor. The undertaking will be conducted off the Wai'anae Coast for approximately 21 days, starting on or near May 2011.

Archaeological Concerns:

Because this project will occur entirely within the offshore waters it is highly unlikely that there are any historic properties located within the area of potential effect. Therefore, we concur with your determination **that no historic properties will be affected** by this undertaking. However, in the event that historic shipwrecks, aviation artifacts, or aids to navigation are encountered during this project please cease work in the immediate vicinity of the find, protect the find from additional disturbance, and contact the State Historic Preservation Division at (808) 692-8015.

History & Culture Concerns:

We are pleased to see that interested Native Hawaiian Organizations are being consulted. The SHPD History & Culture Branch requests additional information regarding potential cultural practices in this area. Is this area a known Ko'a (fishing ground) where cultural practitioners gather ocean resources for subsistence or recreation? Will this project interfere with fishing practices in the area, either temporarily or long-term? Will the area remain open to the public during project activity? We would appreciate it if you would address these questions prior to receiving a formal concurrence on this undertaking from our division.

Please contact Mike Vitousek at (808) 692-8029 or Michael.Vitousek@Hawaii.gov if you have any questions or comments about this letter,

Aloha,

A handwritten signature in black ink, appearing to read "Theresa K. Donham".

Theresa K. Donham
Acting Archaeology Branch Chief & Deputy SHPO
State Historic Preservation Division

cc: Phyllis Cayan, History & Culture Branch Chief
William Aila, Interim Chairperson DLNR



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

December 2, 2010

REPLY TO
ATTENTION OF:

Environmental Programs Branch
Programs and Project Management Division

Pua Aiu, Ph.D., Administrator
Hawai'i State Historic Preservation Division
Department of Land and Natural Resources
601 Kamokila Boulevard, Suite 555
Kapolei, Hawai'i 96707

Dear Dr. Aiu:

The U.S. Army Corps of Engineers, Honolulu District (POH), on behalf of the Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (DASA-ESOH), is proposing to conduct an undertaking to assess the feasibility of adapting and using remotely operated technology for the recovery of munitions from the ocean floor. This action is funded by DASA-ESOH's Research, Development, Test and Evaluation appropriation and supports activities authorized and directed by the National Defense Authorization Act of 2007. The undertaking consists of a technological demonstration and would be conducted for approximately 21 days starting on or about May 2011 in waters off the coast of Wai'anae, O'ahu, Hawai'i.

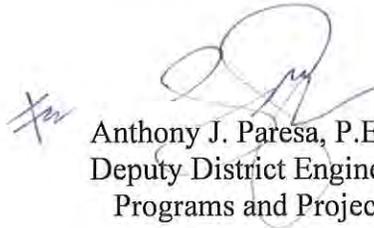
The proposed site for the technology demonstration is identified as Ordnance Reef (Site HI-06), in the FY09 Defense Environmental Programs Annual Report to Congress. Ordnance Reef lies on the western, leeward side of O'ahu and covers an area of approximately 1 nautical mile in length by one-half nautical mile in width (Enclosure 1). The depth of the proposed work area is 30 to 230 feet underwater. The nearest populated settlement areas on O'ahu are Wai'anae, approximately 3 miles to the northeast, and Mā'ili, approximately 5 miles to the east.

The purpose of the technology demonstration is to determine if the new technology of the Remotely Operated Underwater Munitions Recovery System (ROUMRS) is viable for use in the recovery of munitions from the ocean floor off the coast of Wai'anae. The Wai'anae community and elected officials have explicitly expressed their desire for the recovery and destruction of as many of the ocean disposed munitions as can be done. ROUMRS is a remotely operated technology normally used in oil exploration and it has been adapted for the recovery of munitions from the ocean floor. In addition to the recovery operations, DASA-ESOH proposes to destroy (demilitarize) the recovered munitions onsite on a barge. Enclosure 2 provides a brief technical description of the ROUMRS recovery and destruction operations. It is anticipated that the results of this undertaking will also provide the Department of Defense with the technology

and procedures to address other underwater munitions and sites posing an unacceptable risk to human health or the environment.

POH is of the opinion that no significant cultural resources, including ship wrecks, are likely to be present in the project locations. Based on the above project description, POH has made the determination that the project will have 'no effect to historic properties.' In compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and implementing regulations 36 CFR Part 800, POH seeks your office's concurrence with its determination. POH is also consulting, in accordance with the NHPA, the Office of Hawaiian Affairs, and other interested Native Hawaiian organizations and requesting their review comments as well as their *mana 'o*. If you have any questions please contact Mr. Kanalei Shun, Senior Archaeologist, of my Environmental Programs Branch, at (808) 438-7000, or by e-mail at kanalei.shun@usace.army.mil.

Sincerely,

Handwritten signature of Anthony J. Paresa in blue ink, consisting of a stylized 'A' followed by 'Paresa'.

Anthony J. Paresa, P.E.
Deputy District Engineer for
Programs and Project Management

Enclosures



PROJECT LOCATION

EA for Technology Demonstration: ROUMRS and EHDS at Site HI-06, Ordnance Reef

FIGURE 1

Waianae, Oahu, Hawaii



ENCLOSURE 2.

a. Munitions Recovery – Remotely Operated Underwater Munitions Recovery System (ROUMRS)

The munitions recovery system has been designated as the ROUMRS and includes a support vessel, remotely operated vehicle (ROV) and a small craft. The support vessel is to transport the ROV to and from each munitions location and house the ROV operators, observers and equipment needed to monitor the ROV. An off the shelf, remotely operated vehicle (ROV) will be retrofitted with manipulator arms, detachable salvage baskets, hopper, recovery skid, video cameras, LED lights, suction/jetting pumps, filters, sensors, and other appurtenances for this test. The small craft is to be used to transport the salvage baskets, once filled, to the munitions destruction (demilitarization) barge moored nearby. The concept of operations for the munitions recovery is as follows: (see Figures 2-1 through 2-5 and descriptions below.)

Step 1. Spot Basket (Set Basket on Bottom)

- a. The support vessel transports the ROV to a munitions location and sets anchor
- b. The ROV is deployed
- c. The ROV inspects the bottom for a suitable landing location for the salvage basket
- d. The salvage basket is lowered to the bottom and released
- e. The ROV positions the salvage basket near a concentration of munitions, un-pins and opens an upper door



Figure 2-1. Spot Basket (Set Basket on Bottom).

Step 2. Loading (Recover and Load Munitions into ROV)

- f. The ROV positions itself near a concentration of munitions
- g. A munitions piece is inspected and documented (video and laser scaling)
- h. A hopper is extended out of the ROV's recovery skid
- i. The ROV's recovers the munitions piece with the manipulator arm and places it in the hopper (smaller debris such as propellants and small arms ammunition are to be captured with a vacuum and placed in a canister filter)

- j. The hopper is retracted, once filled, and the ROV maneuvers to the salvage basket



Figure 2-2. Loading (Recover and Load Munitions into ROV).

Step 3. Transfer (Transfer Munitions from ROV to Basket)

- k. The ROV lands on the salvage basket, extends its hopper, and transfers its contents (smaller debris captured in the canister filter are also transferred to the salvage basket at this time)
- l. The ROV retracts its hopper and maneuvers to the next recovery location

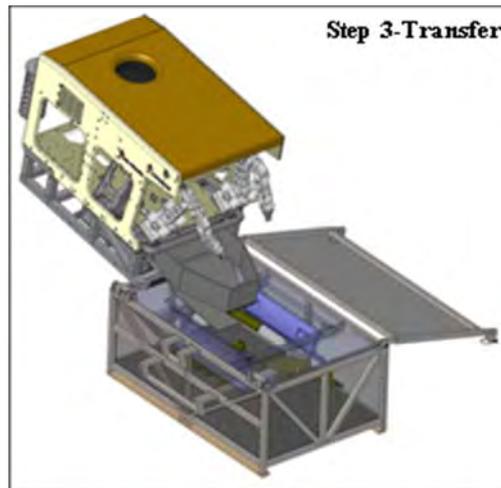


Figure 2-3. Transfer (Transfer Munitions from ROV to Basket).

Step 4. Recovery Rigging (Prepare Basket for Transfer)

- m. Once the salvage basket is filled, an air lift valve is lowered from the surface to the ROV
- n. The ROV attaches the air lift device and a tow line to the salvage basket
- o. The ROV activates the air lift bag
- p. The salvage basket ascends to the surface

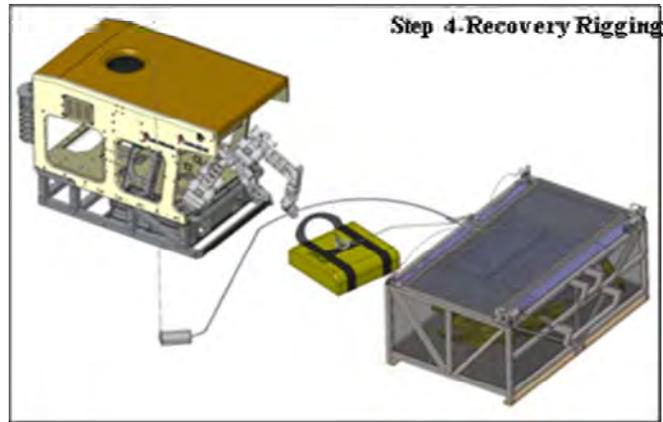


Figure 2-4. Recovery Rigging (Prepare Basket for Transfer).

Step 5. Towing to De-mil Barge (Transfer from Basket to Barge)

- q. The tow line is attached to the small craft and the salvage basket is transported to the destruction (demilitarization) barge
- r. The process would be repeated until all the munitions pieces that can be recovered have been recovered or until the end of the test window (three weeks) has been reached

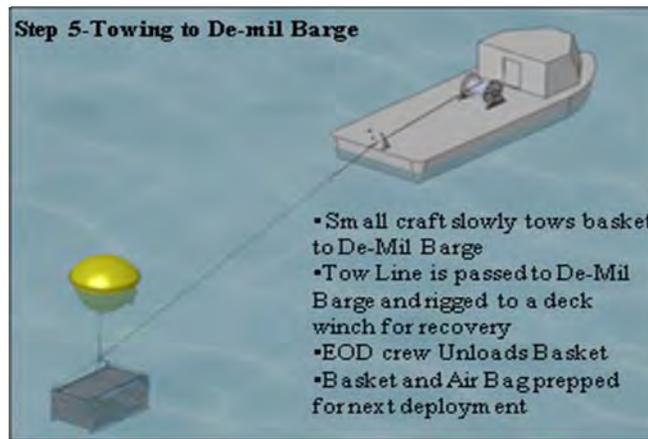


Figure 2-5. Towing to De-mil Barge (Transfer from Basket to Barge).

b. Munitions Destruction (Demilitarization) – Energetic Hazard Demilitarization System (EHDS)

The munitions destruction system has been designated as the Energetic Hazard Demilitarization System (EHDS) which consists of four (4) radiant/conductive batch oven housed in a standard ISO container, power generators, munitions cutting tool, munitions staging area, crane, and other supporting equipment on a barge. The siting for the demilitarization barge is being coordinated with the DoD Explosives Safety Board (DDESB), U.S. Coast Guard, local Harbor Master, and others. No detonation of munitions is proposed—either above, at or below the water line.

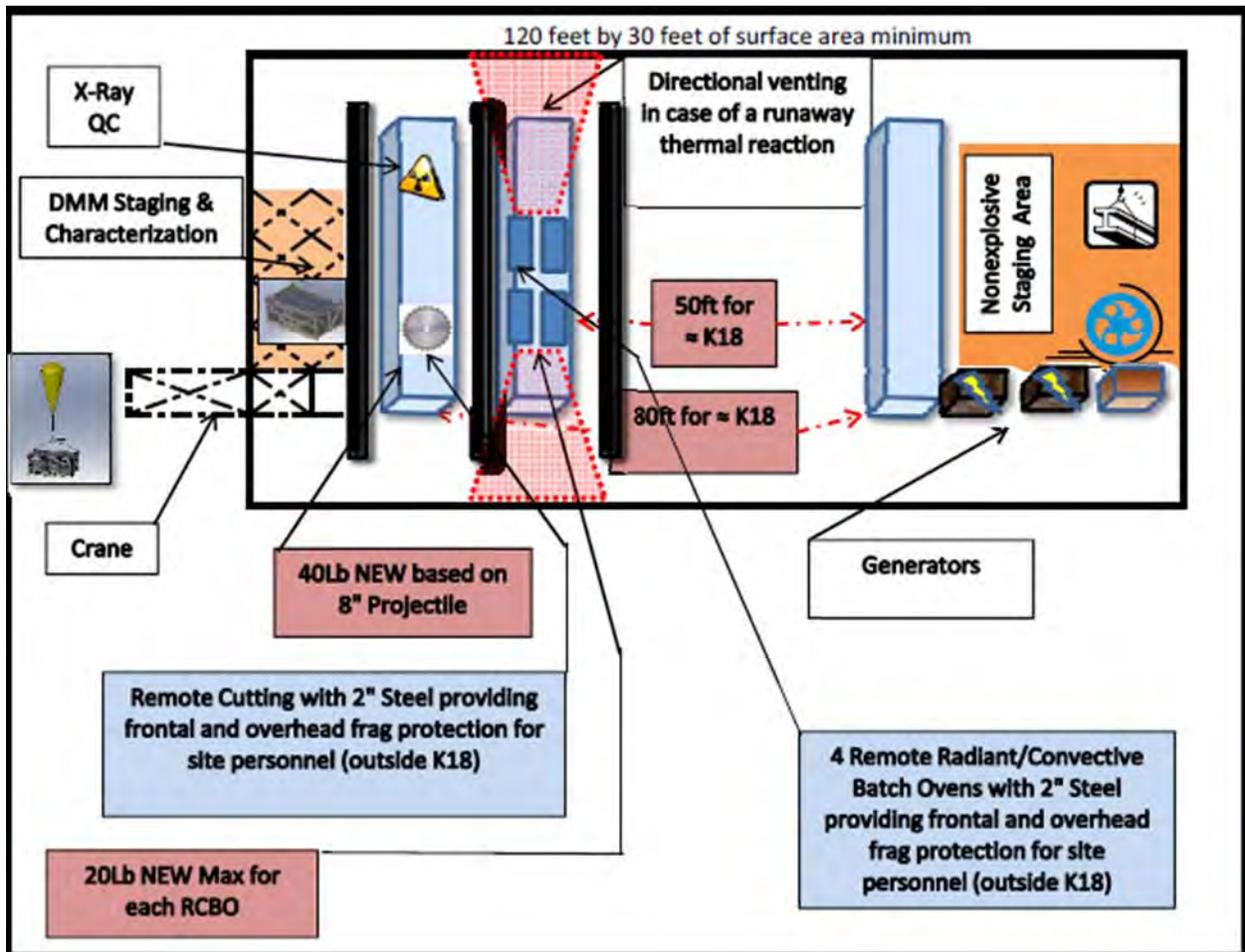


Figure 2-6. Features of the Munitions De-Militarization (Destruction) Barge



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

December 2, 2010

REPLY TO
ATTENTION OF:

Environmental Programs Branch
Programs and Project Management Division

Ms. Phyllis L. Cayan
Chief, History and Culture Branch
Hawai'i State Historic Preservation Division
Department of Land and Natural Resources
601 Kamokila Boulevard, Suite 555
Kapolei, Hawai'i 96707

Dear Ms. Cayan:

The U.S. Army Corps of Engineers, Honolulu District (POH), on behalf of the Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (DASA-ESOH), is proposing to conduct an undertaking to assess the feasibility of adapting and using remotely operated technology for the recovery of munitions from the ocean floor. This action is funded by DASA-ESOH's Research, Development, Test and Evaluation appropriation and supports activities authorized and directed by the National Defense Authorization Act of 2007. The undertaking consists of a technological demonstration and would be conducted for approximately 21 days starting on or about May 2011 in waters off the coast of Wai'anae, O'ahu, Hawai'i.

The proposed site for the technology demonstration is identified as Ordnance Reef (Site HI-06), in the FY09 Defense Environmental Programs Annual Report to Congress. Ordnance Reef lies on the western, leeward side of O'ahu and covers an area of approximately 1 nautical mile in length by one-half nautical mile in width (Enclosure 1). The depth of the proposed work area is 30 to 230 feet underwater. The nearest populated settlement areas on O'ahu are Wai'anae, approximately 3 miles to the northeast, and Mā'ili, approximately 5 miles to the east.

The purpose of the technology demonstration is to determine if the new technology of the Remotely Operated Underwater Munitions Recovery System (ROUMRS) is viable for use in the recovery of munitions from the ocean floor off the coast of Wai'anae. The Wai'anae community and elected officials have explicitly expressed their desire for the recovery and destruction of as many of the ocean disposed munitions as can be done. ROUMRS is a remotely operated technology normally used in oil exploration and it has been adapted for the recovery of munitions from the ocean floor. In addition to the recovery operations, DASA-ESOH proposes to destroy (demilitarize) the recovered munitions onsite on a barge. Enclosure 2 provides a brief technical description of the ROUMRS recovery and destruction operations. It is anticipated that the results of this undertaking will also provide the Department of Defense with the technology

and procedures to address other underwater munitions and sites posing an unacceptable risk to human health or the environment.

POH is of the opinion that no significant cultural resources, including ship wrecks, are likely to be present in the project locations. Based on the above project description, POH has made the determination that the project will have 'no effect to historic properties.' In compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and implementing regulations 36 CFR Part 800, POH seeks review comments on its determination from your staff and from the Oahu Island Burial Council. POH is also consulting, in accordance with the NHPA, the Office of Hawaiian Affairs, and other interested Native Hawaiian organizations and requesting their review comments as well as their *mana* 'o. If you should have any questions, please contact Mr. Kanalei Shun, Senior Archaeologist, of my Environmental Programs Branch, at (808) 438-7000, or by e-mail at kanalei.shun@usace.army.mil.

Sincerely,

Anthony J. Parésa, P.E.
Deputy District Engineer for
Programs and Project Management

Enclosures



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

December 2, 2010

REPLY TO
ATTENTION OF:

Environmental Programs Branch
Programs and Project Management Division

Mr. Clyde Nāmu'o
Chief Executive Officer
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawai'i 96813

Dear Mr. Nāmu'o:

The U.S. Army Corps of Engineers, Honolulu District (POH), on behalf of the Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (DASA-ESOH), is proposing to conduct an undertaking to assess the feasibility of adapting and using remotely operated technology for the recovery of munitions from the ocean floor. This action is funded by the Army's Research, Development, Test and Evaluation appropriation and supports activities authorized and directed by the National Defense Authorization Act of 2007. The undertaking consists of a technological demonstration and would be conducted for approximately 21 days starting on or about May 2011 in waters off the coast of Wai'anae, O'ahu, Hawai'i.

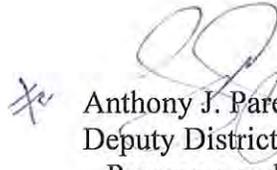
The proposed site for the technology demonstration is identified as Ordnance Reef (Site HI-06), in the FY09 Defense Environmental Programs Annual Report to Congress. Ordnance Reef lies on the western, leeward side of O'ahu and covers an area of approximately 1 nautical mile in length by one-half nautical mile in width (Enclosure 1). The depth of the proposed work area is 30 to 230 feet underwater. The nearest populated settlement areas on O'ahu are Wai'anae, approximately 3 miles to the northeast, and Mā'ili, approximately 5 miles to the east.

The purpose of the technology demonstration is to determine if the new technology of the Remotely Operated Underwater Munitions Recovery System (ROUMRS) is viable for use in the recovery of munitions from the ocean floor off the coast of Wai'anae. The Wai'anae community and elected officials have explicitly expressed their desire for the recovery and destruction of as many of the ocean disposed munitions as can be done. ROUMRS is a remotely operated technology normally used in oil exploration and it has been adapted for the recovery of munitions from the ocean floor. In addition to the recovery operations, DASA-ESOH proposes to destroy (demilitarize) the recovered munitions onsite on a barge. Enclosure 2 provides a brief technical description of the ROUMRS recovery and destruction operations. It is anticipated that the results of this undertaking will also provide the Department of Defense with the technology

and procedures to address other underwater munitions and sites posing an unacceptable risk to human health or the environment.

POH is of the opinion that no significant cultural resources, including ship wrecks, are likely to be present in the project locations. Based on the above project description, POH has made the determination that the project will have 'no effect to historic properties.' In compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and implementing regulations 36 CFR Part 800, POH seeks your office's review comments on its determination. POH is also consulting, in accordance with the NHPA, Hawai'i State Historic Preservation Division, and other interested Native Hawaiian organizations and requesting their review comments as well as their *mana 'o*. If you have any questions please contact Mr. Kanalei Shun, Senior Archaeologist, of my Environmental Programs Branch, at (808) 438-7000, or by e-mail at kanalei.shun@usace.army.mil.

Sincerely,


Anthony J. Paresa, P.E.
Deputy District Engineer for
Programs and Project Management

Enclosures



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

December 2, 2010

REPLY TO
ATTENTION OF:

Environmental Programs Branch
Programs and Project Management Division

Ms. Gege Kawelo
Pelekikena
Hawaiian Civic Club of Wai'anae
P.O. Box 687
Wai'anae, Hawai'i 96792

Dear Ms. Kawelo:

The U.S. Army Corps of Engineers, Honolulu District (POH), on behalf of the Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (DASA-ESOH), is proposing to conduct an undertaking to assess the feasibility of adapting and using remotely operated technology for the recovery of munitions from the ocean floor. This action is funded by DASA-ESOH's Research, Development, Test and Evaluation appropriation and supports activities authorized and directed by the National Defense Authorization Act of 2007. The undertaking consists of a technological demonstration and would be conducted for approximately 21 days starting on or about May 2011 in waters off the coast of Wai'anae, O'ahu, Hawai'i.

The proposed site for the technology demonstration is identified as Ordnance Reef (Site HI-06), in the FY09 Defense Environmental Programs Annual Report to Congress. Ordnance Reef lies on the western, leeward side of O'ahu and covers an area of approximately one nautical mile in length by one-half nautical mile in width (Enclosure 1). The depth of the proposed work area is 30 to 230 feet underwater. The nearest populated settlement areas on O'ahu are Wai'anae, approximately 3 miles to the northeast, and Mā'ili, approximately 5 miles to the east.

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Sincerely,


 Anthony J. Paresa, P.E.
Deputy District Engineer for
Programs and Project Management

Enclosures



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

December 2, 2010

REPLY TO
ATTENTION OF:

Environmental Programs Branch
Programs and Project Management Division

Ms. Leimomi Khan
Pelekikena
Association of Hawaiian Civic Clubs
P.O. Box 1135
Honolulu, Hawai'i 96807

Dear Ms. Khan:

The U.S. Army Corps of Engineers, Honolulu District (POH), on behalf of the Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (DASA-ESOH), is proposing to conduct an undertaking to assess the feasibility of adapting and using remotely operated technology for the recovery of munitions from the ocean floor. This action is funded by DASA-ESOH's Research, Development, Test and Evaluation appropriation and supports activities authorized and directed by the National Defense Authorization Act of 2007. The undertaking consists of a technological demonstration and would be conducted for approximately 21 days starting on or about May 2011 in waters off the coast of Wai'anae, O'ahu, Hawai'i.

