

**FINAL**  
**DECISION DOCUMENT**  
**MILITARY MUNITIONS RESPONSE PROGRAM**  
**ASSATEAGUE ISLAND**  
**FORMERLY USED DEFENSE SITE**  
**WORCESTER COUNTY, MARYLAND**  
**DERP-FUDS PROJECT NOS. C03MD0930 - 01/03**



**U.S. Army Corps of Engineers**  
**Baltimore District**  
**Environmental & Munitions Design Center**  
**2 Hopkins Plaza**  
**Baltimore, Maryland 21201**

**JULY 2020**

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**US Army Corps  
of Engineers ®**

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Contract No. W912DR-13-D-0018 Task Order No. 0006

*Prepared for*

United States Army Corps of Engineers  
Baltimore District  
Environmental & Munitions Design Center  
2 Hopkins Plaza, Room 09-B-05  
Baltimore, Maryland 21201

July 2020

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## LIST OF ACRONYMS AND ABBREVIATIONS

°F	Degrees Fahrenheit
ASR	Archive Search Report
bgs	Below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMUA	Concentrated Munitions Use Area
DERP	Defense Environmental Restoration Program
DGM	Digital Geophysical Mapping
DoD	Department of Defense
EA	EA Engineering, Science, and Technology, Inc., PBC
EOD	Explosive Ordnance Disposal
ft	Foot (feet)
FUDS	Formerly Used Defense Site
in.	Inch(es)
INPR	Inventory Project Report
lb	Pound(s)
MC	Munitions Constituents
MD	Munitions debris
MDAS	Material Documented as Safe
MDE	Maryland Department of the Environment
MEC	Munitions and Explosives of Concern
Mk	Mark
mm	Millimeter(s)
MMRP	Military Munitions Response Program
MPPEH	Material Potentially Presenting an Explosive Hazard
MRS	Munitions Response Site
Navy	U.S. Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
Nos.	Numbers
NPS	National Park Service
RI	Remedial Investigation
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection

TCRA	Time Critical Removal Action
TP	Training Practice
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
WWII	World War II

## **1. DECLARATION**

### **1.1 SITE NAME AND LOCATION**

The U.S. Army Corps of Engineers (USACE) prepared this Decision Document to address Military Munitions Response Program (MMRP) sites known as Rocket Range North (Munitions Response Site [MRS] 01) and Rocket Range South (MRS 03) at the Assateague Island Formerly Used Defense Site (FUDS), Worcester County, Maryland (FUDS Project Numbers [Nos.] C03MD093001 and C03MD093003).

Assateague Island is a 37-mile-long barrier island located along the eastern shore of Maryland and Virginia on the Delmarva Peninsula. From 1944 to 1947, the U.S. Navy (Navy) and the U.S. Army Air Corps established two separate rocket ranges at the Assateague Island FUDS, which were used by the Army Air Corps and the Navy during and after World War II (WWII) for target practice by land-based aircraft. These ranges are referred to as Rocket Range North (MRS 01), also referred to as Stinger-One Rocket Range; and Rocket Range South (MRS 03), located approximately 10 miles south of MRS 01 and referred to as Stinger-Two Rocket Range. MRS 01 (3,412.2 acres) is located on State of Maryland and National Park Service (NPS) properties, which are both open to the public for recreational purposes as a State Park and National Seashore. MRS 03 (3,245.5 acres) is located entirely on NPS property and is open to the public for recreational purposes as part of the National Seashore.

### **1.2 STATEMENT OF BASIS AND PURPOSE**

This Decision Document presents the No Remedial Action remedy selected by the USACE. The No Remedial Action remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 and, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300. As per 40 CFR 300.800(a) of the NCP, the documentation supporting No Remedial Action is contained in the Administrative Record available at the Worcester County Library - Berlin Branch. This No Remedial Action Decision Document is also compliant with Defense Environmental Restoration Program (DERP) policies and guidance.

The Maryland Department of the Environment (MDE) and the National Park Service (NPS) concur with this decision.

### **1.3 DESCRIPTION OF THE SELECTED REMEDY**

No human health or ecological risk was identified for MRS 01 or MRS 03 based on the risk screening of the analytical results from the sampling conducted during the Site Inspection (SI). The Risk Management Methodology (USACE 2016) is the current evaluation system being used to assess risk from Munitions and Explosives of Concern (MEC) at each MRS/FUDS and it accounts for a variety of factors related to the potential risks at a given MRS. These factors include the likelihood of encountering live munitions/explosives (accessibility), the severity of an explosive incident should one occur (severity), and the likelihood of a detonation (sensitivity of the items). The methodology utilizes these factors to illustrate site-specific conditions and

differentiate acceptable from unacceptable conditions. Sufficient area was investigated during the Remedial Investigation (RI) to support the conclusions presented in the Risk Management Methodology. No MEC has been found at either MRS per the RI (EA 2019). Since no MEC has been identified at either MRS 01 or MRS 03 during previous investigations or during the RI, it is unlikely for a future encounter with live munitions or explosives to occur. Therefore, the Risk Management Methodology evaluation for both MRS 01 and MRS 03, determined that site conditions are acceptable.

No response action is necessary to protect the public health or welfare or the environment from actual or threatened releases of MMRP hazards into the environment associated with MRS 01 and MRS 03.

#### **1.4 STATUTORY DETERMINATIONS**

USACE, in coordination with MDE, concluded that No Remedial Action is necessary to protect public health or the environment from the former use of the sites MRS 01 and MRS 03 as rocket ranges. Because no remediation will be done at the site, 5-year reviews are not required. The public participation requirements of Section 117(a) of CERCLA and the NCP at 40 CFR 300.430(f)(3) have been met.

#### **1.5 AUTHORIZING SIGNATURE**

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KAREN J. BAKER  
Programs Director  
North Atlantic Division

20 Aug 2020

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Date

## 2. DECISION SUMMARY

### 2.1 SITE NAME, LOCATION, AND BRIEF DESCRIPTION

The Assateague Island FUDS encompasses the 37-mile-long barrier island located along the eastern shore of Maryland and Virginia on the Delmarva Peninsula ([Figure 1](#)). This Decision Document addresses two separate rocket ranges that were used by the Navy and the U.S. Army Air Corps during and after WWII for target practice with land-based aircraft identified as FUDS Project Numbers [Nos.] C03MD093001 and C03MD093003. These areas, known as the Rocket Range North (MRS 01) and Rocket Range South (MRS 03)<sup>1</sup>, encompass 3,412.2 acres and 3,245.5 acres, respectively (EA Engineering, Science, and Technology, Inc., PBC [EA] 2019a).

The Assateague Island FUDS primarily consists of parkland, which is part of the Assateague Island National Seashore, Chincoteague National Wildlife Refuge, and Assateague State Park. The FUDS property is currently owned by the NPS, the State of Maryland, the U.S. Fish and Wildlife Service, the State of Virginia, and the U.S. Coast Guard. The FUDS property where the designated MRSs are located is owned by NPS and the State of Maryland (EA 2019a). The MDE is the lead regulatory agency.

The Northern Rocket Range encompasses land in the northern portion of Assateague Island National Seashore and tidal waters (ocean to the east and Chincoteague Bay to the west). Within a 2-mile radius of the Northern Range, across Chincoteague Bay to the west, there is a residential area comprised of more than 26 homes. This area has a significant influx of visitors during the summer months, according to the NPS, the northern part of Assateague Island has up to 7,500 visitors per day. Additionally, there are 150 campsites on the National Seashore and approximately 200 camp sites on state property. This transient population significantly impacts the population density at MRS 01 during the summer months (EA 2017).

The Southern Rocket Range encompasses land in the southern portion of Assateague Island National Seashore and tidal waters (ocean to the east and Chincoteague Bay to the west). There are no known inhabited structures in or within a 2-mile radius of the Southern Range and it is much more remote than the Northern Range, consequently it does not have the same influx of visitors. A backcountry campground is located within the boundary of the Southern Rocket Range. The campground has three sites, with a maximum use of 15 people at any given time. The campground receives minimal use during the summer and winter months, and moderate use during the spring and fall. Annual use of this area is probably no more than 1,500 visitors per year. The three designated campsites at MRS 03 are projected to support a maximum of three temporary structures (i.e., tents) at any given time (EA 2017).

The northern tip of Assateague Island lies within a mile of Ocean City, Maryland and the southern tip of Assateague Island lies within a mile of Chincoteague, Virginia. Both Rocket

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<sup>1</sup> The official name of MRS 01 is Rocket Range North and Burial North, and the official name of MRS 03 is Rocket Range South and Burial Areas. Throughout this document, the ranges are referred to as Rocket Range North (MRS 01) and Rocket Range South (MRS 03).

Ranges are located in the middle of Assateague Island, which is over 10 miles from these populated areas.

## **2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES**

This section summarizes the history of the Assateague Island FUDS, previous investigations, and removal actions conducted at Assateague Island FUDS.

### **2.2.1 Site History**

Military activity in defense of the coastline occurred in the waters near Assateague Island during and immediately following WWII. From 1944 to 1947, the Navy and the U.S. Army Air Corps leased land and established two separate rocket ranges at the Assateague Island FUDS for land-based aircraft from Naval Air Station Chincoteague, Virginia and Naval Air Station Manteo, North Carolina. These two rocket ranges at Assateague were reportedly used by the U.S. Army Air Corps and the Navy for target practice by land-based aircraft. The ranges were identified as Rocket Range North or Stinger-One Range (MRS 01) and Rocket Range South or Stinger-Two Range (MRS 03) ([Figure 1](#)). Although the FUDS boundary includes the entire island, the 1994 Archive Search Report (ASR) designated two areas on the island as the only known training areas. The report identified these areas as MRS 01 and MRS 03 (USACE 1994).

Training activities on Assateague Island consisted of air-to-ground target practice using practice rockets and practice bombs as well as inert 20-millimeter (mm) projectiles used for strafing (machine-gun fire) (USACE 1994). Most of the planes that used these ranges originated from Chincoteague Naval Air Station and traveled up the eastern shore of Assateague Island. Once north of the target area, the planes circled around the Island and fired eastward during the approach to the western shore of Assateague. The practice bombs that were dropped reportedly discharged smoke on impact (USACE 1994). At the end of WWII, it was reported that the Department of Defense (DoD) may have created two or possibly three suspect ordnance burial sites during site cleanup. The established locations of the rocket ranges are based on interviews with and drawings provided by a Navy veteran who was the “spotter” stationed at Assateague during WWII. The spotter’s responsibility was to watch the aircraft and note where the bomb/rockets had landed and determine if they hit the target. The Navy veteran drew the ranges from memory, and specifically described the operations. These locations were documented in the ASR.

Both ranges were primarily used as rocket ranges for inert 2.25-inch (in.) and 5-in. rockets; however, practice bombs (which can contain spotting charges) and 20-mm rounds (for strafing) were also used at MRS 01, based on findings to date. Note: MRS 03 was referred to by USACE as MRS 02 in earlier historical documentation (up through the Site Inspection [SI]). Following completion of the SI, MRS 02 was renamed in the USACE database as MRS 03. The summaries of previous investigations of former MRS 02 use the current MRS 03 designation.

Prior to the RI in 2018-2019, munitions debris (MD) from the following munitions were identified at MRS 01: 2.25-in. practice rockets, 3.25-in. practice rockets, 3.5-in. practice rockets, 5-in. practice rockets, 3-pound (lb) Mark (Mk) 23 practice bombs, 4.5-lb Mk 43 practice bombs, and 20-mm Training Practice (TP) projectiles (one casing only). And at MRS 03, only two



pieces of MD from 5-in. practice rockets were identified. No live munitions or explosives of concern were found.

In 1943, the Chincoteague National Wildlife Refuge was established in southern portion of Assateague Island, and in 1965, Assateague Island National Seashore was established on the northern portion. The property associated with the FUDS ranges is on the Assateague Island State Park and Assateague Island National Seashore and these areas are currently owned by the the State of Maryland and NPS, respectively (EA 2019a).

## 2.2.2 Previous Investigations and Removal Actions

Several investigations and historical removal actions have been conducted at MRS 01 and MRS 03 by USACE. A thorough review of previous investigations performed in and around the MRSs on the Assateague Island FUDS is presented in the RI (EA 2019a). The term MEC, munitions and explosives of concern, which distinguishes specific categories of military munitions that may pose unique explosives safety risks, means: 1) Unexploded ordnance (UXO), as defined in 10 USA 101(e)(5)(A) through (C); 2) Discarded military munitions (DMM), as defined in 10 USC 2710(e)(2); or 3) Munitions constituents (e.g., TNT, RDX) as defined in 10 USC 2710(e)(3), present in high enough concentrations to pose an explosive hazard. The term munitions debris (MD) refers to remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal. Items classified as inert were 100 percent inspected and certified free of explosives or related materials. Items classified as practice simulate live items in same weight and dimensions and contain a “spotting charge” to generate smoke and a propellant such as black powder which are typically consumed during training. These items were inspected and certified free of explosives or related materials. A summary of the relevant investigations, responses, and documents is provided in Table 1.

**Table 1 – Summary of Previous Investigations**

Investigation	Summary/Description	Results
1988 Case Incident	In July 1988, Army and Navy EOD Teams were deployed to Assateague Island when WWII-era ordnance washed ashore onto North Ocean Beach in Rocket Range North (MRS 01). MD items recovered by both ordnance teams totaled: 11 inert 2.25-in. rockets (rocket motors and heads), 6 inert 5-in. rockets (2 were only rocket heads), 2 inert 3.25-in. rocket heads, and numerous ballistic tips used to improve the aerodynamics of practice rockets.	Items were determined to be munitions documented as safe (MDAS) (i.e., MD that are safe/no explosive hazard) and were disposed of offsite.
1991 INPR <sup>2</sup>	A records review and site visit were conducted as part of the INPR for Assateague Island. During the site visit, the	Items were determined to be MDAS (i.e., MD

<sup>2</sup> During the 1991 Inventory Project Report (INPR) site visit, the field team was shown an expended inert Mk 43 practice bomb that had been found previously by an NPS ranger on the FUDS (USACE 1991). As documented in the 1995 SI, MD from an “old style practice bomb” was identified; however, additional information regarding the mark and size of the practice bomb was not provided (Parsons Engineering Science, Inc. 1995). During the 1998 time critical removal action (TCRA), three MD items found were associated with practice bombs identified as the Mk 23 practice bomb (Human Factors Applications, Inc. 1998).

**Table 1 – Summary of Previous Investigations**

<b>Investigation</b>	<b>Summary/Description</b>	<b>Results</b>
	field team was shown an expended inert Mark 43 practice bomb and 20-mm TP projectile casing (inert) that had been found by NPS. Additional MD (part of a 5-in. rocket) was identified near the reported location of the southern rocket range (MRS 03) during the INPR site visit. The INPR concluded that an MMRP investigation was warranted and a large-scale clearance was recommended.	that are safe/no explosive hazard) and were disposed of offsite.
1992 Interim Sweep of North Ocean Beach	An instrument-assisted (metal detector) “sweep” of the North Ocean Beach area (near MRS 01) was conducted in 1992. A 570,000-square foot area of the beach was swept to locate and identify metallic items. During this investigation, no ordnance or ordnance-related items were discovered.	No items determined to be munitions related were found.
1994 ASR	The ASR included a review of previous investigations, historic records search, and a site inspection. The ASR noted two target ranges, (MRS 01 and MRS 02 [renamed MRS 03]), that were developed on Assateague Island in the mid-1940s and used for target practice by the Navy. MD from a 3.25-in. rocket was observed in the sand dunes at MRS 01 and MD from an expended 5-in. high-velocity aircraft rocket was identified at MRS 03. No ordnance disposal/burial areas were observed at either MRS. Further investigation for MRS 01 and MRS 03 was recommended.	Items were determined to be MDAS (i.e., MD that are safe/no explosive hazard) and were disposed of offsite.
1995 Site Investigation Report	A site investigation including instrument-assisted magnetometer sweep followed by intrusive investigations was conducted in MRS 01 and MRS 03. Grid systems were set up and surveyed with magnetometers. Eighteen grids in MRS 01 and nine grids in MRS 03 were selected for intrusive (subsurface) investigations to a depth of 2 ft bgs. A total of 20 inert MD items were found on the surface and 125 inert MD were found in the subsurface in MRS 01. All items were consistent with previously found inert or practice munitions, including practice rockets and practice bombs. Two suspect burial trenches, one on the shoreline and one in the surf, were identified at MRS 01. Partial excavation of the burial trench on the shoreline uncovered an additional 36 items, all of which were determined to be inert. At MRS 03, no live munitions or MD items were identified on the surface or in the subsurface during the instrument-assisted sweeps and intrusive investigations. Additional action was recommended.	Items were determined to be MDAS (i.e., MD that are safe/no explosive hazard) and were disposed of offsite.
1998 Time Critical Removal Action (TCRA)	A TCRA was conducted on approximately 2.41 acres of MRS 01. This was the same area reported in the 1995 Site Investigation Report as the suspect burial trench located on the shoreline. Twelve grids were investigated	Items were determined to be MDAS (i.e., MD that are safe/no explosive hazard) and

**Table 1 – Summary of Previous Investigations**

<b>Investigation</b>	<b>Summary/Description</b>	<b>Results</b>
	to a depth of 4 ft bgs resulting in 212 pieces of MD being removed from the disposal/burial area in MRS 01. The MD was consistent with previously identified items, primarily practice rockets and practice bombs.	were disposed of offsite.
2003 USACE Baltimore District Site Visit	USACE Baltimore District completed a site visit to further characterize the potential munitions and explosive risk on Assateague Island as part of long-term monitoring for the 1998 TCRA. Another instrument-assisted sweep was conducted to assess the impact/target areas and potential disposal/burial areas along the beach areas at MRS 01 and MRS 03. Suspect metallic anomalies and two possible burial pits were located at MRS 01. Additionally, “several dozen” anomalies were identified in the area of MRS 03. No removal action was completed as a result of the sweep.	No confirmation of anomalies and no munitions related items identified for removal.
2007 Site Inspection	A Site Inspection was performed by USACE to evaluate if MEC or munitions constituents (MC) hazards remained at the Assateague Island FUDS and to determine if further response was warranted. The Site Inspection included an instrument-assisted sweep of areas in MRS 01 and MRS 03 as well as environmental sampling and laboratory analysis. Instrument-assisted sweeps were conducted across approximately 32 acres within or adjacent to the two MRSs to identify any potential MEC or MD. Cultural debris and numerous underground metallic anomalies were detected; however, intrusive investigations were not part of the Site Inspection. No MEC or MD were identified at MRS 01 or MRS 03 during the Site Inspection. Based on risk screening results, no risks for exposure to MC were identified. The Site Inspection recommended an RI for both MRS 01 and MRS 03.	No confirmation of underground anomalies, no munitions related items identified for removal.
2013 EOD Team Response	On 24 June 2013, a team responded to the discovery of additional MD that had washed up on the beach in MRS 01. A total of 234 MD items were identified at MRS 01 and safely disposed of by the team.	Items were determined to be MDAS (i.e., MD that are safe/no explosive hazard) and were disposed of offsite.
2013 USACE Baltimore District Site Visit	Subsequent to the EOD action above, USACE Baltimore District personnel conducted an instrument-assisted sweep of the suspect impact areas in each MRS (approximately 14 acres) and an additional 19 MD items were recovered and removed from MRS 01; however, no MD was identified in MRS 03.	Items were determined to be MDAS (i.e., MD that are safe/no explosive hazard) and were disposed of offsite.
2017 NPS Findings	On 12 June 2017, NPS notified USACE that they observed items on the beach and in the water in MRS 01 that were consistent with items previously found and removed from the area during previous USACE investigations. NPS posted signs in the area to alert swimmers of the dangers and to prevent swimming in the	No confirmation of anomalies and no munitions related items identified for removal.

