October 2015

FINAL
DECISION DOCUMENT

FORMER SOUTH BEACH
MUNITIONS RESPONSE AREA
MARTHA'S VINEYARD, MASSACHUSETTS

FUDS Property No. D01MA0486
Projects 00 and 01
Contract No. W912DY-04-D-0019
Task Order No. 0006

U. S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT

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FIGURES

TABLES

ACRONYMS

3Rs	Recognize, Retreat and Report
AirMag	Airborne Magnetometry
ARAR	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
CERCLA	Comprehensive Environment Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMR	Code of Massachusetts Regulations
CSM	Conceptual Site Model
DD	Decision Document
DERP	Defense Environmental Restoration Program
DMM	Discarded Military Munitions
DoD	United States Department of Defense
EP	Engineering Pamphlet
EPA	U.S. Environmental Protection Agency
FDE	Findings and Determination of Eligibility
FS	Feasibility Study
Ft	Foot or Feet
FUDS	Formerly Used Defense Site
HHRA	Human Health Risk Assessment
IC	Institutional Control
INPR	Inventory Project Report
LTM	Long Term Management
LUC	Land Use Control
MADEP	Massachusetts Department of Environmental Protection
MADCR	Massachusetts Department of Conservation and Recreation
MA NHESP	Massachusetts Natural Heritage Endangered Species Program
MC	Munitions Constituents
MD	Munitions Debris
MDAS	Material Documented As Safe
MEC HA	Interim Munitions and Explosives of Concern Hazard Assessment Methodology
MEC	Munitions and Explosives of Concern
MK	Mark
MMRP	Military Munitions Response Program
MPPEH	Material Potentially Presenting an Explosive Hazard
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
MSD	Minimum Separation Distance
msl	mean sea level
NOAA	National Oceanic Atmosphere Administration
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OE	Ordnance and Explosives
O&M	Operation and Maintenance
PA	Preliminary Assessment
RAO	Remedial Action Objective
RI	Remedial Investigation

SARA	Superfund Amendments and Reauthorization Act of 1986
SLERA	Screening Level Ecological Risk Assessment
TCRA	Time Critical Removal Action
TMV	Toxicity, Mobility and volume
TTOR	The Trustees of Reservations
UCL	Upper Confidence Limit
USACE	United States Army Corps of Engineers
USC	United States Code
USDA-SCS	United States Department of Agriculture – Soil Conservation Service
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UU/UE	Unlimited Use and Unrestricted Exposure
UXB	UXB International, Inc.
UXO	Unexploded Ordnance
VRH	VRHabilis, LLC

EXECUTIVE SUMMARY

This Decision Document legally formalizes the approval of the selected remedial action for the Formerly Used Defense Site (FUDS), Property No. D01MA0486, consisting of Land Use Controls (LUCs) at the Former South Beach Moving Target Machine Gun and Katama Rocket Range Munitions Response Site MRS 1 Project 00, and no further action for the Remaining Ocean MRS 2 Project 01. The projects are located in Dukes County within the Town of Edgartown, Martha's Vineyard, Massachusetts.

The South Beach Munitions Response Area FUDS consists of 4,431 acres. This acreage was delineated into two MRSs, Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 comprising 695 acres, and the remaining uncontaminated lands were delineated into the Remaining Ocean MRS 2 comprising 3,736 acres.

The Selected Remedy for the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 is Land Use Controls, LUCs (Alternative 2). USACE has determined that the response action selected in this DD for munitions at the MRS is necessary to protect public health, welfare, and the environment from the hazards associated with munitions in the environment, based on the current and intended future use of the MRS. Other potential remedies considered included No Action (Alternative 1), Land and Beach Area Only Subsurface Clearance with LUCs (309 acres) (Alternative 3), and Complete Subsurface Clearance Land and Water (695 acres) (Alternative 4).

The Selected Remedy is expected to most favorably meet all of the evaluated detailed analysis criteria as compared to Alternatives 1, 3, or 4. Alternative 2 can be readily implemented and would provide a high level of effectiveness over the long-term compared to its cost, whereas Alternatives 3 and 4 are more difficult to implement and would incur a much greater cost for only a slightly higher level of effectiveness over the long term. Alternative 1 would not achieve the Remedial Action Objective (RAO) for MRS 1, therefore, it is not considered a viable alternative. The Preferred Alternative satisfies the following statutory requirements of CERCLA Subsection 121(b): 1) protective of human health and the environment; 2) comply with ARARs; and is 3) cost-effective. Alternative 2 can be readily implemented to achieve the RAO and provide safe current and future use of the MRSs. This Alternative does not achieve Unlimited Use/Unrestricted Exposure, (UU/UE) in accordance with 40 CFR 300.430(f)(4)(ii), therefore, five-years reviews will be required.

The present worth cost estimate for the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 Alternative 2 and the Remaining Ocean MRS 2 No Action Alternative is $622,000 and $0, respectively. It is estimated that Alternative 2 would take 6 months to implement.

No other remedies were considered for the Remaining Land MRS since no Munitions and Explosives of Concern were found.

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1. THE DECLARATION

1.1 Project Name and Location

The South Beach Munitions Response Area (MRA) comprised of the Former South Beach Moving Target Machine Gun and Katama Rocket Range Munitions Response Site (MRS) ("MRS 1") Project 00, and the Remaining Ocean MRS, ("MRS 2") Project 01, is located in Dukes County within the Town of Edgartown, Martha's Vineyard, Massachusetts. The two MRSs are within the South Beach MRA, Formerly Used Defense Site (FUDS), Property No. D01MA0486.

1.2 Statement of Basis and Purpose

This Decision Document (DD) presents the United States Army Corps of Engineers (USACE) remedial action consisting of Land Use Controls (LUCs) at the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 and No Action at the Remaining Ocean MRS 2.

This DD is a requirement of Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S. Code (USC) § 9617), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), also known as Superfund. The DD also follows the requirements of USACE Engineer Regulation 200-3-1, Formerly Used Defense Site Program Policy, and the United States Environmental Protection Agency (USEPA) guidance provided in EPA 540-R-98-031, A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents.

The Army is the Executive Agent on behalf of the Department of Defense, (DoD) charged with meeting all applicable environmental restoration requirements at FUDS, regardless of which DoD component previously owned or used the property. The Secretary of the Army further delegated the program management and execution responsibility for FUDS to the USACE. The USACE is the lead agency for investigating, reporting, evaluating and implementing remedial actions at the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1.

As the lead agency for remedial activities, USACE is responsible for environmental restoration at the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 under the Military Munitions Response Program (MMRP), established in 2001 under the Defense Environmental Restoration Program (DERP). The Massachusetts Department of Environmental Protection (MADEP) is the supporting regulatory agency that provides regulatory oversight of environmental restoration activities and environmental compliance. Funding is approved by Congress and provided under DERP to investigate and remediate contaminated sites on FUDS.

1.3 Assessment of Project MRSs

Past military munitions training activities conducted at the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 resulted in munitions contamination within the MRS boundaries.

The FUDS property was established in a 2008 Findings and Determination of Eligibility which established the MMRP project in an Inventory Project Report (USACE, 2008). Between 1943 and 1947, the MRA was used as a gunnery and rocket firing range for the 1st Naval District flight training program at Naval Air Station Quonset Point, Rhode Island and Navy Auxiliary Air Station Martha's Vineyard, Massachusetts. Military practice ordnance potentially used at the MRA included 0.30 and 0.50 caliber ammunition, 2.25 to 5 in. sub-caliber aircraft rockets, 5 in. rocket warheads, 1 to 3.5 in. rocket warheads, 3 to 3.25 in. rockets with warheads, and 3 to 3.25 in. rockets with 5 in. warheads. Since the end of military operations in 1947, numerous discoveries of munitions have been identified at the MRA by local residents, Town of Edgartown employees, and visitors.

Throughout two removal actions and the Remedial Investigation (RI), no MEC has been discovered at the Former South Beach Machine Gun and Katama Rocket Range MRS 1 or the Remaining Ocean MRS 2. However, large quantities of Munitions Debris (MD) were found which confirms the past usage of the site by the military as a rocket target area. Practice rockets that have been identified and documented on-site include 5-inch MK6 warheads that have been plaster filled; however, there is an explosive counterpart that looks similar to the practice rocket warhead. EOD and/or the State Bomb Squad have and will continue to respond to munitions finds at this site. Their reports are inconclusive in the findings as to whether there was any contribution to the detonation of these rocket motor bodies and warheads. Therefore, based on the history of the site, related sites, results of previous actions and the RI, coupled with the large volume of munitions items found and large volume of receptors at the site, there remains a small risk of encountering MEC in at this site.

Between November 1988 and May 1989, a removal action was conducted within the MRS, which concentrated in areas encompassing beaches and sand dunes. During the removal action, approximately 1,655 MD items were successfully recovered with approximately 99 of those items being inert/dummy warheads. Between 18 April and 25 September 2009, a TCRA was conducted within the ocean portion of the MRS. During clearance operations, 617 MD items and 933 pounds of non-munitions related debris were removed.

During the RI, two MD items were observed on land and beach and 96 MD items were recovered in the ocean portion of the 695-acre MRS. The RI included a finding that there was a low statistical potential for MEC to be present and therefore a MEC source or explosive hazard is possible in the MRS. The significant amount of MD within the MRS and the high volume of receptors indicates

that munitions will continue to be encountered at this site in the future. Based on not finding MEC during the RI, a MEC Hazard Assessment (HA) was not performed for either MRS.

Between October and November 2011, environmental sampling for munitions constituents (MC) was conducted at the Investigation Area, which included the collection of discrete, biased surface and subsurface soil samples and groundwater samples. Samples were analyzed for MCs, including antimony, copper, lead, nickel, and zinc, and explosive compounds previously identified as components of munitions identified within the Investigation Area.

A Human Health Risk Assessment and a Screening-Level Ecological Risk Assessment were performed during the RI, neither of which identified a potential risk to human or ecological receptors associated with MCs.

No remedial action was recommended for the Remaining Ocean MRS 2 since no evidence of concentrated munitions use was identified in this MRS during the RI. A Feasibility Study was recommended for the Former South Beach Machine Gun and Katama Rocket Range MRS 1 to address the munitions discovered during the RI. No further action was identified associated with MCs at the Former South Beach Machine Gun and Katama Rocket Range MRS 1 since it was determined that no unacceptable risk exists for human health or ecological receptors.

The RI results were used to develop the Feasibility Study (FS) that identified remedial objectives and goals for the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 to protect human health and the environment, and evaluate remedial alternatives to address the type and extent of MEC contamination. The recommendations of the FS were used to select a remedy, which was documented in a Proposed Plan (PP) that was finalized in June 2015, and released for public comment (15 June 2015 through 17 July 2015). All public comments received were considered prior to selecting the final remedy.