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The purpose of the technology demonstration is to determine if the new technology of the Remotely Operated Underwater Munitions Recovery System (ROUMRS) is viable for use in the recovery of munitions from the ocean floor off the coast of Wai'anae. The Wai'anae community and elected officials have explicitly expressed their desire for the recovery and destruction of as many of the ocean disposed munitions as can be done. ROUMRS is a remotely operated technology normally used in oil exploration and it has been adapted for the recovery of munitions from the ocean floor. In addition to the recovery operations, DASA-ESOH proposes to destroy (demilitarize) the recovered munitions onsite on a barge. Enclosure 2 provides a brief technical description of the ROUMRS recovery and destruction operations. It is anticipated that the results of this undertaking will also provide the Department of Defense with the technology

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Sincerely,



Anthony J. Paresa, P.E.
Deputy District Engineer for
Programs and Project Management

Enclosures

APPENDIX J

Traditional Cultural Practices and Resources Assessment

Traditional Cultural Practices and Resources Assessment

The following discussion was compiled from existing literature (including online resources), videos and information provided by community members interviewed during preparation of the EA.

Project Area

The project area is offshore of the district of Wai‘anae, leeward O‘ahu. The district of Wai‘anae consists of nine ahupua‘a, including Nānākuli, Lualualei, Wai‘anae, Mākaha, Kea‘au, ‘Ōhikilolo, Mākua, Kahanahāiki, and Keawa‘ula. A literature review of cultural impact assessments previously conducted for projects located along the Wai‘anae coast have revealed no offshore historic, cultural or archaeological resources within the project area. However, there are several other land-based or near-shore sites of significance within the ahupua‘a that comprise the Wai‘anae district.

The word “Wai‘anae” has been interpreted to mean “mullet water” and has been associated with a large fresh water fishpond located within the district, known as Puehu, which was used for mullet harvesting by native Hawaiians (Handy and Handy, 1972). Historically, nearshore fisheries and marine resources have been an important resource to native Hawaiians for subsistence and recreation. The Puehu fishpond, located within Pōka‘ī Bay, off the Wai‘anae ahupua‘a, was reported to have been almost completely filled by 1954 (CSH, 2009a).

Historical Context

Pōka‘ī Bay has been the nexus of activity for the Wai‘anae Coast since pre-contact days and continues to be the focus of life in Wai‘anae to this day. The bay is also important to an understanding of the cultural history of the area. At a distance of approximately .5 to 1.5 miles from the shore, the offshore project work areas are within relatively close proximity to Pōka‘ī Bay. The bay is the closest land to the subject work areas defined by the proposed action.

The bay is named for Chief Pōka‘ī who arrived in Hawai‘i 400 to 500 years ago. Pōka‘ī is famous for bringing the cornerstones for Ku‘ilioloa Heiau and the first coconut trees in Hawai‘i. These coconut trees soon grew into a famous grove with the best coconuts on the Wai‘anae Coast. Prior to contact with the western world the bay was the site of a famous fishing village with double-hulled canoes like the Hokuleia transporting in and out of the bay (*Hawai‘i Stories*, n.d.)

The offshore work areas do not hold any particular cultural significance. However, there are a number of archaeological sites onshore in the Wai‘anae District that have cultural significance to Hawaiians. One in particular has a definite tie to the ocean and is relatively close to the project areas. It is the Ku‘ilioloa heiau sited on a small peninsula known as Kaneilio Point which juts out into Pōka‘ī Bay. The edge of this peninsula is about .5 miles from the closest points of Work Areas A and B.

A metal plaque at the entrance to the heiau indicates that the original name for Pōka‘ī Bay was “Malaea” which means calm or serene. The plaque also states that, “At the north end of the bay is Kaupuni Stream, the spawning ground of anae (mullet) which gave Wai‘anae (mullet waters)

its name. The village Pōka‘ī, famous for its coconut grove once lay near the stream.” The following description of the Ku‘ilioloa Heiau was provided by *Ku‘ilioloa Heiau and Kanaloa* (<http://www.bluecoast.org/nonprofit/kanaloa/k25.html>).

The names related to this heiau and place incorporate some of the major gods of the ancient Hawaiians. The name of the heiau, Ku‘ilioloa incorporates the god of war, Kū. The name of the point on which the heiau is built, Kane‘ilio incorporates another of Hawaii’s major gods, Kane. One of the major functions of this heiau was the teaching of celestial navigation, which incorporates the realm of the god Lono through the clouds and the heavens clearly visible from this ideally situated site. Ku‘ilioloa heiau is the domain of the god Kanaloa. In 1819 the kapu system was overthrown. But because Wai‘anae was one of the last places to accept Christianity, Ku‘ilioloa was one of the few heiau where the Hawaiian community could still practice their ancient customs such as sacrifices, the teaching of celestial navigation and fishing, healing and investitures. Before WWII started, due to its strategic location, the U.S. military built a bunker on Ku‘ilioloa, destroying the original walls and terraces. The Wai‘anae community has since rebuilt the heiau.

From the edge of Kane‘ilio Peninsula one is able to see, in both directions, the entire Wai‘anae Coast from Lahilahi Point to Maili Point, with countless ridgetops of the Wai‘anae Mountains visible from this coastal location (Hardwick, 2009). The site is connected with distant travelers by the figure of Pōka‘ī, The Navigator. Famous in legend and song, Pōka‘ī was a voyaging chief of Kahiki (Tahiti) who is said to have brought the valuable and useful coconut palm to Hawai‘i. A huge grove of coconuts once lined the back shore of Pōka‘ī Bay. The trees provided shelter and useful materials for the ancient Hawaiian village. This grove, known as “Ka Uluniu o Pokai,” was not just a legend as it was noted by western sailors in the 1700s. A few examples of these stately trees can still be seen clustered around the entrance to the heiau (Hardwick, 2009).

Due to its advantageous location, one of the primary functions of this heiau was probably as a lookout and navigation heiau. From here specialists in astronomy could study the stars and celestial features. Possibly predicting seasons and events, most certainly learning the star maps that would guide them across the seemingly featureless oceans (Hardwick, 2009).

One of the modern manifestations of this seafaring cultural legacy is the building of the voyaging canoe E Ala. This undertaking was the inspiration of the Wai‘anae Hawaiian Civic Club. The idea was first conceived in 1978 and the actual construction of the canoe was begun in 1981. The citizens of Wai‘anae worked many hours learning how to shape, bend and join wood into its ocean-going form. The project allowed community leaders to guide the opio (children) in an intensive examination of their legends, archaeological remains and oral history of their kupuna to learn about the seafaring ways of their ancestors. For over a decade the E Ala, which means the awakening, was leased to the Polynesian Voyaging Society. The E Ala is not large enough to make trans-oceanic voyages like the Hokuleia, but is suitable for inter-island travel (*The Return of E Ala to the Wai‘anae Coast*).

Swimming, diving, fishing, canoeing, and food gathering, etc., were practiced in Waianae’s waters by pre-contact Hawaiians, and continues to be practiced by contemporary residents of the

district. After the defeat of the army of Oahu's King Kalanikupule by Kamehameha the Great at Nu'uaniu in 1795, many of the defeated O'ahu warriors fled to Wai'anae. The area was isolated, hot, and had little water. Therefore, Wai'anae was not considered desirable by the conquering armies from the island of Hawai'i. But the sea off the coast of Wai'anae contained an abundant supply of fish and other seafood, and the early settlers were able to live off the resources of the ocean and thrive in this area. (Sterling and Summers, 1978)

The following post-contact history was gathered from the video *Hawai'i Stories Presents Pōka'i Bay*, in which Mr. William Aila, long-time harbormaster at the Wai'anae Small Boat Harbor, recounts the stories of Pōka'i Bay and its surrounding environs.

In 1793 Captain Vancouver was the first white man to stop at Pōka'i Bay. The Hawaiian chief was under kapu that day, so the natives asked Vancouver to wait until the next day when their chief would be available to share food with him. Vancouver looked at the desolate landscape and decided not to wait. He sailed away not having seen canoes on the beaches, fish drying on the shore, and hundreds of acres of taro growing in the lush green lo'i in the back valleys of the Wai'anae Mountains. Food was abundant and the fact that there were three heiau in the area attested to the large population that once thrived here.

After Vancouver left, some sailors who passed through noticed the fragrant wood growing in the forests at the base of the Wai'anae Mountains. Those who had been to China recognized this as sandalwood, a highly prized commodity that was used for incense and furniture. For about twenty years sandalwood became the driving force of the Hawaiian economy until the supply was completely depleted. One story about King Kamehameha the Great is that he commissioned the equivalent of two boatloads of sandalwood from the forests of Wai'anae to pay for two modern ships he had purchased from westerners. This speaks to the health of the forests and the large workforce that it must have taken to accomplish such a feat in pre-machinery Hawai'i, as everything was done by hand.

About 1880 Herman Wedemeyer started the first sugar plantation and sugar replaced sandalwood as the chief commodity produced in Wai'anae. Sugar production lasted in Wai'anae from the 1880s until about the 1940s.

From 1890 until the early 1900s a two-story hotel built by John Dowsett (son-in law of plantation boss Herman Wedemeyer) was located in the area where the Wai'anae lifeguard substation now stands. The hotel became a gathering place and provided a place to stay for people who came out on the newly built Dillingham railway that went around the island.

With the bombing of Pearl Harbor and the outbreak of World War II, the beaches of Wai'anae were used to practice amphibious landings. Prior to installation of the breakwater in the 1950s the beach at Pōka'i Bay was like all other beaches in Wai'anae. The sand receded in the winter and was washed back onto the beach in the summer.

The breakwater was constructed to protect the beach and create the harbor. This resulted in a large accretion of sand in the bay.

There was also a pier that the military put in called “the iron pier.” In the 1960s it was deemed unsafe and removed. A mooring field for fishing boats began to grow from the end of the war in 1946 and Hawaiian and Japanese fisherman once again were able to make a living from the ocean. During the war fishing had been banned for the Japanese.

Kaupuni stream, which is located just north of Pōka‘ī Bay, used to go all the way back to the base of the mountain, Kamaili‘unu, and meet up with the large marsh that was there. The marsh was the result of Kamaili Springs meeting the ocean water. One of the reasons that Wai‘anae got its name was for the large mullet that used to be caught at the base of the mountain. The older generation used to say, “When the ducks flew the sky would darken, that’s how many birds there were [in the marsh].” Unfortunately the City, before environmental laws, filled in the marsh and made it a rubbish dump.

Chants and Legends

Although there are no physical cultural resources in the offshore work areas, the cultural legacy of ancient Hawaiians lives on in legends and chants. Two of note, are the Kumulipo and the legends of Maui the demigod. They make reference to Wai‘anae and to the ocean. (pers. comm. Aldeguer) The Kumulipo is the Hawaiian creation chant translated into English by Queen Lili‘uokalani while she was under house arrest at ‘Iolani Palace in 1897. The chant was compiled by one of the Queen’s 18th century ancestors, Keaulumoku. The Kumulipo starts with the emergence of sea creatures, then moves on to insects, land plants, animals and eventually human beings. The chant describes the complex interrelationships between various plants and animals. Most of the chant is a massive genealogy, which lists thousands of ancestors of the Hawaiian royal family.

Some of the legends about the demigod Maui concern the ocean and fishing. Maui is said to have been born in Wai‘anae. Maui was known as “the trickster.” He was extremely clever but was not as skilled a fisherman as his brothers. He managed to increase his catch by stealing his brothers’ fish. When his brothers caught on to this they refused to let Maui fish with them. Maui was very distressed by this rejection so his mother sent him to his father to obtain a magical fish hook known as Manaiakalani. Maui was curious why the Hawaiian Islands were separated and decided to try to join them. So once again he convinced his brothers to let him fish with them. He dropped Manaiakalani into the water and told his brothers to paddle as hard as they could in the opposite direction and not to look back. Finally, they became exhausted and looked back to see the chain of islands being pulled behind them. But as soon as they stopped paddling the magic hook was loosened and the islands separated and drifted back to their original locations. Maui was upset because they didn’t reach shore and the islands remained unconnected (Sterling and Summers, 1978). Many of the ancient legends are reflected in the Wai‘anae Mountains and other geographic elements. The Maui Pōhaku—where Maui “reposed and sunned himself”—is located along Farrington Highway in Lualualei (CSH 2009a).

Cultural Practices

Historically, Wai‘anae was known for its abundant fishing grounds, particularly for deep sea fishing opportunities to the northwest, off Kaena (CSH, 2009b). In the 1950s fisherman didn't need to go more than two miles off shore because there was so much fish in the ocean. Their boats would be full of fish and they would have to turn around and come home. They never went past Black Rock or Mauna Lahilahi, they never went past Maili Point or Pu‘u Ahuluhulu. Now they have to go 40 to 50 miles out before they can find enough fish. The reduced abundance is generally attributed to overfishing on an industrial scale. One tuna purse seiner can carry 200 metric tons of tuna in one trip. That's equivalent to the catch of all of the little boats and the long-liners in Hawai‘i in one year (*Hawai‘i Stories*, n.d.).

Oral accounts of community members tell of a time when marine and coastal resources were still plentiful. Resources included varieties of limu (limu kohu, limu kala, limu pe‘e pe‘e, and wāwae‘iole), fish and other marine life, shells, and coral. While many of these resources are still available in the area's nearshore waters, the supply has been reduced. There is much less fishing and gathering done today than 50 years ago. Because of the reduced supply, most fishing and gathering practiced today is for recreational purposes and not as a means of earning a living (per. comm. G. Grace). Community members attribute this depletion to physical alterations to the coastal areas, such as breakwaters and channelized streams; the capping and diverting of upland streams; the replacement of a large sewer culvert on the Ma‘ili side of Pōka‘ī Bay; and over-harvesting of resources, beyond what is needed for subsistence (CSH, 2009b; pers. comm. A. Greenwood).

Another traditional use of the bay practiced by ancient Hawaiians was the harvesting of sea salt in the tidal pools that surrounded Ku‘ulioloa heiau (prior to the construction of the breakwater walls). In the winter the ocean spray would collect in the tidal pools and after a while the liquid would dry leaving a layer of sea salt that could be harvested and used for cooking. Today you would not be able to do this even if there were no breakwater walls because the water is not as clean as it used to be. At one time, there was also a salt pond located at Keaulana beach, where salt collection was practiced (CSH, 2009b).

Today, Pōka‘ī Bay has protected status. As a result, the fish are coming back to the bay. There are now large schools of akule and weke, and turtles, and even manta rays have been seen feeding on plankton. Recently it has been noticed that mohee (squid) are coming back to Wai‘anae waters in small numbers. They have been seen at the Wai‘anae Boat Harbor, Mākaha surfing beach and Kahe Point power plant. With the banning of the drift gill net fleets it appears that the mohee are making a real comeback.

Along the Wai‘anae coast, traditional cultural practices that continue to be observed today include fishing, net laying, spear fishing/diving, gathering of limu and other marine life (e.g., pīpīpī, ‘opihi, wana), surfing, swimming, canoe paddling, diving, and honoring kupuna that have been laid to rest at sea.

Cultural Significance

Many marine animals are mentioned in ancient Hawaiian legends and chants. As well, various marine plants and animals do have cultural significance to native Hawaiians. Some are

mentioned in traditional oli and mele, such as the lengthy creation chant, the Kumulipo. Some plants and animals have ceremonial meaning for religious purposes. For example, Limu kala is used in ho'oponopono and in purification ceremonies after the death of a relative (pers. comm. W. Aila; Hawai'i Natural History Foundation, 2001). Varieties of fish and other marine life are featured in legends and used as offerings and for other ceremonial purposes. Raw he'e (octopus) is a standard food item at luau and is the Kinolau (physical form) of the Hawaiian God, Kanaloa (pers. comm. W. Aila). Traditionally, the best foods were offered to the gods. Red and white fish were common religious offerings. Common red fish were weke-'ula, moano, or kumū; white fish were aholē, 'ama'ama, or a light-colored weke (Titcomb, 1972).

Also, many families have personal deities in animal form, known as 'aumakua. 'Aumakua are spirits that are embodied in physical form by a plant or animal. Manō (shark), honu (turtle) and he'e (octopus) are common marine species that are often family 'aumakua. Terrestrial animals such as lizards, owls and bats are also 'aumakua. Family members have a symbiotic relationship with their 'aumakua. They do not harm or eat them and the 'aumakua in turn warn and reprimand mortals in dreams and visions (Pukui and Elbert, 1986).

Potential Impacts

According to community members that were interviewed during preparation of this EA, the offshore work areas do not hold any particular cultural significance to native Hawaiians. Most activities such as fishing, diving, canoeing and gathering of limu take place closer to the shore. Interviewees also said that they did not know of the presence of any significant cultural resources in any of the offshore work area, adding that the cultural legacy lives on in legends and chants. While the demonstration project might pose a temporary inconvenience to cultural and recreational activities, specifically fishing, interviewees did not believe that the demonstration project would have any long-term negative impacts on cultural resources or practices in the Wai'anae region.

The following community members were interviewed to gather information relating to potential impacts to cultural resources and practices that could result from implementing the Proposed Action.

Mr. William Aila – Mr. Aila served for many years as the Harbor Master at the Wai‘anae Boat Harbor. He has recently been named to head the Department of Land and Natural Resources. Mr. Aila was raised in Wai‘anae and is an avid fisher and diver. He has over 20 years of experience as a commercial net fisherman and diver gathering marine resources for Native Hawaiian cultural and religious purposes. He, as well as past generations of his family, have fished the waters from Puuloa to Wai‘anae. Mr. Aila is active in the Wai‘anae community, holding past positions on the Wai‘anae Coast Neighborhood Board, and currently serving on the boards of Ka Papa O Kakuhikewa, an organization that promotes natural resource conservation in the Kapolei and Wai‘anae communities through various projects, and Hui Malama I Na Kupuna ‘O Hawai‘i Nei, an organization that is dedicated to ensuring the proper treatment of ancestral Native Hawaiians through, among other things, interment and reinterment services, and repatriation of ancestral remains and items of cultural patrimony. Due to his extensive knowledge of the ocean, Mr. Aila has served on various panels and groups advising the Western Pacific Regional Fishery Management Council, including the Pelagic Advisory Sub-panel, the Bottom Fish and Indigenous Rights Advisory Sub-panel, and Chairman of the Small Boat Pelagic Fisheries Working Group.

Ms. Walterbea Alderguer – Ms. Alderguer is a member of the Concerned Elders of Wai‘anae. Her family is from Maili. Ms. Alderguer is interested and involved in issues relating to environmental justice in the Wai‘anae area. She is also engaged in educating Hawaiian youth in the history and culture of their Wai‘anae home and was involved in the restoration of Kaneaki Heiau in Makaha Valley.

Ms. Polly “Granny” Grace – Ms. Grace grew up in Kalihi and moved to Wai‘anae about 50 years ago after a doctor recommended relocating to a drier climate due to her daughter’s severe asthma. Because the land was so dry and barren, their lives focused on the ocean and beach. Income was supplemented with the plentiful seafood then available in the coastal waters of Wai‘anae. Ms. Grace is a community activist, organizer and small-business women. She is involved in many community activities, such as helping the homeless. One of her first major community efforts in 1976 was to procure emergency medical services for Wai‘anae, which has evolved into the Wai‘anae Coast Comprehensive Health Center. Ms. Grace is also involved with the Queen Lili‘uokalani Children’s Center, whose mission is to help orphans and destitute children with preference given to children of Hawaiian ancestry.

Ms. Alice Kaholo Greenwood – Ms. Greenwood’s family has lived in Wai‘anae since 1913. She is currently one of the many working homeless that live in tents along the 13-miles of beaches on the Wai‘anae coast. She is involved in issues concerning environmental justice and is a member of the Concerned Elders of Wai‘anae and Nani O Wai‘anae (a non-profit volunteer organization committed to creating a community-based program to address environmental issues). Ms. Greenwood has done extensive research in land titles and genealogy and currently serves on the O‘ahu Island Burial Council.

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APPENDIX K

Rivers and Harbors Act Permit Application

18. Nature of Activity (Description of project, include all features)

Deployment of a Remotely Operated Underwater Munitions Recovery System (ROUMRS) vehicle to retrieve military munitions within Pokai Bay. Recovered munitions to be transported to a nearby off-shore barge, housing the Energetic Hazards Demilitarization System (EHDS), for destruction. The EHDS uses a thermal decomposition technique which does not involve open burning, open detonation, or incineration. Remaining components of the munitions are to be recycled as scrap metal to the maximum extent possible.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

The project purpose is to address community concerns regarding military munitions within Pokai Bay. The project is also intended to demonstrate that ROUMRS and EHDS technology can be used to maximize safety, and minimize environmental impacts, when demilitarizing underwater munitions.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

N/A

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
N/A		

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres
Or
Liner Feet N/A

23. Description of Avoidance, Minimization, and Compensation (see instructions)

N/A

24. Is Any Portion of the Work Already Complete? Yes No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list)

Address - See attached "List of Adjoining Property Owners".
City - Waianae State - HI Zip - 96792

26. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
See attached "Other Certifications"					

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

_____ _____ Mark R. Arakaki 17 Nov 2010
 SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than \$10,000 or imprisoned not more than five years or both.