**Table 1 – Summary of Previous Investigations**

Investigation	Summary/Description	Results
	area. As of 3 July 2017, the items were naturally re-buried by sand and were no longer considered a swimming hazard.	
NOTES: ASR = Archives Search Report. MEC = Munitions and explosives of concern. bgs = Below ground surface. mm = Millimeter(s). EOD = Explosive Ordnance Disposal MMRP = Military Munitions Response Program. ft = Foot (feet). MRS = Munitions Response Site. FUDS = Formerly Used Defense Site. NPS = National Park Service. in. = Inch(es). TCRA = Time critical removal action. INPR = Inventory Project Report. TP = Target practice. MC = Munitions constituents. USACE = U.S. Army Corps of Engineers. MD = Munitions debris. WWI = World War II. MDAS = Material documented as safe.		

### 2.2.3 2019 Remedial Investigation

In 2018-2019, USACE conducted an RI to characterize the nature and extent of potential MEC and MC at Rocket Range North (MRS 01) and Rocket Range South (MRS 03). As part of the planning process and CSM development, a detailed review of historical documents was conducted, and discussions were held with USACE and the NPS to confirm historical findings and evaluate the MRS boundaries presented in historical documents. Based on these discussions, the PDT determined the most likely impacted areas to investigate were somewhat different from the existing MRS boundaries. RI activities were focused in areas, as outlined in [Figure 1](#), that correspond to areas where munitions-related items would most likely be located, including the suspect target area and potential disposal area locations, as well as buffer areas where under- and over-shoots could have occurred based on historical documents and interviews. The remedial investigation area for MRS 01 consisted of 1,150 acres (351 on land and 785 in water) and the remedial investigation area for MRS 03 consisted of 1,831 acres (507 on land and 1,324 in water). During the RI, digital geophysical mapping (DGM) data were collected by foot, motorized vehicle, and by boat along transects on land and in the water at MRS 01 and MRS 03 to identify potential concentrated munitions use areas (CMUAs) and to identify anomalies for intrusive investigation.

At MRS 01, a DGM survey was performed over a total of 50 linear miles (20 acres). Based on the smallest munition item of interest (i.e., 20-mm TP projectile) anomalies were selected for the intrusive investigation to support the finding (at a 95 percent confidence level) that there is less than 0.5 MEC per acre within the RI Area. The DGM data were reviewed to identify potential CMUAs and to identify anomalies for intrusive investigation. One CMUA was identified at MRS 01 associated with the former target area. A total of 445 anomalies located both on land and in the water were selected to be intrusively investigated (i.e., dug up and categorized) ([Figure 2](#)). Of the 445 anomalies investigated, only 64 were categorized as being related to munitions, all of which were identified as MD. MD identified in MRS 01 was located in and around the former target area and was consistent with MD historically found at the site. The MD historically found at the site and during the RI included mainly practice rockets along with a few practice bombs, and MD associated with 20-mm TP projectiles (inert projectile and casing).

At MRS 03, a DGM survey was performed over a total of 83.4 linear miles (33.1 acres). Based on the smallest munition item of interest observed (i.e., 20-mm projectile) anomalies were selected for intrusive investigation to support the finding (at a 95 percent confidence level), that there is less than 0.5 MEC per acre within the RI Area. The DGM data were reviewed to identify potential CMUAs and to identify anomalies for intrusive investigation. No CMUAs were identified within MRS 03. A total of 260 anomalies were intrusively investigated both on land and in the water ([Figure 3](#)). None of the 260 anomalies investigated were related to munitions (no MD found). Historically, only two pieces of MD from practice rockets were reportedly found at MRS 03 and no MEC had been found to date on MRS 03. Based on the findings of the RI and the previous investigations, the RI report concluded that it is unlikely MRS 03 was used by the Navy as a practice bombing and strafing range.

The RI noted that prior to the RI, 882 items had been recovered, determined to be MD, and disposed of appropriately as part of the previous investigations at the site. The RI further noted that the majority of the items found historically and during the RI were practice rockets (2.25-in. practice rockets, 3.25-in. practice rockets, 3.5-in. practice rockets, and 5-in. practice rockets). Both the practice rockets and the 20-mm TP projectiles can contain propellant if they did not fire properly. However, in order to reach the target areas on Assateague Island, the propellant within the rockets and 20-mm TP rounds would need to have been expended when fired. Once fired, the practice rockets and 20-mm TP rounds no longer present an explosive hazard because the only explosive component (propellant) is expended. The RI also noted that practice bombs including, the 3-lb Mk 23 and the 4.5-lb Mk 43, usually have spotting charges (10-gauge blank cardboard shotgun shells that contain a primer and black powder) that may still be present after being dropped, if they did not function as intended. Therefore, there is a very small possibility of an encounter with an intact spotting charge contained within the practice bombs. However, since the spotting charges during this time period (1944-1947) were made of cardboard shells, which likely would have been exposed to the elements for 70 plus years, and due to harsh conditions onsite, the majority of the items found have had severe rust and corrosion, it is unlikely intact spotting charges continue to exist on site. In addition, very few practice bombs and only one 20-mm projectile were uncovered, which is less than one percent of the material documented as safe (MDAS). Over ninety-nine percent of the MDAS was associated with the spent practice rockets. Neither spotting charges nor propellant were found in any of the items. Given these conditions, it is unlikely that an encounter with a practice bomb containing an intact spotting charge would occur. Therefore, based on the results of the RI and the previous findings at the target ranges, it is anticipated that future encounters with similar material potentially presenting an explosive hazard (MPPEH) identified at MRS 01 or MRS 03 would also be MDAS.

During the 2007 SI, MC sampling was performed. The SI identified no unacceptable human health or ecological risks for exposure to MC based on risk screening results. The SI concluded no further action was recommended for MC. The RI evaluation of MC included a review of the SI findings and a plan to collect additional MC samples near intrusively investigated anomalies if evidence of a potential MC source was identified during the RI (i.e., breached MEC, etc.). Specifically, no MC sampling was required during the RI unless evidence of a potential MC source was identified. No MEC was found during the RI; therefore, no MC sampling was

performed during the RI. As a result, there was no change to the SI conclusions of no unacceptable human health or ecological risks for exposure to MC (Alion 2007).

Based on the findings of the RI and from the previous findings at the target ranges, no live munitions or explosives of concern were identified at either MRS and they are not anticipated to be encountered; therefore, no remedial action was recommended at MRS 01 and MRS 03.

## **2.3 COMMUNITY PARTICIPATION**

The Final RI Report (EA 2019a) and the Proposed Plan (USACE 2019b) were made available to the public on 24 April 2019. The notice announcing the availability of these documents was published in the *Bayside Gazette* newspaper on both the 18<sup>th</sup> and the 25<sup>th</sup> of April 2019 and in the *Dispatch/Maryland Coast Dispatch* on the 19<sup>th</sup> and 26<sup>th</sup> of April 2019. A public comment period was provided from April 29<sup>th</sup> – June 3<sup>rd</sup>, 2019. In addition, a public meeting was held on May 2<sup>nd</sup>, 2019 to present the Proposed Plan. At the meeting, representatives from USACE answered questions and presented information about the Assateague Island FUDS and the remedial alternatives considered. Select Assateague Island FUDS documents can be accessed on the USACE Baltimore District website titled “Assateague Island.” The current web address for the page is <https://www.nab.usace.army.mil/Missions/Environmental/Formerly-Used-Defense-Sites/Assateague-Island-FUDS/>. All Assateague Island FUDS documents in the Administrative Record are available to the public at the following location.

Worcester County Library Berlin Branch 220 N. Main Street Berlin, Maryland 21811 (410-641-0650).

## **2.4 SCOPE AND ROLE OF THE RESPONSE ACTION**

This Decision Document authorizes the remedial decision of No Remedial Action for Rocket Range North (MRS 01) and Rocket Range South (MRS 03) at Assateague Island. USACE has concluded that no CERCLA action is necessary to ensure protection of human health or the environment from munitions contamination.

## **2.5 SITE CHARACTERISTICS**

This section provides an overview of the physical characteristics of MRS 01 and MRS 03 including topography, geology, and ecology, and describes the nature and extent of contamination.

### **2.5.1 Physical Characteristics**

#### **2.5.1.1 Regional Climate**

The region has a humid mesothermal climate that is influenced by maritime tropical air masses in the summer and by continental polar air masses in the winter. Most high and low-pressure systems track from west to east, as the region lies in a zone of prevailing westerlies. The region is vulnerable to hurricanes primarily between June and November. Normal daily maximum temperatures range from 45 degrees Fahrenheit (°F) in January to 85°F in July. Normal daily

minimum temperatures range from 30°F in January to 65°F in July. Average annual precipitation is approximately 49 in. Rainfall, derived from cyclonic weather systems in the fall, winter, and spring, and from local convective storms in the summer, is distributed fairly evenly throughout the year. The lowest average monthly precipitation of 3.41 in. occurs in December, while the highest average monthly precipitation of 5.67 in. occurs in August. Thunderstorms occur on average 20-40 days a year, primarily in the summer months. Mean average annual snowfall is 6–12 in. (Alion 2007). Natural coastal processes including the action of tides, wind, waves, and currents associated with storms continually influence and shape Assateague Island. Most island changes occur during intense storm events which while typically lasting only a few days can dramatically alter the physical characteristics of Assateague Island and the bay (NPS 2016). As predicted in NPS (NPS 2016) and USGS (USGS 2004) documents, due to effects of climate change the frequency and intensity of storm events at Assateague Island are expected to increase.

### **2.5.1.2 Topography**

The topography of Assateague Island consists mainly of flat to gently rolling sand dunes. The FUDS lies just above sea level and is relatively flat with low relief; island elevations range from sea level to approximately 15 feet (ft) (Alion 2007).

NPS personnel stated that the width of the beaches varies annually from 30 to 40 meters (summer to winter high-tide line) at MRS 01 and 50-60 meters at MRS 03 due to shifting sands. NPS personnel stated that sands are deposited on the beach through wave action during the summer and fall. During the fall, approximately 1.5-2 meters of sand is present in the tidal zone and on the beach. NPS personnel noted that during the winter, winter storms and nor'easters take this sand from the beach and tidal zone and deposit the sand offshore in the form of sandbars. Because of the dynamic conditions at both MRSs along the shoreline (i.e., barrier island subject to extreme wind and wave energy), items buried in the subsurface could potentially migrate to the surface or be covered with additional sands/sediment. Over the past 60 years, the coastline of the Island has migrated towards the west as the Atlantic Ocean has reclaimed parts of the eastern shore, especially in the northern part of the island near MRS 01.

### **2.5.1.3 Geology**

The subsurface sediments of the Delmarva Peninsula rest on a seaward sloping basement of Paleozoic crystalline rocks. The basement is folded and faulted into a series of northwest-southeast trending ridges and depressions. The axis of one major depression, the Salisbury Embayment, crosses the Delmarva Peninsula near the Virginia-Maryland border.

Cretaceous, Cenozoic, and Mesozoic sands, silts, and clays account for more than half of the thickness of subsurface sediments. Lower Cretaceous formations representing non-marine deposition in river channels, flood plains, and swamps are overlain by Upper Cretaceous lagoonal, estuarine, and deep-water marine rocks. This feature represents the gradual encroachment of the Upper Cretaceous Sea over the region (Alion 2007).

#### **2.5.1.4 Soil**

The sand barrier of Assateague Island, composed of beach and wash over sands and gravels topped by wind-blown, vegetated sand dunes, rests on soft lagoonal mud containing oyster, clam, and snail shells. The lagoonal mud overlies organic coastal salt-marsh mud and peat, which, in turn, overlies organic debris-rich sandy mud. This entire sequence overlies pre-Holocene sediments undergoing transgression. Except for steep slopes on dunes, this “soil” is nearly level and is composed of light-gray to white marine sand and shell material (Alion 2007).

Tidal marsh soils are sandy to clayey, poorly drained, acidic, and saline and can contain peat or highly organic black muck. These soils are included in the Tidal Marsh–Coastal Beach Association. Additionally, a small amount of Plummer soils can be found in stabilized depressions on coastal beaches (Alion 2007).

#### **2.5.1.5 Vegetation**

The eastern shore is predominately sand dunes, while the western shore is covered with dense brush and salt-marsh wetlands.

#### **2.5.1.6 Hydrogeology**

Groundwater in the region surrounding Assateague Island is supplied primarily by the Manokin, Pokomoke, and Quaternary aquifers (USACE 1994). The Manokin aquifer is recharged by the overlying Pokomoke aquifer, which is recharged by the downward movement of water from the Quaternary sediments. Recharge of the Manokin and Pokomoke aquifers occurs along a drainage divide between the Atlantic Ocean and the Chesapeake Bay. The Quaternary aquifer is recharged by precipitation over a broad area (USACE 1994).

Regional movement of groundwater in the Manokin and Pokomoke aquifers is away from the drainage divide and towards the ocean, bays, rivers, and areas of pumping. Groundwater movement in the Quaternary aquifer is from areas of high water table to streams, bays, and the ocean (USACE 1994).

#### **2.5.1.7 Surface Water Hydrology**

Tide ranges and tidal currents in the inshore waters of Assateague Island are controlled by the position of ocean inlets. The two ocean inlets on Assateague Island are the Ocean City inlet on the north, which leads to Sinepuxent Bay, and the Chincoteague inlet 30 miles to the south, which leads to Chincoteague Bay (USACE 1994). Refer to [Figure 1](#).

Mean tide range at the Ocean City and Chincoteague inlets is 3.4–3.8 ft. Tidal currents in the bays range from 0.15 to 0.5 knots. Through the tides, approximately 7 percent of the water in the bays is renewed each day (USACE 1994).

Global sea level has risen approximately 18 centimeters (7.1 inches) in the past century. Climate models predict an additional rise of 48 cm (18.9 in.) by 2100, which is more than double the rate of rise for the 20th century. Natural coastal processes including the action of tides, wind, waves,



currents, and sea level rise continually influence and shape Assateague Island. In response to sea level rise, the island is slowly moving westward through storm overwash and inlet formation processes. As global climate change intensifies, the rate of sea level rise and the intensity of coastal storms will likely increase and accelerate the rate and magnitude of island changes (NPS 2016). During a study in 2004, nearly 60 km (37 miles) of shoreline along Assateague Island national seashore was evaluated. Of this total, 30 percent of the mapped shoreline was classified as being at very high vulnerability due to future sea-level rise and 30% was classified as being at high vulnerability due to future sea-level rise (USGS 2004). The areas classified as being at very high vulnerability or high vulnerability include the areas of Assateague Island where the former ranges were located.

#### **2.5.1.8 Ecology**

Numerous salt-marsh wetland areas and freshwater wetlands are present on and surrounding Assateague Island. There are approximately 70 acres of saltwater marshes in MRS 01. There are approximately 54 acres of saltwater marshes and 0.3 acres of freshwater wetlands in MRS 03.