USACE has determined that the response actions selected in this DD for potential hazards associated with munitions at the Former South Beach Moving Target Machine Gun and Katama Rocket Range (MRS 1) are necessary to protect public health, welfare, and the environment, based on the current and intended future use of the MRS.

No action is recommended for the Remaining Ocean MRS 2 because of the insignificant amount of MD (2 practice rockets) found within the MRS and the lack of exposure to receptors. The MRS lies primarily in the ocean, 300 to 600 feet beyond the mean low water mark.

1.4 Description of the Selected Remedy

The Selected Remedy for the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 is Land Use Controls (LUCs). The remedy is based upon the results of field investigations, laboratory analyses, data evaluations, current and future land use, assessments of potential human health and ecological risks, and response actions at the Former South Beach

Moving Target Machine Gun and Katama Rocket Range MRS 1. This alternative reduces exposure hazards to the public.

The Selected Remedy, LUCs, reduces the public's exposure to munitions risk. Specific components of the Selected Remedy for MRS 1 include:

- Awareness training,
- Updating/dissemination of educational and informational training materials,
- Installation of signs, and
- Sign maintenance.

LUCs will be performed annually for the first five years, then a reevaluation of the frequency will be made after five years.

Due to the lack of evidence of concentrated munitions use in the Remaining Ocean MRS 2, no action is required.

1.5 Statutory Determinations

The Selected Remedy consisting of LUCs for the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 is protective of human health and the environment, is cost-effective, and utilizes permanent solutions to the maximum extent practicable in accordance with CERCLA §121.

The Selected Remedy provides the best balance of trade-offs in terms of balancing criteria while also considering state and community acceptance.

The Selected Remedy will not result in unlimited use and unrestricted exposure (UU/UE) at Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1.

The NCP, at 40 CFR 300.430(f)(4)(ii), requires five-year reviews if the remedial action results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for (UU/UE).

1.6 Data Certification Checklist

The following information is included in the Decision Summary section of this DD. Additional information can be found in the Administrative Record files for the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1:

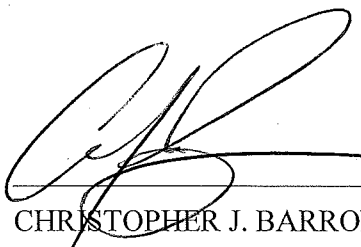
- **Nature and extent of MEC contamination**: Subsection 2.5.2 – Nature and Extent of MEC.
- **Hazard represented by MEC**: Section 2.7 – Summary of Site Risks.
- **Remediation objectives**: Section 2.8 – Remedial Action Objectives.
- **How MEC will be addressed**: Section 2.11 – Principal MEC Issues.

- **Current and reasonably anticipated future land use assumptions used in the hazard assessment and DD:** Section 2.6 – Current and Potential Future Land Use.
- **Potential land use that will be available at the site as a result of the Selected Remedy**: Subsection 2.12.6 – Estimated Outcomes of the Selected Remedy.
- **Total present worth costs and the number of years over which the remedy cost estimates are projected**: Section 2.9 – Description of Alternatives.
- **Key factor(s) that led to selecting the remedy**: Section 2.10 – Comparative Analysis of Alternatives, Section 2.12 – Selected Remedy, and Section 2.13 – Statutory Determinations.

1.7 Authorizing Signature

This Decision Document (DD) presents the selected response action at the South Beach Munitions Response Area (MRA), located in Dukes County within the Town of Edgartown, Martha's Vineyard, Massachusetts. The U.S. Army Corps of Engineers (USACE) is the lead agency under the Defense Environmental Restoration Program (DERP) at the Munitions Response Sites (MRSs) Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1, and South Beach Remaining Ocean MRS 2 Formerly Used Defense Site (FUDS), Property No. D01MA0486, Projects 00 and 01. USACE has developed this Decision Document consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision document will be incorporated into the larger Administrative Record file for FUDS Property No. D01MA0486, Projects 00 and 01, which is available at the Edgartown Public Library, 58 North Water Street, P.O. Box 5249, Edgartown, MA 02539. This DD, which presents the selected remedies with present worth cost estimates of $622,000 and $0, respectively, is approved by the undersigned, pursuant to Memorandum, DAIM-ZA, dated September 9, 2003, subject: Policies for Staffing and Approving Decision Documents, and to Engineer Regulation 200-3-1, FUDS Program Policy.

APPROVED:



Date: 16 OCT 15

CHRISTOPHER J. BARRON
Colonel, EN
Commanding

2. THE DECISION SUMMARY

This DD has been prepared using the guidance published by the USEPA on preparing remedy selection decision documents. Cleanup funding for the implementation of the Selected Remedy will be provided by the Defense Environment Restoration Account, a source of funding approved by the U.S. Congress to clean up contamination on FUDS installations under the DERP. The USACE is the lead agency for investigating, reporting, making decisions, and taking remedial actions regarding MEC at the MRSs. MADEP is the lead regulatory agency.

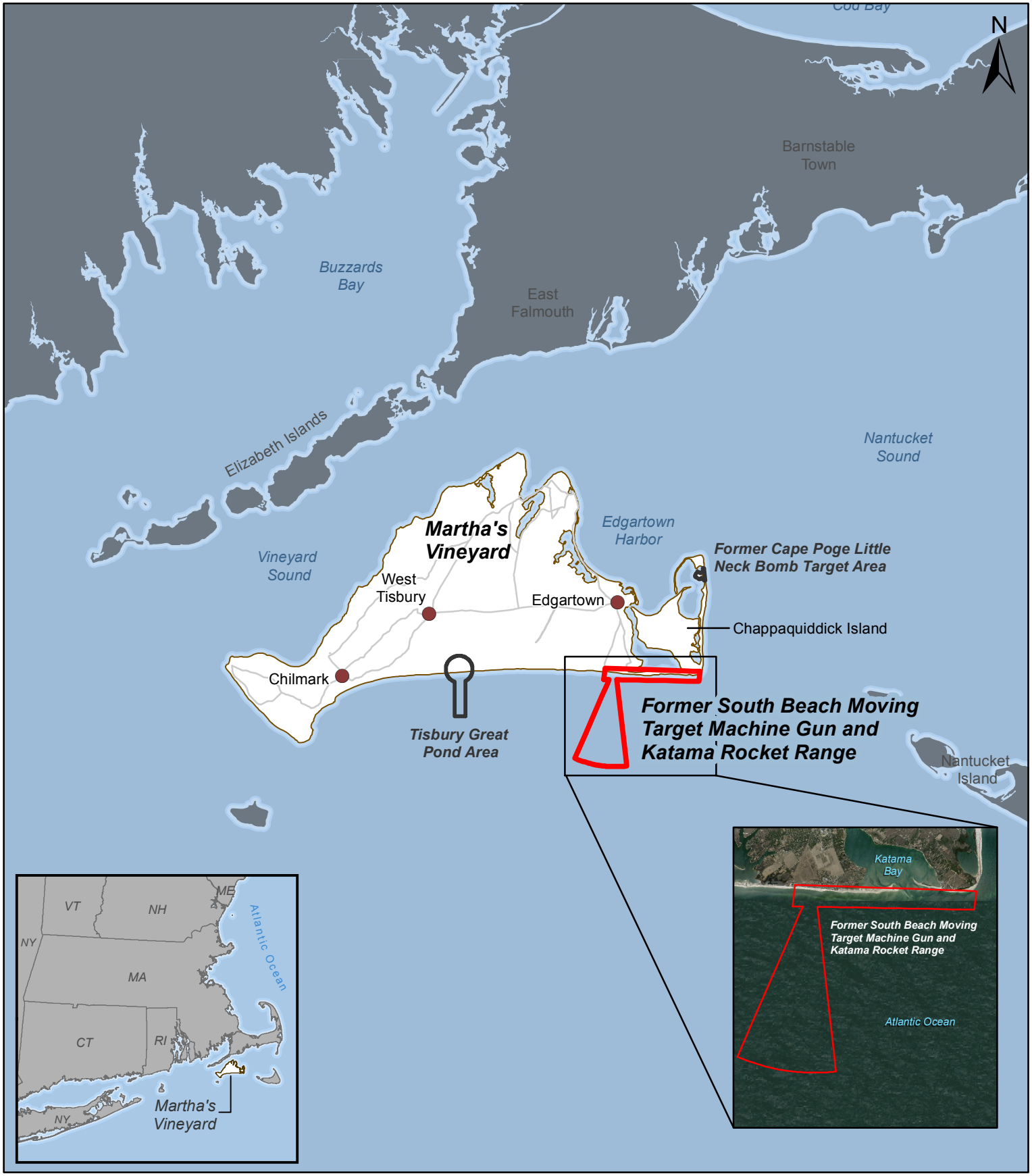
2.1 Project Name, Location, and a Brief Description

The South Beach MRA (FUDS Property No. D01MA0486) is located within the Town of Edgartown, Dukes County, Martha's Vineyard, Massachusetts (Figure 2-1). The FUDS acreage is 4,431. This acreage was delineated into two MRSs; The Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 (Project 00) comprising 695 acres , and the remaining uncontaminated lands were delineated into the Remaining Ocean MRS 2 (Project 01) comprising 3,736 acres.

Currently, the MRA is owned by Dukes County, Massachusetts Department of Conservation and Recreation (MADCR), private landowners, The Trustees of Reservations (TTOR), and the Commonwealth of Massachusetts (some beach property as well as inland and coastal waters).

2.2 Project MRS History and Enforcement Activities

In 1944, the Department of the Navy acquired leases on approximately 264 acres at South Beach. The leases were acquired for the purpose of a gunnery and rocket firing range for the 1st Naval District flight training program at Naval Air Station Quonset Point, Rhode Island and Navy Auxiliary Air Station Martha's Vineyard, Massachusetts. An oval-shaped moving target track, three fixed machine gun firing lines, two rocket targets, a Target Car Shelter, and other support features were constructed near the ocean (Figure 2-2). Two fixed machine gun firing lines, located north of the moving target track, were used to fire ammunition at targets that traveled along the oval-shaped track. The third fixed machine gun range, located northeast of the moving target range, was used to fire ammunition at targets placed in front of a soil impact berm. The two rocket targets, located on the eastern and western side of the moving target track, were used by pilots to practice their rocket firing skills. The site remained active until 1947 when the U.S. Navy approved the discontinuance of the site. Following closure of the site, the moving target track was removed (USACE, 2010).