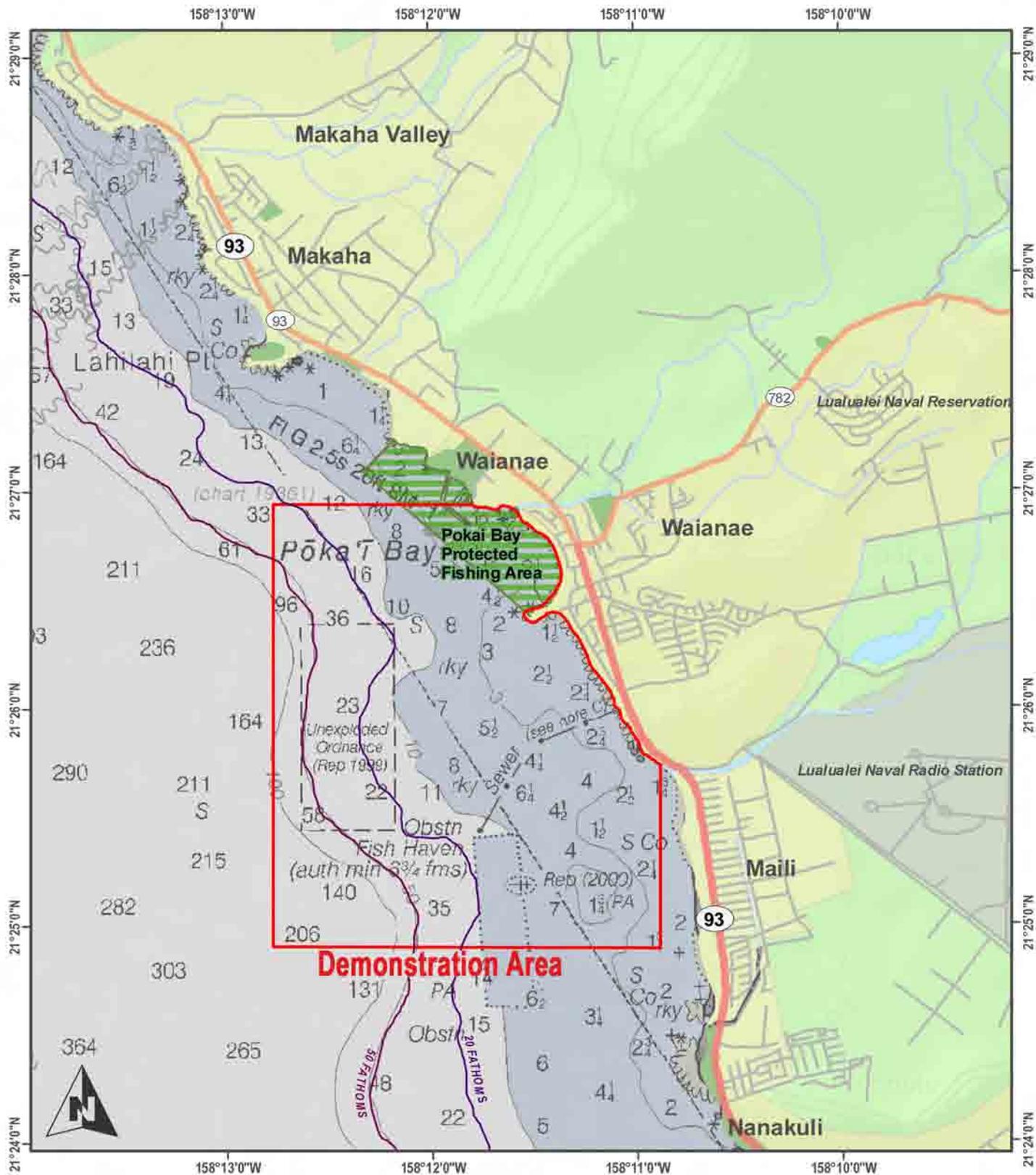
List of Adjoining Property Owners

Owner - Tax Records	Address	TMK				
		Division	Zone	Section	Plat	Parcel/Lot
United States of America	85-10 Army St	8	5	1	9	0
State of Hawaii	Waianae Valley Rd	8	5	1	45	0
United States of America	Plantation Rd	8	5	1	46	0
State of Hawaii	85-601 Farrington Hwy	8	5	2	49	0
State of Hawaii	85-491 Farrington Hwy	8	5	2	44	0
State of Hawaii	85-471 Farrington Hwy	8	5	2	11	0
State of Hawaii	85-251 Farrington Hwy	8	5	2	18	0
United States of America	85-10 Army St	8	5	1	8	0
State of Hawaii	Pokai Bay St	8	5	1	62	0
State of Hawaii	86-81 Farrington Hwy	8	6	1	7	0

Other Certifications

Other Certifications or Approvals/Denials Received						
<u>Agency</u>	<u>Type Approval</u>	<u>Identification Number</u>	<u>Date Applied</u>	<u>Date Approved</u>	<u>Date Denied</u>	<u>Result</u>
Hawaii DBEDT	CZM Federal Consistency		In Progress			
Hawaii DLNR	Right of Entry Permit		In Progress			
Hawaii DLNR	Mooring,		12 Aug 10			Permit Not Required
Hawaii DLNR	Coral/Live Rock Permit		12 Aug 10			Permit Not Required
Hawaii DLNR	CDUP		12 Aug 10			Permit Not Required
Hawaii DOH	90-day Haz Waste Permit		In Progress			
Hawaii DOH	Air Permit		14 Jun 10			Permit Not Required
NOAA	Essential Fish Habitat		In Progress			
NOAA	Endangered Species Act		In Progress			
FWS	Fish and Wildlife Coordination Act		In Progress			

Maps
Ordnance Reef



SPATIAL INFORMATION
 MAIN MAP - Scale 1:50,000. Datum: NAD83. Projection: UTM Zone 4N
 OAHU MAP - Scale 1:2,000,000. Datum: WGS84. Projection: Geographic

DATA RESOURCES: ESRI, NOAA, USGS, Natural Earth.com, Hawaii Dept. of Natural Resources



Figure 1: Ordnance Reef (HI-06) Location

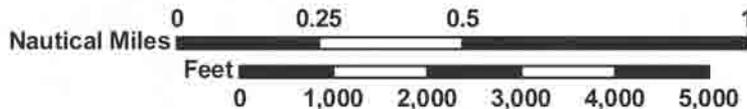
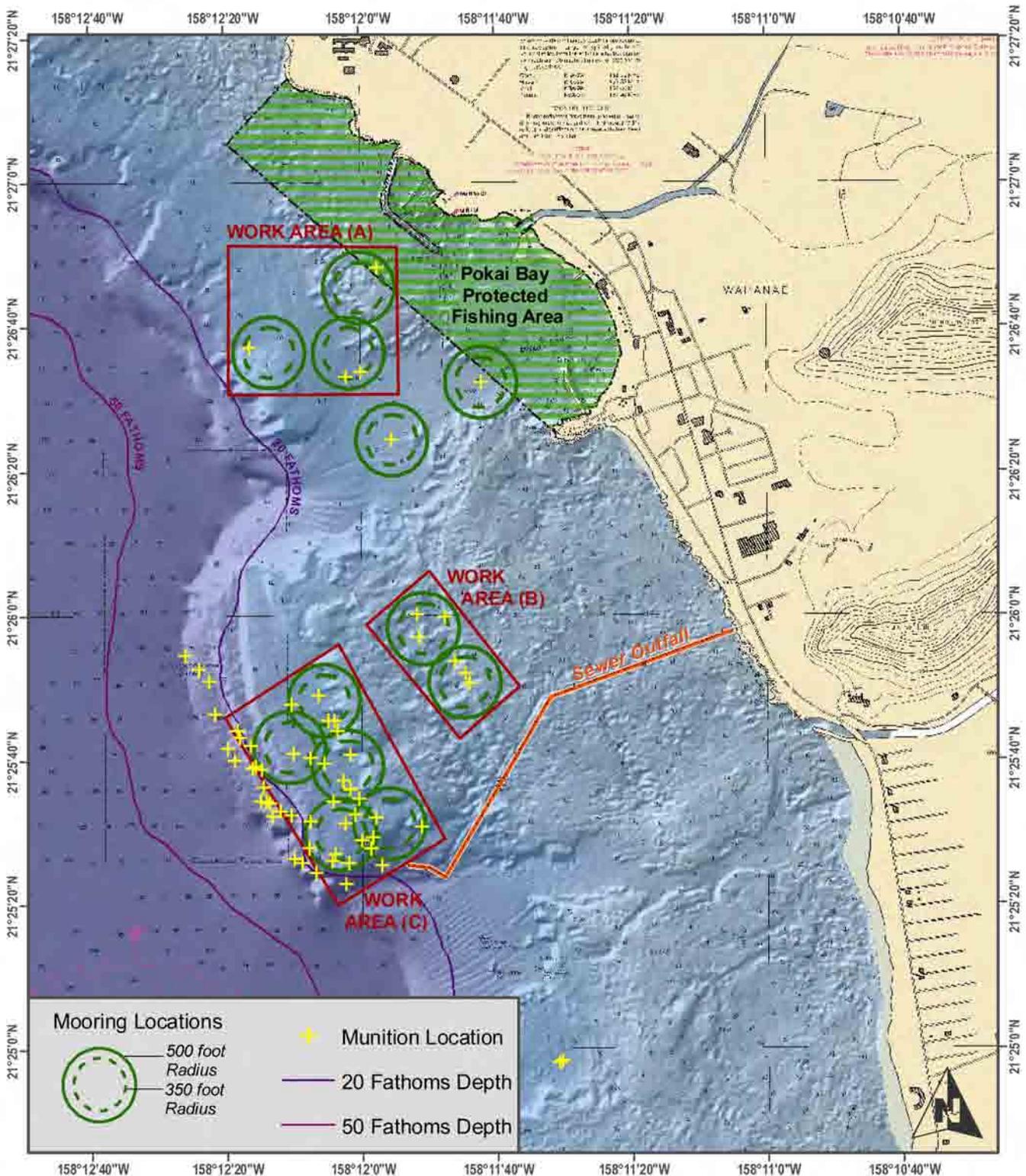
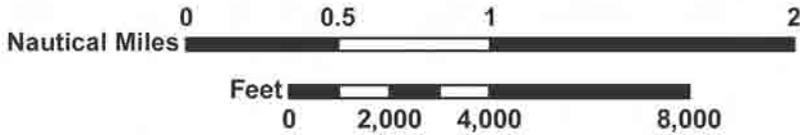
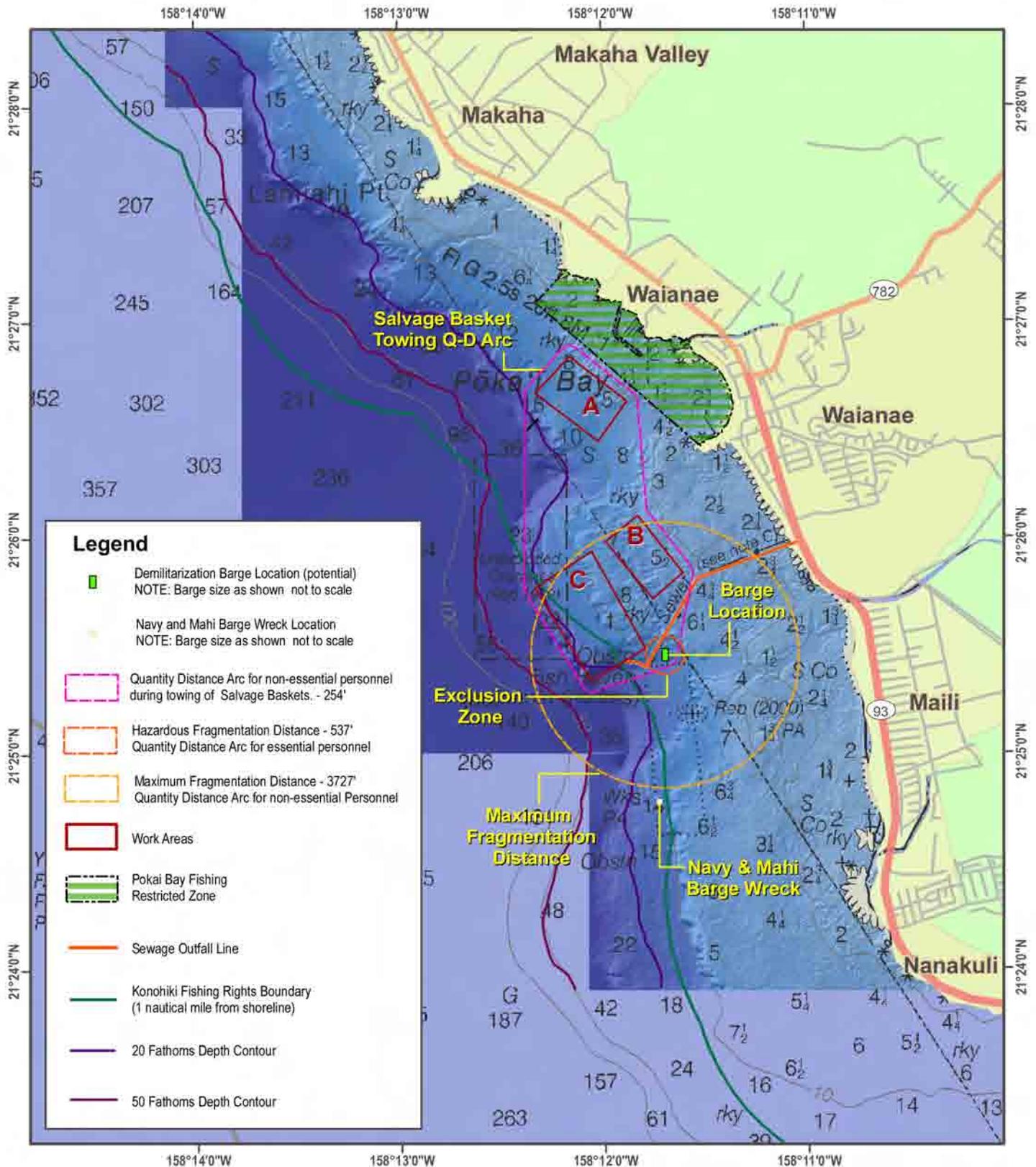


Figure 2: Ordnance Reef (HI-06) Layout and Mooring Locations



SPATIAL INFORMATION
 MAIN MAP - Scale 1:50,000. Datum: NAD83. Projection: UTM Zone 4N
 OAHU MAP - Scale 1:2,000,000. Datum: WGS84. Projection: Geographic



DATA RESOURCES: ESRI, NOAA, USGS, Natural Earth.com, Hawaii Dept. of Natural Resources

Figure 3: Explosive Safety Quantity Distance Arcs (Safety Zones)

ARA Incorporated
Technology Demonstration
at Ordnance Reef (HI-06), Waianae, Oahu, Hawaii
Best Management Practices (BMP)

The technology demonstrations (the Demonstration) that are proposed to occur at Ordnance Reef (HI-06) consists of two commercially available technologies that have been adapted for (a) the remote recovery of munitions from the ocean floor; and (b) the demilitarization of recovered munitions on an offshore barge. These technologies (the Remotely Operated Underwater Munitions Recovery System (ROUMRS) and Energetic Hazards Demilitarization System (EHDS)) will be assessed concurrently at Ordnance Reef (HI-06)). These Best Management Practices (BMP) are focused on the ROUMRS technology demonstration. ROUMRS is designed to demonstrate its capabilities to recover underwater military munitions (UWMM) in a manner protective of the public and environment. ARA's BMP describe procedures ARA will employ to protect human health and the environment, including to help avoid or limit injury to coral and other benthic habitats, and protecting sensitive marine life (e.g., marine species listed under the Endangered Species Act (ESA) or Protected Under the Marine Mammal Protection Act (MMPA), during field operations.

During or as a result of this Demonstration:

- Remedial or corrective actions will not be required. However, should inadvertent damage to coral or other benthic habitats occur, the Army will implement mitigation measures.
- Hazardous waste will not be generated.
- Managed solid waste will not be disposed at Ordnance Reef (HI-06).

The BMP to be used are:

1. General
2. Briefings
3. Pre-dive Checks
4. Placement of Anchorages, Moorings and Staging Areas In Environmentally Sensitive Areas
5. Subsea Investigation and Classification Munitions and Munitions Debris

6. Recovery of Munitions and Munitions Debris
7. Salvage Basket Operations
8. Lift Bag Operations
9. Operations in Sensitive Areas
10. Marine Species - Endangered Species Act (ESA)
11. Spill Contingency Plans

The steps taken to help avoid or limit injury to coral and other benthic habitats are addressed in BMP 2, 4, 5, and 6.

FINAL

Best Management Practice 1: General

Systematic planning and execution is essential for the efficient demonstration of ROURMS and for the safe and effective operation of ROURMS' remotely operated vehicle (ROV). The Demonstration's overall objectives will be accomplished by performing a number of general tasks. At a minimum these tasks will include:

- All required permits for topside and subsea activities will be secured from State, Federal, Port, and Local authorities as required. These permits may include:
 - Rights of Entry
 - Section 10 Permits
 - Anchorage Authorizations
 - To be determined, as required and listed in the work plans
- The Project Engineer for ROURMS Operations will
 - Ensure all required equipment is scheduled, available and prepared for use (sea and topside operations).
 - Ensure all parties directly involved with topside and subsea operations are briefed on planned operations and emergency procedures.
- Each crew member will review the work plans to develop a complete understanding of the overall operation and mission. This includes a thorough review of any customer-produced documentation (e.g., scope, photographs, previous reports).
- The ARA team will:
 - Mobilize all equipment allocated and scheduled for topside and subsea operations.
 - Transport all equipment, personnel, and spares to the work site.
 - Check, prepare, and confirm operability of all equipment for the individual tasks in proper order of use.
 - Minimize any turbidity and siltation from landward Demonstration-related work and contain it, to the extent possible, within the vicinity of the site through the appropriate use of effective containment devices and the curtailment of work during adverse tidal and weather conditions.
 - Compare and coordinate all pre-dive functionality tests as well as checklists for deployment.
 - Inspect, prior to use, all demonstration-related materials and equipment (barges, ROVs, etc.) to be placed in the water to ensure it is free of visible pollutants.

- Prevent the stockpiling of demonstration-related materials in the water (intertidal zones, reef flats, stream channels, sea grass beds, etc.).
- Dispose of all demonstration related waste that is not recyclable at approved properly permitted facility.
- Prevent the contamination (e.g., trash or debris disposal, the introduction of non-native species, the attraction of non-native pests) of adjacent habitats (e.g., reef flats, channels, open ocean, stream channels, sea grass beds) by demonstration-related activities.
- Ensure fueling of Demonstration-related vehicles and equipment occurs away from the water.
- Prepare a contingency plan to control petroleum products accidentally spilled during the Demonstration and have absorbent pads and containment booms on-site, if appropriate, to facilitate the clean-up of accidental petroleum releases.
- Deploy equipment; locate the work site, and begin work.
- At the completion of the work task, recover equipment (per detailed procedures).
- Perform post-dive functionality checks as well as visual condition inspections.
- Clean, pack, and demobilize equipment, upon completion of the Demonstration.

Best Management Practice 2: Briefing

The operation of an ROV is a team effort. Each day, prior to starting ROV operations, a full crew briefing is essential to ensure efficient tasking and enhance team synergies. The crew briefing, at a minimum, will include:

- Mission tasking and/or threat outline, detailing the specific tasks assigned to each crewmember.
- A thorough and complete explanation of the individual tasks for each day's mission.
- A safety briefing.
- The scope of work and specific goals to be accomplished during individual tasks.
- Ingress and egress routes to the work site.
- Crew positions and specific responsibilities during the tasks.
- Tactics, techniques, and procedures for accomplishing each individual task and completing the mission.
- Specific information needed as well as methods of documentation.
- Relevant information about munitions to be inspected and recovered including, but not limited to drawings, photographs, damage reports, witness statements and any other information that will assist in the work task.
- Work area coordinates.
- Topographic maps, bathymetric data, tide tables, underwater obstruction analysis, prior surveys and any other environmental information that will assist in accessing the work areas.
- Summary of previous work performed at Ordnance Reef (HI-06) to include the Oceanic and Atmospheric Administration (NOAA) Coral Avoidance and Minimization of Injury Plan (CAMIP) detailing the locations of sensitive corals and other benthic habitats.
- Schedule for completion of mission objectives including the best and worst case scenarios, with consideration of potential delays.

Best Management Practice 3: Pre-Dive Checks

The following pre-dive check should be carried out prior to every dive:

- Visually inspect the ROV to ensure the propellers are not fouled, all components are secured, and there is no mechanical damage to the frame or other components.
- Check the tether for scrapes, nicks, or other visible damage. The ROV will not be used, if the tether jacket is broken through.
- Verify correct operation of the ROV's thrusters. (CAUTION: ROV thrusters should only run for a few seconds when not submerged in water.)
- Ensure:
 - All fasteners are in place and secure.
 - Whip connectors at the electronics and tether termination cans are connected securely. (Note: Dielectric silicone grease will be used to lubricate electrical connections, as necessary.)
 - Unused vehicle connectors are capped securely with dummy plugs.
 - Surface cables are securely connected.
- The Auto Depth switch on the control panel will be switched to OFF, the Manual Depth Control knob will be centered, and the Auto Heading selector will be OFF prior to powering up the system.
- Lights, camera, manipulators, tooling functions, and thrusters will be tested. The data recorders and documentation processes will be tested to ensure they are operating properly. (CAUTION: Lights should only be tested for a few seconds if not submerged in water seconds to prevent heat buildup.)
- After the vehicle is placed into the water confirm the operability of the ballast and trim.
- If any instruments or equipment are not functioning properly, the Project Engineer will determine the potential impact and implement actions necessary to achieve mission objectives. Any maintenance performed will be documented.

Best Management Practice 4: Placement of Anchorages, Moorings and Staging Areas in Environmentally Sensitive Areas.

This section contains the detailed BMP for anchoring watercraft and the staging of subsea equipment. Special considerations are included to avoid injury to coral and other benthic habitats and to minimize such injury during remote operations. Every operational situation is unique with special needs and requirements.

- If available, the coordinates for each potential mooring, anchorage, and staging area must be confirmed prior to contacting the bottom.
- Mooring, anchorage and staging areas will be located using global positioning systems.
- A crew briefing will be conducted prior to ROV operations, with the ROV and topside crew be briefed about:
 - Coral growth, reefs, marine life, protected marine species, and habitat, that must be avoided.
 - Culturally important structures and locations.
 - Photographs, drawings, previous reports, and the NOAA CAMIP documenting the relative level of concern for each area at Ordnance Reef (HI-06).
- The ROV will only be operated by approved and qualified operators.
- The pre-dive checklist will be followed prior to launching the ROV.
- Watercraft will not be allowed in the ROV operating area
- The RSV will not move without the prior knowledge of the ROV operator.
- The ROV will be launched as far away as practical from propellers and any overboard obstructions.
- The ROV tether will:
 - Be manned at all times.
 - Have positive buoyancy to minimize bottom contact and possible disturbance of reef structures.
- The ROV will:
 - Be used to reconnoitered the position of mooring, anchorages and staging areas prior to contacting the bottom to confirm these areas are acceptable based on criteria provided the CAMIP.
 - Approach the mooring, anchorage, or staging areas, exercise caution and avoid contact with the bottom, environmental features, coral, or structures.
 - Digitally record, document and save an image of the target location (e.g., mooring, anchorage, staging locations) prior to contacting the bottom.

- Avoid coral species, protected marine species, reefs, habitats of concern, and culturally important structures and locations to prevent damage prior to and following placement of the mooring, anchorage, or equipment on the bottom.
- Used to lower moorings, anchorages, and equipment to the bottom or such will be lowered using lines – **moorings, anchorages, and equipment will not be dropped or released freely from the surface!**
- Good communications will be maintained between the ROV operator and the helm to ensure the ROV operator is aware of the relative positions of the ROV to the vessel, and is informed of the vessel's anticipated.
- Moorings and anchorages in sensitive locations will employ floated lines.
- Upon completion of work at the site, the condition of the target location will be digitally recorded and saved after the mooring, anchorage, or staged equipment is removed. **Injury to sensitive areas will be reported to the Army's lead.**

Best Management Practice 5: Subsea Investigation and Classification Munitions and Munitions Debris

This section contains the detailed BMP for investigating munitions and munitions debris. Some steps describe precautions to be taken during ROV operations in environmentally and culturally sensitive areas. Every operational situation is unique with special needs and requirements.