Assateague Island is bordered on the east by the Atlantic Ocean and on the west by Chincoteague Bay. Both MRSs are within Assateague Island National Seashore and are located within the Maryland and Virginia designated coastal zone areas. Under the Coastal Zone Management Act, coastal zones are afforded additional federal and state protection, and all projects conducted within a coastal zone must adhere to the Coastal Zone Management Program and balance the demands of coastal resource use and conservation (National Oceanic and Atmospheric Administration 2017).

MRS 03 is in a proposed Wilderness Area and as such is protected under the Wilderness Act, which mandates the “preservation of wilderness character.” Based on the legal description of the wilderness definition, five specific qualities were identified that are needed to support wilderness character: untrammeled, natural, undeveloped, opportunities for solitude, or primitive and unconfined recreation (Sudol 2014).

The ecological habitat within the two MRSs include terrestrial plants, terrestrial invertebrates (e.g., insects and worms), benthic organisms, aquatic organisms, terrestrial-feeding/predatory animals, terrestrial-feeding/predatory birds, aquatic-feeding mammals, and aquatic-feeding birds.

The unique environmental conditions found on Assateague Island also provide habitat for a multitude of specialized plant and animal species, many of which are rare, threatened, or endangered. Several populations of migratory birds, including federal and state-listed species use the seashore seasonally for breeding, overwintering, and as a stopover habitat while migrating along the Atlantic Flyway. Federally-listed migratory sea life has also been observed within the seashore, including four species of sea turtles and three whale species. The seabeach amaranth (*Amaranthus pumilus*) is the only federally-listed plant species known to occur at the seashore; however, there are numerous state-listed plant species that are also known to occur (EA 2017).

## 2.5.2 Nature and Extent of Contamination

### 2.5.2.1 Rocket Range North (MRS 01)

At MRS 01, no MEC were encountered during the RI, as is consistent with historical investigations. During the RI, 90 MD items were recovered on land at MRS 01 and 13 MD items were recovered in the water. All the MD identified on land during the RI were found in and around the approximate historical target area ([Figure 2](#)). The target area was revised during the RI based on the locations of recovered MD. The revised target area consisted of approximately 27.6 acres.

Types of MD recovered at MRS 01 during the RI and previous investigations include 5-in, 3.25-in, and 2.25-in practice rockets; 3-lb Mk 23, 4.5-lb Mk 43, and “old style” (unspecified) practice bombs, and a 20-mm TP projectile and casing. A total of 985 pieces of MD have been recovered at MRS 01 since the initial 1988 Case Incident. Of these finds, 99 percent were practice rockets (only six practice bombs, one 20-mm projectile, and one 20-mm casing have been recovered). Of the recovered MD items, 532 were encountered on the surface and 453 were recovered from the subsurface. The majority of MD items on the surface were recovered after storm events such as nor’easters, bringing the MD to the surface; it is atypical to encounter MD on the surface without a major weather event.

MD on land at MRS 01 was found at depths ranging from 0 to 60 in. below ground surface (bgs); however, the majority of items were found at depths greater than 12 in. bgs. The anomalies located in the surf zone, on the edge of the target area closest to the ocean, were at depths greater than 60 in. and were not recoverable due to collapsing sands.

In the surf zone, MD was identified at 24 in. and greater bgs. There were five subsurface anomalies in the surf zone that were not reached. The intrusive investigation had to be terminated after digging to 60 in. because the excavation areas were continuously filling back in with sands and collapsing. These anomalies are likely remnants of the burial pit removed during the 1998 TCRA. The TCRA was performed in a limited area at low tides near the surf zone and was terminated at a depth of 48 in. (or 4 ft) bgs. MD recovered from the water portion of MRS 01 during the RI was found at depths ranging from 6 to 14 in. bgs and were only found in the ocean portion of the MRS. The water depths in which the MD was found ranged between 13 and 23 ft.

### 2.5.2.2 Rocket Range South (MRS 03)

At MRS 03, no MEC were encountered during the RI, as is consistent with historical investigations. In addition, no MD was found during the RI. A total of 219 subsurface anomalies were investigated on land and 41 anomalies in the water, none of which were attributed to MD ([Figure 3](#)). Historically, only two pieces of MD from 5-in. practice rockets (no 20-mm TP rounds or practice bombs) have been identified at MRS 03; therefore, it is unlikely that MRS 03 was significantly used as a former practice rocket range, if it was used at all.

### 2.5.3 Conceptual Site Model

A conceptual site model is a graphical representation of a site and its environment that visually depicts potential exposure pathways that might be present. The conceptual site model is broken out into three sections 1) Sources—areas where MEC or MC has or may enter the environment, 2) Interactions—the hazard from MEC or MC that may arise as a result of receptors coming in contact with source areas, and 3) Receptors—organisms (human or ecological) that have the potential to come in contact with a chemical or physical agent at the present time or in the reasonably anticipated future. The conceptual site model summarizes potential receptor exposure pathways for MEC and MC that are or may be “complete,” “potentially complete,” or “incomplete.” All elements of the pathway must be present for a pathway to be considered “complete” or “potentially complete,” including a source of MEC and/or MC, a receptor that might be affected by contamination, and a method for which the receptor may be exposed to the contaminant.

The conceptual site models for MRS 01 and MRS 03 were updated as part of the RI to identify complete, potentially complete, or incomplete exposure pathways for current and reasonably anticipated future land uses. The updated conceptual site models were based on the data presented in previous investigations and data collected and analyzed as part of the RI. Based on the findings of the 2007 SI, no MC were identified at MRS 01 or MRS 03 that pose a risk to human health or the environment; therefore, all MC exposure pathways are incomplete for MC. Since no MEC was identified historically or during the RI, no MEC source was identified at MRS 01 or MRS 03, and therefore, the exposure pathway for MRS 01 and MRS 03 is incomplete.

As noted in Section 2.5.1.1 and 2.5.1.7, natural coastal processes including the action of tides, wind, waves, currents, and sea level rise continually influence and shape Assateague Island. In response to sea level rise, the island is slowly moving westward through storm overwash and inlet formation processes. Based on the natural changes, it is likely that the shoreline will continue to move westward and the former range impact areas will eventually be underwater for longer periods of time. With continued wave action in the former range area there will be cyclical exposure of buried objects (i.e., munitions debris) located along the shoreline. If unmitigated, the shoreline will move further inland until it eventually surpasses the former range area, leaving the entire area underwater. These changes may continue to uncover munitions debris as has historically occurred at Assateague Island, but no MEC has been identified and therefore, it is anticipated that there will continue to be no exposure pathway for MEC at MRS 01 and MRS 03.

## 2.6 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

MRS 01 is located on property owned by NPS and the State of Maryland. The area encompassed by MRS 01 is open for public use and includes the Assateague State Park nature center and the southern portion of the Assateague State Park campground. Portions of the National Seashore and associated facilities located within MRS 01 include the National Seashore Entrance Station, North and South Ocean beaches, the former North Beach U.S. Lifesaving Service Station, and the Oceanside and Bayside Campgrounds that includes restrooms, picnic areas, and water filling stations ([Figure 4](#)). Additionally, the parking lot for North Ocean Beach and the Campground

Office and Ranger Station is located within MRS 01; however, the Visitor Center and National Park Headquarters are outside of the MRS boundary (NPS 2016). MRS 03 is located entirely on NPS property and is open to the public for recreational use. Green Run, a backcountry campsite, is located within the MRS 03 boundary, along with four known hunting blinds. There are no known permanently inhabited structures in MRS 01 or MRS 03 (Alion 2007). Land use is not anticipated to change at either MRS in the future.

## **2.7 SUMMARY OF SITE RISKS**

No MC sampling was performed during the RI, as in accordance with the RI planning documents, additional MC sampling was planned only if any source areas (areas with concentrations of MEC) were found during the RI (EA 2017). The following sections, 2.7.1 and 2.7.2, present the discussion from the 2007 SI report (Alion, 2007) of the risk-based screening performed on MC at the two MRSs at the Assateague Island FUDS. This information is summarized in the RI Report. Since no MEC or source areas containing MEC was found, no MC sampling was conducted during RI and no risk assessment of MC was performed.

An analysis of the explosive risk from MEC for MRS 01 and MRS 03 is included within the RI report. A summary the risk is provided below.

### **2.7.1 Human Health Risk Screening for MC**

Environmental samples were collected during the 2007 SI and analyzed for select explosives and metals that were associated with the munitions known to have been used at the Assateague Island FUDS. Samples collected during the SI were biased to/collected in suspect target and disposal areas to evaluate those areas with the greatest potential for MC contamination related to former MMRP operations. No MC were reported as exceeding human health screening criteria for surface water, sediment, soil, or groundwater in MRS 01. No MC were reported as exceeding human health screening criteria for surface water, sediment, or soil in MRS 03. One MC (aluminum) was reported as exceeding 1/10<sup>th</sup> the human health screening criteria for groundwater in MRS 03. However, this analyte was not retained as a chemical of potential concern because the sample was from a temporary well point that was not filtered and likely contained sediment particles as evidenced by elevated levels of essential nutrients (Alion 2007). As such, no unacceptable risks to human receptors associated with MC were identified for MRS 01 or MRS 03.

### **2.7.2 Ecological Risk Screening for MC**

A screening level ecological risk assessment (SLERA) was required at the former FUDS since it is located in an area regulated by the Maryland and Virginia Coastal Zone Management Programs, contains numerous salt-marsh wetland areas, and provides valuable and recognized habitat for ecological receptors, including rare, threatened, and endangered species. The SLERA performed as part of the 2007 SI identified antimony as exceeding ecological soil screening criteria at MRS 01 and MRS 03. However, the antimony concentrations were consistent with background values in the area and are likely not related to the munitions found onsite. Therefore, no MC were identified to pose a risk for ecological receptors at MRS 01 or MRS 03 (Alion 2007).

### 2.7.3 Risk Management Methodology for MEC

The Risk Management Methodology included in the study paper *Decision Logic to Assess Risks Associated with Explosive Hazards, and to Develop Remedial Action Objectives (RAOs) for MRS* (USACE 2016) is the current evaluation system being used to assess risk from MEC at each MRS at the FUDS and it accounts for a variety of factors related to the potential risks at a given MRS. This methodology has three main purposes: to provide decision logic to differentiate acceptable versus unacceptable site conditions at MRSs; to establish a systematic approach for developing remedial action objectives (RAOs); and to assist in developing acceptable response alternatives to meet the RAOs. The methodology utilizes MRS characteristics of Accessibility, Sensitivity, and Severity to illustrate site-specific conditions, and assign acceptable versus unacceptable scenarios for each MRS. The methodology contains a series of risk matrices (Matrix 1 through 4) that use site-specific data to relate accessibility, munitions sensitivity, and severity of an explosive event if it were to occur, to determine baseline risks as discussed below.

**Matrix 1**—the “Likelihood to Encounter” relates the site characterization data for the amount of MEC potentially present to site use, including accessibility, in order to determine the likelihood of encountering MEC at a specific site. “Amount of MEC” is determined using site-specific characterization data or anticipated or completed results of a remedial action. “Access Conditions” are selected based on considerations of the access and frequency of use for the MRS.

- For MRS-01, no MEC has been found and all MD identified to date has been fired, expending the potential explosive component. However, MRS 01 is used daily as it is open to the public for recreational use and there is suspected, a low possibility of MEC presence, based only on historical evidence of munitions use. Therefore, the likelihood of encounter with MEC is considered “Seldom” (Table 2).
- For MRS-03, no MEC has been found and the two pieces of MD identified suggest the MRS may not have been used; therefore, the likelihood of encounter with MEC is “Unlikely” (Table 3).

**Matrix 2**—the “Severity of an Incident” relates the “Likelihood of Encounter” from Matrix 1 to the severity of an unintentional detonation. Unlike the two factors affecting the “Likelihood of Encounter” in Matrix 1, the “Severity” factor in Matrix 2 is a static characteristic of each of the munitions known or suspected to exist at the property.

- For MRS-01, no MEC has been found and all MD identified to date has been fired, expending the potential explosive components. However, if based on a “rare occurrence”, a practice bomb containing a spotting charge was encountered, injury would be considered “Modest” resulting in potential emergency medical treatment (Table 2).
- For MRS-03, no MEC has been found and the two pieces of MD identified suggest the MRS may not have been used; therefore, the encounter with explosive munitions is “Unlikely” and severity of injury is “Improbable” (Table 3).

**Matrix 3**—the “Likelihood of Detonation” relates the sensitivity of site-specific munitions items to the likelihood for energy to be imparted on an item, such that the interaction results in detonation (an incident). The “sensitivity” of a munitions item is alone a static component,

inherent to the known or suspected munitions present at the site. The likelihood to impart energy is selected from the known activities at the site that may cause an interaction that results in energy being imparted on a munitions item by human activity.

- For MRS-01, no MEC has been found and all MD identified to date has been fired, expending the potential explosive components. The fired/spent 20-mm practice projectile and fired practice rockets are not sensitive to detonation. A practice bomb with an intact spotting charge would have a “Low” sensitivity to detonation. Based on the current use of MRS 01, which is a National Seashore/Park not planned for development, the likelihood to impart energy on an item is “Modest” (Table 2).
- For MRS-03, no MEC has been found and the two pieces of MD identified suggest the MRS may not have been used; therefore, the likelihood of energy to be imparted is “Inconsequential” and the munitions sensitivity to detonation is “Not Sensitive” (Table 3).

**Matrix 4**—represents the overall risk for the site and differentiates “acceptable” from “unacceptable” conditions. This is determined based on the likelihood of an encounter (Matrix 1), with consideration given to the severity of the incident (Matrix 2), combined with the likelihood of an interaction that results in detonation (Matrix 3). This matrix identifies acceptable conditions, which become possible remedial action goals that are ultimately achievable (via remedial response actions) for all portions of the MRS.

- For MRS-01, the result from Matrix 2 and the result from Matrix 3, input into Matrix 4 indicate that conditions at MRS 01 are “Acceptable”. Based on the completion of the Risk Management Methodology evaluation, MRS 01 was identified as having acceptable site conditions (Table 2).
- For MRS-03, the result from Matrix 2 and the result from Matrix 3, input into Matrix 4 indicate that conditions at MRS 03 are “Acceptable”. Based on the completion of the Risk Management Methodology evaluation, MRS 01 was identified as having acceptable site conditions (Table 3).

The summary of the results from each matrix evaluation is presented in Table 2 for MRS 01 and Table 3 for MRS 03.

**Table 2: Risk Management Methodology Summary Evaluation for MRS 01**

<b>Matrix</b>	<b>Evaluation</b>	<b>Risk</b>
#1 Likelihood of Encounter	Amount of Live Munitions – None Found	Seldom
#2 Severity of Incident	Encounters with Live Munitions Items - None	Rare Occurrence – Modest Injury
#3 Likelihood of Detonation	Sensitivity of Detonation - Low	Low
#4 Site Conditions	Seldom to Encounter, Rare Occurrence of Injury, Low Sensitivity	ACCEPTABLE SITE CONDITIONS

**Table 3: Risk Management Methodology Summary Evaluation for MRS 03**

<b>Matrix</b>	<b>Evaluation</b>	<b>Risk</b>
#1 Likelihood of Encounter	Amount of Live Munitions – None Found	Unlikely
#2 Severity of Incident	Encounters with Live Munitions Items - None	Improbable – No Injury Anticipated
#3 Likelihood of Detonation	Sensitivity of Detonation – Not Sensitive	Inconsequential – Not Likely to Impart Energy
#4 Site Conditions	Unlikely, Improbable, Not Sensitive	ACCEPTABLE SITE CONDITIONS

Sufficient area was investigated during the RI to support the conclusions presented in the Risk Management Methodology. Although practice and inert munitions have been identified at both MRSs, no MEC has been found. Since no MEC has been identified at either MRS 01 or MRS 03 during previous investigations or during the RI, it is unlikely that a future encounter with live munitions or explosives will occur. Therefore, the Risk Management Methodology evaluation determined acceptable site conditions for both MRS 01 and MRS 03. If, however, in the future, new information and/or MD is discovered that is significantly different from what is known or discovered to date, the NPS may consult with the USACE to assess options.

## **2.8 DOCUMENTATION OF SIGNIFICANT CHANGES FROM THE PREFERRED ALTERNATIVE IN THE PROPOSED PLAN**

No comments on the proposed plan for the Assateague Island FUDS at MRS-01 or MRS-03 were received at the public meeting or during the public comment period April 29<sup>th</sup> – June 3<sup>rd</sup>, 2019. Therefore, there are no changes in this Decision Document to the No Remedial Action determination for MRS 01 and MRS 03 at the Assateague Island FUDS presented in the Proposed Plan for these sites.

### **3. RESPONSIVENESS SUMMARY**

A public comment period for the Proposed Plan was provided from April 29<sup>th</sup> – June 3<sup>rd</sup>, 2019. In addition, a public meeting was held on 2 May 2019 to present the Proposed Plan. At the public meeting, representatives from USACE presented investigation information about Rocket Range North (MRS 01) and Rocket Range South (MRS 03) and the preferred remedy being considered. USACE answered questions about the investigation and the proposed no remedial action decision for the FUDS. A summary of the meeting and meeting materials is provided in [Appendix A](#).

#### **3.1 STAKEHOLDER COMMENTS AND USACE RESPONSES**

The public comment period ended on 3 June 2019. No formal comments were received during the public meeting nor during the comment period.