US Army Corps of Engineers

FIGURE 2-1

Site Location - Martha's Vineyard, MA

0 2.5 5 10 15 Miles

0 5 10 15 20 25 Kilometers

UXB amec

NOTES:
Base map data source: ESRI

4/13/2015	Rev:	SBeach_MV_Island_FS.mxd	
Drawn: JBO	Chk: DMS	PROJ: 562910000	

MRS	Acres
Former South Beach Moving Target Machine Gun and Katama Rocket Range	695
Remaining Ocean	3,736
MRA TOTAL	**4,431**

N

Katama Airpark

Katama Farm

Katama Bay

Pocha Pond

Wasque Point

FORMER SOUTH BEACH MOVING TARGET MACHINE GUN AND KATAMA ROCKET RANGE MRS (695 acres)

REMAINING OCEAN MRS (3,736 acres)
(SEE AREAL OVERVIEW INSET FOR FULL EXTENT)

Atlantic Ocean

AREAL OVERVIEW

0 1 2 Miles

Former Rocket Target

MRA Boundary

Proposed Former Machine Gun and Katama Rocket Range MRS

Proposed Remaining Ocean MRS

South Beach FUDS Boundary

South Beach Investigation Area

US Army Corps of Engineers

FIGURE 2-2

Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS, Martha's Vineyard, MA

0 200 400 800 1,200 Meters

0 750 1,500 3,000 4,500 Feet

UXB amec

NOTES:
2009 Aerial Data Source: MassGIS

4/13/2015	Rev:	SBeach_Revised_MRS_FS.mxd	
Drawn: JBO	Chk: DMS	PROJ: 562910000	

Military practice ordnance used at the MRA included:

- 2.25 to 5 in. sub-caliber aircraft rockets with 5 in. rocket warheads
- 1 to 3.5 in. rocket warheads
- 3 to 3.25 in. rockets with warheads, and
- 3 to 3.25 in. rockets with 5 in. warheads.

Records do not indicate that the property was ever used to store, transport, treat, or dispose of associated munitions used on the property. In 2008 and 2009, two 100 lb bombs of an unknown source, were reported at Wasque Point, however, there is no supporting evidence that they were associated with historical operations at South Beach.

2.2.1 Previous Investigations

Investigations conducted at the South Beach MRA prior to the 2011 RI include:

- Ordnance and Explosive Waste Remediation Project, USACE (1988);
- Unexploded Ordnance (UXO) Removal, Department of the Army [Explosive Ordnance Disposal (EOD)] (1989);
- Inventory Project Report (2008);
- Time Critical Removal Action (TCRA) (2009);
- Emergency Response, VRHabilis (VRH) (2008 to 2011); and
- Emergency Response, UXB (2012).

2.2.2 Unexploded Ordnance Removal

Between November 1988 and May 1989, a UXO removal action was conducted within the MRA, which concentrated in areas encompassing the beach and sand dunes. During the removal action, approximately 1,655 MD items were successfully recovered with approximately 99 of those items being warheads. As part of this removal action, the beach and sand dunes disturbed by intrusive activities were restored (Army, 1989).

2.2.3 Inventory Project Report

In 2008, the USACE prepared an Inventory Project Report (INPR). The report's Findings and Determination of Eligibility (FDE) established an area from South Beach to Wasque Point as a FUDS. A Military Munitions Response Program (MMRP) project was proposed and the INPR identified a MEC category hazard potential. A Munitions Response Site Prioritization Protocol (MRSPP) priority ranking was deferred and was to be scored based on the finding of the proposed TCRA (USACE, 2008c).

2.2.4 Time Critical Removal Action

Between 18 April and 25 September 2009, a TCRA was conducted within the MRA to remove MEC, Material Potentially Presenting an Explosive Hazard (MPPEH), and explosive hazards at the site (USACE, 2010).

The removal action was conducted on approximately 22 acres within the MRA, which were subdivided into grids. Within each grid, 5-ft sweep lanes were established for conducting the magnetometer-assisted surface/subsurface/underwater clearance operations using a Schonstedt GA-52Cx magnetometer. Anomalies identified by the magnetometer were investigated and removed using hand tools and mechanical equipment.

During clearance operations, 617 MD items and 933 pounds of non-munitions related debris were removed. These items included 2.25 to 3.5 in. rocket motors, a 3 in. rocket motor with a 5 in. warhead, a 3.5 in. rocket motor with a 5 in. warhead, and 3.5 to 5 in. warheads. In addition to clearance operations, five demolition events were performed at South Beach in which 42 items were perforated and found to be inert (USACE, 2010).

2.2.5 Emergency Response

Between May 2008 and August 2011, VRH responded to four emergency calls associated with potential ordnance. EOD responded to two emergency calls associated with two 100 lb bombs. The EOD incident reports from May 2008 and February 2009 state that a 100 pound bomb suspected of containing high explosives was detonated. The details of emergency response calls are presented in Table 2-1.

Table 2-1. Emergency Responses
Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1

Date	Location	Quantity	Ordnance Description	Response Action
05-2008[(1)]	Wasque Point	1	100-pound bomb (suspected of containing HE)	Massachusetts Bomb Squad detonated the bomb. Based upon the detonation, the bomb was suspected of being live ordnance.
26-08-2008[(2)]	South Beach	8	• 41.5-in. x 3.125-in. rocket motor • 38.5-in. x 3.125-in. rocket motor • 25.5-in. x 2.75-in. rocket motor • 24.5-in. x 2.75-in. rocket motor • 22.5-in. x 2.75-in. rocket motor • 24.75-in. x 2.75-in. rocket motor • 26-in. x 2.75-in. rocket motor • 6-in. x 2.75-in. rocket motor	n/a
13-02-2009[(2)]	Wasque Point	1	100-pound bomb	VRH identified item as ordnance and secured the immediate area. The Massachusetts Bomb Squad and Navy EOD were notified. Navy EOD detonated the bomb and determined that the bomb likely contained incendiary compounds when observing the resulting explosion.

Date	Location	Quantity	Ordnance Description	Response Action
1-08-2011[2]	Norton Point	1	2.25-in. rocket motor	VRH personnel determined the item to be free of hazardous/ energetic material and was removed to a secure container.
2-17-12[3]	South Beach	1	5-in. MK6 practice warhead	UXB personnel determined that the item was safe to move for detonation. The warhead was moved to South Beach at the entrance to Norton Point and detonated. The item was determined to be a MD item.

Notes: [1] Information obtained in the Amended Findings and Determination of Eligibility, South Beach at Martha's Vineyard, (Moving Target Machine Gun Range) (USACE, 2008c).
[2] Information obtained from VHR Emergency Response Reports (VHR, 2008; 2009; and 2011).
[3] Information obtained from UXB Daily Report (UXB, 2012).

EOD - explosive ordnance disposal **in.** - inch(es) **MD** - munitions debris **VRH** - VRHabilis, LLC

2.2.6 Remedial Investigation/Feasibility Study

An RI/FS, conducted in accordance with the NCP [40 CFR 300.430(d) and (e)], was initiated in 2009 and concluded in 2015. The RI field work was conducted to characterize the nature and extent of MEC and MC of the South Beach MRA. The sources of data evaluated as part of the RI to characterize contamination at this MRA included historical information and archival searches, results of the RI field effort, site layouts based on historical maps and photos, and the visual inspection of the terrain and structures. The data collected during the field investigation and the conclusions drawn in the *Remedial Investigation Report, Former Moving Target Machine Gun Range at South Beach Area of Investigation*, regarding hazards to human health and the environment were used to develop the FS, which was finalized in June 2015.

The RI was conducted on upland, shoreline and offshore areas to collect data necessary to determine the nature and extent of potential MEC, MD, and MC resulting from historical military activities conducted within the Former South Beach Moving Target Machine Gun and Katama Range. To achieve the RI goals, various field investigative activities were conducted including: geophysical mapping, intrusive investigations, and environmental sampling for analysis for MCs consisting of explosives compounds and metals.

Key findings of the RI included:

- At the Former Moving Target Machine Gun Range:
    - Identification of 97 MD items and 98 non-munitions related debris items
    - A 300m firing line was confirmed through visual inspection of a concrete pad with stanchions for mounting machine guns.
    - The 150m firing line, and suspected firing line and impact berm were not able to be confirmed through visual inspection, as the areas are currently residential and have been completely reworked by construction of homes and landscaping activities.

- MEC was not identified during the RI
- At the Former Katama Rocket Range:
    - While the former target areas are currently underwater, the limits of the rocket training range and the distribution of munitions debris were confirmed through geophysics and intrusive investigation.
    - MEC was not identified during the RI at the former Katama Rocket Range. MD has been identified in ocean, land, and beach areas.
    - A transport study conducted in the vicinity of the historic rocket targets demonstrated that ferrous items are moving into these two grid areas, with a measurable change after storm events.
    - Due to significant beach erosion and deeper water depths in the surf zone, ferrous items including rocks with ferrous signatures previously buried below sensor detection depth may have become detectable/exposed and migrated into the previously cleared grids; all items were within 400 feet of the water's edge as measured from the mean low-water mark.
    - The distribution of MD concentrations is further east of the former target areas indicating a strong prevailing easterly ocean current; this is further confirmed by the acoustic pinger which broke free from one of the seed items in the transport study and washed ashore approximately one mile east of where it was emplaced.
    - MEC was not identified during the RI at the Former Katama Rocket Range.
- Two 100 pound bombs were reported on two separate occasions (one in 2008 and one in 2009) at Wasque point, approximately 2.1 miles from where the majority of MD was identified. No additional MEC or MD was identified during the RI at Wasque Point. There is no supporting evidence through historical research or the RI that these bombs were part of historical military operations conducted at South Beach and are considered isolated finds unrelated to the site.
- MC sampling indicated that human health screening criterion were not exceeded in soil or groundwater.
- No high explosive compounds or their by-products were detected in soil; therefore, none of these compounds pose a potential risk to ecological receptors resources at this site.
- A HHRA was performed during the RI. None of the key metals (antimony, copper, lead, nickel, and zinc) were detected in soil at levels that exceed MADEP-specified background concentrations; therefore, all are consistent with a condition of No Significant Risk based on CERCLA and the MCP Method I Standards.
- A SLERA for MCs was performed during the RI. Although concentrations of lead in surface soil exceeded the USEPA Eco-SSL for that metal, its potential for risk was found

to be negligible based on the 95% UCL concentration for the 2 to 12 inch soil depth interval and a refinement of the ecological soil screening level based on less conservative exposure assumptions for the 0 to 2 inch depth interval. Therefore, it can be concluded that none of the MCs evaluated at the MRA pose a potential for risk to ecological receptors.

Based upon the RI results, the following recommendations were proposed.

- Revise the current MRA Boundary to include the extent of munitions determined through previous investigation geophysical and intrusive investigation data.
- The South Beach MRA should be subdivided into two MRSs, comprising the Former Machine Gun and Katama Rocket Range MRS 1 (Project 00) (695 acres) and the Remaining Ocean Area MRS 2 (Project 01) (3,736 acres).