- A crew briefing will be conducted prior to ROV operations, with the ROV and topside crew be briefed about:
 - Coral growth, reefs, marine life, protected marine species, and habitat, that must be avoided.
 - Culturally important structures and locations
 - Photographs, drawings, previous reports, and the NOAA CAMIP documenting the relative level of concern for each area at Ordnance Reef (HI-06).
- ROV will only be operated by approved and qualified operators.
- The pre-dive checklist will be followed prior to launching the ROV.
- Watercraft will not be allowed in the ROV operating area.
- The RSV will not move without the prior knowledge of the ROV operator.
- The ROV will be launched as far away as practical from propellers and any overboard obstructions.
- The ROV tether will:
 - Be manned at all times.
 - Have positive buoyancy to minimize bottom contact and possible disturbance of reef structures.
- Care will be taken to ensure the ROV tether does not foul or contact the bottom.
- The ROV will circumnavigate the munitions and munitions debris, collecting and recording digital images of the area.
- If needed, unique markers may be placed next to individual munitions, clusters of munitions, and other materials of interest and digitally recorded.
- Coordinates of the identified munitions and other materials of interest will be documented and saved.
- Images of the munitions and munitions debris will be digitally recorded and assigned a unique identifier. Co-located or multiple munitions may be recorded with a single identifier. Target identifiers will include at a minimum an alpha numeric identifier, coordinates, and a description of the munition or material.

- All coral species, including any Branching Corals (*Pocillopora meandrina*, *Pocillopora eydouxi*, etc) or Lobate Corals (*Porities lobata*, *Porities evermanni*, *Porities duerdeni*, etc) greater than 12 inches in vertical growth that is either growing on a munition or in a location where it could be damaged during recovery of the target (munition) will be documented. Recovery of munitions or munitions debris with corals having greater than 12 inches of vertical growth will not occur until NOAA has been consulted about coral mitigation options (e.g., transplantation, habitat replacement) and the Army concurs with the recovery. Any munitions intentionally not recovered will be documented as to type, location, and the reason for leaving it in place.
- Encrusting Corals (e.g., *Leptastrea*, *Montipora captata*, *Montipora patula*) commonly grow on targets at Ordnance Reef (HI-06), but will not be noted.
- **Injury to sensitive areas will be identified and reported to the Army Lead.**

Best Management Practice 6: Recovery of Munitions and Munitions Debris

This section contains the detailed BMP for recovering munitions and munitions debris from the bottom. Munitions and munitions debris selected for recovery will be interrogated and classified per the appropriate ARA BMP and the work plan. Every operational situation is unique with special needs and requirements.

- The selection and prioritization of munitions and munitions debris for recovery will be performed prior to initiating ROV dive operations.
- Selected munitions and munitions debris will be prioritized and placed onto a Recovery Sheet that is presented to the field crew prior to initiating ROV operations.
- At a minimum, Recovery Sheets will include the Identification number of the munitions and munitions debris, its description and the coordinates from which it was recovered.
- If needed, salvage baskets will be staged near munitions and munitions debris being recovered per the appropriate BMP. Prior to beginning ROV recovery operations, the ROV operator will:
 - Confirm the salvage basket's operational status.
 - Confirm the ROV's navigation corridor to and from the salvage baskets to limit potential impacts to all coral species.
- The ROV will limit, to the extent possible, contact with and avoid disturbance of the bottom while collecting munitions and munitions debris
- When contact with the bottom is necessary, the ROV operator will ensure that corals and reef structures are avoided using the following checklist to minimize impact.
 - Transit route to the target must be established to help avoid or limit injury to coral and/or other benthic habitats, and navigate to the target safely without damaging the ROV.
 - Remove the target (munition or munitions debris) from the bottom without causing injury to coral or other benthic habitats.
 - If there is a release of munitions constituents (MC) to the environment, the MC will be recovered to the extent possible using the ROV mounted vacuum and trash pump.

- The ROV will be set down and perform any required work without damaging coral or other benthic habitats.
- If these activities cannot be performed, consult with NOAA and the Army concerning alternatives.
- All coral species, including any Branching Corals (*Pocillopora meandrina*, *Pocillopora eydouxi*, etc) or Lobate Corals (*Porities lobata*, *Porities evermanni*, *Porities duerdeni*, etc) greater than 12 inches in vertical growth that is either growing on a munition or in a location where it could be damaged during recovery of the target (munition) will not be removed until NOAA has been consulted about coral mitigation options (e.g., transplantation, habitat replacement) and the Army concurs with the recovery. Any targets intentionally not recovered will be documented as to type, location, and the reason for leaving it in place.
- Once a munition has been collected, it will be placed into the ROV's hopper or, if necessary, transferred directly to the salvage basket at a nearby staging area.
- The ROV hopper will be unloaded into the salvage baskets as necessary.
- After a munition has been recovered from the bottom, images of its former location will be digitally recorded.
- Any munitions debris recovered from underwater and from munitions processed by the EHDS will be hauled off site, and be recycled or disposed per applicable laws and regulations. The Army may retain some munitions debris for scientific study.

Best Management Practice 7: Salvage Basket Operations

- Inspect the salvage basket per ARA Salvage Basket's Pre and Post Dive Checklist.
- Confirm using the ROV that the location and placement of the salvage basket is in an area that will not injure coral or other benthic habitats as noted in NOAA's CAMIP.
- Perform salvage basket preparation and maintenance topside. Confirm that the:
 - Salvage basket does not have damage that would effect its operation (e.g., broken structural elements, holes that would allow release of contents).
 - The hopper doors open and operate correctly.
 - Lifting points and rigging are in good condition.
 - Side and top salvage gates open and operate correctly.
 - Air bottles of the lift system are filled and ready for deployment.
- Perform salvage basket launch and recovery per BMP 4 and BMP 8.
- Tow the salvage basket.

Best Management Practice 8: Lift Bag Operations

- Confirm that lift rigging and tow bridle are operable, correct if inoperable noting any maintenance performed.
- Confirm that lift bag and air system are operable, correct if inoperable noting any maintenance performed.
- Perform ascent and descent preparation by:
 - Confirming:
 - ✓ All personnel are ready for a lift.
 - ✓ The ascent corridor is free and clear of personnel, watercrafts, and marine life.
 - Communicating with salvage basket recovery team regarding the lift.
 - Activating air system remotely using the ROV.

Best Management Practice 9: Operations in Sensitive Areas

A Demonstration-Specific Work Plan (WP) will be prepared and submitted to responsible parties before in-water activities begin. The name and contact information for the designated Demonstration points of contact (POC) for all in-water activities are included in the Health and Safety Plan portion of the WP. The designated POC will ensure that daily visual inspection of Ordnance Reef (HI-06) and its environs are conducted to verify that Demonstration-related activities do not result in uncontrolled adverse environmental impacts and that should environmental injury occur, such injury is minimized to the maximum extent practicable. Visual inspections will be documented with photographs and written descriptions, if necessary. Full water column silt curtains are not needed for this Demonstration because there are no anticipated effects from the suspension of disturbed sediments and turbidity. The WP will include measures to help ensure:

- In-water activities employ sound attenuation measures that will minimize the intensity and duration of percussion impacts through the aquatic environment to the extent practical and feasible.
- The ROV, any mechanized equipment and other materials used during the Demonstration will be clean and free of obvious contamination and deleterious substances that might include toxic chemicals and clay-coated material.
- A Spill Contingency Plan (BMP #11) is in place on landside platforms and in all support vessels associated with the demonstration. The Project Manager or ship's Captain will detail procedures for managing the accidental release of petroleum products to the aquatic environment, if there is a release. Particular care per the site-specific planning documents must be taken to ensure that no petroleum products, trash, or other debris enter near-shore waters. When such material is found within the operating area, the material will be collected and disposed of at a permitted facility. Additionally, spill containment kits will be kept on hand.
- Watercraft will be piloted by licensed people who are familiar with operating in Hawaiian waters.
- Visual surveys will occur prior to the start of work each day, and periodically during the day, including prior to resumption of work following a break of more than 30 minutes.

- All in-water work will be postponed or halted when an ESA-listed marine species or a species protected under the MMPA is within 210 feet (i.e., 63 meters) of the proposed work, and will only begin or resume after these marine species has voluntarily departed the area. If ESA-listed marine species are noticed within 210 feet after work has already begun, that work may continue only if, in the best judgment of the Project Manager, there is no way for the activity to adversely affect the ESA-listed or MMPA-protected species.
- Protocol and operations measures for the avoidance and protection of protected species that include, but may not be limited to green sea and hawksbill turtles, Hawaiian monk seals, humpback whales and other protected species in active, mechanized equipment and boat areas of operation will incorporate the following site-specific avoidance and minimization measures:
 - When piloting watercrafts, operators will alter course to remain a minimum of 300 feet from whales and 210 feet from other marine mammals and sea turtles,
 - Reduce watercraft speed to 10 knots or less when piloting watercrafts at or within the ranges described above from marine mammals and turtles. Operators will be particularly vigilant to watch for turtles at or near the surface in areas of known or suspected marine mammal or turtle activity, and if practicable, reduce watercraft speed to 5 knots or less,
 - If despite efforts to maintain the distances and speeds described above, a marine mammal or turtle approaches a watercraft, put the engine in neutral until the animal is at least 50 feet away, and then slowly move away to the prescribed distance,
 - Marine mammals and sea turtles will not be encircled or trapped between multiple watercrafts or between vessels and the shore,
 - Do not attempt to feed, touch, ride, or otherwise intentionally interact with any ESA-listed or MMPA-protected marine species,
 - All on-site demonstration personnel must be apprised of the status of any ESA-listed species potentially present in the demonstration area and the protections afforded to those species under Federal laws. Information explaining laws and regulations for listed species in Hawaii may be downloaded at <http://www.nmfs.noaa.gov/protres/MMWatch/hawaii.htm>. The POC will ensure that protocols and observers in place to avoid the potential contact with or harassment of ESA-listed or MMPA-protected species are followed during all periods of in-water work,

- Records any protected species observed in the demonstration areas for the duration of in-water activities will be maintained and submitted at the close of in-water activities.
- Immediate notification to Don Hubner (808-944-2233) Protected Resources Division, NMFS, PIRO, if:
 - A take occurs;
 - New information reveals the action has affected listed species in a manner or to an extent not previously evaluated;
 - If the action is subsequently modified and causes effects to listed species in a manner or to an extent not previously considered or evaluated; or
 - A new species is listed or critical habitat is designated that may be affected by the authorized work.
- For stranded sea turtles, contact 808-983-5730 (M-F 0700-1600) or the pager number 808-288-5685/0023 after hours and weekends for a fast call back.
- For concerns relating to marine mammals contact 888-256-9840.

Best Management Practice: 10. Marine Species Listed Under the Endangered Species Act (ESA) or Protected Under the Marine Mammal Protection Act (MMPA)

The following BMPs are intended to ensure that the proposed action would have insignificant impacts on ESA-listed or MMPA protected marine species, or to diminish the likelihood of impact below the threshold of discountable.

Note: Any concurrence by National Marine Fisheries Service (NMFS) Protected Resources Division that the proposed action is not likely to adversely affect ESA-listed marine species would be based in large part on the expectation that as a minimum the following BMPs would be implemented. These BMPs are in no way intended to supersede or replace measures required by any other agency including, but not limited to the USFWS, USEPA, or NMFS Habitat Conservation Division.

Constant vigilance will be kept for the presence of ESA-listed or MMPA protected marine species during all aspects of the proposed action, particularly in-water activities such as dredging, boat operations, diving, or ROV operations.

- A competent observer will be designated to survey the marine areas adjacent to the proposed action for ESA-listed or MMPA protected marine species.
- Visual surveys will occur prior to the start of work each day, and periodically during the day, including prior to resumption of work following any break of more than one half hour.
- All in-water work will be postponed or halted when an ESA-listed marine species is within 210 feet of the proposed work, and will only begin or resume after the ESA-listed marine species has voluntarily departed the area. If ESA-listed or MMPA-protected marine species are noticed within 210 feet after work has already begun, that work may continue only if, in the best judgment of the Project Manager, there is no way for the activity to adversely affect the ESA-listed or MMPA-protected marine species. For example; the ROV performing surveys or underwater work is likely safe, whereas the air-lifting of the salvage baskets may not be prudent.
- When piloting watercraft, operators will alter course to remain a minimum of 300 feet from whales and 210 feet from other marine mammals and sea turtles.
- Reduce speed to 10 knots or less when piloting watercraft at or within the ranges described above from marine mammals and sea turtles. Operators will be particularly vigilant to watch for turtles at or near the surface in areas of known

or suspected marine mammal or turtle activity, and if practicable, reduce watercraft speed to 5 knots or less.

- If despite efforts to maintain the distances and speeds described above, a marine mammal or turtle approaches the watercraft, put the engine in neutral until the animal is at least 50 feet away, and then slowly move away to the prescribed distance.
- Marine mammals and sea turtles will not be encircled or trapped between multiple vessels or between vessels and the shore.
- Do not attempt to feed, touch, ride, or otherwise intentionally interact with any ESA-listed or MMPA-protected marine species.

No contamination of the marine environment is anticipated from demonstration-related activities.

- To control petroleum products accidentally spilled during the demonstration, appropriate materials to contain and clean potential spills will be stored and readily available at the work site.
- All demonstration-related materials and equipment to be placed in the water will be free of visible pollutants prior to use. The Project Engineer responsible for operations or his designated person will perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations will be postponed or halted should a leak be detected, and will not proceed until the leak is repaired and equipment cleaned.
- Turbidity and siltation from demonstration-related work will be minimized. Silt containment devices are not applicable for this technology demonstration.
- Although no construction debris will be generated during the ROUMRS demonstration, all waste, debris, and litter on the watercraft will be controlled and not allowed to enter or remain in the marine environment during the demonstration.

Best Management Practice 11: Spill Contingency Plan

This Spill Contingency Plan is designed to identify and prevent potential spill hazards, and outline protocols to respond to spill hazards at ARA Incorporated Field Operations on Oahu, Hawaii. ARA will have a spill containment kit onboard the RSV and the DSV.

- All watercraft used in the demonstration will have their own spill contingency plans, and personnel involved with the demonstration will be briefed on those plans.
- Define the severity and type of the spill – A chemical spill during the technology demonstration is highly unlikely because the storage of hazardous chemicals, other than petroleum products onsite is not anticipated. The most of any one chemical being stored is a one gallon in a container approved for commercial products.
 - All chemicals are stored in containers of one gallon or less causing minimal problems in the event of a container breaking or tipping over.
 - All watercraft fueling operations will occur at approved marina fueling locations.
 - Fueling of all other approved portable fuel receptacles (gas cans) will occur at licensed facilities
- Response to an accidental release of a petroleum product or other hazardous material:
 - Evacuate the immediate vicinity of affected areas if exposure puts you and others in imminent danger.
 - If the spill is in a building, close all doors and open windows if substance is volatile and initiate emergency actions (see below).
 - If the spill is on a watercraft, use spill kits to control spill and prevent an overboard release.
 - Activate actions listed in the Demonstration Health and Safety Plan if serious bodily injury or property damage has occurred or is imminent. Call 911.
 - Administer first aid to victim(s), taking the appropriate personal protective equipment (PPE) and other necessary precautions to prevent rescuers exposure. Identification of specific hazard is essential.
 - **Contact Watercraft Captain, Operations, and Project Manager.**

- Actions to take in the event of a petroleum spill, bodily injury:
 - Flush affected eyes, skin and clothing with water using eyewash station, sinks or safety shower. Remove contaminated clothing.
 - If possible and safe to do so, use petroleum or chemical spill kits to and absorb the spill. Wear appropriate PPE, including respirator, if necessary. Sweep up and bag the absorbent. Dispose of material properly. Refer to material safety and data sheets (MSDS).
 - If spill occurs in an enclosed area, leave and close the door behind you.
 - Pull Fire Alarm switch to activate the occupant emergency plan.
 - Assemble in a designated area.
 - Take a head count. Notify the Captain, Project Manager, or Facilities Manager on the nature of the emergency.
 - Activate Emergency Response Plan, if necessary.
 - Stay away from the affected area or building and do not re-enter until it is cleared by the safety officer.

Emergency Telephone Numbers

Emergency Telephone	911
US Coast Guard, NRC	800.424.8802
Fire Department Honolulu	808.523.4411
State Spill Response (business hours only)	808.586.4249
24 Hour State Spill Hotline	808.247.2191

Once contact is made report:

- Your Name
- Location of Emergency
- Type of Emergency
- Type of Help Required

ARA Emergency Contact Numbers:

- ROUMRS Program Manager –John Coughlin – 443.745.4163
- ROUMRS Project Manager – Josh Bowers – 814.243.9460
- ROV Support Vessel Captain –TBD
- Demilitarization Support Vessel Operations Manager -TBD

Figure 2

ROUMRS Capabilities

ROV Features

Manipulators

- Dual 7-function arms w/ force-feed back

Hydraulics

- 15kW HPU with 16 function valve pack

Vehicle rated for 300m operations

- Upgradable to 2000m – requires floatation change

Thrusters

- (3) vertical 496LB up/down thrust
- (4) horizontal 496 LB fwd/rev/lateral thrust

Recovery Skid w/ Hopper

- 200LB lift capacity with a 5.8 FT³ fill volume

Suction/jetting pump with Canister Filter

- 125" filter-passes sand/retains propellant grains
- Suction nozzle carried by manipulator
- Canister Filters are jettisoned and later recovered in Salvage Basket

Onboard Sensors

- Scanning Sonar, depth, heading, roll/pitch

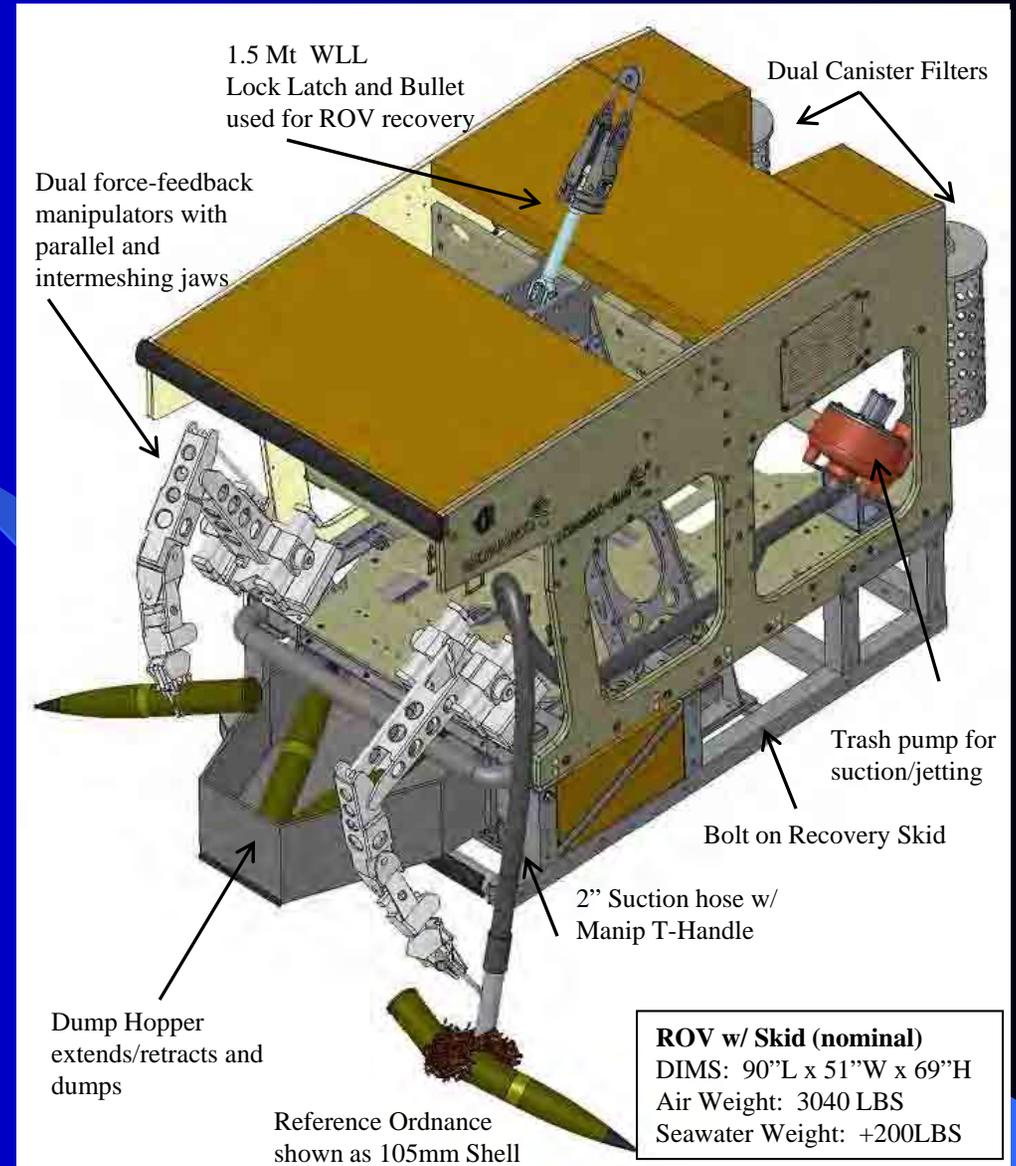
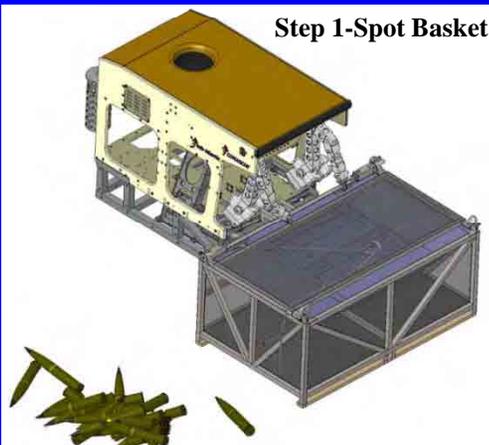


Figure 2 – SMA Permit Application

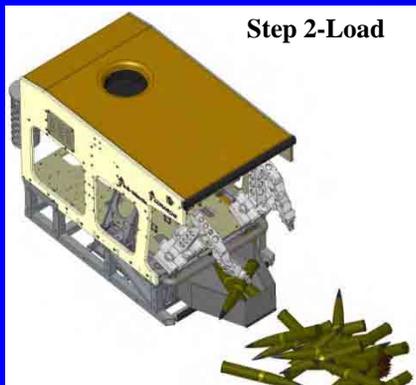
Figure 3 ROUMRS Conceptual Operations

Step 1-Spot Basket



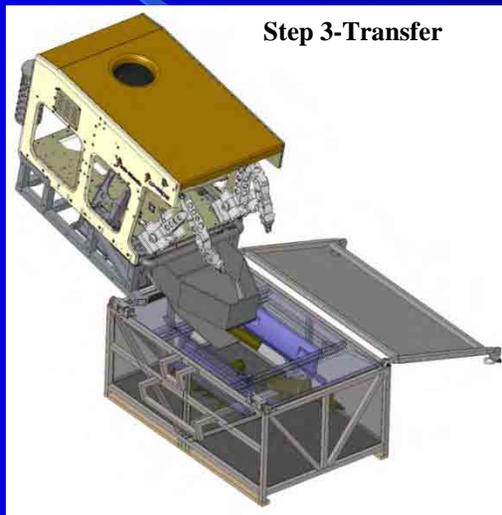
- Landing site inspected for coral/live rock
- Salvage Basket lowered to bottom and released
- ROV positions Basket near concentrated UXO, un-pins and opens upper door

Step 2-Load



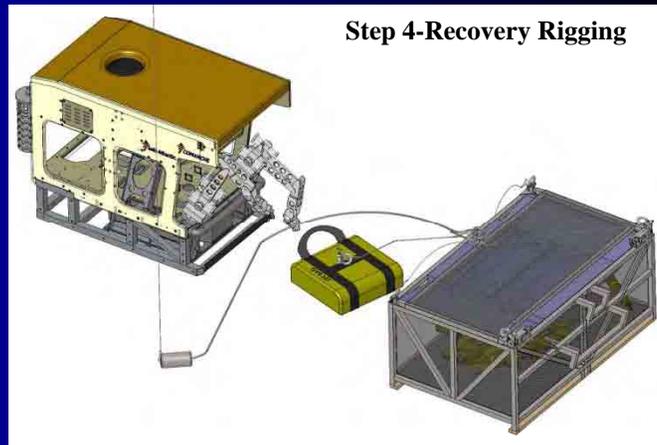
- Hopper is extended out of Recovery Skid
- UXO is documented (video, laser scaling)
- Manipulators/tooling used to pickup UXO
- Small debris vacuumed into Canister Filters
- Retract Hopper

Step 3-Transfer



- ROV transits to and lands on Salvage Basket
- Hopper extended, contents emptied, and Hopper retracted
- Canister Filters jettisoned and recovered
- ROV transits to next Recovery Site

Step 4-Recovery Rigging



- Air Lift Valise is lowered, ROV moves it to Basket
- Air Lift rigging and Tow/Recovery Line connected
- ROV turns ON air valve and inflates Lift Bag
- Salvage Basket ascends to surface

Step 5-Tow to De-mil Barge



- Small craft slowly tows basket to De-Mil Barge
- Tow Line is passed to De-Mil Barge and rigged to a deck winch for recovery
- EOD crew Unloads Basket
- Basket and Air Bag prepped for next deployment

Figure 3 – SMA Permit Application

APPENDIX L*

Hazardous Waste Treatment Permit Application

* Note: Some of the information presented in this appendix has since been revised. All current information is contained in the Environmental Assessment and Draft Finding of No Significant Impact.