#### **3.2 TECHNICAL AND LEGAL ISSUES**

No issues were raised during the public meeting or during the public comment period that would impact the technical or legal requirements for the remedy.



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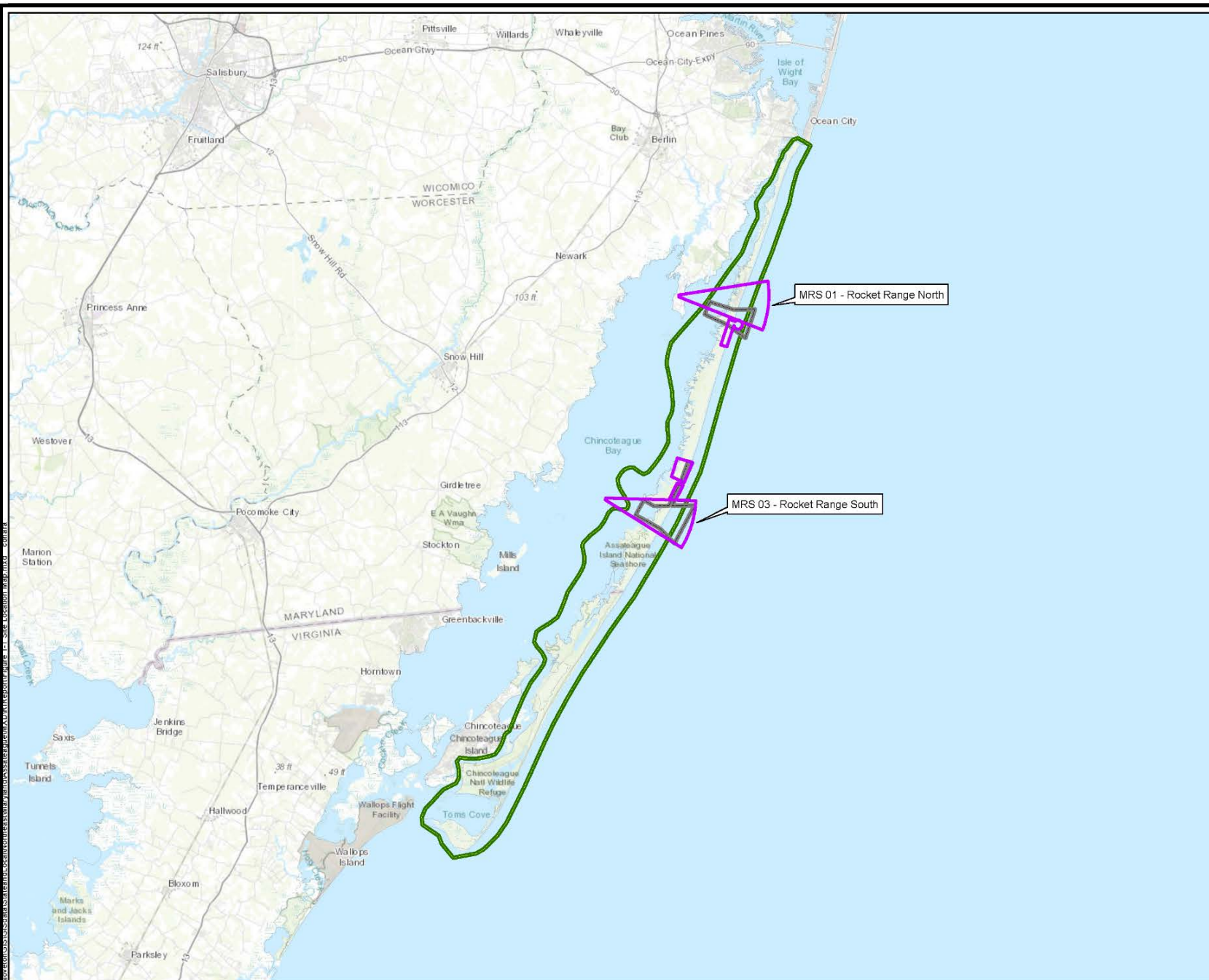
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## FIGURES

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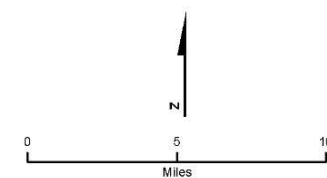
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#### Legend

- Approximate MRS Boundary
- Remedial Investigation Area
- FUDS Boundary

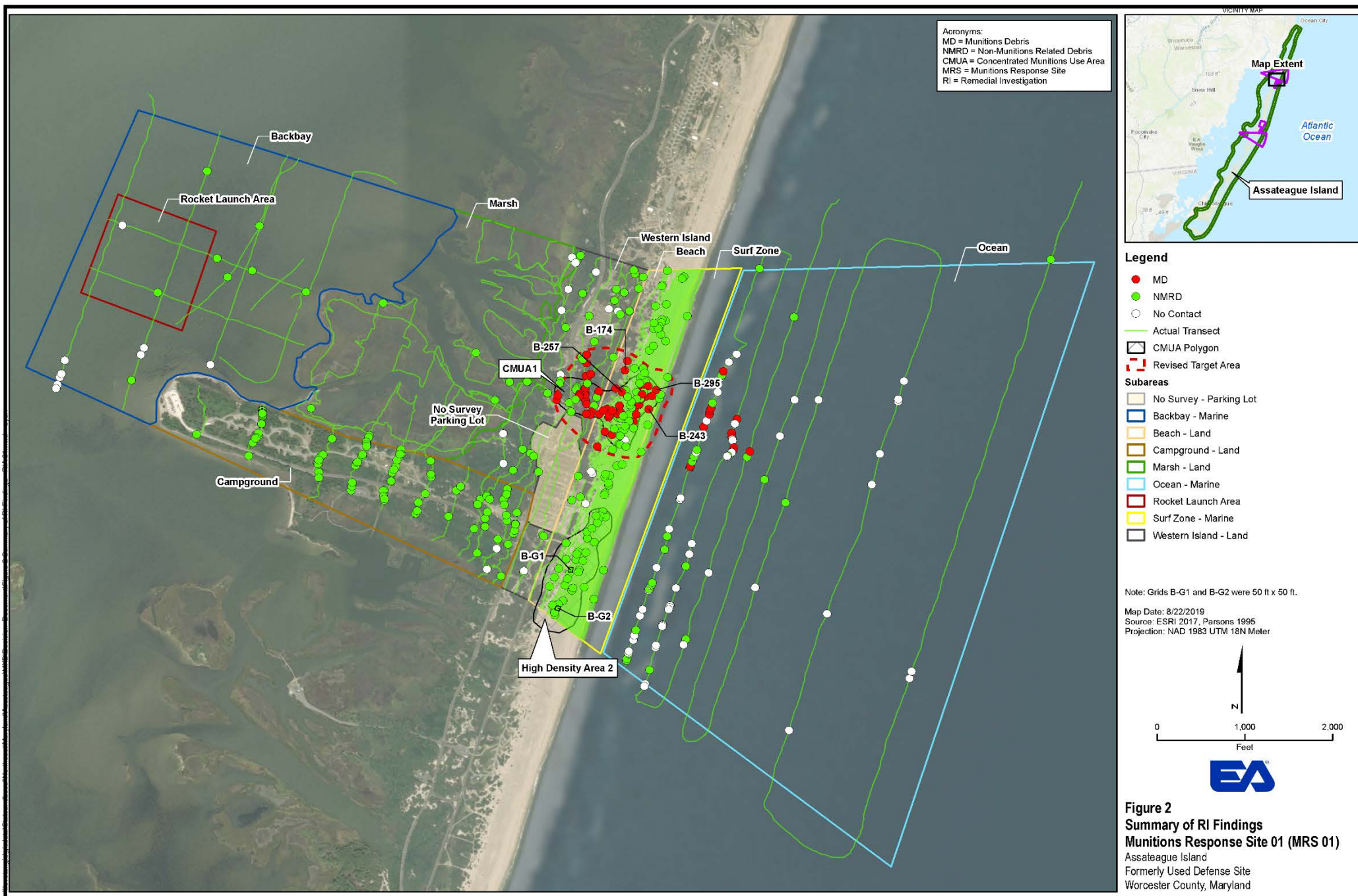
Map Date: 10/16/2018  
 Source: ESRI 2017, Parsons 1994,  
 USACE RFP Assateague Island 2013  
 Projection: NAD 1983 UTM 18N Meter



**Figure 1**  
**Site Location Map**  
 Assateague Island  
 Formerly Used Defense Site  
 Worcester County, Maryland

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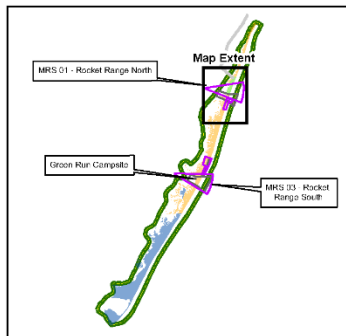
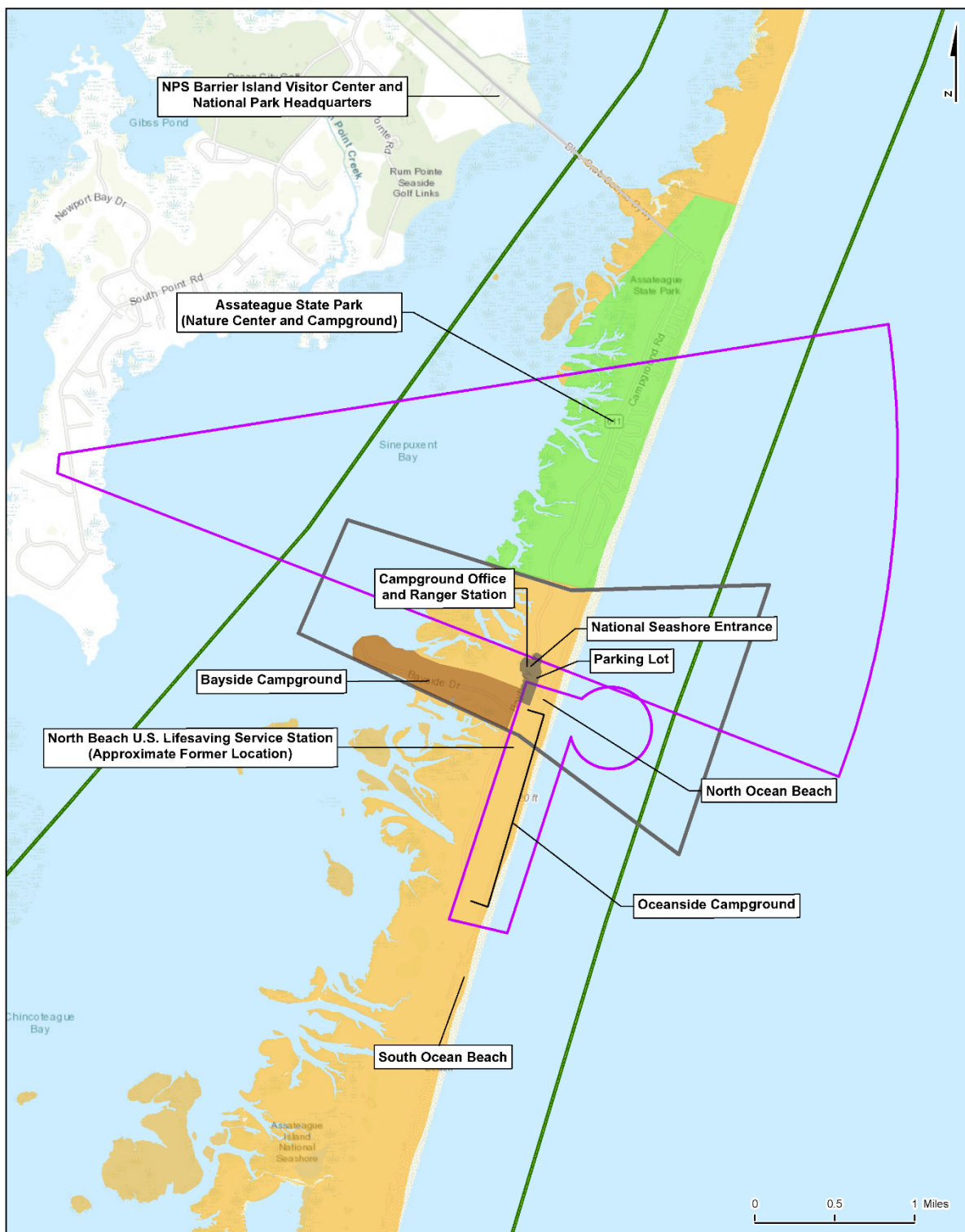


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\\nrc01\GIS\State\StateandLocal\Northeast\Maryland\Assateague\MXD\Figure 4 - Assateague Island Features V2.mxd



#### Legend

- Remedial Investigation Area
- MRS Boundary
- Assateague State Park
- Assateague Island National Seashore
- Chincoteague National Wildlife Refuge
- Parking Lot
- FUDS Boundary

Notes:  
FUDS - Formerly Used Defense Site  
MRS - Munitions Response Site

**Figure 4**  
**Assateague Island Features**  
Assateague Island  
Formerly Used Defense Site  
Worcester County, Maryland

Sources: ESRI  
Parsons, 1995  
Assateague Island National Seashore 2016  
National Park Service  
Map Date: 8/20/2019

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## **Appendix A**

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### **PROPOSED PLAN PUBLIC MEETING MATERIALS AND MINUTES**

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**PUBLIC MEETING ADVERTISEMENTS**

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**US Army Corps  
of Engineers**

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**for the Assateague Island Formerly Used Defense Site**

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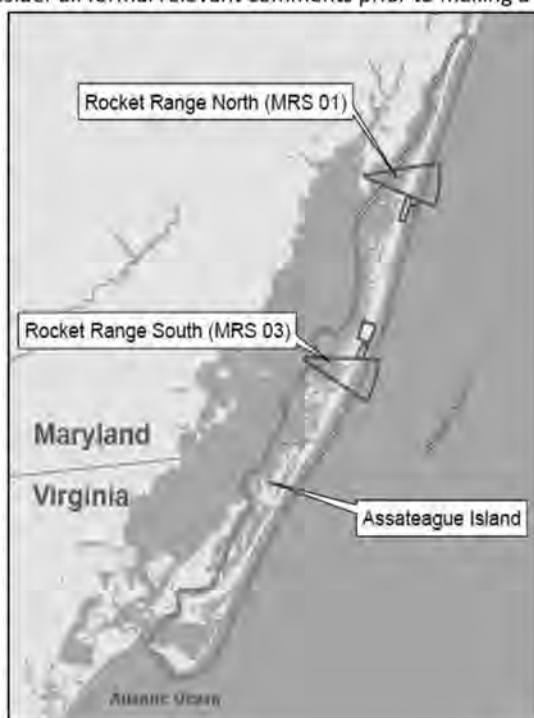
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USACE Baltimore District  
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Baltimore, MD 21201  
Ph: (410) 962-2683  
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USACE Baltimore District  
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Baltimore, MD 21201  
Ph: (410) 962-2626  
Christopher.P.Gardner@usace.army.mil

# Split Council Ratifies Union Contract

BY SHAWN J. SOPER

MANAGING EDITOR

OCEAN CITY – After years of debate, a successful referendum last November and a lengthy negotiation period last month, a divided council on Monday approved a new contract for the town's firefighter-paramedic union, but it certainly wasn't easy.

Way back in February 2016, the clock expired on negotiations between the town and the Career Firefighter Paramedics Union of Ocean City, or IAFF 4269, on a new three-year contract, resulting in the town's best and final offer becoming the new contract by default. Those negotiations broke down over the town's unwavering position on the elimination of the paramedics' long-standing 24-hour shifts.

Unsatisfied with the result, the IAFF successfully petitioned to referendum the right to collectively bargain on the new contract with binding interest arbitration if a similar impasse was reached. Last November, the town's electorate approved binding interest arbitration for the firefighter-paramedics.

This week's approved contract, which did not need arbitration to resolve, was narrowly approved by a 4-3 vote. The sticking point for two of the three nay votes was the re-appearance of the 24-hour shifts, which are negotiated back into the contract as part of a hybrid shift rotation.

"I support our firefighters and paramedics and hold them in high esteem," said Councilman Dennis Dare. "In all good consciousness, I cannot support paramedics working in 24-hour shifts. I can't vote to support this contract."

Council Secretary Mary Knight agreed, saying, "No research or data supports human beings working in 24-hour shifts. I can't support this contract because of that."

Councilman Matt James, who served on the town's negotiating team, said he could not support the contract on the table because he didn't believe it represented the best interest of the town. He supports the 24-hour shift schedule.

"I also can't support this for different reasons," he said. "They are not proactive. They don't go out looking for sick people or looking for fires. They are reactive when the calls come in. I know this contract could have been reached with a significantly lower cost. It came in around \$800,000 and I think it could have been done for \$300,000."

Councilman John Gehrig said if the council was clearly divided on the proposed contract, maybe the entire negotiating process was flawed.

"I wonder if this is the best way to negotiate," he said. "We have three councilmembers who have now said they are not for it. I wonder if this should be negotiated right out here in front."

Gehrig said the entire process felt

like it was handled by independent lawyers and not those who would be affected by the outcome the most.

"We're certainly not comfortable with the contract as it is written, but the lawyers did the negotiating," he said. "We work with our firefighters and paramedics like partners, like family, but this almost feels like we're getting a divorce. The fact that we're split on this shows the negotiation process is broken."