At the completion of the RI, a FS was recommended to evaluate future response action alternatives with regard to potential MEC hazards at the South Beach MRA. An FS is warranted due to the significant density of MD discovered and estimated to remain within the Former Machine Gun and Katama Rocket Range MRS 1 boundary, coupled with likely public exposure to the practice rockets, and the small potential of MEC on the site, as well as the need to employ UXO-certified technicians to make the determination whether a munition is inert or UXO. No further evaluation of MC is warranted. The FS presents a detailed analysis of remedial alternatives where the strengths and weaknesses of the remedial alternatives relative to one another were evaluated with respect to each of the NCP criteria. This approach to analyzing alternatives is designed to provide decision-makers with sufficient information to adequately compare the alternatives, select an appropriate remedy for the MRSs, and demonstrate satisfaction of meeting the CERCLA remedy selection requirements for this DD.

The results of the FS were presented in the *Final Feasibility Study, Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS,* and summarized in the *Final Proposed Plan, Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS*. As required by the NCP [40 CFR 300.800(a)], both technical documents are on file as part of the Administrative Record (AR). No CERCLA enforcement activities have been required at the site.

A No Further Action recommendation was made for the Remaining Ocean MRS 2 (FUDS Property No. D01MA0486, Project 01) and was not carried forward to an FS. There is no evidence or history of concentrated munitions use within the Remaining Ocean MRS 2.

2.3 Community Participation

Throughout the RI/FS process, community participation has been solicited in several ways, including a Public Involvement Plan, fact sheets, public notices, and public meetings.

A summary of the community participation process is provided in the Responsiveness Summary, which is included as a component of this DD (see Section 3). Pursuant to CERCLA Section

113(k)(2)(B) and Section 117, and Section 300.430(f)(2) and (3) of the NCP, the PP for the Former Moving Target Machine Gun and Katama Rocket Range MRS 1, and the Remaining Ocean MRS 2 was released for public comment on 15 June 2015. The PP and the RI/FS reports are in the Information Repository, located in the Edgartown Public Library, 216 58 North Water Street, P.O. Box 5249, Edgartown, MA 02539; 508-627-4221.

The public comment period was 15 June to 17 July 2015. Comments were received by USACE during this time. A public meeting was held on 24 June 2015 at the Whaling Church, Edgartown, MA, to present the PP, to answer questions, and to solicit comments from the public. Representatives from USACE and its' contractor; and MADEP attended the meeting. The notification for the PP meeting and public comment period was published in the following:

- Cape Cod Times

  South Beach Public Notice - Sunday, 14 June 2015

- Martha's Vineyard Times

  South Beach Public Notice - Thursday, 18 June 2015

- Vineyard Gazette

  South Beach Public Notice - Friday, 19 June 2015

2.4 Scope and Role of Response Action

This DD authorizes the Selected Remedy to address munitions contamination at the Former Moving Target Machine Gun and Katama Rocket Range MRS 1. The Selected Alternative consists of LUCs. The purpose of the remedial action is to reduce the hazard associated with munitions to human health and the environment based on the current and intended future land use of public access for recreational and commercial activities.

2.5 Project MRS Characteristics

The following information is presented to document the site characteristics of the Former Moving Target Machine Gun and Katama Rocket Range MRS 1. Detailed information about the MRS characteristics, the site conceptual model, and the nature and extent of contamination is presented in the *Final Remedial Investigation Report, Former Moving Target Machine Gun Range at South Beach Area of Investigation*.

2.5.1 Environmental Setting

2.5.1.1 Climate

Martha's Vineyard has a temperate marine climate. Although Martha's Vineyard's weather is typically moderate, there are occasions where the island experiences extreme weather conditions such as blizzards and hurricanes. Martha's Vineyard generally experiences a delayed spring season, being surrounded by an ocean that is still cold from the winter; however, it is also known

for an exceptionally mild fall season, due to the ocean remaining warm from the summer. The highest temperature ever recorded on Martha's Vineyard was 99 degrees Fahrenheit in 1948, and the lowest temperature ever recorded was -9 degrees Fahrenheit in 1961.

Precipitation on Martha's Vineyard and the Islands of Cape Cod and Nantucket is the lowest in the New England region, averaging slightly less than 40 inches per year. This is due to storm systems that move across western areas, build up in mountainous regions, and dissipate before reaching the coast.

2.5.1.2 Topography

The inland portion of the site is relatively flat at South Beach and slowly rises to the east toward the bluff at Wasque Point. Elevations within the MRS range from 0 ft above mean sea level (msl) along the shore to approximately 32 ft above msl at Wasque Point. Due to the dynamic nature of the beach portion of the site, the landscape of the beach is continuously changing.

2.5.1.3 Soil Conditions

Soils underlying the MRA consist of beach areas and Udipsamments soils, which are found near the coast. Both soils consist of deep sand of various textures that have rapid to very rapid permeability. Due to the continuous washing and rewashing by waves, beach areas typically do not have plant cover. Most areas of Udipsamments will have a cover of grasses and shrubs. The beaches nearest the ocean are inundated twice daily by tides. The entire beach is generally flooded by spring tides and storm tides (United States Department of Agriculture – Soil Conservation Service [USDA-SCS], 1986).

Carver loamy coarse sand and Katama sandy loam soils are located on the remaining portion of the site. These soils are very deep and range from well to excessively drained. These soils typically consist of sandy loam and loamy coarse sand over coarse sand. The permeability of these soils ranges from moderately rapid to very rapid. Depth to seasonal high water table is greater than 6 ft below ground surface (bgs) in both soils (USDA-SCS, 1986).

2.5.1.4 Geology

The MRSs and the Island of Martha's Vineyard are relics of the last ice age and the warming trends that followed. Repeated glaciations scraped soil and rock from the mainland of New England. Eighteen-thousand years ago, the glaciers reached their southernmost extent and began to melt and retreat, depositing the rock and other material once trapped within the ice, as terminal moraines. These terminal moraines can be found on Martha's Vineyard.

The geological deposits that make up the site consist of recent beach and marsh sediments, glacial deposits, interglacial deposits, and glacially deformed ancient coastal plain sediments. The county consists mostly of deposits from the last glacial stage, but in places consists of glacial or interglacial deposits as much as 300,000 years old. These deposits overlie solid bedrock and range from

approximately 500 ft thick on the north shore of Martha's Vineyard to 900 ft thick on the south shore. The bedrock consists of metamorphic rocks, such as schist and gneiss, and igneous rocks.

2.5.1.5 Surface Water Hydrology

Soils in the upland areas and on the beaches are excessively drained and have very high permeability (USDA-SCS, 1986). Therefore, there is very little to no surface water runoff in these areas.

Mattakeset Herring Creek flows through the south-central portion of the site between two former firing lines and the former moving target track (Figure 2-2). This stream flows from Crackatuxet Cove southeast into Mattakeset Bay. A visual survey of the "creek" identified the drainage as a concrete culvert that is ephemeral in nature that was not sampled during the RI.

2.5.1.6 Groundwater Hydrology

The principal aquifers on Martha's Vineyard are moraines and outwash deposits, which derive their water from local precipitation. Bedrock is much less permeable than the overlying sediments, commonly contains seawater, and is not considered to be part of the aquifers of Martha's Vineyard (USACE, 2009).

The water table at South Beach generally mimics topography and is weakly influenced by tidal fluctuations. Groundwater quality studies indicate that salt-water intrusion occurs along the coastline and to a lesser degree throughout the interior of the island. Depth to groundwater ranges from greater than 6 ft bgs in upland soils to near ground surface in lower areas near shorelines and marshes (USACE, 2009). The shallow freshwater aquifer is underlain by brackish water that is unsuitable for human consumption (USACE, 2008). In general, supplies of water for homes, cooling, and small businesses can be developed in most areas of outwash from wells that are 1.5 to 2 in. in diameter with 3 feet of screen set about 10 feet below the water table.

2.5.1.7 Sensitive Species, Environments, and Environmental Resources

Former Moving Target Machine Gun and Katama Rocket Range MRS 1 include three habitat types: 1) upland habitat; 2) beach; and 3) ocean. These areas provide habitat to a variety of terrestrial plants, invertebrates, and wildlife as well as marine organisms. The MRA has been designated as a Priority Habitat of Rare Species and Estimated Habitats of Rare Wildlife in the Massachusetts Natural Heritage Atlas 13th Edition (effective October 1, 2008). Habitat alteration within areas mapped as Priority Habitats (PH) may result in a take of a state-listed species, and is subject to regulatory review by the Natural Heritage & Endangered Species Program. Priority habitat maps are based on known occurrence of rare species and habitat considerations. The MRA is mapped as PH 15. Based upon coordination with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and Massachusetts Natural Heritage and Endangered Species Program; there are approximately 37 federal/state threatened, endangered, and/or special concern species

that have been observed on Martha's Vineyard (Table 2-2). Table 2-2 is specific to Martha's Vineyard. Table 2-3 summarizes the observed species found within the MRA. These include piping plover, (*Charadrius melodus*), a federally threatened species which utilizes beach and nearby upland habitat, and the federally endangered roseate tern, (*Sterna dougallii*), and four federally listed sea turtle species which utilize near shore ocean habitat. Sea turtles occur seasonally off the coast of Martha's Vineyard from June through early November. While they may occur near shore off South Beach, they are likely to occur in the offshore MRS only briefly as transients. State listed species include many insect and plant species which may utilize upland coastal sand plain or beach habitat. During the RI, the project entomologist determined no known colonies of northeastern tiger beetle exist at this MRS.