Hazardous Waste Permit Application

Treatment of Munitions

Ordnance Reef (HI-06)
Waianae, Oahu, Hawaii



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I. Background Information

The Army is proposing to demonstrate (Demonstration) concurrently two technologies at Ordnance Reef (HI-06), off the coast of Waianae, Oahu, Hawaii. The Demonstration involves an assessment of the feasibility of remotely cutting recovered munitions and then treating exposed explosive munitions constituents (MC) using contained radiant convection heating to decompose the explosive MC on an offshore barge within an area referred to Ordnance Reef (HI-06). These actions results in the demilitarization and destruction of the recovered munitions. This technology assessment is funded by the Army's Research, Development, Test and Evaluation appropriation and supports activities authorized and directed by the National Defense Authorization Act of 2007. The proposed assessment is expected to result in the disposal of many of the munitions recovered from Ordnance Reef (HI-06), between depths of approximately 30 and 120 feet of water, during a concurrent technology assessment of remote recovery technology.

The Demonstration involves two concurrent technology assessments. The two primary technologies will be assessed are a Remotely Operated Underwater Military Munitions Recovery System (ROUMRS) for recovery of underwater military munitions (UWMM), and the Energetic Hazard Demilitarization System (EHDS) for treatment of recovered munitions. This package includes a description of the Demonstration.

As provided within the National Defense Authorization Act (P.L. 109-364), the Secretary of Defense was instructed to conduct research on the effects of military munitions sea disposed in US coastal waters on the ocean environment and those that use. Under this Act, research should include investigating the feasibility of removing or otherwise remediating the military munitions and the development of effective safety measures for dealing with such military munitions. For this Demonstration, the Army selected Ordnance Reef (HI-06) because of the extensive knowledge available about the munitions present, including the depth and grid coordinates of individual and clusters of munitions; the site's characteristics (i.e., a close-to-shore, shallow water--less than 120 feet--hard bottom surface); and public and state concerns with the munitions' presence in an area heavily used for recreational and commercial purposes.

During a benthic survey of the Waianae waste water treatment plant (WWTP) sewage outfall in 1992, the City and County of Honolulu (CCH), Department of Wastewater Management's oceanographic team discovered what appeared to be UWMM northwest and south of the existing sewage outfall's diffuser. In 2002, the US Navy's Explosive Ordnance Disposal Detachment located and identified roughly 2,000 munitions which it categorized as mostlikely discarded military munitions (DMM). In 2006, the Army and Navy funded the National Oceanic and Atmospheric Administration (NOAA) to conduct a screening-level survey of Ordnance Reef (HI-06). The NOAA survey, which was limited to depths of 24 to approximately 300 feet, determined both the boundaries of Ordnance Reef (HI-06) and the locations of UWMM present, provided information for use in identifying the types and approximate quantities of the military munitions observed, and analyzed sediment and fish tissue samples for munitions constituents (e.g., metals and explosives). The report, which provided the DoD with screening-level data, also provided the basis for assessing the potential explosives safety and human health or environmental risks associated with the UWMM present and for making a determination of whether a response was required.

The Army's and Navy's explosives safety centers concluded that the UWMM present did not pose an immediate explosives safety risk to the public, and only deliberate activities (e.g., divers disturbing munitions) posed a threat to those who use the site for recreational-related and other activities. Army's Center for Health Promotion and Preventive Medicine (USACHPPM), now the Army's Public Health Command, and the Navy's Environmental Health Center, the agencies responsible for health and environmental risk assessments, concluded that (a) the contaminant levels from any munitions constituents (MC) detected were all well below risk-based levels; and (b) the only metals detected in fish tissue did not appear to be associated with the UWMM present at Ordnance Reef. Based on available data, these assessors concluded that it was unlikely that the UWMM posed a health risk to humans. The ecological evaluation found no overt signs of stress or ecological impact. However, both agencies concluded that there were data gaps that needed to be addressed to answer the community's questions regarding possible risk to human health and/or contamination of ocean food resources. The University of Hawaii is currently completing a study to fill the data gaps.

II. Demonstration Project Delivery Team

A. Funding Federal Agency

Office of the Deputy Assistant Secretary of the Army
for Environment, Safety, and Occupational Health (DASA-ESOH)
110 Army Pentagon, Room 3D453
Washington, D.C. 20310-0110

B. Contracting Agency

Army Contracting Command
Contracting Center of Excellence
200 Stovall Street
11th Floor
Alexandria, VA 22332-1800

C. Munitions Treatment Contractor

ARA Inc.
Martin Arase
11211 Wayples Mill Rd
Fairfax, VA 22030-7406

D. Local Assisting Agency

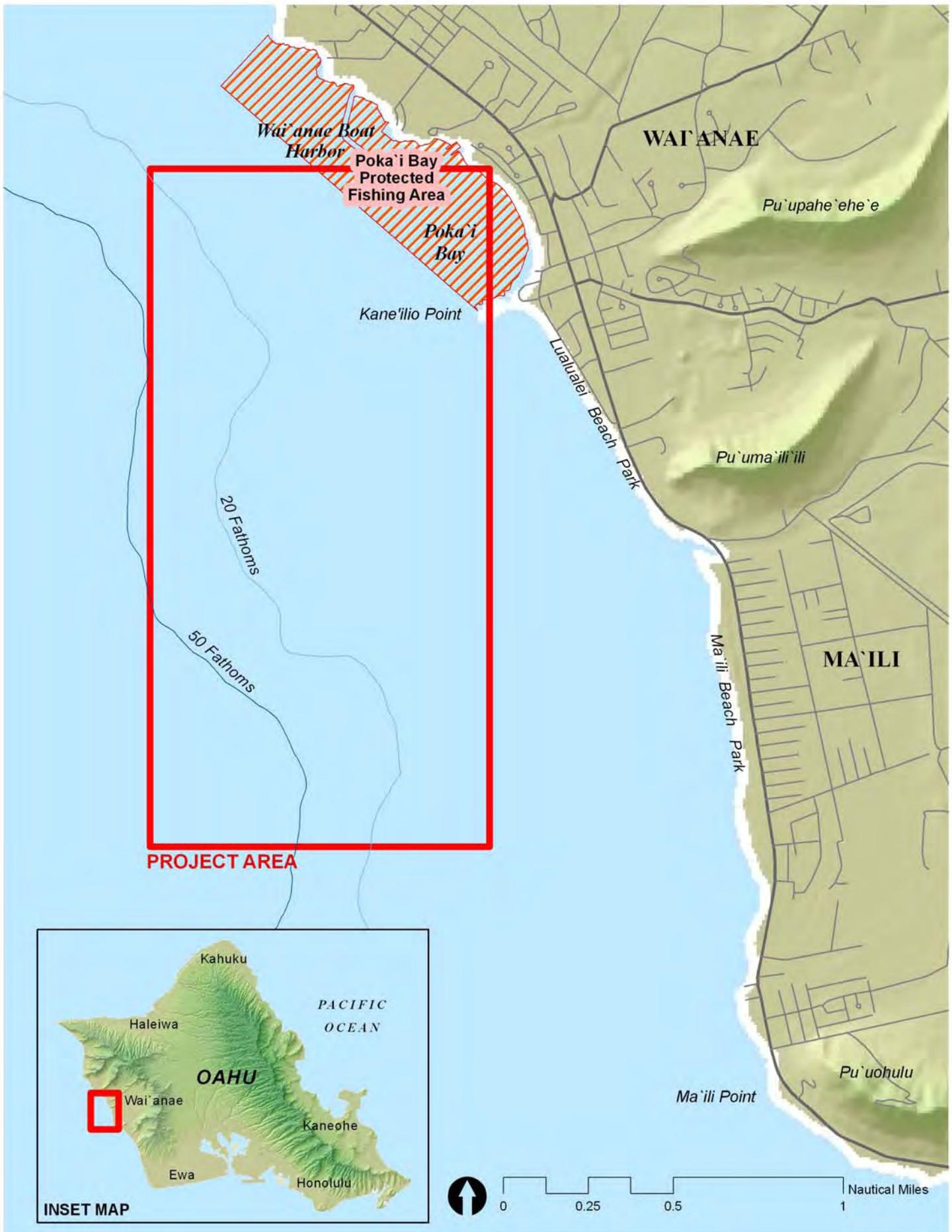
U.S. Army Corps of Engineers, Honolulu District
Bldg. 252, Attn: CEPOH-PP-E
Fort Shafter, HI 96858-5440

E. Property Owner

Hawaii State Department of Land and Natural Resources
Land Division, Kalanimoku Building
1151 Punchbowl St.
Honolulu, HI 96813

III. Project Maps

A. Demonstration Location. The Demonstration site (Ordnance Reef (HI-06)) is located south and west of Pokai Bay, and due west of Waianae, Oahu, Hawaii. It is centered around latitude North 21 degrees 26 minutes 0 seconds, longitude West 158 degrees 12 minutes 0 seconds. The Demonstration's work areas cover approximately three nautical miles long in the north-south direction and approximately one nautical mile wide in the east-west direction. Figure 1 below shows the Demonstration site, and bathymetric information about Ordnance Reef (HI-06). Working depths are expected to range from approximately 30 to 120 feet.



PROJECT LOCATION

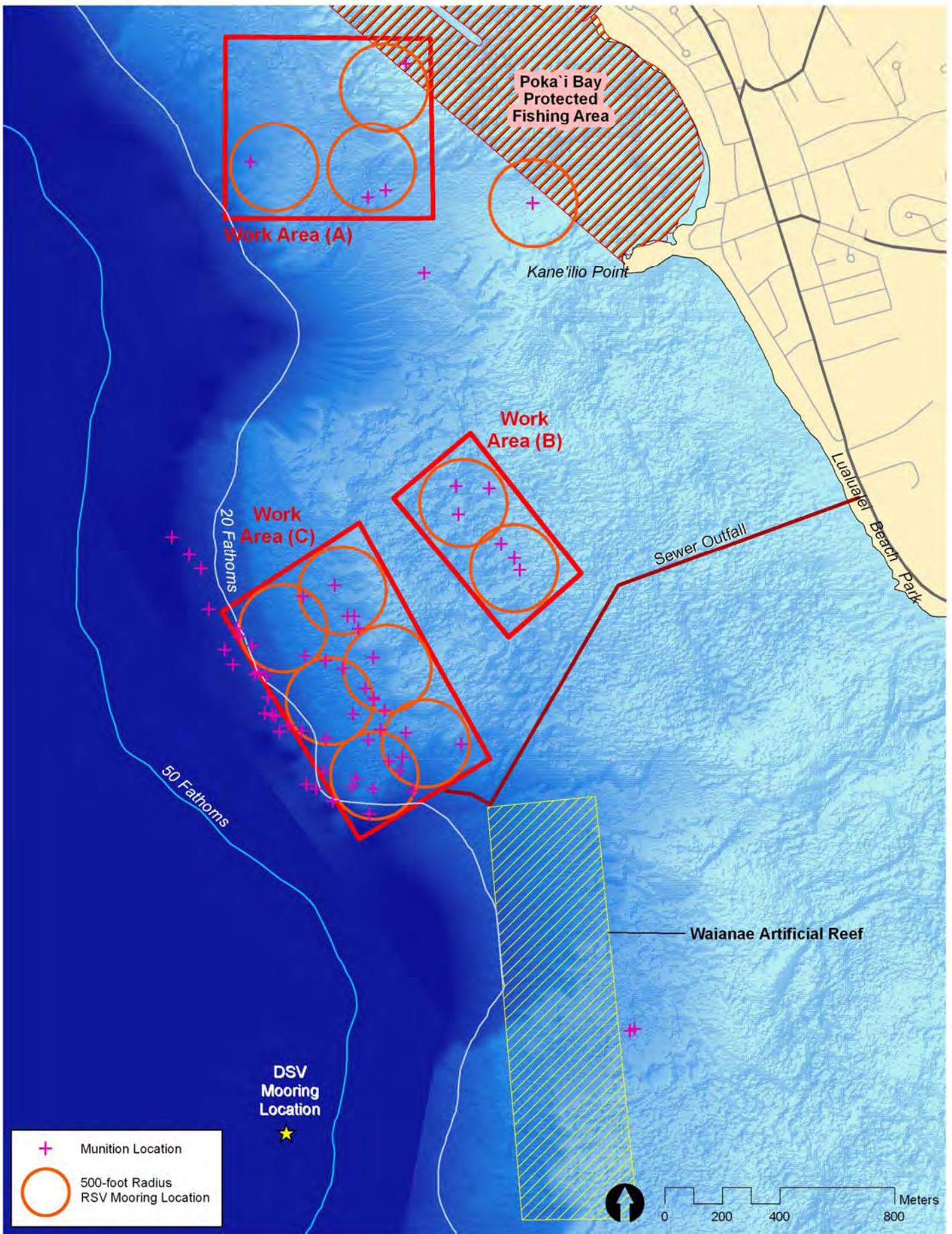
EA for Technology Demonstration: ROUMRS and EHDS at Site HI-06, Ordnance Reef

FIGURE 1

Waianae, Oahu, Hawaii



B. Demonstration Site - Layout and Mooring Locations of the ROURMS' Remotely Operated Vehicle (ROV) Support Vessel (RSV) and location of the Demilitarization Support Vessel (DSV), which houses the Energetic Hazard Demilitarization System (EHDS), is shown. Watercraft working on this Demonstration will operate out of Waianae Small Boat Harbor. Figure below also identifies locations of UWMM.



Proposed Work Areas and Mooring Sites

EA for Technology Demonstration: ROUMRS and EHDS at Site HI-06, Ordnance Reef

FIGURE 3

Waianae, Oahu, Hawaii



IV. UWMM – Type of Military Munitions and Estimated Quantities

The below tables lists the type of military munitions encountered at Ordnance Reef (HI-06) and estimated quantities. The information found in these tables is a compilation of data obtained from the 2002 and 2006 surveys. Although divers verified most of these munitions, a few were not verified.

**Munitions Discovered at Ordnance Reef
(2002 and 2006)**

Ordnance ID	Latitude	Longitde	Description	Quantity	Size	Units	Type	Year Found	Depth (Feet)	Explosive Weight (lbs)	Total Weight (lbs)
7.0	21.42825	-158.20547	18 x 8in proj	18	8 in		proj	2002	148	22	260
14.1	21.42892	-158.20506	5 x 8in proj	5	8 in		proj	2002	130	22	260
22.3	21.42344	-158.20186	2 x 8in proj	2	8 in		proj	2002	129	22	260
27.0	21.42928	-158.20133	75 items naval gun ammunition in varied sizes between 5in and 8in	75	8 in		naval gun ammo	2002	74	22	260
28.0	21.42889	-158.20097	continuation of items 27 and 27.1 - 75 items naval gun ammunition in varied sizes between 5in and 8in	75	8 in		naval gun ammo	2002	72	22	260
29.0	21.42797	-158.20047	continuation of items 27 and 27.1 - 75 items naval gun ammunition in varied sizes between 5in and 8in	75	8 in		naval gun ammo	2002	73	22	260
31.0	21.42389	-158.20122	naval gun ammunition between 6in to 8in 12 items	12	8 in		naval gun ammo	2002	101	22	260
32.0	21.42303	-158.20064	3 x naval gun ammunition 8in	3	8 in		naval gun ammo	2002	138	22	260

**Munitions Discovered at Ordnance Reef
(2002 and 2006)**

Ordnance ID	Latitude	Longitude	Description	Quantity	Size	Units	Type	Year Found	Depth (Feet)	Explosive Weight (lbs)	Total Weight (lbs)
35.0	21.42383	-158.20050	naval gun ammunition between 6in to 8in 5 items	5	8 in		naval gun ammo	2002	91	22	260
37.0	21.42619	-158.20117	naval gun ammunition 8in 12 items	12	8 in		naval gun ammo	2002	85	22	260
39.0	21.42469	-158.19997	naval gun ammunition 8in 7 items	7	8 in		naval gun ammo	2002	85	22	260
2.0	21.43181	-158.20722	5 x 155mm proj	5	155 mm		proj	2002	161	16	97
6.0	21.42953	-158.20600	10 x 155mm proj	10	155 mm		proj	2002	149	16	97
10.0	21.42753	-158.20433	20 x 155mm proj	20	155 mm		proj	2002	125	16	97
12.1	21.42614	-158.20378	15 x 155mm proj	15	155 mm		proj	2002	132	16	97
13.1	21.42564	-158.20364	15 x 155mm proj	15	155 mm		proj	2002	135	16	97
22.1	21.42344	-158.20186	10 x 155mm proj	10	155 mm		proj	2002	129	16	97
23.0	21.42764	-158.20150	3in to 6in naval gun ammunition 35 items	35	6 in		naval gun ammo	2002	80	13	105
24.0	21.42700	-158.20075	continuation of item 23 - 3in to 6in naval gun ammunition 35 items	35	6 in		naval gun ammo	2002	77	13	105
25.0	21.42664	-158.20047	continuation of item 23 end of dive - 3in to 6in naval gun ammunition 35 items	35	6 in		naval gun ammo	2002	76	13	105

**Munitions Discovered at Ordnance Reef
(2002 and 2006)**

Ordnance ID	Latitude	Longitude	Description	Quantity	Size	Units	Type	Year Found	Depth (Feet)	Explosive Weight (lbs)	Total Weight (lbs)
46.1	21.43025	-158.20176	high concentration of 6in projectiles	No Estimate	6 in		proj	2002	71	2	130
47.0	21.42928	-158.20112	high concentration of 6in projectiles	No Estimate	6 in		proj	2002	73	2	130
48.0	21.42522	-158.19754	high concentration of 6in projectiles	No Estimate	6 in		proj	2002	64	2	130
38.0	21.42536	-158.20067	naval gun ammunition 5in 5 items	5	5 in		naval gun ammo	2002	84	2	56
5.0	21.42867	-158.20497	24 x 105mm proj	24	105 mm		proj	2002	129	7	29
9.0	21.42836	-158.20456	17 x 105mm proj	17	105 mm		proj	2002	123	7	29
12.0	21.42614	-158.20378	10 x 105mm proj	10	105 mm		proj	2002	132	7	29
13.0	21.42564	-158.20364	20 x 105mm proj	20	105 mm		proj	2002	135	7	29
20.1	21.42397	-158.20275	5 x 105mm proj	5	105 mm		proj	2002	133	7	29
21.1	21.42383	-158.20242	10 x 105mm proj	10	105 mm		proj	2002	131	7	29
30.0	21.42439	-158.20217	3 x 105mm proj	2	105 mm		proj	2002	117	7	29
33.0	21.42542	-158.20208	62 ea 105mm projectiles	62	105 mm		proj	2002	99	7	29
34.0	21.42417	-158.20108	continuation of item 33 - 62 ea 105mm projectiles	62	105 mm		proj	2002	97	7	29
45.0	21.44272	-158.19997	105mm cart casing	1	105 mm		cart casing	2002	56	7	29
26.0	21.44672	-158.19928	100lb old style frag bomb recon from surface not diver verified	1	100 lb		frag bomb	2002	16	65	120
3.0	21.43125	-158.20664	1 x 90mm mortar	1	90 mm		mortar	2002	150	2	43

**Munitions Discovered at Ordnance Reef
(2002 and 2006)**

Ordnance ID	Latitude	Longitde	Description	Quantity	Size	Units	Type	Year Found	Depth (Feet)	Explosive Weight (lbs)	Total Weight (lbs)
36.0	21.42992	-158.20283	beginning of large pile of ordnance 43 items counted within divers visibility before assent	43	0		ordnance	2002	81		
40.0	21.42439	-158.19961	naval gun ammunition various sizes 10 items	10	0		naval gun ammo	2002	93		
42.0	21.42669	-158.20047	naval gun ammunition various sizes 55 items	55	0		naval gun ammo	2002	76		
43.0	21.42631	-158.20011	continuation of item 42 - naval gun ammunition various sizes 55 items	55	0		naval gun ammo	2002	75		
44.0	21.42558	-158.19939	continuation of item 42 - naval gun ammunition various sizes 55 items	55	0		naval gun ammo	2002	73		
15.1	21.42747	-158.20447	200 x .50cal rds	200	50	cal	rds	2002	129	1	1
27.1	21.42928	-158.20133	large piles of 50cal rounds sited at several locations	No Estimate	50	cal	rds	2002	74	1	1
28.1	21.42889	-158.20097	continuation of items 27 and 27.1 - large piles of 50cal rounds sited at several locations	No Estimate	50	cal	rds	2002	72	1	1