At that point, it was uncertain how the vote was going to go. Dare, Knight and James had already said they could not support the new contract, but others on the council had not yet played their hands. Gehrig asked what would happen if the contract was not ratified on Monday. City Solicitor Guy Ayres explained the IAFF contract was intrinsically tied to the ongoing fiscal year 2020 budget deliberations.

"If the resolution fails, we don't have a collective bargaining agreement," he said. "The city manager presents a budget based on the terms of this agreement. He wouldn't know what to set the budget at if we don't have a collective bargaining agreement."

Ayres supposed if the contract was not ratified, it could go back to renegotiation, but questioned what could be gained if the 24-hour shifts were truly a deal-breaker.

"If this is a stand-off over the 24-hour shifts, then I don't know what you're going to bargain for," he said. "I'll check with our labor lawyers, but if that is the impasse, I don't know what different agreement you can reach."

Councilman Mark Paddack, who served on the town's negotiation team and drew from his experience with negotiating collective bargaining agreements for the police department, said he was satisfied with the IAFF deal on the table.

"I'm confident in this contract," he said. "It is 49 pages long and it took five long meeting days. I can tell you for the 28 years of my career, I wasn't home with my family on weekends. I was working. The firefighters and paramedics over here will have to work some weekends. We're a resort town and the police and the public works people all work weekends. That's how we got to the 24-hour shifts."

Paddack said the alternative to reaching the agreement with the IAFF was hiring more personnel, the salaries and benefits for whom would not offset the cost of the contract on the table.

"This is a hybrid," he said. "It's not all 24-hour shifts. It's a hybrid schedule to fill the personnel needs on weekends. The recommendation was to hire 18 new personnel, but I can tell you that's not going to happen. I wish we could have given you everything you asked for, but that's not going to happen. These things need to be done incrementally and you got a big bite of

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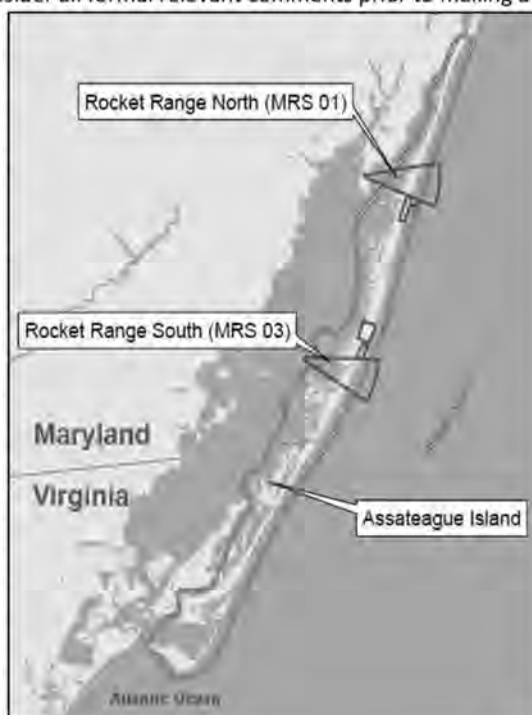
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# Senator Offers Legislative Review

*(Editor's Note: The following review of the Maryland legislative session was submitted by District 38 Sen. Mary Beth Carozza, who represents Worcester, Wicomico and Somerset counties. After a term in the House of Delegates, Carozza was elected to the Senate last November.)*

BERLIN – The 439th Session of the Maryland General Assembly and my first session as a Maryland State Senator concluded on Tuesday, April 9 at 12 a.m. and adjourned until January 2020. The 90-day session presented a new landscape in Annapolis with new state senators, delegates, leadership members and committee chairs, the passing of Speaker Michael Busch, the health challenges of Senate President Thomas V. Mike Miller and the second term of Gov. Larry Hogan.

The 2018 Election statewide had consequences. For members of the Eastern Shore Delegation, it has meant stepping up to meet the significant challenge of educating more of our urban, liberal-leaning colleagues on the impact of proposed legislation on our Shore Way of Life and beginning to build effective coalitions as new legislation and policies are proposed.

Given the impact of proposed legislation, the Senate Republican Caucus worked to try and minimize the negative consequences on our core constituencies. With the minimum wage deliberations, we all fought hard to keep the tip wage and to have a longer phase-in period for small businesses with less than 15 employees. I also introduced an amendment that would have created a regional tier system for the implementation of the minimum wage increase. My amendment had some bipartisan support but not enough to pass it. I voted against the minimum wage increase and voted to sustain Governor Hogan's veto. To address the many legislative and regulatory challenges currently facing our small businesses, I have begun to work with a bipartisan Senate small business workgroup focused on providing relief for Maryland's job creators.

Throughout the Session, I returned over and over again to a point I made in the Lincoln Day presentation I was honored to give on the Senate Floor.

Looking at the leadership lessons we learn from President Lincoln during the Civil War, I pointed out his approach of always leaving something on the table for the other side, even when you could have taken it all. I reminded my colleagues that having the votes should not mean shutting down the other side. It can and should mean accomplishing goals to include and not harm key stakeholders like small businesses, watermen, and farmers. We have to live and work together.

For District 38, it has meant my using this first year to work with local elected officials and leaders on strategies to advance priorities through legislation, regulatory relief, and partnerships with the Hogan Administration to meet our shared goals.

Taking into account the new makeup and challenges of the 2019 Maryland General Assembly, I especially appreciate our shared accomplishments, including passage of Governor Hogan's fiscally-sound budget with no new taxes and a record \$7 billion for education, the Ocean City Convention Center expansion bill (which did not advance last session), \$500,000 for the Somerset County Visitor Center and \$931,000 for the entrepreneurship and economic development center in Salisbury.

We also were successful in defeating legislation that would have legalized physician-assisted suicide in Maryland. The legislation proposed was flawed on so many levels with no safeguards for individuals with disabilities, no family notification required, no identification required for pickup, and no way to prevent insurance fraud. Furthermore, every state that has legalized physician-assisted suicide has seen their general suicide rates dramatically increase. This legislation failed by a vote of 23-23, and I voted against this bill. One vote can make a difference.

My proposed legislation to expand the penalties in the special events zones and to extend the seasonal exemption from 106 to 120 days met resistance from committee chairs who were not inclined to make any revisions to the laws which have been in effect for only a year. However, the

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# Letters

Continued from Page 26

that moving forward with only one bid is against the by-laws. The objective should always be to obtain 3 bids on a project. OPA management nor the Board has any control over who or how many contractors bid a project.

The request for proposals (RFP) was sent to 13 firms. The due date was extended to give firms more time to prepare a bid. Back in January we had a proposal for the club house (the original RFP was for a renovation approach which was estimated to be in excess of \$2 million.)

That same renovation bidder then gave us a very competitive price for a smaller replacement building. It was then decided to issue a new RFP. We received one bid for the second RFP which was for a replacement and at a price very similar to the one provided by the first bidder.

So, in my opinion the appropriate steps were taken to provide Ocean Pines with a viable, cost effective solution to a problem that has been before us for several years - what do you do with an old, poorly maintained, failing structure.

The solution provides for golf operations to continue and provides for community space that many say is desperately needed. And in a worst-case scenario, if at some time in the future, golf completely ends in Ocean Pines, there will be a building that can serve the community well in many different ways.

Additional posting on the Forum states, "However, those are not all the questions regarding the actual final cost. The following items are listed as "Exclusions:"

- Tap and impact fees –
- Builders Risk Insurance
- Performance and Payment Bonds
- Unforeseen site conditions and unsuitable soils
- Dewatering
- Landscaping
- Relocation of existing utilities
- Electric, telephone, CATV and gas services
- Kitchen equipment
- Furnishings, fixtures and equipment
- Fire and security systems
- Telephone, data, cable TV, sound system, punch down and termination
- Telephone/data boxes and wiring
- Extreme price escalation in raw material prices
- Any item added as a result of agency reviews that are not shown at this time
- Any item not specifically shown on bid documents mentioned above"

Well this is a long list that is not as problematic as suggested in the post. The following explanations may be helpful:

However, those are not all the questions regarding the actual final cost. The following items are listed as "Exclusions:"

the county dependent on connecting to existing sewer/water normally paid by the owner

- Builders Risk Insurance – Normally paid by the owner
- Performance and Payment Bonds – If you need this you should look for a different contractor

• Unforeseen site conditions and unsuitable soils – This can only be verified when the existing building is completely removed

• Dewatering – Not anticipated to be needed on this site

• Landscaping – This will be provided by OPA

• Relocation of existing utilities – Because the new building will be on the site of the existing building and the footprint size will be similar no relocation of utilities is expected

• Electric, telephone, CATV and gas services – This is primarily connecting to these services that already exist in the building now

• Kitchen equipment – This is already owned by OPA, was paid as part of the lower level renovation of Tern Grill, and has been determined to be reusable in the new facility

• Furnishings, fixtures and equipment – These items are owned by OPA and will be stored at Public Works and installed in the new building

• Fire and security systems – Sprinkler systems and Ansul systems are included in the bid. If it is determined that a security system needs to be installed that will be done.

• Telephone, data, cable TV, sound system, punch down and termination – An owner install or coordination

• Telephone/data boxes and wiring – An owner install. Most likely VOIP utilizing existing computers and phones

• Extreme price escalation in raw material prices – This is in reference to items like asphalt for paving that experience large price swings and cannot be predicted months in advance of construction

• Any item added as a result of agency reviews that are not shown at this time – If OPA decided to make changes once the final design is reviewed and approved this would add cost.

• Any item not specifically shown on bid documents mentioned above – Clarity of bid documents and a commitment not to make changes once approved is the best way to navigate the path forward.

The guaranteed maximum price for the clubhouse project is \$1.6 million. The estimated cost for the building is \$1,420,000. There is a \$180,000 contingency that provides the money necessary for items in the above list.

The existing building will be demolished after removing the items that can be reused in this and other projects. The value of the removed items is in excess of \$100,000.

Continued on Page 29



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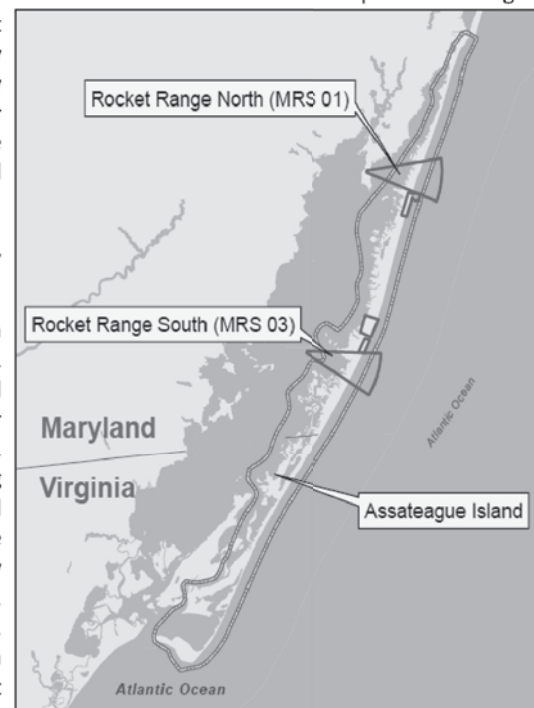
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# Letters

Continued from Page 20

helping the town to thrive and grow. We hope to have your support and see you April 29 at the High School.

*Edward S. Lee, Facilitator  
Snow Hill Now*

## To fix Berlin, everyone needs to work together

Editor,

My father often told me: failing to plan is planning to fail.

Berlin's recent budget predicament—I loathe to call it a crisis because that word implies something unexpected and dire—seems not only predictable but the predictable result of both a failure to plan and a failure to stick to a plan.

Getting us out of this mess, and moving Berlin toward a healthy future, will require planning. So far, I haven't seen any such plan coming out of City Hall, our Town Council, or our mayor.

Urban planning is an art and a science, and in recent years the Town of Berlin has planned poorly.

The purchase of Berlin Falls Park—a potential future boon to this town—along with the ill-conceived development and annexation of Oceans East, the recent approvals of annexation requests for parcels along the route 50 corridor—the Gerardi property, and the Athena property—as well as the resulting overbuilt water treatment plant, are clear demonstrators of Berlin's lack of planning, or even adherence to an existing plan.

Rather than follow our own strategies, Berlin reacts on a case-by-case basis without regard to the current state of the town and its finances, and without regard to current or future growth.

Berlin's response to annexation criticism usually falls along this line: "If we don't make it part of Berlin then we have no say over what happens there."

That argument is flawed on several levels. Berlin town limits don't have to expand in order for the town to have input over development of property contiguous to our corporate limits.

The implication that we have no sway over county policies, that the county board will discount the sovereignty of the Town of Berlin in favor of private development, is ridiculous. Restrictions are placed on businesses all the time through the use of zoning restrictions, water regulations, building codes, and, most importantly, strategic, long term planning.

We as a community get to decide if we want more gas stations along Route 50. We choose if we want the welcome sign for Berlin from the west to be a Wawa with a wall of pamphlets.

Do we want another car dealership? A McDonald's? Chain hotels? More apartments? Do we want to develop a second business district away from Main Street?

Stick to the plan.

We need more than a plan. We need leaders who are willing to follow a plan, who are not influenced by the belief that a particular developer is a "good man," or by flashy demonstrations and promises of tax "revenue" without consideration of future monetary and non-monetary costs.

A well planned community is not one that relies on "nice" developers who will "do the right thing." A well planned community equally enforces rules and regulations for all businesses and developers, no matter the builder, no matter the business owner, no matter the land owner.

This uniform and consistent application of codes and ordinances is lacking in Berlin.

All this is to say that Berlin, to get itself out of its current financial mess—and keep itself out—needs strategic financial and comprehensive plans for the future. Not just the for next 10 years as required of a comprehensive plan, but the next five years, then 15 years, then 20 years down the road, and beyond.

Berlin needs all of us—elected officials, committees, town employees, and administrators, along with residents, business owners, and community leaders—to work together to ensure that as a town, as a community, we are willing to make changes, to abide plans and goals, all toward ensuring Berlin's long term health, financial and otherwise.

*Jeff Smith  
Berlin*

## State once again failed to act on CAFO legislation

Editor,

This year a very important piece of legislation to study the air quality around industrial chicken houses or CAFO's failed to get out of committee for the 3rd year in a row.

Despite testimony from many Eastern Shore citizens who live near these facilities and suffer from the air and deal with asthma and related respiratory illnesses and who once again traveled to Annapolis to share their stories, nothing happened.

The Community Healthy Air Act would have required monitoring of several different facilities and then an analysis by scientists from the University of Maryland School of Public Health, University of Maryland College of Agriculture and Natural Resources and the Bloomberg School of Public Health and their report would have been presented to Maryland legislators.

Instead, the Maryland Department of the Environment and the Delmarva Poultry Industry teamed up to perform air quality monitoring of just two locations: one upwind and one downwind of a CAFO, but with no independent scientific analysis of the data and no indication that the results will be shared with either the public or anyone else.

*Nancy Tuttle  
Ocean Pines*



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**7206 National Seashore Lane, Berlin, MD 21811.**

The U.S. Army Corps of Engineers (USACE) has completed a Remedial Investigation and a Proposed Plan for the Assateague Island Formerly Used Defense Site (FUDS) in Worcester County, MD. The public is invited to provide feedback on the draft final Proposed Plan for the Assateague Island FUDS site and USACE is conducting a public meeting on May 2, 2019 where the public can learn more.

Assateague Island is a 37-mile-long barrier island along the eastern shore of Maryland and Virginia. From 1944 to 1947, the U.S. Navy and the U.S. Army Air Corps established two separate rocket ranges on Assateague Island, a Northern Range (Munitions Response Site [MRS] 01) and one in the South (MRS 03), which were used during World War II for target practice by land-based aircraft. No live munitions have been discovered on either range at the Assateague Island National Seashore in Maryland or at the Assateague Island Maryland State Park, where the target ranges were located. Only munitions debris have been uncovered. The Proposed Plan summarizes the remedial investigation and proposes a preferred approach of no further action.

The Proposed Plan and RI Report will be available for public review beginning April 24, 2019 by hard copy and electronic copy at the Worcester County Library – Berlin Branch at 13 Harrison Ave., Berlin, MD. For more information about the library location or hours, please call (410) 641-0650. It will also be available online at:

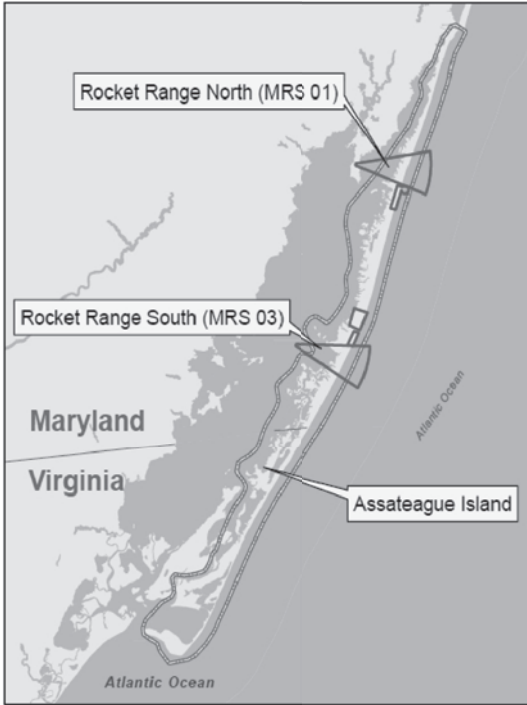
[www.nab.usace.army.mil/Missions/Environmental/Formerly-Used-Defense-Sites/](http://www.nab.usace.army.mil/Missions/Environmental/Formerly-Used-Defense-Sites/)

### Public Comment Period – April 29, 2019 to June 3, 2019

The USACE will hold a public comment period for the Proposed Plan from April 29 to June 3, 2019. The USACE will consider all formal relevant comments prior to making a final decision. You may submit formal written comments by email or mail postmarked by June 3, 2019 to Christopher Gardner, USACE Baltimore District (address and e-mail below).