Table 2-2. Endangered, Threatened, and Special Concern Species
South Beach Munitions Response Area

Common Name	Scientific Name	State Status	Federal Status
Birds			
Common Tern	*Sterna hirundo*	Special Concern	--
Roseate Tern	*Sterna dougallii*	Endangered	Endangered
Least Tern	*Sterna antillarum*	Special Concern	--
Northern Harrier	*Circus syneus*	Threatened	--
Piping Plover	*Charadrius melodus*	Threatened	Threatened
Reptiles			
Green Sea Turtle	*Chelonia mydas*	Threatened	Threatened
Leatherback Sea Turtle	*Dermochelys coriacea*	Endangered	Endangered
Loggerhead Sea Turtle	*Caretta caretta*	Threatened	Threatened
Kemp's ridley Sea Turtle	*Lepidochelys kempi*	Endangered	Endangered
Insects			
Chain dot Geometer	*Cingulia cateraria*	Special Concern	--
Coastal Heathland Cutworm	*Abagrotis nefascia*	Special Concern	--
Gerhard's Underwing Moth	*Catocala Herodias gerhardi*	Special Concern	--
Faded Grey Geometer	*Stenoporpia Polygrammaaria*	Threatened	--
Pine Barrens Zale	*Zale sp 1 nr. lunifera*	Special Concern	--
Pink Sallow Moth	*Psectraglea carnosa*	Special Concern	--
Sandplain Euchaena	*Euchlaena madusaria*	Special Concern	--
Barrens Buckmoth	*Hemileuca maia*	Special Concern	--
Melsheimer's Sack Bearer	*Cicinus Melsheimeri*	Threatened	--
Pine Barrens Lycia	*Lycia ypsilon*	Threatened	--
Coastal Swamp Metarranthis	*Metarranthis pilosaria*	Special Concern	--
Slender Clearwig Sphinx Moth	*Henaris pilosaria*	Special Concern	--
Spartina Borer Moth	*Spartiniphagia inops*	Special Concern	--
Imperial Moth	*Eacles imperialis*	Threatened	--
Barrens Metarranthis Moth	*Metarranthis apiciaria*	Endangered	--
Comet Darner	*Anax longippes*	Special Concern	--
Purple Tiger Beetle	*Cicindela purpurea*	Endangered	--
Northeastern Tiger Beetle	*Cicindela dorsalis*	Endangered	Threatened
Three-Lined Angle Moth	*Digrammia eremiata*	Threatened	--
Plants			
Sandplain gerardia	*Agalinus acuta*	Endangered	Endangered
Bristly Foxtail	*Setaria parviflora*	Special Concern	--
Bushy Rockrose	*Crocanthemum dumosum*	Special Concern	--
Purple Needlegrass	*Aristida purpurascens*	Threatened	--
Sandplain Flax	*Linum intercursum*	Special Concern	--
Saltpond Pennywort	*Hydrocotyle verticellata*	Threatened	--
Pygmyweed	*Tillacea aquatica*	Threatened	--
Sandplain Blue-eyed grass	*Sisinchium fuseatum*	Special Concern	--
Nantucket Shadbush	*Amelanchier nantuckensis*	Special Concern	--
Sea-Breach Knotweed	*Polygonum glaucum*	Special Concern	--

Note:
This list was obtained from the RI Work Plan.
-- Status not listed

Table 2-3. Observed Species within South Beach MRA

Species	Federal Threatened and Endangered Species?	Massachusetts Threatened and Endangered Species?	Found Within FUDS MRS?	Found On Martha's Vineyard?	Comment	Reference
Piping plover (*Charadrius melodus*)	Yes	Yes	Yes	Yes	5 pairs of piping plovers nested at Norton Point Beach in Edgartown, 2010 TTOR data observed Piping Plovers at Norton Point	Final TCRA After Action Report (March 2010)
Common Tern (*Sterna hirundo*)	No	Yes	Yes	Yes	2010 nesting data provided by TTOR - Least and Common Tern nesting was recorded at Norton Point Beach	Chapter 7.0 Environmental Protection Plan, Final RI Work Plan (November 2010)
Least Tern (Sterna antillarum)	No	Yes	Yes	Yes		

2.5.2 Nature and Extent of Munitions and Explosives of Concern

During the RI, 98 MD items and 97 cultural debris items were recovered. Recovered items included intact and remnants of practice rockets. Within beach and land portions of the MRA, MD was found between 6 inches and 2 feet below ground surface (bgs). In the ocean portions of the MRA, all MD recovered was discovered within the subsurface up to 4 ft below the ocean floor.

The total count of munitions debris items (practice rockets) recovered during the RI and the 2 TCRAs conducted at the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 equals 2,370 items.

2.6 Current and Potential Future Land Use

Currently, the MRA is owned by Dukes County, Massachusetts Department of Conservation and Recreation (MADCR), private landowners, The Trustees of Reservations (TTOR), and the Commonwealth of Massachusetts (some beach property as well as inland and coastal waters). Figure 2-6 illustrates which property tracks are owned by public entities and which tracts are privately owned within the MRA. South Beach is managed by the Edgartown Parks and Recreation Department from May through Labor Day of each year. The former range encompasses an area that is currently a popular public beach used for recreational purposes such as hiking, canoeing, kayaking, recreational fishing, clamming, crabbing, wildlife observation, photography, education, and other water-related activities. Land use is not expected to change in the future; however, it is possible that additional upland and beach habitat may be lost due to erosion (UXB, 2011).

2.7 Summary of Project MRS Hazards

The results of the RI were used to evaluate potential hazards associated with MC and MEC. Based on the risk assessments completed in the RI, MCs, including metals and explosive compounds, were not detected at concentrations that pose an unacceptable risk to human health or the environment. Although the potential exists for an explosive hazard at the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1, no UXO or Demilitarized Military Munitions (DMM) were identified during the RI field activities. Since no MEC was found at the MRS, a MEC HA score was not able to be determined for the MRS (UXB, 2014).

2.8 Remedial Action Objectives

The RAO established for the Former Moving Target Machine Gun and Katama Rocket Range MRS 1 is to reduce the probability of the public from handling munitions encountered during residential, construction/maintenance, and recreational activities performed:

- at ground surface on land and beach,
- in soil down to 4 feet below ground surface, and
- in the area of breaking waves, or the ocean surf zone.

The RAOs provide protection to human health and the environment by removing potential exposure to an explosive hazard. The RAOs were developed to address hazards under current and potential future land use which is not anticipated to change.

2.9 Description of Alternatives

CERCLA, Section 121, requires that each selected remedial alternative be: 1) protective of human health and the environment; 2) cost-effective; 3) comply with all applicable or relevant and appropriate federal and state requirements; and 4) use permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment (i.e., removal and disposal) as a principal element for the reduction of the hazard. The four remedial alternatives evaluated for the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 included the following:

- Alternative 1 – No Action: A "no action" alternative is required by the NCP to be developed during a FS to provide a baseline for comparison against other contemplated alternatives. In Alternative 1, the government would take no action with regard to locating, removing, and disposing of any potential MEC present within the MRS.

- Alternative 2 – LUCs: The alternative involves the implementation of a LUCs based on public awareness and education components to provide a means to reduce MEC encounters by workers and recreational users and visitors (i.e., unqualified personnel) through behavior modification.

- Alternative 3 – Land and Beach Area Only Subsurface Clearance with LUCs (309 acres): Alternative 3 included removal of subsurface munitions to 3 feet below ground surface in the beach and land areas including the dunes. LUCs would be implemented on the remaining land and ocean areas.
- Alternative 4 – Complete Subsurface Clearance Land and Water (695 acres). Alternative 4 included clearing the entire MRS of subsurface munitions to 4 feet below ground surface, on land and beach and in the area of breaking waves, or the ocean surf zone.

In accordance with DoDM 4715.20 (DoD, 2012), a minimum of three alternatives for each MRS are required. One alternative must consider a no action alternative. A second alternative must consider an action to remediate the site to a protective condition that requires LUCs. A third alternative must consider an action to remediate the site to a condition of UU/UE.

For the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1, Alternative 1 meets the requirement for a no action alternative. Alternatives 2 and 3 meet the requirement for an alternative with LUCs, and Alternative 4 meets the requirement for an alternative which will achieve UU/UE.

Detailed documentation describing the development of each of the four alternatives with the results of the detailed and comparative analyses conducted as part of the FS are available for review in the Administrative Record in the *Final Feasibility Study, Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS*. In the FS, the alternatives were evaluated and compared in relation to the nine NCP criteria prescribed for remedy selection in accordance with CERCLA. The alternatives are summarized below:

Alternative 1 – No Action

CERCLA requires that a "no action" alternative be evaluated for the purpose of comparison to the other proposed alternatives. This alternative means no action would be taken to locate, remove, and dispose of MEC. In addition, no public awareness or education training would be initiated with regard to the hazards of munitions. For the No Action alternative, it is assumed that no change to the current land use of the MRS would occur. There would be no applicable or relevant and appropriate requirements (ARARs) associated with this alternative. **Cost - $0**

Alternative 2 – Land Use Controls

Alternative 2 would consist of various LUC components to manage risk to people through proper education, signage and other means should they encounter MD remaining at this MRS. This alternative includes:

- Development and distribution of informational materials to provide awareness to property owners and authorities of the presence of munitions, and guidance on how to respond to

encountered munitions. (i.e. the DoD policy referred as "the 3Rs" - Recognize, Retreat and Report).

- Installation/ maintenance of signage at strategic access points in the MRS to alert the general public and other users of the MRS history and nature of munitions present, in addition to public safety information (i.e., 3Rs).
- An ongoing educational program providing periodic training on-island for the local community to provide awareness on the munitions characterized at the MRS, and the 3Rs. Attendance would be open to the public.

Although legal mechanisms of control cannot be imposed by the federal government on the privately-owned parcels included within the MRS boundary, the implementation of a LUC alternative based on public awareness and education components would provide a means for USACE to coordinate an effort to reduce munitions handling by private residents, TTOR personnel, contractor/maintenance personnel, and recreational users/visitors (i.e., unqualified/untrained personnel). Alternative 2 would achieve the RAO to protect recreational users, visitors, and workers at the MRS from explosive hazards associated with MEC exposure in the top 4 feet of subsurface soil during intrusive activities through exposure controls as long as the LUCs remain in place. The LUC components can be readily implemented as there are no associated technical difficulties, and the materials and services needed to implement this alternative are available. There are no ARARs associated with Alternative 2 and since this alternative reduces the exposure to MEC rather than the amount of MEC, it is contingent upon the cooperation and active participation of the local government with the existing property owners (TTOR, Dukes County, the Massachusetts Department of Conservation and Recreation,) and the Town of Edgartown), local responders, and the public using the MRS. Approximately 6 months would be required to establish LUCs associated with Alternative 2. Since this remedial alternative would not allow for unlimited use and unrestricted exposure, a Five-Year Review is required by the NCP (40 CFR 300.430(f)(4)(ii)). Five-Year Reviews would continue until any contaminants remaining on-site are at levels at or below those allowing for unlimited use and unrestricted exposure. **Alternative 2 Costs = $369,000 (Alternative) + $42,000 x 6 (Five-Year Reviews) = $622,000.**

Alternative 3 – Land and Beach Area Only Subsurface Clearance with LUCs (309 acres)

Alternative 3 includes removal of subsurface munitions to approximately 4 feet below ground surface on the land and beach areas within the MRS (309 acres). LUCs would also be implemented as described in Alternative 2. The RAO would be achieved to a high degree of certainty and would allow recreation activities that could involve intrusive activities to occur. The RAO would also be achieved through exposure control utilizing LUCs.

MD remains at the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1, and it is statistically possible for MEC to remain in the MRS. Based on the historical

reports of munitions-related discoveries within the MRS and quantity of munitions estimated to remain, property owners and MRS users will likely continue to encounter munitions in the future which should be handled by qualified/trained personnel and managed appropriately.