**Munitions Discovered at Ordnance Reef
(2002 and 2006)**

Ordnance ID	Latitude	Longitude	Description	Quantity	Size	Units	Type	Year Found	Depth (Feet)	Explosive Weight (lbs)	Total Weight (lbs)
29.1	21.42797	-158.20047	continuation of items 27 and 27.1 - large piles of 50cal rounds sited at several locations	No Estimate	50 cal	rds		2002	73	1	1
46.0	21.43025	-158.20176	high concentration of 50cal rounds	No Estimate	50 cal	rds		2002	71	1	1
DODDive3	21.41613	-158.19192	possible 50 cal round	1	50 cal	rds		2006		1	1
Site17sw	21.43070	-158.19553	one 50 cal round	1	50 cal	rds		2006		1	1
Site18sw	21.43109	-158.19572	one 50 cal round	1	50 cal	rds		2006		1	1
Site22sw	21.43248	-158.19759	scattered 50 cal rounds	5	50 cal	rds		2006		1	1
Site160202	21.41620	-158.19176	possible 50 cal rounds	3	50 cal	rds		2006		1	1
Site181920	21.42743	-158.20408	50 cal casing recovered by ROV; brass donnage ring	1	50 cal	rds		2006	103	1	1
Site205636	21.42789	-158.20209	50 cal casing	1	50 cal	rds		2006	80	1	1
Site19sw	21.43155	-158.19615	two 37mm shell casings, one 50 cal shell casing	3	37 mm	rds		2006		1	1
Site11sw	21.43330	-158.19655	one 30 cal round and 37 mm casing	2	30 cal	rds		2006		1	1
11.0	21.42672	-158.20403	250 x 25mm rds	250	25 mm	rds		2002	129	1	1
5.1	21.42867	-158.20497	90 x 20mm rds	90	20 mm	rds		2002	129	1	1
13.2	21.42564	-158.20364	100 x 20mm rds	100	20 mm	rds		2002	135	1	1
14.2	21.42892	-158.20506	200 x 20mm rds	200	20 mm	rds		2002	130	1	1
18.1	21.42583	-158.20333	100 x 20mm rds	100	20 mm	rds		2002	124	1	1
19.1	21.42567	-158.20289	200 x 20mm rds	200	20 mm	rds		2002	129	1	1

**Munitions Discovered at Ordnance Reef
(2002 and 2006)**

Ordnance ID	Latitude	Longitde	Description	Quantity	Size	Units	Type	Year Found	Depth (Feet)	Explosive Weight (lbs)	Total Weight (lbs)
20.2	21.42397	-158.20275	150 x 20mm rds	150	20	mm	rds	2002	133	1	1
21.2	21.42383	-158.20242	200 x 20mm rds	200	20	mm	rds	2002	131	1	1
37.1	21.42619	-158.20117	a large quantity of 20mm rounds	No Estimate	20	mm	rds	2002	85	1	1
38.1	21.42536	-158.20067	a large quantity of 20mm rounds	No Estimate	20	mm	rds	2002	84	1	1
39.1	21.42469	-158.19997	a large quantity of 20mm rounds	No Estimate	20	mm	rds	2002	85	1	1
40.1	21.42439	-158.19961	a large quantity of 20mm rounds	No Estimate	20	mm	rds	2002	93	1	1
41.0	21.42375	-158.19917	a large quantity of 20mm rounds	No Estimate	20	mm	rds	2002	115	1	1
Site20sw	21.43338	-158.19767	dozen 20mm shells	12	20	mm	rds	2006		1	1
6.1	21.42953	-158.20600	10 x closed ammo boxes (2ftx2ftx2ft)	10	8	sqft	ammo box	2002	149		
8.0	21.42778	-158.20519	2 x closed ammo boxes (2ftx2ftx2ft)	2	8	sqft	ammo box	2002	146		
14.0	21.42892	-158.20506	10 x closed ammo boxes (2ftx2ftx2ft)	10	8	sqft	ammo box	2002	130		
15.0	21.42747	-158.20447	3 x closed ammo boxes (2ftx2ftx2ft)	3	8	sqft	ammo box	2002	129		
22.2	21.42344	-158.20186	4 x closed ammo boxes (2ftx2ftx2ft)	4	8	sqft	ammo box	2002	129		
PS2_75sw	21.44010	-158.19870	potential munition boxes	2	8	sqft	ammo box	2006	75		
17.0	21.42619	-158.20389	20 x tubes (4ft x 3in dia)	20	4	ft	tubes	2002	136		
18.0	21.42583	-158.20333	10 x tubes (4ft x 3in dia)	10	4	ft	tubes	2002	124		

**Munitions Discovered at Ordnance Reef
(2002 and 2006)**

Ordnance ID	Latitude	Longitude	Description	Quantity	Size	Units	Type	Year Found	Depth (Feet)	Explosive Weight (lbs)	Total Weight (lbs)
19.0	21.42567	-158.20289	10 x tubes (4ft x 3in dia)	10	4 ft		tubes	2002	129		
20.0	21.42397	-158.20275	10 x tubes (4ft x 3in dia)	10	4 ft		tubes	2002	133		
21.0	21.42383	-158.20242	10 x tubes (4ft x 3in dia)	10	4 ft		tubes	2002	131		
22.0	21.42344	-158.20186	10 x tubes (4ft x 3in dia)	10	4 ft		tubes	2002	129		
16.0	21.42622	-158.20414	1 x has? (2ft x 3in dia)	1	2 ft		has	2002	142		
Site77sw	21.44251	-158.20058	three cylinders found 1 foot long by 5 inch dia	3	1 ft		tubes	2006			
1.0	21.44364	-158.20453	bottom mine	1	0		mine	2002	82		
4.0	21.43081	-158.20625	depth chg	1	0		depth chg	2002	145		
WPokBayRov	21.44150	-158.20150	large protruding cluster standing proud off bottom; undetermined man-made objects	1			unknown	2006			
Site164749	21.42803	-158.20278	ROV ops	1			unknown	2006			
Site205909	21.42569	-158.20024	ROV ops	1			unknown	2006			
Site210008	21.42481	-158.19951	ROV ops	1			unknown	2006			

V. Description of ROUMRS' Operating Procedures

The below information describes the equipment and procedures to be used to recover UWMM. Safety and environmental considerations have been incorporated into the operating procedure.

ARA Incorporated
Technology Demonstration
at Ordnance Reef (HI-06), Waianae, Oahu, Hawaii
Best Management Practices (BMP)

The technology demonstrations (the Demonstration) that are proposed to occur at Ordnance Reef (HI-06) consists of two commercially available technologies that have been adapted for (a) the remote recovery of munitions from the ocean floor; and (b) the demilitarization of recovered munitions on an offshore barge. These technologies (the Remotely Operated Underwater Munitions Recovery System (ROUMRS) and Energetic Hazards Demilitarization System (EHDS)) will be assessed concurrently at Ordnance Reef (HI-06)). These Best Management Practices (BMP) are focused on the ROUMRS technology demonstration. ROUMRS is designed to demonstrate its capabilities to recover underwater military munitions (UWMM) in a manner protective of the public and environment. ARA's BMP describe procedures ARA will employ to protect human health and the environment, including to help avoid or limit injury to coral and other benthic habitats, and protecting sensitive marine life (e.g., marine species listed under the Endangered Species Act (ESA) or Protected Under the Marine Mammal Protection Act (MMPA), during field operations.

During or as a result of this Demonstration:

- Remedial or corrective actions will not be required. However, should inadvertent damage to coral or other benthic habitats occur, the Army will implement mitigation measures.
- Hazardous waste will not be generated.
- Managed solid waste will not be disposed at Ordnance Reef (HI-06).

The BMP to be used are:

1. General
2. Briefings
3. Pre-dive Checks
4. Placement of Anchorages, Moorings and Staging Areas In Environmentally Sensitive Areas
5. Subsea Investigation and Classification Munitions and Munitions Debris

6. Recovery of Munitions and Munitions Debris
7. Salvage Basket Operations
8. Lift Bag Operations
9. Operations in Sensitive Areas
10. Marine Species - Endangered Species Act (ESA)
11. Spill Contingency Plans

The steps taken to help avoid or limit injury to coral and other benthic habitats are addressed in BMP 2, 4, 5, and 6.

FINAL

Best Management Practice 1: General

Systematic planning and execution is essential for the efficient demonstration of ROURMS and for the safe and effective operation of ROURMS' remotely operated vehicle (ROV). The Demonstration's overall objectives will be accomplished by performing a number of general tasks. At a minimum these tasks will include:

- All required permits for topside and subsea activities will be secured from State, Federal, Port, and Local authorities as required. These permits may include:
 - Rights of Entry
 - Section 10 Permits
 - Anchorage Authorizations
 - To be determined, as required and listed in the work plans
- The Project Engineer for ROURMS Operations will
 - Ensure all required equipment is scheduled, available and prepared for use (sea and topside operations).
 - Ensure all parties directly involved with topside and subsea operations are briefed on planned operations and emergency procedures.
- Each crew member will review the work plans to develop a complete understanding of the overall operation and mission. This includes a thorough review of any customer-produced documentation (e.g., scope, photographs, previous reports).
- The ARA team will:
 - Mobilize all equipment allocated and scheduled for topside and subsea operations.
 - Transport all equipment, personnel, and spares to the work site.
 - Check, prepare, and confirm operability of all equipment for the individual tasks in proper order of use.
 - Minimize any turbidity and siltation from landward Demonstration-related work and contain it, to the extent possible, within the vicinity of the site through the appropriate use of effective containment devices and the curtailment of work during adverse tidal and weather conditions.
 - Compare and coordinate all pre-dive functionality tests as well as checklists for deployment.
 - Inspect, prior to use, all demonstration-related materials and equipment (barges, ROVs, etc.) to be placed in the water to ensure it is free of visible pollutants.

- Prevent the stockpiling of demonstration-related materials in the water (intertidal zones, reef flats, stream channels, sea grass beds, etc.).
- Dispose of all demonstration related waste that is not recyclable at approved properly permitted facility.
- Prevent the contamination (e.g., trash or debris disposal, the introduction of non-native species, the attraction of non-native pests) of adjacent habitats (e.g., reef flats, channels, open ocean, stream channels, sea grass beds) by demonstration-related activities.
- Ensure fueling of Demonstration-related vehicles and equipment occurs away from the water.
- Prepare a contingency plan to control petroleum products accidentally spilled during the Demonstration and have absorbent pads and containment booms on-site, if appropriate, to facilitate the clean-up of accidental petroleum releases.
- Deploy equipment; locate the work site, and begin work.
- At the completion of the work task, recover equipment (per detailed procedures).
- Perform post-dive functionality checks as well as visual condition inspections.
- Clean, pack, and demobilize equipment, upon completion of the Demonstration.

Best Management Practice 2: Briefing

The operation of an ROV is a team effort. Each day, prior to starting ROV operations, a full crew briefing is essential to ensure efficient tasking and enhance team synergies. The crew briefing, at a minimum, will include:

- Mission tasking and/or threat outline, detailing the specific tasks assigned to each crewmember.
- A thorough and complete explanation of the individual tasks for each day's mission.
- A safety briefing.
- The scope of work and specific goals to be accomplished during individual tasks.
- Ingress and egress routes to the work site.
- Crew positions and specific responsibilities during the tasks.
- Tactics, techniques, and procedures for accomplishing each individual task and completing the mission.
- Specific information needed as well as methods of documentation.
- Relevant information about munitions to be inspected and recovered including, but not limited to drawings, photographs, damage reports, witness statements and any other information that will assist in the work task.
- Work area coordinates.
- Topographic maps, bathymetric data, tide tables, underwater obstruction analysis, prior surveys and any other environmental information that will assist in accessing the work areas.
- Summary of previous work performed at Ordnance Reef (HI-06) to include the Oceanic and Atmospheric Administration (NOAA) Coral Avoidance and Minimization of Injury Plan (CAMIP) detailing the locations of sensitive corals and other benthic habitats.
- Schedule for completion of mission objectives including the best and worst case scenarios, with consideration of potential delays.

Best Management Practice 3: Pre-Dive Checks

The following pre-dive check should be carried out prior to every dive:

- Visually inspect the ROV to ensure the propellers are not fouled, all components are secured, and there is no mechanical damage to the frame or other components.
- Check the tether for scrapes, nicks, or other visible damage. The ROV will not be used, if the tether jacket is broken through.
- Verify correct operation of the ROV's thrusters. (CAUTION: ROV thrusters should only run for a few seconds when not submerged in water.)
- Ensure:
 - All fasteners are in place and secure.
 - Whip connectors at the electronics and tether termination cans are connected securely. (Note: Dielectric silicone grease will be used to lubricate electrical connections, as necessary.)
 - Unused vehicle connectors are capped securely with dummy plugs.
 - Surface cables are securely connected.
- The Auto Depth switch on the control panel will be switched to OFF, the Manual Depth Control knob will be centered, and the Auto Heading selector will be OFF prior to powering up the system.
- Lights, camera, manipulators, tooling functions, and thrusters will be tested. The data recorders and documentation processes will be tested to ensure they are operating properly. (CAUTION: Lights should only be tested for a few seconds if not submerged in water seconds to prevent heat buildup.)
- After the vehicle is placed into the water confirm the operability of the ballast and trim.
- If any instruments or equipment are not functioning properly, the Project Engineer will determine the potential impact and implement actions necessary to achieve mission objectives. Any maintenance performed will be documented.

Best Management Practice 4: Placement of Anchorages, Moorings and Staging Areas in Environmentally Sensitive Areas.

This section contains the detailed BMP for anchoring watercraft and the staging of subsea equipment. Special considerations are included to avoid injury to coral and other benthic habitats and to minimize such injury during remote operations. Every operational situation is unique with special needs and requirements.

- If available, the coordinates for each potential mooring, anchorage, and staging area must be confirmed prior to contacting the bottom.
- Mooring, anchorage and staging areas will be located using global positioning systems.
- A crew briefing will be conducted prior to ROV operations, with the ROV and topside crew be briefed about:
 - Coral growth, reefs, marine life, protected marine species, and habitat, that must be avoided.
 - Culturally important structures and locations.
 - Photographs, drawings, previous reports, and the NOAA CAMIP documenting the relative level of concern for each area at Ordnance Reef (HI-06).
- The ROV will only be operated by approved and qualified operators.
- The pre-dive checklist will be followed prior to launching the ROV.
- Watercraft will not be allowed in the ROV operating area
- The RSV will not move without the prior knowledge of the ROV operator.
- The ROV will be launched as far away as practical from propellers and any overboard obstructions.
- The ROV tether will:
 - Be manned at all times.
 - Have positive buoyancy to minimize bottom contact and possible disturbance of reef structures.
- The ROV will:
 - Be used to reconnoitered the position of mooring, anchorages and staging areas prior to contacting the bottom to confirm these areas are acceptable based on criteria provided the CAMIP.
 - Approach the mooring, anchorage, or staging areas, exercise caution and avoid contact with the bottom, environmental features, coral, or structures.
 - Digitally record, document and save an image of the target location (e.g., mooring, anchorage, staging locations) prior to contacting the bottom.

- Avoid coral species, protected marine species, reefs, habitats of concern, and culturally important structures and locations to prevent damage prior to and following placement of the mooring, anchorage, or equipment on the bottom.
- Used to lower moorings, anchorages, and equipment to the bottom or such will be lowered using lines – **moorings, anchorages, and equipment will not be dropped or released freely from the surface!**
- Good communications will be maintained between the ROV operator and the helm to ensure the ROV operator is aware of the relative positions of the ROV to the vessel, and is informed of the vessel’s anticipated.
- Moorings and anchorages in sensitive locations will employ floated lines.
- Upon completion of work at the site, the condition of the target location will be digitally recorded and saved after the mooring, anchorage, or staged equipment is removed. **Injury to sensitive areas will be reported to the Army’s lead.**

Best Management Practice 5: Subsea Investigation and Classification Munitions and Munitions Debris

This section contains the detailed BMP for investigating munitions and munitions debris. Some steps describe precautions to be taken during ROV operations in environmentally and culturally sensitive areas. Every operational situation is unique with special needs and requirements.

- A crew briefing will be conducted prior to ROV operations, with the ROV and topside crew be briefed about:
 - Coral growth, reefs, marine life, protected marine species, and habitat, that must be avoided.
 - Culturally important structures and locations
 - Photographs, drawings, previous reports, and the NOAA CAMIP documenting the relative level of concern for each area at Ordnance Reef (HI-06).
- ROV will only be operated by approved and qualified operators.
- The pre-dive checklist will be followed prior to launching the ROV.
- Watercraft will not be allowed in the ROV operating area.
- The RSV will not move without the prior knowledge of the ROV operator.
- The ROV will be launched as far away as practical from propellers and any overboard obstructions.
- The ROV tether will:
 - Be manned at all times.
 - Have positive buoyancy to minimize bottom contact and possible disturbance of reef structures.
- Care will be taken to ensure the ROV tether does not foul or contact the bottom.
- The ROV will circumnavigate the munitions and munitions debris, collecting and recording digital images of the area.
- If needed, unique markers may be placed next to individual munitions, clusters of munitions, and other materials of interest and digitally recorded.
- Coordinates of the identified munitions and other materials of interest will be documented and saved.
- Images of the munitions and munitions debris will be digitally recorded and assigned a unique identifier. Co-located or multiple munitions may be recorded with a single identifier. Target identifiers will include at a minimum an alpha numeric identifier, coordinates, and a description of the munition or material.

- All coral species, including any Branching Corals (*Pocillopora meandrina*, *Pocillopora eydouxi*, etc) or Lobate Corals (*Porities lobata*, *Porities evermanni*, *Porities duerdeni*, etc) greater than 12 inches in vertical growth that is either growing on a munition or in a location where it could be damaged during recovery of the target (munition) will be documented. Recovery of munitions or munitions debris with corals having greater than 12 inches of vertical growth will not occur until NOAA has been consulted about coral mitigation options (e.g., transplantation, habitat replacement) and the Army concurs with the recovery. Any munitions intentionally not recovered will be documented as to type, location, and the reason for leaving it in place.
- Encrusting Corals (e.g., *Leptastrea*, *Montipora captata*, *Montipora patula*) commonly grow on targets at Ordnance Reef (HI-06), but will not be noted.
- **Injury to sensitive areas will be identified and reported to the Army Lead.**

Best Management Practice 6: Recovery of Munitions and Munitions Debris

This section contains the detailed BMP for recovering munitions and munitions debris from the bottom. Munitions and munitions debris selected for recovery will be interrogated and classified per the appropriate ARA BMP and the work plan. Every operational situation is unique with special needs and requirements.

- The selection and prioritization of munitions and munitions debris for recovery will be performed prior to initiating ROV dive operations.
- Selected munitions and munitions debris will be prioritized and placed onto a Recovery Sheet that is presented to the field crew prior to initiating ROV operations.
- At a minimum, Recovery Sheets will include the Identification number of the munitions and munitions debris, its description and the coordinates from which it was recovered.
- If needed, salvage baskets will be staged near munitions and munitions debris being recovered per the appropriate BMP. Prior to beginning ROV recovery operations, the ROV operator will:
 - Confirm the salvage basket's operational status.
 - Confirm the ROV's navigation corridor to and from the salvage baskets to limit potential impacts to all coral species.
- The ROV will limit, to the extent possible, contact with and avoid disturbance of the bottom while collecting munitions and munitions debris
- When contact with the bottom is necessary, the ROV operator will ensure that corals and reef structures are avoided using the following checklist to minimize impact.
 - Transit route to the target must be established to help avoid or limit injury to coral and/or other benthic habitats, and navigate to the target safely without damaging the ROV.
 - Remove the target (munition or munitions debris) from the bottom without causing injury to coral or other benthic habitats.
 - If there is a release of munitions constituents (MC) to the environment, the MC will be recovered to the extent possible using the ROV mounted vacuum and trash pump.

- The ROV will be set down and perform any required work without damaging coral or other benthic habitats.
- If these activities cannot be performed, consult with NOAA and the Army concerning alternatives.
- All coral species, including any Branching Corals (*Pocillopora meandrina*, *Pocillopora eydouxi*, etc) or Lobate Corals (*Porities lobata*, *Porities evermanni*, *Porities duerdeni*, etc) greater than 12 inches in vertical growth that is either growing on a munition or in a location where it could be damaged during recovery of the target (munition) will not be removed until NOAA has been consulted about coral mitigation options (e.g., transplantation, habitat replacement) and the Army concurs with the recovery. Any targets intentionally not recovered will be documented as to type, location, and the reason for leaving it in place.
- Once a munition has been collected, it will be placed into the ROV's hopper or, if necessary, transferred directly to the salvage basket at a nearby staging area.
- The ROV hopper will be unloaded into the salvage baskets as necessary.
- After a munition has been recovered from the bottom, images of its former location will be digitally recorded.
- Any munitions debris recovered from underwater and from munitions processed by the EHDS will be hauled off site, and be recycled or disposed per applicable laws and regulations. The Army may retain some munitions debris for scientific study.

Best Management Practice 7: Salvage Basket Operations

- Inspect the salvage basket per ARA Salvage Basket's Pre and Post Dive Checklist.
- Confirm using the ROV that the location and placement of the salvage basket is in an area that will not injure coral or other benthic habitats as noted in NOAA's CAMIP.
- Perform salvage basket preparation and maintenance topside. Confirm that the:
 - Salvage basket does not have damage that would effect its operation (e.g., broken structural elements, holes that would allow release of contents).
 - The hopper doors open and operate correctly.
 - Lifting points and rigging are in good condition.
 - Side and top salvage gates open and operate correctly.
 - Air bottles of the lift system are filled and ready for deployment.
- Perform salvage basket launch and recovery per BMP 4 and BMP 8.
- Tow the salvage basket.

Best Management Practice 8: Lift Bag Operations

- Confirm that lift rigging and tow bridle are operable, correct if inoperable noting any maintenance performed.
- Confirm that lift bag and air system are operable, correct if inoperable noting any maintenance performed.
- Perform ascent and descent preparation by:
 - Confirming:
 - ✓ All personnel are ready for a lift.
 - ✓ The ascent corridor is free and clear of personnel, watercrafts, and marine life.
 - Communicating with salvage basket recovery team regarding the lift.
 - Activating air system remotely using the ROV.