### Public Meeting – May 2, 2019

A public meeting will be held on May 2, 2019 from 6:00-8:00 p.m. at the Assateague Island Environmental Education Center at 7206 National Seashore Lane, Berlin, MD. The public meeting will include a presentation, and poster sessions, where community members can review individual poster stations, discuss completed activities, meet with project team members, and submit comments.



### Meeting Agenda

- 6:00 pm - 6:30 pm: View displays and speak with staff**
- 6:30 pm – 7:30 pm: Formal presentation followed by a question and answer session**
- 7:30 pm – 8:00 pm: View displays and speak with staff**

For more information regarding the public meeting for the Assateague Island Formerly Used Defense Site, please contact either:

Liza Finley (CENAB-ENE-C) Project Manager USACE Baltimore District 2 Hopkins Plaza Baltimore, MD 21201 Ph: (410) 962-2683 Liza.Finlev@usace.army.mil	Christopher Gardner (CENAB-CC) Public Affairs Specialist USACE Baltimore District 2 Hopkins Plaza Baltimore, MD 21201 Ph: (410) 962-2626 Christopher.P.Gardner@usace.army.mil
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**PUBLIC MEETING SIGN-IN SHEET**



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Project Assateague Island FUDS  
Subject Public Meeting

Project No. \_\_\_\_\_

Sheet No. \_\_\_\_\_ of \_\_\_\_\_

Drawing No. \_\_\_\_\_

Computed by \_\_\_\_\_

Date 5/2/19

Checked by \_\_\_\_\_

Date \_\_\_\_\_

# Sign-In

Name	Affiliation	Where are you from?
Emily Cline	EA Engineering	Hunt Valley, MD
Mike O'Neill	EA Engineering	Hunt Valley, MD
Liza Finley	USACE	Baltimore, MD
Katrina Harris	Bridge Consulting	Philadelphia, PA
Tom Colozza	USACE	Baltimore, MD
Todd Steelman	USACE	Baltimore, MD
IRA MAY	MDE	Assateague Island NS
Bill Hulslander	NPS	Assateague State Park
Stephanie Venarchick	ASR	Salisbury, MD
Shawn Jester	Congressman Andy Harris	
Walt West	NPS	Assateague Island
ELIZABETH WALKER		SOUTH POINT
Sylvia Tunis	Resident	Berlin, MD - South Point Rd.
John Zayed	"	
TUVE TUVESSON	"	

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## **PUBLIC MEETING PRESENTATION**

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# FORMERLY USED DEFENSE SITE ASSATEAGUE ISLAND PUBLIC MEETING

May 2<sup>nd</sup>, 2019

U.S. Army Corps of Engineers  
Baltimore District



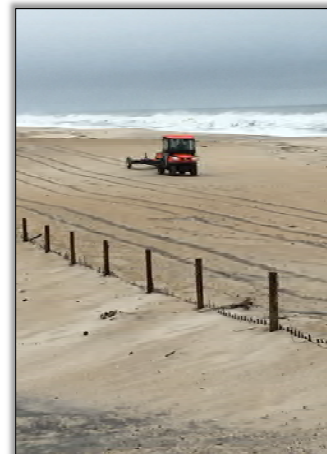
Assateague Island Environmental Education Center  
7206 National Seashore Lane  
Berlin, MD



## INTRODUCTION

### • Why are we here?

- Present the results of the military munitions **Remedial Investigation** at Assateague Island
- Present **Proposed Plan** for Assateague Island
- Receive **public input** on the Preferred Approach
  - Federal requirement of the environmental cleanup process (National Contingency Plan at 40 Code of Federal Regulation § 300.430(f)(3)(c).



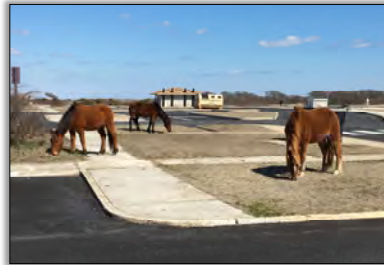
Introduction



## INTRODUCTION

2

- Project Team:
  - United States Army Corps of Engineers (USACE) – Baltimore District
  - USACE Contractor: EA, Engineering, Science, and Technology, Inc., PBC (EA)
  - National Park Service (NPS)
  - Maryland Department of the Environment (MDE).
- Sign in sheet
- Handouts



Introduction



## AGENDA

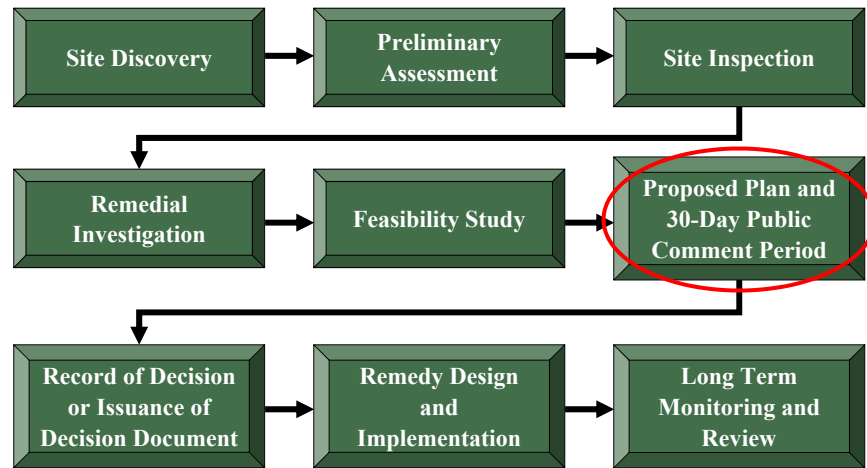
3

- Introduction
- Environmental Response Process
- Assateague Island Site History
- Remedial Investigation
- Risk Management Methodology
- Summary and Conclusions of Remedial Investigation
- Next Steps – Proposed Plan and Ways to Comment
- Questions



## STAGE IN THE ENVIRONMENTAL RESPONSE PROCESS

4



Introduction



## ASSATEAGUE ISLAND FORMERLY USED DEFENSE

5

- The Munitions Response Sites (MRSs) are located on property owned by the National Park Service and the State of Maryland.
- Currently used as a nature preserve and recreation area.

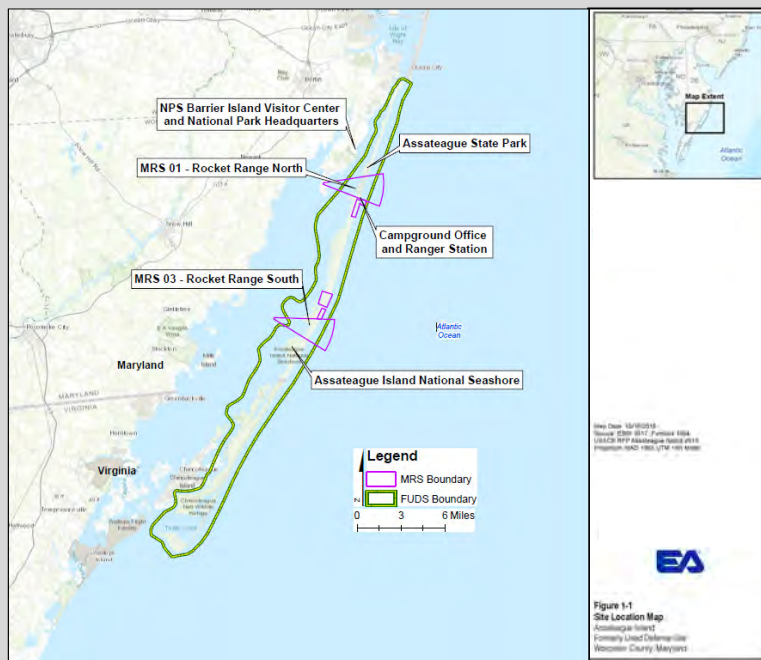


Figure 1-1  
Site Location Map  
Assateague Island  
Formerly Used Defense Sites  
Western County, Maryland



## 6

- 
- Hand-drawn map of the Rio Grande area. The map shows the Rio Grande flowing from the top left towards the bottom right. A branch, Rio Nuevo, flows from the top left into the main river. Further down, the Rio Grande flows into the Rio Grande Canal, which then leads to the Rio Grande Dam. The map includes a scale bar indicating 0 to 3 miles. A north arrow is located in the bottom right corner. The map is labeled "Rio Grande" and "Rio Nuevo".




## 7

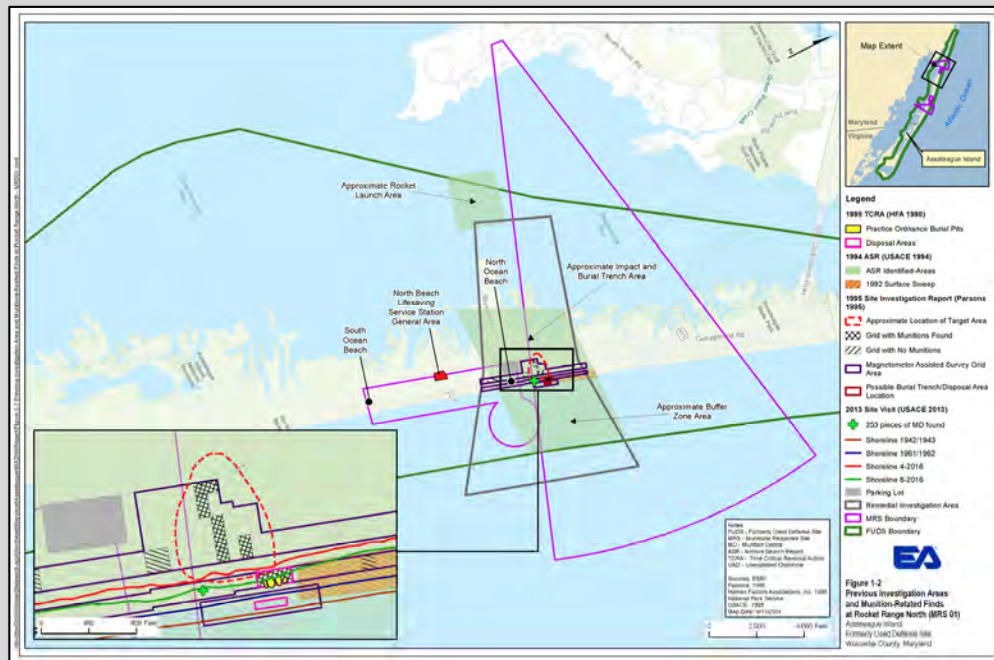
- 
- The top image shows a person wearing a brown hooded jacket, a high-visibility yellow safety vest, and black boots, using a metal detector in a field of dry grass and brush. The bottom image is a close-up of the metal detector's coil, which is a circular metal plate, resting on the ground.



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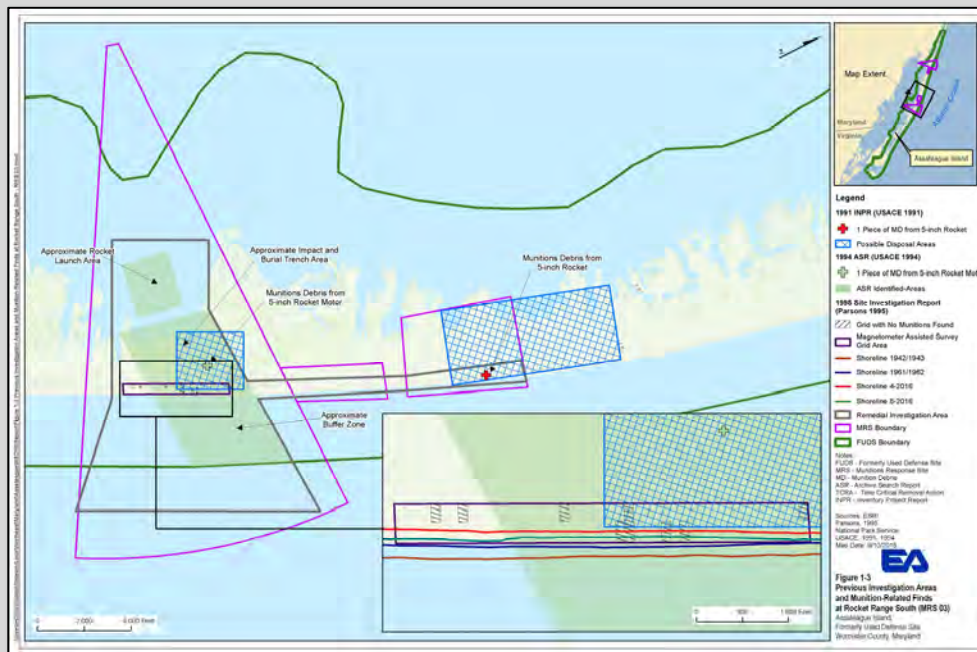
## PREVIOUS INVESTIGATIONS - MRS 01

8



## PREVIOUS INVESTIGATIONS – MRS 03

9



## ASSATEAGUE ISLAND PREVIOUS INVESTIGATIONS

10

- 1995 Site Investigation Report
  - Metal detector-assisted “sweep” of gridded areas in MRS 01 and MRS 03 – 125 items of munitions debris uncovered in the subsurface (1 practice bomb) and 20 on the surface.
- 1998 Time Critical Removal Action (TCRA)
  - Identified a disposal/burial area – 212 items of munitions debris uncovered in subsurface (3 Mk 23 bombs)
- 2003 Baltimore District Site Visit
  - As part of long-term monitoring after TCRA, further characterized area for potential munitions
- 2007 Site Inspection
  - Evaluated if live munitions or munitions constituent hazards existed



Site History



## PREVIOUS INVESTIGATIONS – SAMPLING

11

- Soil, surface water, sediment, and groundwater sampling performed during the Site Investigation:
- Analyzed for metals and explosives
  - No explosives detected
  - Low-level concentrations of metals
    - Aluminum detected in groundwater at one location at MRS 03, but elevated concentration likely from suspended sediment particles in sample – Aluminum not considered a Chemical of Potential Concern.
    - Antimony detected in soil above ecological soil screening levels at both MRSs – Detections were below background.
- No further action was recommended for munitions constituents.



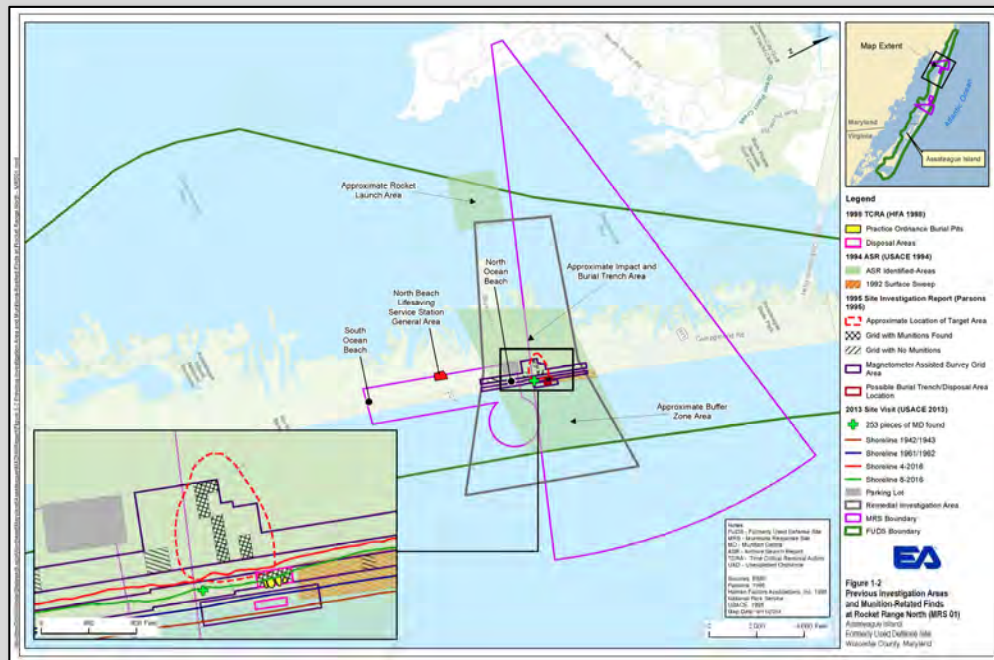
Site History





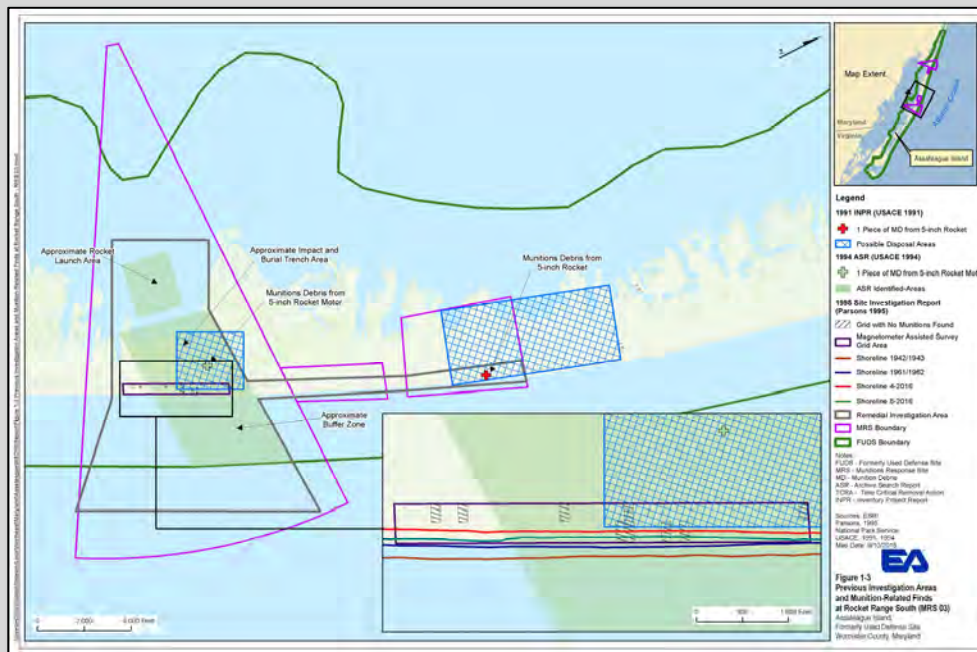
## PREVIOUS INVESTIGATIONS - MRS 01

12



## PREVIOUS INVESTIGATIONS – MRS 03

13



# ASSATEAGUE ISLAND PREVIOUS INVESTIGATIONS

14

- 2013 Explosive Ordnance Disposal Team
  - 213 items of munitions debris washed up on shore; Explosive Ordnance Disposal (EOD) team response.
- 2013 USACE Site Visit
  - USACE conducted metal detector-assisted "sweep" located 19 more pieces of munitions debris on surface.
- National Park Service Findings
  - In 2017 NPS reported munitions debris in surf zone, items were reburied naturally by sand, no recovery.
  - NPS Cumulative Findings to date; 250 pieces of munitions debris discovered and disposed of.