Detection of MEC would be performed using digital detection instrumentation, proven to work effectively at the site during the RI. Once identified, intrusive activities would be performed using both mechanized equipment and hand-tools and restoration of disturbed areas would be required. Mechanized equipment would be used to remove the dunes in the vicinity of the rocket targets and in areas of high anomaly densities. All munitions would require inspection prior to removal to determine if they present an explosive hazard or if they are safe to move. If potentially explosive, the munitions would be detonated in place using EOD standard operating procedures to minimize risks to workers. Items identified as safe would be removed and taken off-site for recycling. After completion of the subsurface clearance, the site would be re-vegetated with native grasses and post-construction monitoring of re-vegetated areas would occur until vegetation has been successfully restored.

Since sensitive species are known to exist within the MRS, the USACE would coordinate with MA National Heritage and Endangered Species Program (NHESP), United States Fish and Wildlife Service, and TTOR;. A rare plant and wildlife habitat evaluation would be conducted during development of the work plan. A botanical and wildlife survey and habitat evaluation would be conducted prior to fieldwork. The fieldwork would be scheduled to avoid sensitive species as much as possible. Work would also be coordinated with the Massachusetts Historical Commission and the Wampanoag Tribal Historic Preservation Office. Twenty two ARARs were identified for the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 Alternative 3. Alternative 3 would comply with all ARARs and procedures for ensuring compliance would be developed in the Remedial Action Work Plan.

This alternative would also include LUC components and would require Five-Year Reviews (however the Five-Year Reviews are not considered part of the Alternative). It is estimated that partial clearance under Alternative 3 would require approximately 12 months of fieldwork to implement. Approximately 6 months would be required to establish LUCs associated with Alternative 3. **Alternative 3 Costs - $8,634,000 (Alternative) + $42,000 x 6 (Five-Year Reviews) = $8,886,000.**

Alternative 4 – Complete Subsurface Clearance Land and Water (695 acres) Alternative 4 includes all the activities in Alternative 3 (subsurface remediation of MEC on the land and beach) and adds MEC detection and removal in the surf zone waters (386 acres) of the MRS.

MD remains at the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 and it is statistically possible for MEC to remain in the MRS. Based on the historical reports of munitions-related discoveries within the MRS and quantity of munitions estimated to

remain, property owners and MRS users will likely continue to encounter munitions in the future, which should be handled by qualified/trained personnel and managed appropriately.

As with Alternative 3, detection of MEC would be performed using digital detection instrumentation and intrusive activities would be performed using both mechanized equipment and hand-tools. Restoration of disturbed areas would be required. Mechanized equipment would be used to remove the dunes in the vicinity of the rocket targets and in areas of high anomaly densities. Intrusive activities are anticipated to occur within the top 4 feet of soil. However, if anomalies are detected below 4 feet, they would be removed. All munitions would require inspection prior to removal to determine if they present an explosive hazard or if they are safe to move. If potentially explosive, the munitions would be detonated in place using EOD standard operating procedures to minimize risks to workers. Items identified as safe would be removed and taken off-site for recycling. After completion of the subsurface clearance, the site would be re-vegetated with native grasses and post-construction monitoring of re-vegetated areas would occur for 3 years.

Due to the dynamic nature of the ocean surf zone, a "Mag and Dig" technique would be used for clearance activities in the ocean surf zone. Mag and Dig means divers would identify anomalies on transects using underwater hand-held analog instruments and excavate each anomaly as it is found. Rocket motor bodies can be reliably detected to 4 ft bgs, however, if anomalies are detected below a dug anomaly, they will be investigated, removed, and properly disposed of. The RAO would be achieved to a high degree of certainty.

Coordination with MA Division of Marine Fisheries, the National Oceanic and Atmospheric Administration (NOAA), US Fish and Wildlife Service, MA NHESP, and TTOR would be required due to the sensitive species known to exist within the MRS. A rare plant and wildlife habitat evaluation would also be conducted during development of the work plan in accordance with MA NHESP guidelines. Work would be coordinated with the Massachusetts Historical Commission and the Wampanoag Tribal Historic Preservation.

Twenty five ARARs were identified for the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 Alternative 4. Alternative 4 would comply with all ARARs and procedures for ensuring compliance would be developed in the Remedial Action Work Plan.

It is estimated that Alternative 4 would require approximately 24 months of fieldwork to implement (with shut downs in winter months). After all clearance operations are complete, a review of the site would be made (similar to a CERCLA Five Year Review) that will ensure the effectiveness of the remedial actions for unlimited use and unrestricted exposure. **Alternative 4 Costs - $16,006,000 (Alternative) + $42,000 x 1 (Review) = $16,048,000**

2.10 Comparative Analysis of Alternatives

Nine CERCLA/NCP criteria are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy [40 CFR 300.430(e)(9)]. The criteria

were developed to address the CERCLA requirements and considerations, and to address the additional technical and policy considerations that are important in selecting remedial alternatives. The evaluation criteria with the associated statutory considerations are described below.

Threshold Criteria:

1. **Overall protectiveness of human health and the environment –** Determines whether an alternative achieves the RAO by eliminating, reducing, or controlling threats to public health and the environment through LUCs, engineering controls, or treatment. An emphasis is placed on effectiveness in terms of worker safety issues during remedial actions and post-remedial actions for local residents and workers based on future land use.
2. **Compliance with ARARs –** Evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified. ARARs do not apply to Alternatives 1 and 2. The ARARs identified for Alternatives 3 and 4 are summarized in Table 2-4.

Table 2-4. ARARs Identified for Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 Alternatives 3 and 4

ARAR	Alternative 1 – No Action	Alternative 2 – LUCs	Alternative 3 – Land Area Only Subsurface Clearance with LUCs (309 Acres)	Alternative 4 –Complete Subsurface Clearance Land and Water (695 Acres)
16 U.S.C. §1538(a)(1)	x	x	✓	✓
40 CFR 264.601	x	x	✓	✓
321 CMR 10.04(1)	x	x	✓	✓
321 CMR 10.23(1)	x	x	✓	✓
321 CMR 10.23(2)	x	x	✓	✓
321 CMR 10.23(3)	x	x	✓	✓
321 CMR 10.23 (6) (b) (1)	x	x	✓	✓
321 CMR 10.23(6) (b) (2)	x	x	✓	✓
321 CMR 10.23(7) (a)	x	x	✓	✓
321 CMR 10.23(7) (b)	x	x	✓	✓
310 CMR 9.40 (2)(b) (1st sentence	x	x	✓	✓
310 CMR 9.40 (3)(b) (1st sentence)	x	x	✓	✓
310 CMR 10.25 (5) Land under the Ocean	x	x	x	✓
310 CMR 10.25 (6) Land under the Ocean	x	x	x	✓
310 CMR 10.25 (7) Land under the Ocean	x	x	x	✓
310 CMR 10.27 (3) Coastal Beaches	x	x	✓	✓
310 CMR 10.27 (6) Coastal Beaches	x	x	✓	✓
310 CMR 10.27 (7) Coastal Beaches	x	x	✓	✓
310 CMR 10.28 (3) Coastal Dunes	x	x	✓	✓
310 CMR 10.28 (6) Coastal Dunes	x	x	✓	✓
310 CMR 10.32 (3) Salt Marshes	x	x	✓	✓
310 CMR 10.32 (6) Salt Marshes	x	x	✓	✓
314 CMR 9.06 (2)(1st sentence)	x	x	✓	✓
314 CMR 9.07 (1)(a)(1st sentence)	x	x	✓	✓

Notes: × Not Identified as ARAR for Alternative ✓ Identified as ARAR for Alternative

Balancing Criteria:

3. **Long-term effectiveness and permanence –** Considers the ability of an alternative to maintain protection of human health and the environment over time. The evaluation of the long-term effectiveness and permanence of containment and controls takes into account the magnitude of residual hazards, the adequacy of the alternative in limiting the hazard, the need for long-term monitoring and management, the administrative feasibility of maintaining the LUCs and the potential hazard should they fail. The

evaluation also considers mechanisms such as the CERCLA Five Year Review process to assess on a periodic basis the long-term effectiveness and permanence, as well as the protectiveness of the alternative.

4. **Reduction of toxicity, mobility, or volume (TMV) of contaminants through treatment –** Considers an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present, in this case MEC.

5. **Short-term effectiveness –** Considers the length of time needed to implement an alternative and the hazards the alternative poses to workers, residents, and the environment during implementation. In addition, for munitions, safety considerations include an evaluation of what resources are available and how long it will take to mitigate munitions and achieve RAOs.

6. **Implementability –** Considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services, and the relative effort associated with implementation of the alternative.

7. **Cost –** Includes estimated capital costs. Cost estimates are expected to be accurate within a range of +50% to -30%.

Modifying Criteria:

8. **State acceptance –** Assesses the technical and administrative issues and concerns the state (MADEP) may have regarding each of the alternatives evaluated in this DD. State acceptance of the alternatives was evaluated during the States Review of the Draft Proposed Plan and the public comment period.

9. **Community acceptance –** Assesses the issues and concerns the public may have regarding each of the alternatives evaluated in this DD. Community acceptance of the alternatives was evaluated during the Proposed Plan public comment period.

2.10.1 Comparative Analysis of the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 Alternatives

1. **Overall Protectiveness of Human Health and the Environment –** Munitions items remain within the MRS and a small risk for encountering MEC exists. Based on the historical reports of munitions-related discoveries within the MRS and quantity of munitions estimated to remain, property owners and MRS users will likely continue to encounter munitions in the future, which should be handled by qualified/trained personnel and managed appropriately. Alternative 1 would not eliminate, reduce, or control the threat of human exposure to surface and subsurface munitions and potential for munitions to be handled by unqualified/untrained personnel and disposed of improperly. Alternative

2 would be protective but only controls exposure through LUCs. Alternative 3 provides protectiveness as munitions may be removed from beach and land areas; however, the RI characterization identified most MD items were in the ocean within 600 feet of the shoreline (east of the historic targets). Alternative 4 is protective of human health because subsurface munitions would be removed from the entirety of the MRS and destroyed. Risks to the environment associated with Alternative 4 are greatest, and would require extensive planning, management, monitoring of endangered and threatened species, and restoration.

2. **Compliance with ARARs –** There are no regulations or criteria associated with Alternative 1 or Alternative 2, and Alternatives 3 and 4 would be implemented and performed to comply with all ARARs. Alternative 3 would require less coordination and planning to avoid potential environmental impacts than Alternative 4 since there is no ocean subsurface clearance included in Alternative 3. Alternative 4 would be intrusive in nature and would require monitoring of impacts on marine environmental resources.

3. **Long-Term Effectiveness and Permanence –** Alternative 1 is not effective or permanent. Alternative 2 would be effective since it controls exposure through LUCs. However, it relies on exposure control rather than removal or treatment. Under Alternative 3, all munitions would be destroyed within the land and beach portions of the MRS, but would still require LUCs in the long-term. Alternative 4 would remove MEC hazards from within the entirety of the MRS and would be an effective and permanent remedial alternative over the long-term because it would eliminate risk regardless of the future use of the property.