Best Management Practice 9: Operations in Sensitive Areas

A Demonstration-Specific Work Plan (WP) will be prepared and submitted to responsible parties before in-water activities begin. The name and contact information for the designated Demonstration points of contact (POC) for all in-water activities are included in the Health and Safety Plan portion of the WP. The designated POC will ensure that daily visual inspection of Ordnance Reef (HI-06) and its environs are conducted to verify that Demonstration-related activities do not result in uncontrolled adverse environmental impacts and that should environmental injury occur, such injury is minimized to the maximum extent practicable. Visual inspections will be documented with photographs and written descriptions, if necessary. Full water column silt curtains are not needed for this Demonstration because there are no anticipated effects from the suspension of disturbed sediments and turbidity. The WP will include measures to help ensure:

- In-water activities employ sound attenuation measures that will minimize the intensity and duration of percussion impacts through the aquatic environment to the extent practical and feasible.
- The ROV, any mechanized equipment and other materials used during the Demonstration will be clean and free of obvious contamination and deleterious substances that might include toxic chemicals and clay-coated material.
- A Spill Contingency Plan (BMP #11) is in place on landside platforms and in all support vessels associated with the demonstration. The Project Manager or ship's Captain will detail procedures for managing the accidental release of petroleum products to the aquatic environment, if there is a release. Particular care per the site-specific planning documents must be taken to ensure that no petroleum products, trash, or other debris enter near-shore waters. When such material is found within the operating area, the material will be collected and disposed of at a permitted facility. Additionally, spill containment kits will be kept on hand.
- Watercraft will be piloted by licensed people who are familiar with operating in Hawaiian waters.
- Visual surveys will occur prior to the start of work each day, and periodically during the day, including prior to resumption of work following a break of more than 30 minutes.

- All in-water work will be postponed or halted when an ESA-listed marine species or a species protected under the MMPA is within 210 feet (i.e., 63 meters) of the proposed work, and will only begin or resume after these marine species has voluntarily departed the area. If ESA-listed marine species are noticed within 210 feet after work has already begun, that work may continue only if, in the best judgment of the Project Manager, there is no way for the activity to adversely affect the ESA-listed or MMPA-protected species.
- Protocol and operations measures for the avoidance and protection of protected species that include, but may not be limited to green sea and hawksbill turtles, Hawaiian monk seals, humpback whales and other protected species in active, mechanized equipment and boat areas of operation will incorporate the following site-specific avoidance and minimization measures:
 - When piloting watercrafts, operators will alter course to remain a minimum of 300 feet from whales and 210 feet from other marine mammals and sea turtles,
 - Reduce watercraft speed to 10 knots or less when piloting watercrafts at or within the ranges described above from marine mammals and turtles. Operators will be particularly vigilant to watch for turtles at or near the surface in areas of known or suspected marine mammal or turtle activity, and if practicable, reduce watercraft speed to 5 knots or less,
 - If despite efforts to maintain the distances and speeds described above, a marine mammal or turtle approaches a watercraft, put the engine in neutral until the animal is at least 50 feet away, and then slowly move away to the prescribed distance,
 - Marine mammals and sea turtles will not be encircled or trapped between multiple watercrafts or between vessels and the shore,
 - Do not attempt to feed, touch, ride, or otherwise intentionally interact with any ESA-listed or MMPA-protected marine species,
 - All on-site demonstration personnel must be apprised of the status of any ESA-listed species potentially present in the demonstration area and the protections afforded to those species under Federal laws. Information explaining laws and regulations for listed species in Hawaii may be downloaded at <http://www.nmfs.noaa.gov/protres/MMWatch/hawaii.htm>. The POC will ensure that protocols and observers in place to avoid the potential contact with or harassment of ESA-listed or MMPA-protected species are followed during all periods of in-water work,

- Records any protected species observed in the demonstration areas for the duration of in-water activities will be maintained and submitted at the close of in-water activities.
- Immediate notification to Don Hubner (808-944-2233) Protected Resources Division, NMFS, PIRO, if:
 - A take occurs;
 - New information reveals the action has affected listed species in a manner or to an extent not previously evaluated;
 - If the action is subsequently modified and causes effects to listed species in a manner or to an extent not previously considered or evaluated; or
 - A new species is listed or critical habitat is designated that may be affected by the authorized work.
- For stranded sea turtles, contact 808-983-5730 (M-F 0700-1600) or the pager number 808-288-5685/0023 after hours and weekends for a fast call back.
- For concerns relating to marine mammals contact 888-256-9840.

Best Management Practice: 10. Marine Species Listed Under the Endangered Species Act (ESA) or Protected Under the Marine Mammal Protection Act (MMPA)

The following BMPs are intended to ensure that the proposed action would have insignificant impacts on ESA-listed or MMPA protected marine species, or to diminish the likelihood of impact below the threshold of discountable.

Note: Any concurrence by National Marine Fisheries Service (NMFS) Protected Resources Division that the proposed action is not likely to adversely affect ESA-listed marine species would be based in large part on the expectation that as a minimum the following BMPs would be implemented. These BMPs are in no way intended to supersede or replace measures required by any other agency including, but not limited to the USFWS, USEPA, or NMFS Habitat Conservation Division.

Constant vigilance will be kept for the presence of ESA-listed or MMPA protected marine species during all aspects of the proposed action, particularly in-water activities such as dredging, boat operations, diving, or ROV operations.

- A competent observer will be designated to survey the marine areas adjacent to the proposed action for ESA-listed or MMPA protected marine species.
- Visual surveys will occur prior to the start of work each day, and periodically during the day, including prior to resumption of work following any break of more than one half hour.
- All in-water work will be postponed or halted when an ESA-listed marine species is within 210 feet of the proposed work, and will only begin or resume after the ESA-listed marine species has voluntarily departed the area. If ESA-listed or MMPA-protected marine species are noticed within 210 feet after work has already begun, that work may continue only if, in the best judgment of the Project Manager, there is no way for the activity to adversely affect the ESA-listed or MMPA-protected marine species. For example; the ROV performing surveys or underwater work is likely safe, whereas the air-lifting of the salvage baskets may not be prudent.
- When piloting watercraft, operators will alter course to remain a minimum of 300 feet from whales and 210 feet from other marine mammals and sea turtles.
- Reduce speed to 10 knots or less when piloting watercraft at or within the ranges described above from marine mammals and sea turtles. Operators will be particularly vigilant to watch for turtles at or near the surface in areas of known

or suspected marine mammal or turtle activity, and if practicable, reduce watercraft speed to 5 knots or less.

- If despite efforts to maintain the distances and speeds described above, a marine mammal or turtle approaches the watercraft, put the engine in neutral until the animal is at least 50 feet away, and then slowly move away to the prescribed distance.
- Marine mammals and sea turtles will not be encircled or trapped between multiple vessels or between vessels and the shore.
- Do not attempt to feed, touch, ride, or otherwise intentionally interact with any ESA-listed or MMPA-protected marine species.

No contamination of the marine environment is anticipated from demonstration-related activities.

- To control petroleum products accidentally spilled during the demonstration, appropriate materials to contain and clean potential spills will be stored and readily available at the work site.
- All demonstration-related materials and equipment to be placed in the water will be free of visible pollutants prior to use. The Project Engineer responsible for operations or his designated person will perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations will be postponed or halted should a leak be detected, and will not proceed until the leak is repaired and equipment cleaned.
- Turbidity and siltation from demonstration-related work will be minimized. Silt containment devices are not applicable for this technology demonstration.
- Although no construction debris will be generated during the ROUMRS demonstration, all waste, debris, and litter on the watercraft will be controlled and not allowed to enter or remain in the marine environment during the demonstration.

Best Management Practice 11: Spill Contingency Plan

This Spill Contingency Plan is designed to identify and prevent potential spill hazards, and outline protocols to respond to spill hazards at ARA Incorporated Field Operations on Oahu, Hawaii. ARA will have a spill containment kit onboard the RSV and the DSV.

- All watercraft used in the demonstration will have their own spill contingency plans, and personnel involved with the demonstration will be briefed on those plans.
- Define the severity and type of the spill – A chemical spill during the technology demonstration is highly unlikely because the storage of hazardous chemicals, other than petroleum products onsite is not anticipated. The most of any one chemical being stored is a one gallon in a container approved for commercial products.
 - All chemicals are stored in containers of one gallon or less causing minimal problems in the event of a container breaking or tipping over.
 - All watercraft fueling operations will occur at approved marina fueling locations.
 - Fueling of all other approved portable fuel receptacles (gas cans) will occur at licensed facilities
- Response to an accidental release of a petroleum product or other hazardous material:
 - Evacuate the immediate vicinity of affected areas if exposure puts you and others in imminent danger.
 - If the spill is in a building, close all doors and open windows if substance is volatile and initiate emergency actions (see below).
 - If the spill is on a watercraft, use spill kits to control spill and prevent an overboard release.
 - Activate actions listed in the Demonstration Health and Safety Plan if serious bodily injury or property damage has occurred or is imminent. Call 911.
 - Administer first aid to victim(s), taking the appropriate personal protective equipment (PPE) and other necessary precautions to prevent rescuers exposure. Identification of specific hazard is essential.
 - **Contact Watercraft Captain, Operations, and Project Manager.**

- Actions to take in the event of a petroleum spill, bodily injury:
 - Flush affected eyes, skin and clothing with water using eyewash station, sinks or safety shower. Remove contaminated clothing.
 - If possible and safe to do so, use petroleum or chemical spill kits to and absorb the spill. Wear appropriate PPE, including respirator, if necessary. Sweep up and bag the absorbent. Dispose of material properly. Refer to material safety and data sheets (MSDS).
 - If spill occurs in an enclosed area, leave and close the door behind you.
 - Pull Fire Alarm switch to activate the occupant emergency plan.
 - Assemble in a designated area.
 - Take a head count. Notify the Captain, Project Manager, or Facilities Manager on the nature of the emergency.
 - Activate Emergency Response Plan, if necessary.
 - Stay away from the affected area or building and do not re-enter until it is cleared by the safety officer.

Emergency Telephone Numbers

Emergency Telephone	911
US Coast Guard, NRC	800.424.8802
Fire Department Honolulu	808.523.4411
State Spill Response (business hours only)	808.586.4249
24 Hour State Spill Hotline	808.247.2191

Once contact is made report:

- Your Name
- Location of Emergency
- Type of Emergency
- Type of Help Required

ARA Emergency Contact Numbers:

- ROUMRS Program Manager –John Coughlin – 443.745.4163
- ROUMRS Project Manager – Josh Bowers – 814.243.9460
- ROV Support Vessel Captain –TBD
- Demilitarization Support Vessel Operations Manager -TBD

VI. Description of the EHDS Theory and Operating Procedure

The following information describes the technical background, equipment, and procedures that will be used to thermally decompose the energetic munitions constituents. The EHDS work will be conducted on an off-shore barge as indicated on Figure 3 above. The metal scrap will be inspected, certified as materials designated as safe (MDAS), and be recycled or retained for scientific study.

Theory and Operating Procedure
Energetic Hazard Demilitarization System (EHDS)

White Paper - Energetic Hazard Demilitarization System

Problem Statement

Currently, the preferred means of disposal for conventional Unexploded Ordnance (UXO), Disposed Military Munitions (DMM), and Material Potentially Presenting an Explosive Hazard (MPPEH) by contractors performing a Munitions and Explosives of Concern (MEC) clearance operation is intentional detonation using explosive charges. The detonation of explosives at culturally and environmentally sensitive locations at Department of Defense (DoD) and Formally Used Defense Site (FUDS) properties is often a controversial issue for State and Federal Regulators, activists, and the public. Although blow-in-place (BIP) operations will always need to be conducted for some MPPEH items that are deemed unacceptable to move, the DoD also needs a safe and cost effective disposal alternative that supports MEC clearance objectives while meeting DoD Explosive Safety Board (DDESB) safety requirements, state and federal regulations, and concerns of the public.

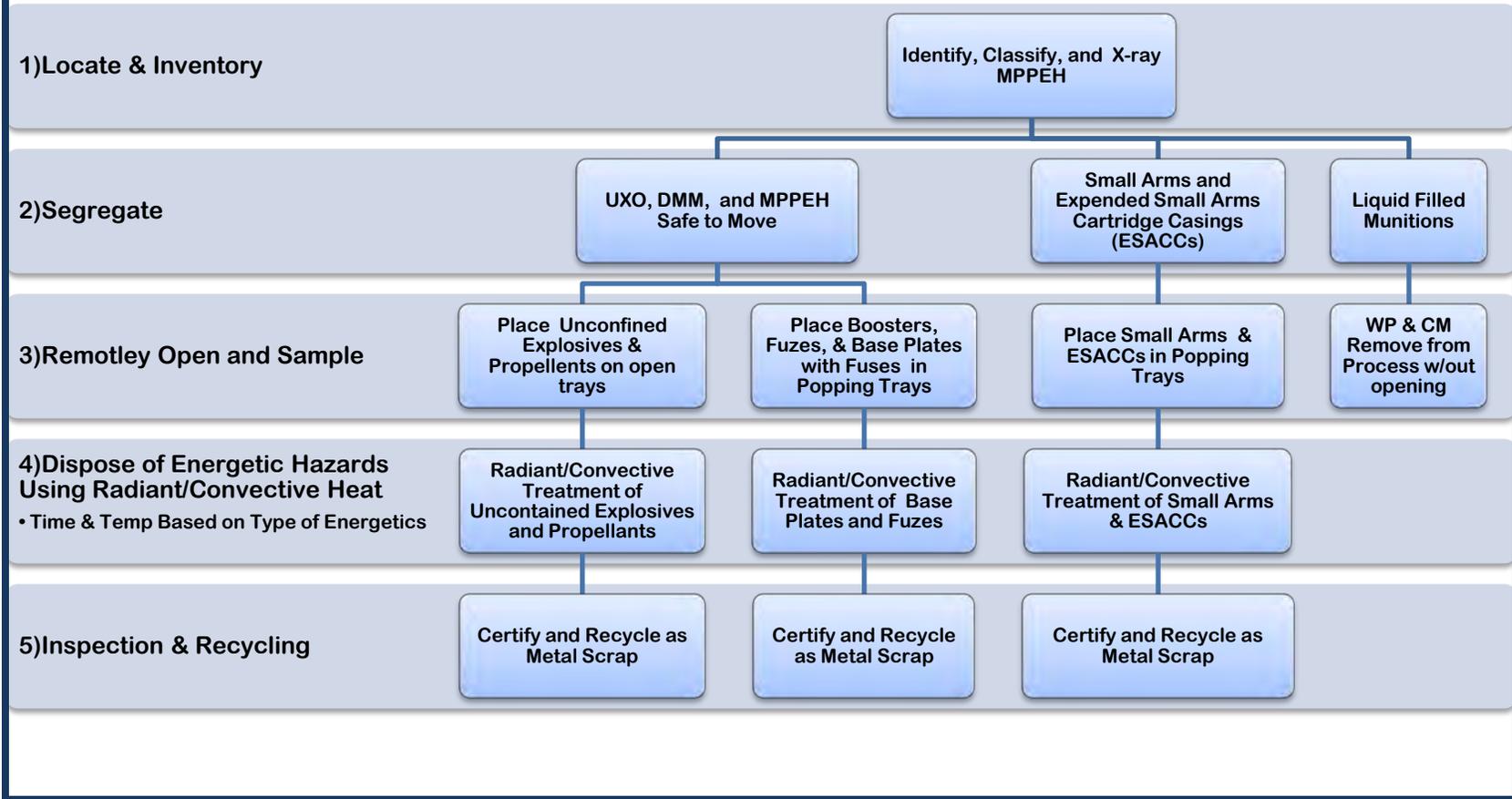
Solution

To meet this need ARA has developed the Energetic Hazard Demilitarization System (EHDS) to remove the explosive hazard associated with MPPEH, to convert it to Material Designated as Safe (MDAS), and recycle the remaining metals. ARA's EHDS process alleviates public concerns by remotely opening MPPEH items and thermally disposing of energetic compounds without open burning, open detonation, or incineration. This paper presents ARA's proposed services using EHDS for the disposal of conventional MPPEH eliminating the majority of intentional detonations during MEC Clearance operations at environmentally and culturally sensitive locations.

Approach

The disposal of MPPEH items using EHDS is an approach that involves five (5) operational steps (See Figure 1) and the use of specialized demilitarization equipment designed by ARA. ARA's EHDS process and equipment involves remotely opening items containing energetic compounds and then thermally disposing the unconfined energetic hazards using Radiant/Convective (RC) Batch Ovens as shown in Figure 2. RC heating decomposes explosive compounds using heat just as effectively as open burning or incineration while providing better temperature control and using less energy. The use of ARA's RC Batch Ovens is not incineration. At no time do flames or the radiant element in the ovens contact the energetic compounds or MPPEH. The thermal decomposition of explosives is an irreversible reaction that breaks the chemical bonds of the compounds and does not generate explosive gases. After heating and removal of the explosive hazard, the metal scrap is inspected, certified as MDAS, and recycled. All demilitarization activities would be performed in accordance to a site specific Explosive Safety Submission, and remote cutting and heating operations would be controlled from an area outside of the DDESB designated blast and fragmentation exclusion zones.

Figure 1 ARA's Energetic Hazard Demilitarization System Approach



With the exception of using an x-ray, EHDS Approach Steps 1 and 2 (in Figure 1) are similar to most MEC clearance operations. If the MPPEH item is safe to move, it can be processed using EHDS. After the MPPEH items are located and inventoried, the items are segregated (Step 2) by type and size. ARA adds the additional safety step of x-raying MPPEH items that are unidentified, whether due to age, rust, or the growth of marine life, to ensure that White Phosphorous (WP) rounds and liquid filled munitions are not processed to protect site personnel, the environment, and equipment from injury, exposure, or damage. Small arms (less than 50 caliber), Expanded Small Arms Cartridge Casings (ESACCs), boosters, and fuzes are placed directly into ARA's specially designed popping trays without remotely opening (Step 3). Loose propellants and other unconfined energetic compounds would be placed in open trays.

Approach Step 3, remotely cutting and opening MPPEH items using water jet cutters or wet saws, is commonly used in industrial settings for the demilitarization of munitions, but is rarely used during MEC clearance operations. Step 3 safely exposes the previously confined energetic compounds while the operators controlling the equipment are located at a safe distance.

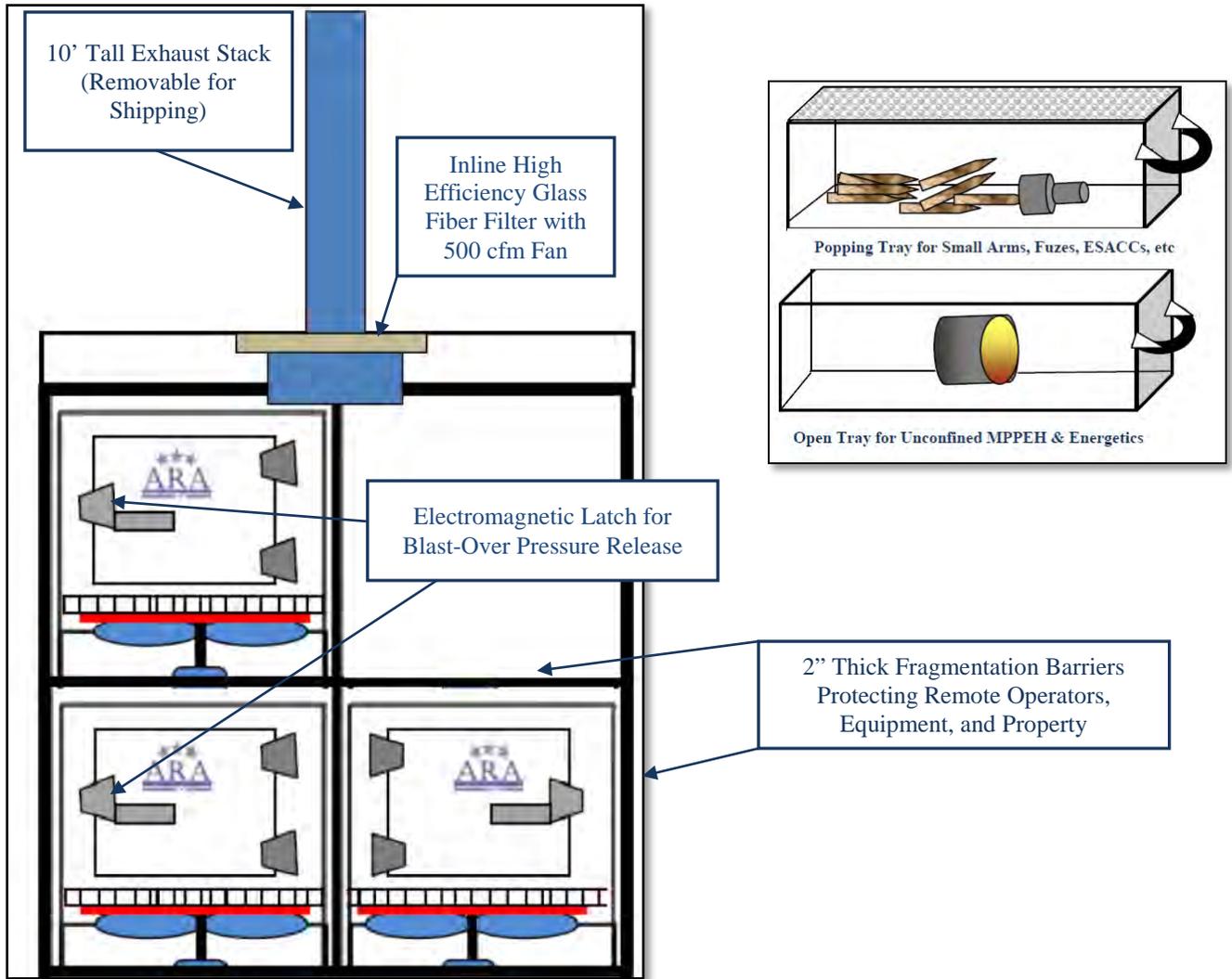
Remotely cutting open MPPEH items allows ARA to accomplish four (4) things:

- 1) Allows the energetic compounds to be sampled so the appropriate times and temperatures for disposal can be accurately determined (Step 4);
- 2) Allows the decomposition of the energetic compounds to occur during heating (Step 4) without the possible buildup of pressure that could cause an accidental mechanical detonation;
- 3) Allows the operator to cut the MPPEH items into pieces reducing the net energetic contents to less than 20lbs of net explosive weight (NEW) of TNT, which is the designed limit of the RC Batch Ovens used to heat the energetic compounds in Step 4; and
- 4) Allows integrated base fuses and boosters (containing confined explosive compounds) to be placed into the popping trays.

After remotely cutting, the unconfined energetic compounds can be placed into open trays for low temperature thermal decontamination. To dispose of the energetic hazards associated with MPPEH (Step 4 in Figure 1), ARA would use six (6) electrically powered RC Batch Ovens and contain them in a standard 20 foot shipping container (Figure 2). Each of the six (6) RC Batch Ovens will consist of the following:

- Oven Enclosure: 6" thick High Efficiency insulated construction with 18 gauge stainless steel interior construction and 10 gauge aluminized exterior construction.
- The dimensions of the oven to be 60" long x 30" high x 42" wide (sitting on a 20" steel frame for a 50" overall height).
- Internal oven chamber will be 48" deep x 12" high x 30" wide.
- One (1) 6" thick hinged access door to include an electromagnetic latch to prevent over-pressurizations, and spring loaded hinges to open the doors at the end of the heating cycle.
- One (1) electric, radiant-heating, element designed to achieve 650 degrees F air temperature.
- One (1) supply air recirculation fan to increase convection heating and promote even heat distribution.
- 2" of Steel encasing each RC Batch Ovens providing a fragmentation barrier on the back, both sides, and bottom of each oven protecting the remote operators' located perpendicular to the open front of the unit.