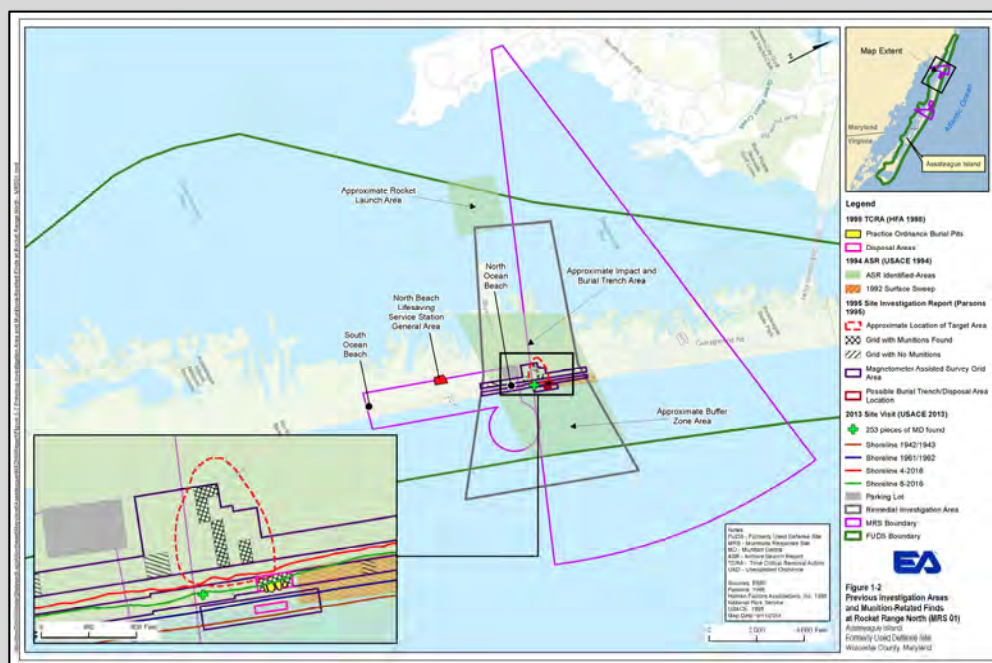


Site History



## PREVIOUS INVESTIGATIONS - MRS 01

15



## MUNITIONS DEBRIS HISTORICALLY FOUND

16

Investigation	Description	Surface		Subsurface		Total
		MEC	MD	MEC	MD	
1988 Case Incident	5-inch practice rockets	0	5	0	1	6
	3.25-inch practice rockets	0	0	0	2	2
	2.25-inch practice rockets	0	0	0	11	11
1991 Inventory Project Report	Practice bomb (4.5 lb Mk 43)	0	1	0	0	1
	20-mm Projectile Casing (inert)	0	1	0	0	1
1994 Archive Search Report	3.25-inch practice rockets	0	1	0	0	1
1995 Site Investigation Report	5-inch practice rockets	0	0	0	1	1
	2.25-inch practice rockets	0	20	0	120	140
	3.5-inch practice rockets	0	0	0	3	3
	"Old style" Practice bomb (type not specified)	0	0	0	1	1
1998 Time Critical Removal Action (TCRA)	5-inch practice rockets	0	0	0	3	3
	3.25-inch practice rockets	0	0	0	10	10
	2.25-inch practice rockets	0	0	0	196	196
	Practice bomb (3 lb Mk 23)	0	0	0	3	3
2013 EOD Team Response	MD (type unknown)	0	234	0	0	234
2013 USACE Site Visit	MD (type unknown)	0	19	0	0	19
NPS MD Collection	MD (type unknown)	0	250	0	0	250
Total Items (found)		0	531	0	351	882

Site History



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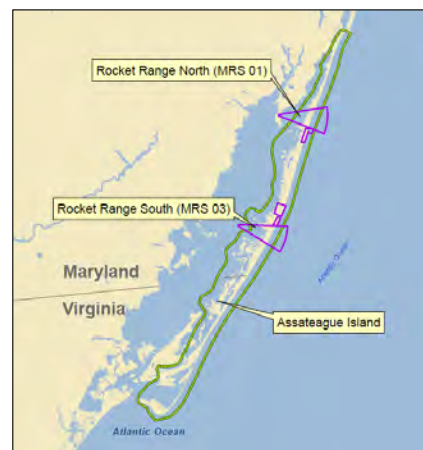
## REMEDIAL INVESTIGATION

17

**Purpose:** Conduct Remedial Investigation (RI) of Rocket Range North (Munitions Response Sites [MRS] 01) and Rocket Range South (MRS 03)

### Objectives:

- Determine nature and extent of Munitions and Explosives of Concern (MEC) and Munitions Constituents (MC).
- Assess risk/hazards of current and future exposures.



Project Scope and Objectives



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## WHAT IS DIGITAL GEOPHYSICAL MAPPING AND HOW IS IT COLLECTED?

18

- Digital Geophysical Mapping (DGM): is use of specialized instruments on the ground surface to detect metallic items such as munitions or munitions debris below the ground surface. The instruments used are metal detectors and the signals collected are known as **anomalies**.



- Collected by pushing or pulling metal detectors along paths (i.e., transects)
- Signal is recorded and combined with location (GPS, Latitude/Longitude).
- Path spacing is based on the size of the items you are looking for.



Overview of RI Activities



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## HOW IS DGM DATA USED?

19

- A statistical program is used to determine how many of the signals (**anomalies**) detected by the instrument should be dug up to determine if it is a possible munition.
  - **Targets of Interest** – are those signals (**anomalies**) detected by the instrumentation that are large enough to be potentially considered as munitions.
  - Must investigate enough area and the targets of interest within the area to be confident that few to no live munitions will be encountered by the public.
- Munitions personnel use the global positioning system (GPS) data and hand-held metal detectors to re-locate the targets of interest selected and then dig them up to determine if the target is a munition of concern.



Overview of RI Activities



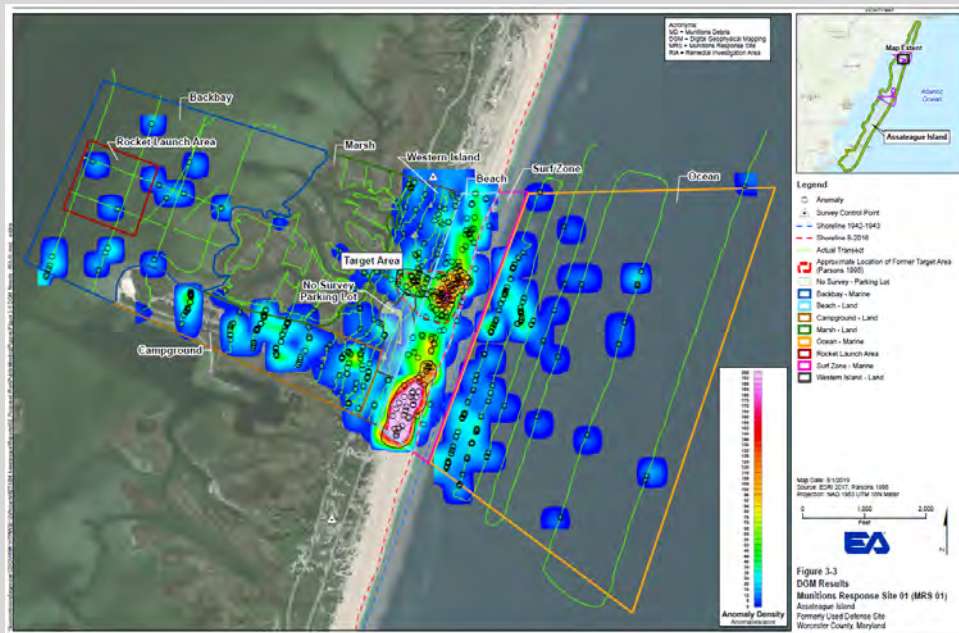
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## DGM DATA TARGETS OF INTEREST

20



## OVERVIEW OF INVESTIGATION ACTIVITIES

21

### • Marine Field Activities – 7 November 2017 to 26 January 2018

- Performed investigation in Ocean and Bay Areas
- Processed DGM data
- Intrusively investigated all targets of interest identified with an Unexploded Ordnance (UXO) dive team.



Overview of RI Activities





## OVERVIEW OF RI ACTIVITIES

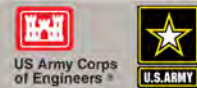
22

### • Land Field Activities – 3 March to 5 May 2018

- Performed select vegetation removal to clear paths for investigation
- Performed investigation along beach, dunes, marshes, vegetated and wooded areas
- Processed DGM data
- Intrusively investigated targets of interest (i.e., signals large enough to indicate possible munitions).

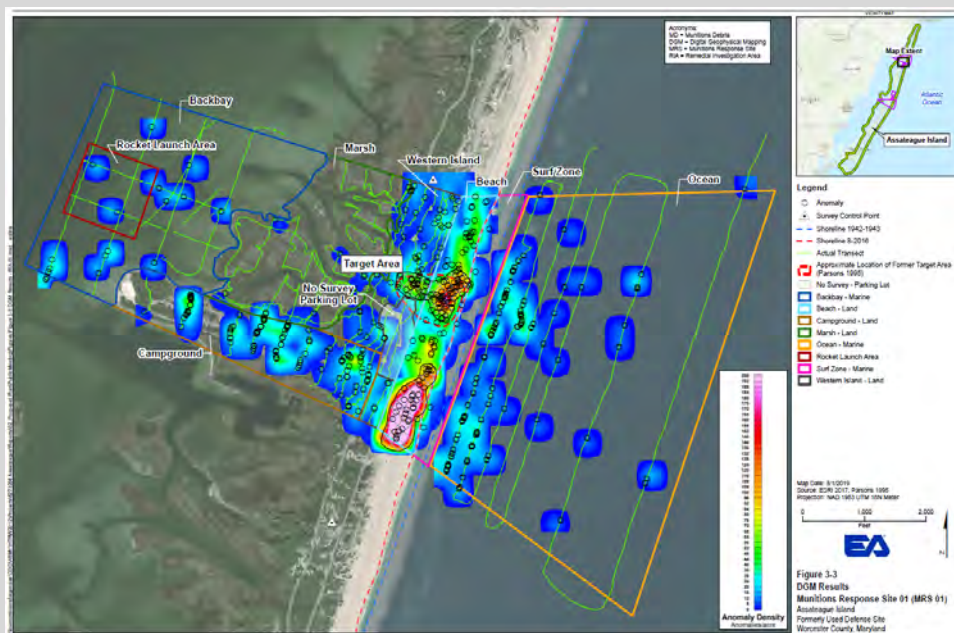


Overview of RI Activities



## DGM INVESTIGATION RESULTS – MRS 01

23



## DGM INVESTIGATION RESULTS – MRS 01

24

### Summary of Water-Based Digital Geophysical Mapping Surveys Performed at MRS 01

Munitions Use	Area	DGM Miles Planned	DGM Acres Planned	DGM Miles Collected	DGM Acres Collected
Non-Target Area	Back Bay	3.6	2.9	4.1	3.3
Non-Target Area	Ocean	7.5	6	8.9	7.1
<b>Total</b>		<b>11.1</b>	<b>8.9</b>	<b>13.0</b>	<b>10.4</b>
<i>Taken from Table 3-1 in the RI.</i>					

RI DGM, Field Modifications, and Summary



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## DGM INVESTIGATION RESULTS – MRS 01

25

### Summary of Land-Based Digital Geophysical Mapping Surveys Performed at MRS 01

Munitions Use	Area	DGM Miles Planned	DGM Acres Planned	DGM Miles Collected	DGM Acres Collected
Non-Target Area	Marsh	2.6	1	6.5	2.6
Target and Non-Target Areas	Back Bay Campground	2	0.8	3.6	1.4
Target and Non-Target Areas	West Island	3.5	1.4	5.2	2.1
Disposal and Non-Target Areas	Beach	32	12.8	28.7	11.4
Disposal and Non-Target Areas	Shallow Surf	11	4.4	6.3	2.5
<b>Total</b>		<b>51.1</b>	<b>20.4</b>	<b>50.2</b>	<b>20.0</b>
<i>Taken from Table 3-2 in the RI.</i>					

RI DGM, Field Modifications, and Summary



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## DGM INVESTIGATION MODIFICATIONS – MRS 01

22

- **Land—Shallow Surf and Beach DGM**

- Limited data collection in surf zone (safety concerns)
  - Shallow Surf – Planned 4.4 acres/**Performed 2.5 acres.**
- Reduced investigation acreage for the beach area (over estimated in Work Plan)
  - Beach – Planned 12.8 acres/**Performed 11.4 acres.**



RI DGM, Field Modifications, and Summary



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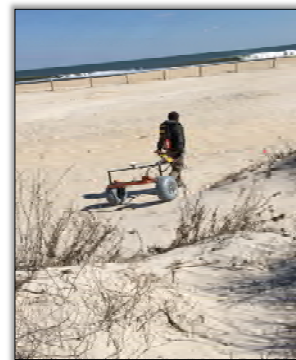


## DGM INVESTIGATION MODIFICATIONS – MRS 01

23

- **Land—All Areas**

- Adjustments to transects to minimize vegetation removal.
- Good transect coverage of Non-Target Areas—no grids needed.
- Ample transect coverage and signal detection in the target area; therefore, no grids were necessary.