4. **Reduction of TMV of Contaminants Through Treatment –** Alternatives 1 and 2 would not reduce the TMV of munitions within the MRS. Alternative 3 would be effective in the reduction of TMV through destruction of all munitions within the land and beach portions of the MRS. Alternative 4 would be effective in reducing the TMV of munitions because all detectable MEC throughout the entirety of the MRS would be removed and destroyed.

5. **Short-Term Effectiveness –** Because no construction activities are associated with either alternative, Alternatives 1 and 2 would not present significant additional risk to the public or workers at the MRS. Alternatives 3 and 4 would increase risk to the public and workers during clearance of munitions to varying degrees based on the implementation of exclusion zones for intrusive activities, and in cases where MPPEH or suspect MEC is encountered on site destruction would be required to render the item MDAS. Alternatives 1 and 2 would not cause damage to the environment because no clearing, grubbing, or excavation would be required. Alternatives 3 and 4 would cause some damage to the environment because of the excavation required to conduct beach subsurface clearance activities. The time

durations required to implement Alternative 2 is estimated at 6 months. Alternatives 3 and 4 would require 1 year and 2 years, respectively to complete the field work.

6. **Implementability –** Alternative 1 would be easily implemented. The LUCs recommended as Alternative 2 could also be readily implemented because these activities pose no technical difficulties and the materials and services needed are readily available. Alternatives 3 and 4 would require substantial earth-moving and site restoration and would be much more difficult to implement than Alternative 2. Alternative 4 would take longer to implement than Alternative 3 as it would be performed over a large area and would require intrusive ocean work. Alternative 4 would be slightly more difficult to implement because of the additional administrative work required as a result of the longer duration to implement the remedy compared to Alternative 3. Specific activities, including awareness training for workers and use of protection procedures/mitigation techniques would be required to preserve and restore environmental resources during any of the clearance alternatives.

7. **Cost—**The total cost to perform each alternative is as follows:

- Alternative 1 = $0
- Alternative 2 = $369,000 + $42,000 x 6 (Five-Year Reviews) = $622,000
- Alternative 3 = $8,634,000 + $42,000 x 6 (Five-Year Reviews) = $8,885,000
- Alternative 4 = $16,006,000 + $42,000 (One review) = $16,048,000

Note: Costs have been rounded to the nearest thousand dollars.

8. **State Acceptance**

MADEP concurs with the proposed remedy.

9. **Community Acceptance**

A Responsiveness Summary has been compiled and presented in Section 3 of this DD to document comments received from the public and considered by USACE with detailed responses for the record.

2.10.2 Comparative Analysis Summary

Table 2-5 presents the comparative summary of the detailed analysis of the alternatives for the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1. Alternative 2, LUCs is the Preferred Alternative because it most favorably meets all of the evaluated detailed analysis criteria as compared to Alternatives 1, 3, or 4. Alternative 2 can be readily implemented and would provide a high level of effectiveness over the long-term compared to its cost, whereas Alternatives 3 and 4 are more difficult to implement and would incur a much greater cost for only

a slightly higher level of effectiveness over the long term. The Preferred Alternative satisfies the following statutory requirements of CERCLA Subsection 121 (b): 1) be protective of human health and the environment; 2) comply with ARARs; and is 3) cost-effective;. Alternative 2 can be readily implemented to achieve the RAO and provide safe current and future use of the MRSs. The Preferred Alternative meets regulatory requirements and satisfies the statutory requirements under CERCLA §121(b).

Table 2-5. Comparative Summary of Detailed Analysis of Remedial Alternatives

Comparative Summary of the Detailed Analysis of Remedial Alternatives					
			Preferred		
Evaluation Criteria		**Alternative 1: No Action**	**Alternative 2: LUCs**	**Alternative 3: Partial Subsurface Clearance with LUCs**	**Alternative 4: Complete Subsurface Clearance Land and Water – 695 Acres**
Threshold	**1. Overall Protection of Human Health and Environment**	■	●	●	●
	2. Compliance with ARARs	●	●	●	●
Balancing	**3. Long-Term Effectiveness**	■	□	□	●
	4. Reduction of TMV through Treatment	■	■	□	●
	5. Short-Term Effectiveness	■	●	□	□
	6. Implementability	●	●	□	□
	7. Cost[1]	**$0**	**$622,000**	**$8,855,000**	**$16,048,000**
Modifying[2]	**8. State Acceptance**	■	●	■	■
	9. Community Acceptance	□	●	■	■

● Favorable (Pass for threshold criteria)
□ Moderately Favorable
■ Not Favorable (Fail for threshold criteria)

2.11 Principal MEC Issues

Principal MEC issues are materials that present significant potential explosive hazard to human health or the environment should exposure occur. Because MEC would present a significant hazard to human health, it is considered to be a principal MEC hazard. All of the alternatives, except Alternative 1, would address the principal MEC hazard. Alternative 2 would address the hazard by reducing the potential for exposure through increased public awareness rather than treatment. Alternative 3 would address the hazard by reducing the exposure through treatment (i.e., removal and disposal) in areas most accessed by the public, and by reducing the potential for exposure through increased public awareness for the remaining areas. Alternative 4 would address the potential hazard most effectively by removing and disposing of all detectable munitions.

2.12 Selected Remedy

Based on the requirements of CERCLA and the NCP, and on a detailed analysis of the remedial alternatives using the nine criteria (which includes public and state comments), USACE has selected Alternative 2. The selected remedy includes LUCs within the MRS (695 acres); and public education and notification. Alternative 2 meets the RAO of minimizing or eliminating the explosive hazard to the public, residents, workers, and contractors through public awareness.

2.12.1 Summary of the Rationale for the Selected Remedy

The Selected Remedy is believed to provide the best balance of trade-offs among the alternatives with respect to the CERCLA/NCP criteria. USACE believes that the Selected Remedy can be easily implemented based upon previous public awareness activities at the MRS and is most cost-effective relative to the other alternatives while still being protective of human health in the long-term. It also has minimal environmental impacts during implementation. USACE will implement and perform the selected Alternative to comply with all ARARs.

2.12.2 Detailed Description of the Selected Remedy

Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1

Risks related to encountering munitions may be managed for the MRS through a limited action alternative consisting of various LUCs. The implementation of a LUC alternative based on public awareness and education components at the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 would provide a means for USACE to coordinate an effort to reduce munition encounters by workers and recreational users and visitors (i.e., unqualified and untrained personnel) through behavior modification. Successful implementation of LUC would be contingent upon the cooperation and active participation of the workers and recreational users and visitors and authorities of the Army and other government agencies to protect the public from explosives hazards. Alternative 2 for the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 was developed using USACE guidance EP 1110-1-24 for

Establishing and Maintaining Institutional Controls for Ordnance and Explosive Projects (USACE, 2000) as a reference.

Three forms of public informational materials for education would be LUC components under Alternative 2.

1. Development and distribution of informational materials to periodically provide awareness to property owners and town authorities of the presence of munitions, and the DoD policy referred to as "the 3Rs" to be able to recognize, retreat and report any future munitions that is encountered while performing maintenance, improvement, or construction activities on their property.

2. For the general public accessing the MRS for recreational/visiting purposes, installation/maintenance of signage at strategic access points in the MRS would be used to alert users of the MRS history and nature of munitions present, in addition to public safety information (i.e., 3Rs).

3. An educational program is considered under Alternative 2 including providing periodic training on-island for the local community to provide awareness of the munitions characterized at the MRS, and the 3Rs policy that will be used for future discoveries at the MRS. The 3Rs will be displayed on signage posted in and around the MRS. Attendance to training will be open to the public.

The LUCs that would remain in-place to address residual hazards or risks must be managed in the long-term. LUC enforcement, review of site conditions, and maintenance activities for this alternative is a means of performing long-term management following achievement of response complete, and will be performed on an annual basis for 5 years. LUCs will be reevaluated after 5 years. LUC enforcement activities would include providing recurring awareness training materials and reproduction of informational materials. This alternative will require maintenance of signs and Five-Year Reviews.

Remaining Ocean MRS 2

There is no MEC or MC hazard present at the Remaining Ocean MRS 2, therefore, No Action is the selected remedy for the Remaining Ocean MRS 2.

2.12.3 Cost Estimate for the Selected Remedy

The total cost to perform Alternative 2 at the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 is $622,000. A detailed cost estimate for Alternative 2 was developed as part of the FS and has been adopted for this DD and provided as Table 2-6. The information in this cost estimate is based on the best available information regarding the anticipated scope of the remedy. Changes in the cost elements may occur as a result of new

information and data collected during the engineering design of the remedy. Major changes, if they occur, may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Differences, or a DD amendment.

2.12.4 Estimated Outcomes of Selected Remedy

Based on the information available at this time, the Selected Remedy for the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1, will be protective of human health and the environment, will comply with ARARs, and will be cost-effective. Upon implementation of the remedy, there will be no anticipated change in the use of the land or resources at the MRS. USACE is responsible for implementing, maintaining, and reporting on the remedial action. Although USACE may later transfer these procedural responsibilities to another party by contract or through other means, USACE shall retain ultimate responsibility for the remedy.

2.13 Statutory Determinations

Under CERCLA Section 121, the USACE must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the TMV of hazardous substances as their principal element. The following subsections discuss the remedy in light of the statutory requirements.