Figure 2 – Energetic Hazard Disposal Unit



8' Wide Container (end view) Showing 3 RCBOs with 20 lb NEW Limit Each

ARA's RC Batch Oven safely raises the temperature of energetic compounds, irreversibly breaking the chemical and molecular bonds. The minimum non-explosive decomposition temperatures for most explosives range from 200 °C to 250°C. Slightly higher temperatures may be used to increase the decomposition rates; however, ARA plans to maintain temperatures well below the ignition temperatures of the explosive(s) of concern (for example 295-300°C for TNT, 255 to 260°C for RDX, 230°C for nitrocellulose (NC)). Non-explosive decomposition of NC (the propellant in small arms) occurs at temperatures ranging from 160°C to 220°C. The time at a given temperature of each tray with MPPEH items will vary slightly based on the mass of energetic compounds contained therein. Real time temperature monitoring will be performed by the remote operators to verify that adequate temperatures (as determined from the time versus temperature curves in Figure 3 for the decomposition of the specific explosive) have been reached and a non-explosive condition has been achieved.

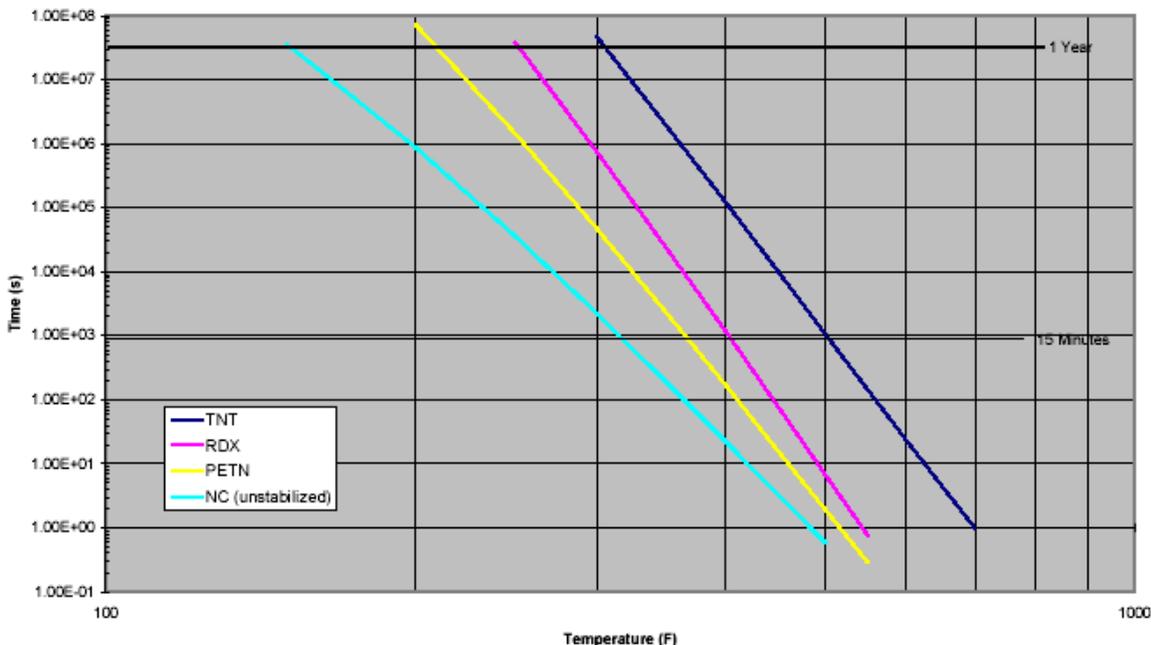


Figure 3: Time/Temperature Curves for Complete Destruction of Various Explosives Using the Arrhenius Equation (Source: Parsons-UXB Joint Venture, 2003, Phase II Report on Process Verification and Quality Control for the Kaho'olawe Car Bottom Thermal Processing Unit for Scrap Material Processing; Cooper, Paul, *Explosives Engineering*, Wiley-VCH, 1996)

Based on the time temperature curve in Figure 3, the slow decomposition of NC begins at approximately 160°C. At the temperature of approximately 210°C non-explosive decomposition would take *approximately* 15 minutes. However, it may take as long as an hour to reach the target temperature depending on the mass and surface area of the MPPEH item being treated. In summary, NC will have already begun to decompose once the temperature reaches 160°C and will continue to decontaminate while the temperature is increased to the target temperature of 210°C. Very similar to TNT in its reaction to temperature, Explosive D (not shown in Figure 3) has an ignition temperature of 300°C and begins decomposing at a rapid rate at approximately 250°C.

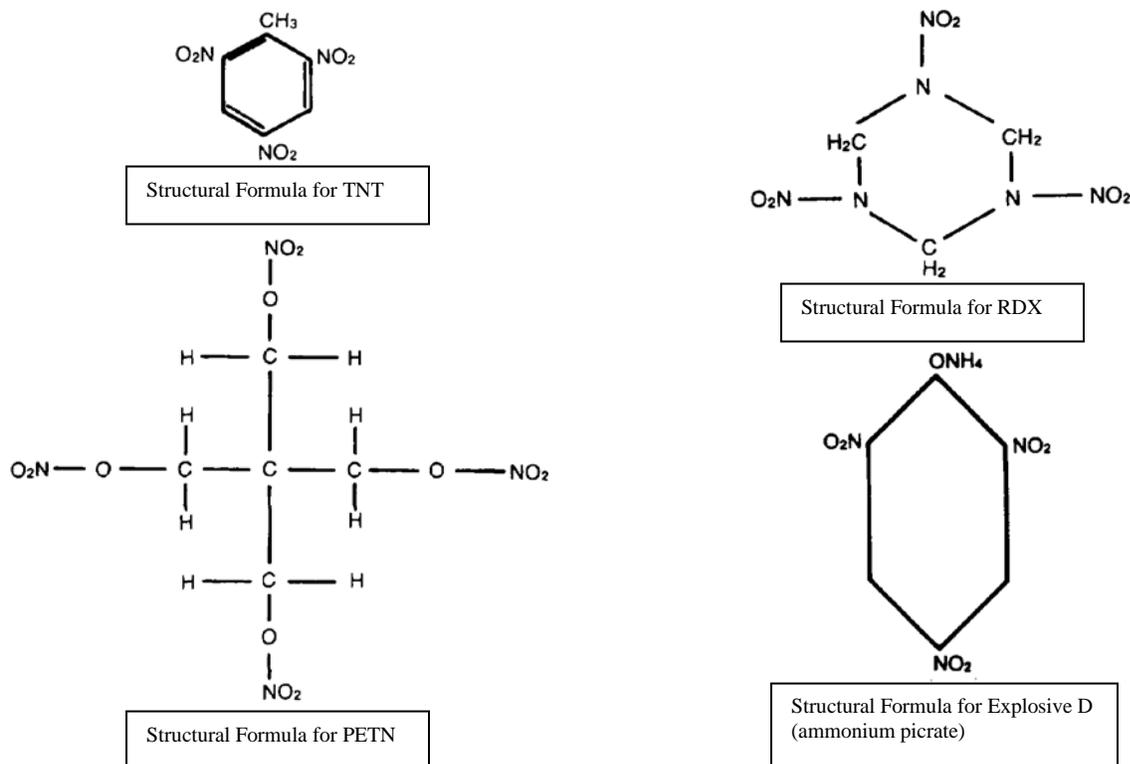
The fifth step involves the post-heating activities. After completion of RC heating, the MPPEH will be visually inspected by the ARA Explosive Safety Officer, and the temperature monitoring indicators are

downloaded. Assuming that the required temperature is reached throughout the tray containing MPPEH, certification of the batch as a MDAS will be declared. If needed, the tray will be re-treated until MDAS certification is achieved. After MDAS status is complete, ARA will fill out and submit the certification and attach the temperature and time documentation. ARA's EHDS process neither uses or generates hazardous waste and is basically a recycling process for metals. ARA has designed each RC Batch Oven to safely decontaminate approximately 20 lbs of NEW. ARA estimates six (6) RC Batch Ovens will convert MPPEH containing approximately 120 lbs of NEW to MDAS each 1.5 – 2 hours.

Heating the MPPEH to higher temperatures (in excess of 300°C) is cost prohibitive, increases emissions, and increases the chance of a rapid reaction or accidental detonation. Figure 4 shows the structural formula for some common high explosives. ARA's approach using RC heat is carefully controlled to ensure that temperatures high enough to break the molecular bonds of explosives are achieved without causing the production of lead or other metal vapors. Lead vaporization can occur at temperatures of 361° C (700° Fahrenheit) or greater. At no time will ARA's RC Batch Ovens reach this temperature range, which is much higher than the needed temperature for most explosives, including Explosive D, TNT, RDX, PETN, and NC.

ARA personnel perfected the use of convective heat for the in-situ decontamination of explosives in sewers and ammunition plant structures and were the first to develop the equipment and techniques. The EHDS and heating with RC Batch Ovens are improvements upon those proven convective heating processes that allow for better temperature control, reduce emissions, and result in the safe disposal of energetic compounds. EHDS converts MPPEH to MDAS resulting in the recycling of metals.

Figure 4- Structural Formulas for Common High Explosives



VII. Description of Explosive Munitions Constituents (MC) Compounds and e Treatment By-Products

The attached analysis was performed to estimate the type and quantity of decomposition by-products, per unit weight of energetic material (i.e., explosive MC compounds) from the EHDS treatment system.

Description of Energetic Compounds
and
Decomposition Products

Energetic Hazard Demilitarization System (EHDS)

Letter Report

Emissions Estimates for the Destruction of Military Munitions By ARA's Energetic Hazard Demilitarization System

Prepared for

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Revision 1
March 14, 2011

Emissions Estimates for the Destruction of Military Munitions (MM) By ARA's Energetic Hazard Demilitarization System (EHDS)

Purpose of This Letter Report

Bill Mitchell and Associates, LLC, 5621 Pelham Rd, Durham, NC 27713 was asked by ARA, Inc Sykesville, MD to derive emission estimates for the EHDS when it is used to destroy Military Munitions recovered from Ordnance Reef (HI-06), Hawaii.

Description of the EHDS

The EHDS process involves cutting munitions into pieces and using a radiant/convective (RC) oven to thermally decompose the exposed explosive munitions constituent (MC) compounds (referred to herein as energetic material). These ovens are housed in a standard, 20-foot long Conex shipping container with a High Efficiency Particulate Air (HEPA) filter-equipped exhaust duct and two 500 cubic feet per minute (cfm) fans that operate continuously. The exterior dimensions of the ovens are: 60 in. long, 30 in. high and 42" wide; the interior dimensions are 48 in. long, 12 in. high and 30 in. wide. The interior volume of each oven is approximately 10 ft³ (0.3 m³). Each oven has a 6-in. thick, hinged access door with an electromagnetic latch (to prevent over-pressurization), spring loaded hinges to facilitate opening the doors at the end of the heating cycle, an electric, radiant-heating, element (designed to achieve 650 °F air temperature in the chamber) and a supply air recirculation fan (to increase convection heating and promote even heat distribution). Although each oven has a net explosive weight (NEW) capacity rating of 40-lb NEW, during routine operations the maximum NEW placed within the ovens at Ordnance Reef (HI-06) will be 20 lbs. NEW.

During the Ordnance Reef (HI-06) MM disposal operations, the EHDS will be located on a barge. Recovered MM will be placed on the barge where they will be separated by type and size. Items whose explosive type cannot be determined will be x-rayed to ensure that white phosphorus (WP) rounds and liquid-filled munitions are not processed. Those that cannot be processed will be separated and handled per the approved explosives safety plan.

The remaining MM will be treated using the following four-step process:

Step 1. Small Arms Ammunition and fuzes containing confined explosives will be removed from the other MM and placed into vented, popping trays and sealed.

Step 2. The remaining MM will be remotely opened using a wet saw to reduce the energetic content to less than 20 - lbs. NEW. The resulting munition pieces and any loose explosive material will then be placed in open top trays and, if there is uncertainty about the identity of the exposed energetic material, its identity will be determined using a test kit.

Step 3. The trays containing the confined explosive parts and the unconfined explosive pieces will be placed in the RC ovens and heated to a temperature between 350 and 475 °F (depending on the energetic in the materials being treated) and held at the desired temperature (using a real time, temperature monitoring system installed in the oven) for sufficient time to destroy all of the energetic materials in the trays. The "cook" time and temperature required for a tray will be established using time versus temperature charts derived in an earlier study.¹

Step 4. After the required time-temperature cycle has been completed, the oven will be allowed to cool to 200 °F or less before the door is opened remotely, the oven gases allowed to vent through the HEPA filter-equipped stack and the contents of the trays will be inspected per the approved explosives safety plan to confirm that all materials can be certified as materials documented as safe (MDAS). If required, the heating cycle will be repeated until the contents of the tray are certified as MDAS. Once

an item has been certified as MDAS, it will be set aside for either recycling or other appropriate safe disposal.

ARA anticipates that it can operate six RC ovens simultaneously and that it can accomplish four heating cycles in eight hours. This will allow them to destroy up to 480 lbs NEW during an eight-hour shift. At the end of the day, the filter will be removed from the exhaust duct, visually inspected for particle build-up and replaced, if necessary. (Note – In the unlikely event that explosive residues are suspected as being present on the filter, the filter will be tested for explosive compounds and the necessary corrective action taken.)

Decomposition Pathways for Each Energetic Material

Based on the initial survey, the MM at Ordnance Reef (HI-06) contains the following energetic materials: NC, PETN, RDX, TNT, Comp B, Tetryl and Explosive D (ammonium picrate). There are no decomposition data available for these materials when they are decomposed under the conditions that will be present in the EHDS system (air environment at atmospheric pressure). However, there is an extensive body of data available on the decomposition pathways and products of these materials that were derived under conditions that can be applied to the EHDS system.²⁻¹⁵ This information is summarized below for each energetic material.

Aliphatic Nitrate Esters.

NC (C₁₂H₁₆N₄O₁₈). The initial step in the decomposition process of nitrocellulose (NC) is the homolytic fission of a C – C bond to produce CH₂ONO₂ (a free radical) which immediately decomposes into formaldehyde (H₂CO) and NO₂. The NO₂ and H₂CO then attack the remaining NC fragment or intact NC polymeric chain which accelerates the decomposition process (autocatalysis). At or near atmospheric pressure, the major decomposition products (i.e., > 15% by weight) are CO and NO and the minor decomposition products (<15% by weight) are CO₂, NO₂, CH₄, C₂H₂, HCN and H₂O.^{2, 3, 4}

PETN (C₅H₈N₄O₁₂). The initial step in the decomposition process is the homolytic fission of C – C bonds to produce CH₂ONO₂ free radicals which immediately decompose into formaldehyde (H₂CO) and NO₂. The remaining C(CH₂ONO₂)₃ fragment then eliminates CO, NO and CH₃ONO₂ (which decomposes further to produce CO, NO, H₂O and NO₂). At or near atmospheric pressure, the major decomposition products are CO and NO, and the minor decomposition products are CO₂, NO₂, HCN and H₂O.^{2, 3}

Nitramines.

RDX (C₃H₆N₆O₆). The initial step in the decomposition process is the transfer of an O atom from an NO₂ group to a CH₂ group followed by the homolytic fission of a C – N bond to produce formaldehyde (H₂CO) and N₂O. The H₂CO and N₂O then react to produce CO, N₂ and H₂O. At or near atmospheric pressure, the major decomposition products are CO, N₂ and H₂O and the minor ones are C₂H₂, NO₂, NO and CH₄ are also produced.^{5, 6, 7, 9, 12} (NOTE – Although HMX (C₄H₈N₈O₈) has not been identified as being in the Ordnance Reef (HI-06) MM, if it is encountered, the decomposition process of HMX and the final decomposition products will be the same as for RDX.^{3, 9, 12})

Tetryl (C₇H₅N₅O₈). Because of the presence of the benzene ring, the decomposition pathway of tetryl is different from that of RDX and HMX. For tetryl the initial step in the decomposition process is homolytic breakage of the N to N bond leading to the release of NO₂ and the formation of a highly unstable nitrobenzene compound which immediately decomposes to release more NO₂. The NO₂ then attacks the tetryl molecule which accelerates the decomposition of the tetryl molecules.^{4, 14} At or near atmospheric pressure, the major decomposition products are CO and NO and the minor ones are soot, CO₂, C₂H₂, NO₂, and HCN.

Nitroaromatics.

TNT (C₇H₅N₃O₆). The initial step in the decomposition is the loss of the methyl group (CH₃) from the benzene ring. This is followed by the homolytic breakage of the C-N bonds on the ring to produce NO₂ molecules which then attack the benzene ring. At or near atmospheric pressure, the major decomposition products are CO, CO₂ and NO and the minor ones are soot, C₂H₂, NO₂, and HCN.^{8, 9}

Picrates

Explosive D [(NH₄) (C₆H₄N₃O₇)]. Although no published literature on the decomposition of ammonium perchlorate (Explosive D) was found, an article on the decomposition products for six metal picrates was located.¹³ For all six metal picrates, the initial step in the decomposition process is the formation of the gaseous metal (M) isocyanate (MNCO). The major decomposition products are CO and NO and the minor ones are CO₂, C₂H₂, soot and HCN.^{10, 11} Based on this data, it's reasonable to assume that ammonium picrate will produce the same major and minor decomposition products. (NOTE – There will not be metal decomposition products because Explosive D does not contain metals.)

Nitroaromatic/Nitramine Blend

Comb B. Comp B is composed of 39.5% TNT, 59.5% RDX and 1% wax by weight. Because the first step in the decomposition of energetic materials involves the breakage of a chemical bond in the energetic molecule itself, the first step in the decomposition of Comp B is the independent decomposition of TNT and RDX molecules. That is, the initial decomposition step in the TNT will be the release of NO₂ and the initial step in the decomposition of the RDX will be the transfer of an O atom from an NO₂ group to a CH₂ group followed by the homolytic fission of a C – N bond to produce formaldehyde (H₂CO) and N₂O. Although the NO₂ produced by the TNT might increase the decomposition of the RDX molecules, the final decomposition products are the same as for the pure materials.

Findings and Observations in the Above Studies That Should Apply to the EHDS

Some observations and findings in the above studies that should apply to the EHDS when it processes the Ordnance Reef (HI-06) MM follow:

- (1) NO was a major final decomposition product for all of the materials and CO was a major decomposition product for all except RDX (for which it was a minor decomposition product). CO₂ was a major decomposition product for TNT and a minor one for the other materials. When they were reported, NO₂, HCN, soot and the small hydrocarbons were always minor decomposition products.
- (2) Energetic materials in the same explosive category that also have similar structures have identical decomposition pathways and final degradation products.¹²
- (3) The binders and performance/stability modifiers sometimes found in energetic materials generally decompose before the energetic and the heat they release usually lowers the temperature at which the decomposition of the energetic compounds begins to occur. But the presence of the binder does not seem to significantly influence the final decomposition products.

(4) Temperature and pressure can influence the relative ratios of the final decomposition products, but the mix of products tends to remain the same. The effect seems to be directly related to the percentage of the energetic compound that is in the vapor state rather than of the energetic material itself.¹² That is, the higher the percentage of the energetic in the vapor state, the higher the effect of temperature and pressure on the distribution of the final decomposition products.

(5) In the one instance where the decomposition was studied in both reactive (e.g., O₂) and inert environments, the reactive environment produced more CO and NO and less CO₂ and NO₂ than the inert environment.

(6) When the decomposition process is allowed to go to completion, aromatic and polycyclic decomposition products have never been reported for any of the energetic materials present in the Ordnance Reef (HI-06) MM. In fact, the highest molecular weight hydrocarbon reported in the literature reviewed was ethylene and it was present in very small quantities. The absence of higher molecular weight organic materials is consistent with the reaction pathways by which the energetic materials thermally degrade.

Calculation of the Emission Estimates for the Ordnance Reef (HI-06) MM

Table 1 contains estimates of the weight of CO, NO and NO₂ that will be produced for each pound of energetic material treated in the EHDS when it processes energetic materials from MM at Ordnance Reef (HI-06). These estimates are based on the following assumptions.

(1) CO, NO and NO₂ are the only decomposition products that are produced in meaningful quantities when the EHDS decomposes the energetic materials in the Ordnance Reef (HI-06) MM and the heating cycle is long enough to completely decompose the energetic materials in the RC oven..

(2) All of the carbon in the energetic material is released as CO. (NOTE - This is a very conservative estimate because some of the carbon was always released as CO₂ and, in one case, CO₂ was the major carbon-based decomposition product.)

(3) 85% of the nitrogen in the energetic material is released as NO and the remainder is released as NO₂. (NOTE – This is a reasonable assumption because NO was always the major nitrogen-based decomposition product and NO₂ was always a minor one and because some of the nitrogen will likely be converted to nitrogen gas.)

(4) The energetic compounds in fuzes, boosters, small arms ammunition and similar materials can be ignored because they will represent less than 1% of the total weight of the energetic materials treated and the decomposition products will be identical to those for the corresponding unconfined energetic compound.

(5) The metals in the munition parts and slices will not vaporize and will remain in the oven trays. (NOTE – This is a reasonable assumption because studies have shown that the metals in munition casings and parts do not vaporize even when the items are detonated.¹⁶

Table 1. Pounds of Each Major Decomposition Product Produced Per Pound of Energetic Material Treated in the EHDS.

Energetic Material	lbs. of Decomposition Product Produced per lb. of Energetic Material Treated in the EHDS		
	CO	NO	NO ₂
NC	0.667	0.175	0.052
PETN	0.443	0.280	0.084
RDX	0.378	0.597	0.178
Tetryl	0.820	0.462	0.138
TNT	0.863	0.292	0.087
Explosive D	0.677	0.356	0.106
Comp B	0.566	0.471	0.141

Table 2 contains estimates of the total pounds of each major decomposition product that will be released into the atmosphere over a two-hour heating cycle in which 120 lbs. of the same energetic material is treated in the EHDS.

Table 2. Total Pounds of Each Major Decomposition Product Produced Per Two-Hour Heating Cycle.

Energetic Material	lbs. of Each Decomposition Product Produced During A Two -Hour Heating Cycle		
	CO	NO	NO ₂
NC	80	21	6
PETN	53	34	10
RDX	45	72	21
Tetryl	98	55	17
TNT	104	35	10
Explosive D	81	43	13
Comp B	68	56	17

NOTE – The estimates in Tables 1 and 2 represent a worst case scenario. It’s highly likely that the actual emissions of CO and NO_x are considerably less than these estimates. Emission tests conducted when the EHDS is treating real world MM are the only way to determine the actual emission products.

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