South Beach MRS
Alternative 2
Land Use Controls

CAPITAL COST:

Bid Item No.	Description	QTY	Unit	Team Production (Units/Day)	# Teams	Duration (Weeks)	Weekly Cost Per Team	Cost Per Acre	Total
0100	Work and Safety Plans, UFP-QAPP, TPP	0.00	LS	N/A	N/A	N/A	$ 97,169	N/A	$ -
0110	Explosive Safety Submission	0.00	LS	N/A	N/A	N/A	$ 23,515	N/A	$ -
0200	Mobilization - Per Person	0.00	Person	N/A	N/A	N/A	$ 1,756	N/A	$ -
0300	Site Management	0.00	Week	1.00	1	0.00	$ 49,906	N/A	$ -
0310	Survey/Positioning	0.00	AC	10.00	1	0.00	$ 15,389	$ -	$ -
0320	Brush Clearing	0.00	AC	12.00	1	0.00	$ 2,865	$ -	$ -
0330	Environmental Monitoring and Coordination (Habitat Survey)	0.00	AC	15.00	1	0.00	$ 39,621	$ -	$ -
0400	MEC Surface Removal	0.00	AC	3.00	2	0.00	$ 43,586	$ -	$ -
0410	MEC Sub-surface Removal, Analogue	0.00	AC	2.00	1	0.00	$ 45,168	$ -	$ -
0420	Digital Geophysical Mapping	0.00	AC	3.00	1	0.00	$ 21,389	$ -	$ -
0430	Digital Data Analysis	0.00	AC	3.00	1	0.00	$ 9,164	$ -	$ -
0440	Anomaly Reacquisition	0.00	AC	2.00	2	0.00	$ 15,389	$ -	$ -
0450	Anomaly Resolution	0.00	AC	2.00	2	0.00	$ 45,168	$ -	$ -
0460	Dune MEC Removal - Sand Sifting	0.00	CY	450.00	3	0.00	$ 46,205	$ -	$ -
0500	Underwater MEC Removal - No Divers	0.00	AC	1.00	2	0.00	$ 45,685	$ -	$ -
0510	Underwater MEC Removal - Divers	0.00	AC	1.5	2	0.00	$ 86,667	$ -	$ -
0520	DGM - Underwater	0.00	AC	4.0	1	0.00	$ 25,099	$ -	$ -
0540	Anomaly Resolution - Underwater	0.00	AC	1.5	2	0.00	$ 86,667	$ -	$ -
0600	MDAS Certification and Disposal	0.00	LS	0.2	1	0.00	$ 19,545	N/A	$ -
0610	Site Restoration	0.00	LS	0.1	1	0.00	$ 36,159	N/A	$ -
0620	Demobilization	0.00	Person	N/A	N/A	N/A	$ 690	N/A	$ -
0700	Remedial Action Completion Report	0.00	LS	N/A	N/A	N/A	$ 78,598	N/A	$ -
0710	Land Use Control Plan	1.00	LS	N/A	N/A	N/A	$ 36,741	N/A	$ 36,741
0800	Land Use Control Implementation	1.00	LS	N/A	N/A	N/A	$ 94,328	N/A	$ 94,328
0810	Annual Post-Construction Revegetation Monitoring	0.00	Year	N/A	N/A	N/A	$ 27,695	N/A	$ -
	Sub-Total								$ 131,069
	Contingency	15%							$ 19,660
	Sub-Total								$ 150,729
	Infrastructure Improvements	2%							$ 3,015
	Project Management	5%							$ 7,536
	Remedial Design (USACE)	8%							$ 12,058
	Construction Management (USACE)	6%							$ 9,044
	Total Capital Cost								**$ 182,383**

LONG-TERM MANAGEMENT COST:

	Description	Year	QTY	Unit	Unit Cost	Total
900	Long-Term Management	1-30	30	EA	$ 5,408	$ 162,239
910	UXO On-call Support	1-30	0	EA	$ 10,422	$ -
	Sub-Total					$ 162,239
	Contingency	15%				$ 24,336
	Project Management	5%				$ 8,112
	Total Long-Term Management Cost					**$ 186,574**

ALTERNATIVE 2: TOTAL CAPITAL AND LONG-TERM MANAGEMENT COST: **$ 368,957**

PERIODIC COST:

	Description	Year	QTY	Unit	Unit Cost	Total
0820	Five Year Review (cost per review)	5	6	EA	$ 42,166	$ 252,999

**5 Year Review not included in total alternative cost estimate*

ALTERNATIVE 2: TOTAL REMEDIAL ALTERNATIVE COST PLUS REVIEW COST **$ 621,955**

Notes: AC = acres EA = each LS = lump sum N/A = not applicable WK = week

2.13.1 Protection of Human Health and the Environment

The Selected Remedy, Alternative 2, will protect public health and welfare through mitigation of hazards to public health and welfare from exposure to potential residual MEC.

2.13.2 Compliance with Applicable or Relevant and Appropriate Requirements

There are no ARARs associated with the Selected Remedy.

2.13.3 Cost Effectiveness

The Selected Remedies are cost-effective because it represents a reasonable value for the costs incurred. In making this determination, the following definition was used: "A remedy shall be cost-effective if its' costs are proportional to its' overall effectiveness" (NCP §300.430(f)(l)(ii)(D)). This was accomplished by evaluating the "overall effectiveness" of alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in TMV through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of this remedy was determined to be proportional to its' costs and hence this remedy represents a reasonable value for the costs incurred. As indicated by the comparative analysis conducted for all remedial alternatives considered during the FS, the Selected Remedy, Alternative 2, is the most cost-effective alternative that provides acceptable levels of achievement of the other evaluation criteria.

2.13.4 Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Possible

The Selected Remedy does not utilize permanent solutions or resource recovery technologies to the maximum extent possible. Due to the lack of MEC on the MRS, LUCs provide acceptable levels of protection.

2.13.5 Preference for Treatment as a Principal Element

Treatment of MEC consists of removal and disposal. The statutory preference for treatment as a principal element of the remedy by removing and disposing of the subsurface MEC is not the preferred treatment for the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1, due to the lack of MEC on the MRS. LUCs are warranted due to the significant density of MD discovered and estimated to remain within the Former Machine Gun and Katama Rocket Range MRS 1 boundary, coupled with likely public exposure to the practice rockets, and the small potential of MEC on the site, as well as the need to employ UXO-certified technicians to make the determination whether a munition is inert or UXO.

2.13.6 Five Year Review Requirements

Five Year Reviews are required at the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 until UU/UE is achieved.

2.14 Documentation of Significant Changes from Preferred Alternatives of Proposed Plan

To fulfill CERCLA and the NCP, the DD must document and discuss the reasons for any significant changes made to the selected remedy. Changes include those reasonably anticipated by the public from the time the PP was released for public comment to the final selection of the remedy. The PP for the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1 was advertised for public availability in June 2015. The PP identified LUCs as the response action for the Former South Beach Moving Target Machine Gun and Katama Rocket Range MRS 1. Written and oral comments were received during the public comment period and are summarized in Section 3, The Responsiveness Summary.

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3. RESPONSIVENESS SUMMARY

The public comment period for the Proposed Plan was held from 15 June 2015 to 17 July 2015. Instructions were given on how to obtain and review information pertaining to this MRS as well as how to submit formal comments. The public was also given an opportunity to attend the public meeting and provide comments on the Proposed Plan at the Public Meeting held on 24 June 2015. This Responsiveness Summary provides an overview of community and support agency comments and concerns regarding the hazards identified at the site.

3.1 Stakeholder Issues and Lead Agency Responses

This section summarizes the stakeholder and public comments received during the comment period and at the public meeting on the Proposed Plan and lead agency responses to those comments. Additional details can be found in the transcript for the public meeting, which is available in the Administrative Record. There were no public comments received regarding the Proposed Plan. The following public comments were received.

Public Comment 1: (Anne Malewicz, MADEP – Public Meeting):

On behalf of MassDEP, we applaud the Army Corps for their work and the consultants for the great work they have done so far, and we look forward to their final Remedy.

Lead Agency Response 1:

USACE, MADEP, TTOR, DCR, and other stakeholders have worked together throughout the RI/FS process to evaluate the potential hazards and will continue to provide the opportunity for stakeholder input prior to and during the implementation of the Remedy.

Public Comment 2: (Joanne Dearden, MADEP - Mail):

The Department has reviewed the U.S. Army Corps of Engineers email dated June 10, 2015 which outlines their responses to MassDEP's June 1, 2015 comment letter for the South Beach Moving Target Machine Gun and Katama Rocket Range Draft Final Feasibility Study and Proposed Plan.

MassDEP would like to reiterate their position that the 100 lb bombs found at Wasque Point should be included in this investigation. As stated in the comment letter, the source of the 100 lbs has yet to be identified and MassDEP is concerned on how these items will be managed should the frequency of 100 lb bomb responses increase in the future. USACE states in their response that they will notify DoD regarding the potential for an offshore source for the 100 lb bombs at Wasque Point that may need to be pursued by another entity. If this is the case, MassDEP should be included in discussions regarding future projects at Wasque Point as well as discussions regarding ordnance response.

Also, USACE states in their response that they intend to contact the property owners regarding their responses to the Institutional Analysis questionnaire and the property owner's level of participation in the selected remedy. Please provide MassDEP with the details of these discussions

(phone conversation record, meeting minutes, email correspondence, etc). As stated in MassDEP's comment letter the selected remedy and LUCs do require a level of participation by the property owners greater than merely following the "3Rs".

Lead Agency Response 2:

The 100 lb bombs were included in the Remedial Investigation. Due to their lack of association with the pattern and type of munitions historically used at South Beach, they are not included as part of the Decision Document, as they are believed to be from an offshore unknown source. However, Alternative 2, Land Use Controls which include signage informing the public of what actions to take should they encounter munitions will by inclusion address any ordnance that is found on South Beach all the way to Wasque Point, including the 100 lb bombs. Should a future project be initiated under the FUDS program, USACE will engage State Regulators through the normal project execution process. However, should DOD and/or other entities outside USACE initiate a project to investigate the 100lb bombs, NAE will not be the lead agency and as such will have no authority to spend funds on projects outside the FUDS program. As such we will not engage in or lead any discussions.

The DCR/Town of Edgartown, as the primary property owner/operations manager was contacted via telephone (Pam Dolby/Marylyn Wortman) with regard to their intent in how the DCR/Town completed the IA. They stated they fully supported Land Use Controls in the future as they have in the past. They completed a new IA and resubmitted it to USACE on June 4, 2015. The resubmitted IA was provided via email to MADEP. The only requirements the land owners are expected to fulfill include the following:

1. Have employees of the DCR/Town Lifeguards and TTOR Rangers attend annual Ordnance Training. Both agencies have participated in this program in the past and are willing to participate in this activity in the future.

2. Disseminate information packets. Both the DCR/Town and TTOR have willingly disseminated information provided to them by USACE in the past and they will continue to willingly disseminate information in the future.

3. Allow signs to be posted on their property and maintained by USACE. DCR, Dukes County, and the TTOR have allowed signs to be posted at South Beach including Norton Point and Wasque Point in the past and are willing to allow USACE to continue to oversee and maintain the signage into the future.

4. The Town of Edgartown operating South Beach on behalf of the owner, DCR, and the TTOR operating Norton Point on behalf of the owner, Dukes County and the TTOR operator and owner of Wasque Point are all willing to follow the 3 Rs.

The following sections summarize email correspondence between USACE and MADEP regarding the munitions response protocol for South Beach and Cape Poge Projects. MADEP provided the

below public comment 3, via email in response to an email from Carol Ann Charette (USACE) informing both Ann Malewicz and Joanne Dearden of MADEP and the local stakeholders, Town of Edgartown South Beach Operations Manager; and TTOR Norton Point Operations Manager and Wasque Point, Operations Manager/Owner informing them that as of July 1, 2015, all munitions finds on South Beach and Cape Poge will need to be reported to local emergency/law enforcement officials. Below is the original email content USACE sent to the Town of Edgartown, South Beach Operations Manager, and TTOR Martha's Vineyard Superintendent, Chris Kennedy.