RI DGM, Field Modifications, and Summary



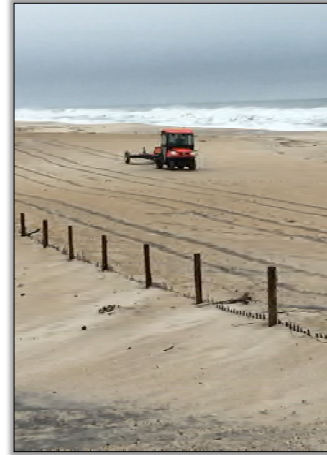
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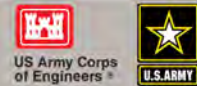
## DGM INVESTIGATION SUMMARY – MRS 01

24

- Achieved enough coverage to be confident that few to no live munitions will be encountered.
- Performed transects on land and water (150-ft spacing in-between transects) - one target area identified.
- Performed transects in beach area from low-tide (water edge) and the dunes (15-ft spacing in-between transects) - **no disposal areas identified.**
- “Suspect” disposal area in the surf zone not accessible from land or water (safety concerns) does not affect findings.
- DGM Coverage - Planned 20.4 acres/**Performed 20.0 acres.**

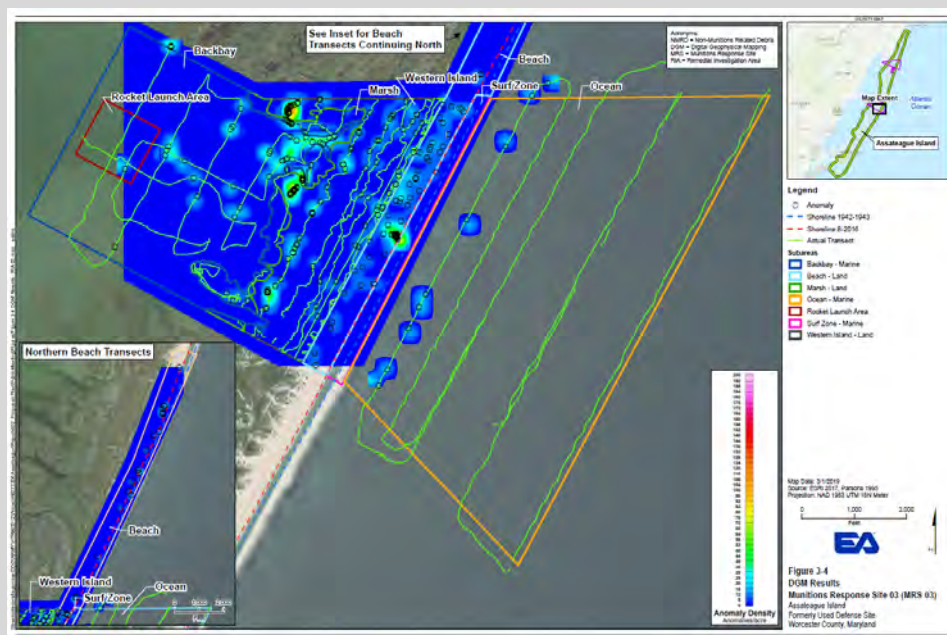


RI DGM, Field Modifications, and Summary



## DGM INVESTIGATION RESULTS – MRS 03

25



## DGM INVESTIGATION RESULTS – MRS 03

30

### Summary of Water-Based Digital Geophysical Mapping Surveys Performed at MRS 03

Munitions Use	Area	DGM Miles Planned	DGM Acres Planned	DGM Miles Collected	DGM Acres Collected
Non-Target Area	Back Bay	3.25	2.6	6.1	4.9
Non-Target Area	Ocean	7.5	6	10.9	8.7
<b>Total</b>		<b>10.75</b>	<b>8.6</b>	<b>17.0</b>	<b>13.6</b>

*Taken from Table 3-1 in the RI.*

RI DGM, Field Modifications, and Summary



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## DGM INVESTIGATION RESULTS – MRS 03

31

### Summary of Land-Based Digital Geophysical Mapping Surveys Performed at MRS 03

Munitions Use	Area	DGM Miles Planned	DGM Acres Planned	DGM Miles Collected	DGM Acres Collected
Non-Target Area	West Island	1.3	0.5	7.8	3.1
Non-Target Area	West Island	4.6	1.9	3.6	1.5
Non-Target/Disposal Area	Beach	146.0	59.0	65.0	25.8
Non-Target/Disposal Area	Shallow Surf	11.0	4.4	6.9	2.7
<b>Total</b>		<b>163.0</b>	<b>66.2</b>	<b>83.4</b>	<b>33.1</b>

*Taken from Table 3-3 in the RI.*

RI DGM, Field Modifications, and Summary



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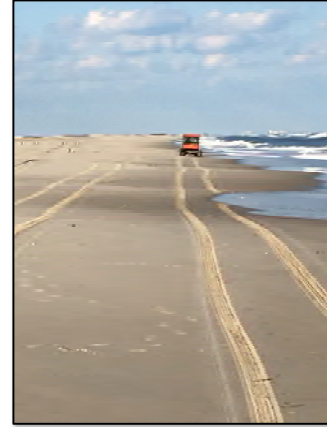




## DGM INVESTIGATION MODIFICATIONS – MRS 03

### • Land—Shallow Surf and Beach DGM Modifications

- Limited data collection in surf zone (safety concerns)
  - Planned 4.4 acres/**Performed 2.7 acres.**
- Reduced acreage investigated for the beach area (over estimated in Work Plan)
  - Planned 59.0 acres/**Performed 25.8 acres.**



RI DGM, Field Modifications, and Summary



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## DGM INVESTIGATION SUMMARY – MRS 03

- **Achieved enough coverage to be confident that few to no live munitions will be encountered.**
- Performed 150-ft transect spacing on land and water - **no target areas identified.**
- Performed 15-ft transect spacing in beach area from low-tide (water edge) and the dunes — **no disposal areas identified.**



RI DGM, Field Modifications, and Summary



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## INTRUSIVE INVESTIGATION RESULTS – MRS 01

34



## INTRUSIVE INVESTIGATION RESULTS – MRS 01

35

### • Intrusive Investigation Findings—Water

- 109 targets of interest were investigated
- 13 items identified as munitions debris
- 62 unable to be relocated or buried deeper than the diver could safely excavate
- 34 items identified as cultural debris (steel cans, anchors, etc.)
- **NO LIVE MUNITIONS FOUND**



## INTRUSIVE INVESTIGATION RESULTS – MRS 01

36

- **Intrusive Investigation Findings—Land**

- 336 targets of interest were investigated
- 51 pieces of munitions debris (MD predominately from practice rockets, 1 – 3-lb Mk 23 practice bomb, 1 - practice 20-mm projectile)
- 1 item range-related debris (physical target)
- 31 buried too deep to safely excavate
- 246 items identified as cultural debris (tent stakes, metal posts, etc.)



- **NO LIVE MUNITIONS FOUND**

Intrusive Investigation Results, Field Modifications and Summary



## INTRUSIVE INVESTIGATION RESULTS – MRS 01

37

- Intrusively investigated over **400 targets of interest**.
- **NO LIVE MUNITIONS FOUND!**
- Located **former target area**
- Mini-excavator assisted investigation with several signals detected at depth:
  - Identified a **large metal plate/** remnants of the former target.
  - Identified munitions debris in the former burial pit removed during the 1998 Removal Action.



Intrusive Investigation Results, Field Modifications and Summary





## INTRUSIVE INVESTIGATION RESULTS – MRS 01

38

### Summary of Recovered Items at MRS 01 During the RI

Description	Surface		Subsurface		Total
	MEC	MD	MEC	MD	
Land					
20-mm Training Practice Projectile	0	1	0	0	1
2.25-in. practice rockets	0	0	0	88	88
Practice bomb (3-lb Mk 23)	0	0	0	1	1
Water					
2.25-in. practice rockets	0	0	0	13	13
Total	0	1	0	102	103
Taken from Table 4-2 in the RI.					
NOTES:					
in.	=	Inch(es).	MEC	=	Munitions and explosives of concern.
MD	=	Munitions debris.	RI	=	Remedial investigation.
mm	=	Millimeter(s).			

Intrusive Investigation Results, Field Modifications and Summary



## INTRUSIVE INVESTIGATION RESULTS – MRS 03

39



## INTRUSIVE INVESTIGATION RESULTS – MRS 03

40

- **Intrusive Investigation Findings – Water**
  - **41 targets of interest investigated**
  - 17 unable to be relocated or buried deeper than the diver could safely excavate
  - 24 items identified as cultural debris.
- **No Live Munitions or Munitions Debris Identified**



Intrusive Investigation Results, Field Modifications and Summary



## INTRUSIVE INVESTIGATION RESULTS – MRS 03

41

- **Intrusive Investigation Findings – Land**
  - **219 targets of interest investigated**
  - 62 "no finds" (buried deeper than able to safely excavate or weak signals likely resulting from elevated background noise)
  - 148 items identified as cultural debris.
- **No Live Munitions or Munitions Debris Identified**



Intrusive Investigation Results, Field Modifications and Summary



## INTRUSIVE INVESTIGATION RESULTS – MRS 03

42

- Intrusively investigated **260 targets of interest**.
- Identified Green Run Life Saving Station foundation and cultural debris.
- **No Live Munitions or Munitions Debris Identified.**



Intrusive Investigation Results, Field Modifications and Summary



## MUNITIONS DEBRIS AND CULTURAL DEBRIS DISPOSAL

43

- **Processed Munitions Items –**
  - Thorough inspection and re-inspection process to determine that the items are free of explosives.
  - Items segregated and classified as **Material Documented as Safe (MDAS)** to dispose of upon final inspection.
    - **MDAS** – Munitions that have been assessed, do not present an explosive hazard, and for which a chain of custody has been established and maintained.
  - **MDAS** was shipped off-site for final disposition and subsequent disposal.
  - Cultural debris (such as wire, nails, trash etc.) drummed and recycled/disposed of off-site.



Intrusive Investigation Results, Field Modifications and Summary



## INTRUSIVE INVESTIGATION RESULTS

44

### MRS 01 SUMMARY

#### **MRS 01:**

- Sufficient area was investigated to be confident that few to no live munitions will be encountered.
- Using intrusive and DGM data, it is statistically estimated that approximately 500 practice or inert munitions items may still remain in the target area.
- Confirmed the presence of the target area; however area increased to approximately 27.6 acres (versus 16 acres) based on historical and current findings.
- All munitions-related items had been fired or expended
- **No Live Munitions Found!**

Intrusive Investigation Results, and Field Modifications



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## INTRUSIVE INVESTIGATION RESULTS

45

### MRS 03 SUMMARY

- Sufficient enough area covered to be confident that few to no live munitions will be encountered.
- Confirmed that no target or disposal areas identified.
- **No Live Munitions or Munitions Debris Identified.**



RI Target List Development, Intrusive Investigation Results, and Field Modifications



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## RISK MANAGEMENT METHODOLOGY

- Matrix 1 – Likelihood of Encounter
- Matrix 2 – Severity of Incident
- Matrix 3 – Likelihood of Detonation
- Matrix 4 – Acceptable and Unacceptable Site Conditions

*Note: Matrices on following pages taken from Appendix G of the RI Report.*

Risk Management Methodology



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**Matrix 1. Likelihood of Encounter (MRS 01)**

Likelihood of Encounter, Matrix 1: Amount of MEC vs. Access Conditions	Access Conditions (Frequency of Use) <sup>(c)</sup>			
	Regular (e.g., daily use, open access)	Often (e.g., less regular or periodic use, some access)	Intermittent (e.g., some irregular use, or access limited)	Rare (e.g., very limited use, access prevented)
• MEC is visible on the surface and detected in the subsurface.	Frequent	Frequent	Likely	Occasional
• The area is identified as a CMUA where MEC is known or suspected (e.g., MD indicative of MEC is identified) to be present in the surface and subsurface.	Frequent	Likely	Occasional	Seldom
• MEC presence based on physical evidence (e.g., MD indicative of MEC), although the area is not a CMUA, or • The MEC concentration is below a project-specific threshold to support this selection (e.g., less than 1.0/acre at 95 percent confidence).	Likely	Occasional	Seldom	Unlikely
• MEC presence is based on isolated historical discoveries (e.g., EOD report) prior to investigation, or • A DERP response action has been conducted to physically remove MEC and known or suspected hazard remains to support this selection, (e.g., surface removal where subsurface was not addressed), or • The MEC concentration is below a project-specific threshold to support this selection (e.g., less than 0.5/acre at 95 percent confidence).	Occasional	Seldom	Unlikely	Unlikely
• MEC presence is suspected based on historical evidence of munitions use only, or • A DERP response action has been conducted to physically remove surface and subsurface MEC (evidence that some residual hazard remains to support this selection), or • The MEC concentration is below a project-specific threshold to support this selection (e.g., less than 0.25/acre at 95 percent confidence).	<b>Seldom</b>	Seldom	Unlikely	Unlikely
• Investigation of the MRS did not identify evidence of MEC presence, or • A DERP response action has been conducted that will achieve UU/UE.	Unlikely	Unlikely	Unlikely	Unlikely

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Matrix 2. Severity of Incident (MRS 01)

Severity of Explosive Incident, Matrix 2: Severity vs. Likelihood of Encounter		Access Conditions (Frequency of Use) <sup>(b)</sup>				
		Frequent: Regular, or inevitable occurrences	Likely: Several or numerous occurrences	Occasional: Sporadic or intermittent occurrences	Seldom: Infrequent; rare occurrences	Unlikely: Not probable
Severity Associated with Specific Munitions Items <sup>(a)</sup>	<b>Catastrophic/Critical:</b> May result in 1 or more deaths, permanent total or partial disability, or hospitalization	A	A	B	B	D
	<b>Modest:</b> May result in 1 (or more) injury resulting in emergency medical treatment, without hospitalization	B	B	B	C	D
	<b>Minor:</b> May result in 1 or more injuries requiring first aid or medical treatment	B	C	C	C	D
	<b>Improbable:</b> No injury is anticipated	D	D	D	D	D
	<p>(a) There is currently no scale for ranking the explosive nature of munitions, and it; therefore, requires coordination with qualified UXO professionals on the project team. Initiatives are underway to evaluate these considerations of scale. There must be a defined munitions item having an explosive nature and a defined exposure scenario. Additionally, the degrees of hazards differentiate between intact UXO and munitions components such as rocket motors, fuzes, discarded military munitions, and explosive soils. Decision logic to support the selection on this scale must be supported by the CSM, and documented in the project reports. Additional research in this subject area in the future may allow for additional refinement within these categories so that site-specific conditions will be the primary factor for project team determination once MEC types onsite have been determined.</p> <p>(b) Note that with data collected from physical remediation, it is possible to support an unlikely determination for Matrix 1 and Matrix 2.</p> <p>"A" indicates conditions most likely to result in determination of an unacceptable risk.</p> <p>"D" indicates conditions most likely to result in determination of an acceptable risk.</p>					

## Risk Management Methodology



Matrix 3. Likelihood of Detonation (MRS 01)

Likelihood of Detonation, Matrix 3: Munitions Sensitivity vs. Likelihood of Energy to be Impacted		Likelihood to Impart Energy on an Item <sup>(b)</sup>		
		High: (e.g., areas planned for development, or seasonally tilled)	Modest: (e.g., undeveloped, wildlife refuge, parks)	Inconsequential: (e.g., not anticipated, prevented, mitigated)
Sensitivity: <sup>(a)</sup> Susceptibility to Detonation	<b>High:</b> (e.g., classified as sensitive)	1	1	3
	<b>Moderate:</b> (e.g., high explosive or pyrotechnics)	1	2	3
	<b>Low:</b> (e.g., propellant of bulk secondary explosives)	1	2	3
	<b>Not Sensitive</b>	2	3	3
		<p>(a) The Sensitivity categories are scaled highest to lowest, similar to the MRSPP Table 1: Munitions Type Data Elements Table. While the scale of sensitivity in Matrix 3 is similar to MRSPP Table 1, the matrix must have the flexibility to consider the inclusion of unlisted or undefined items, such as fuzes having small amounts of primary charge and not attached to a booster charge, which may be less sensitive than fuzes with large amounts of primary charge or any fuze connected to a booster charge. Selections must be supported by identifying the specific munitions on the MRS (listed with correct nomenclature).</p> <p>(b) The likelihood to impart energy on an item can be high for farmed land that is regularly tilled or areas where development is planned. Moderate areas may include parks or areas where digging is manual or limited. Areas that are inconsequential will include areas where digging is not anticipated, or otherwise mitigated to prevent imparting energy on an item. The project team will consider land use, specifically types and amount of energy imparted at the site that will result in an interaction with a munitions item. The project team will document the justification for selection on the scale.</p>		

## Risk Management Methodology



## RISK MANAGEMENT METHODOLOGY

Table 1: Evaluation for MRS 01

Matrix	Evaluation	Risk
#1 Likelihood of Encounter	Amount of Live Munitions - None Found	Seldom
#2 Severity of Incident	Encounters with Live Munitions Items - None	Rare Occurrence - Modest Injury
#3 Likelihood of Detonation	Sensitivity of Detonation - Low	Low
# 4 Site Conditions	Seldom to Encounter, Rare Occurrence of Injury, Low Sensitivity	ACCEPTABLE SITE CONDITIONS

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Matrix 1. Likelihood of Encounter (MRS 03)

Likelihood of Encounter, Matrix 1: Amount of MEC vs. Access Conditions	Access Conditions (Frequency of Use) <sup>(c)</sup>			
	Regular (e.g., daily use, open access)	Often (e.g., less regular or periodic use, some access)	Intermittent (e.g., some irregular use, or access limited)	Rare (e.g., very limited use, access prevented)
• MEC is visible on the surface and detected in the subsurface.	Frequent	Frequent	Likely	Occasional
• The area is identified as a CMUA where MEC is known or suspected (e.g., MD indicative of MEC is identified) to be present in the surface and subsurface.	Frequent	Likely	Occasional	Seldom
• MEC presence based on physical evidence (e.g., MD indicative of MEC), although the area is not a CMUA, or • The MEC concentration is below a project-specific threshold to support this selection (e.g., less than 1.0/acre at 95 percent confidence).	Likely	Occasional	Seldom	Unlikely
• MEC presence is based on isolated historical discoveries (e.g., EOD report) prior to investigation, or • A DERP response action has been conducted to physically remove MEC and known or suspected hazard remains to support this selection, (e.g., surface removal where subsurface was not addressed), or • The MEC concentration is below a project-specific threshold to support this selection (e.g., less than 0.5/acre at 95 percent confidence).	Occasional	Seldom	Unlikely	Unlikely
• MEC presence is suspected based on historical evidence of munitions use only, or • A DERP response action has been conducted to physically remove surface and subsurface MEC (evidence that some residual hazard remains to support this selection), or • The MEC concentration is below a project-specific threshold to support this selection (e.g., less than 0.25/acre at 95 percent confidence).	Seldom	Seldom	Unlikely	Unlikely
• Investigation of the MRS did not identify evidence of MEC presence, or • A DERP response action has been conducted that will achieve UU/UE.	Unlikely	Unlikely	Unlikely	Unlikely

Risk Management Methodology



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Matrix 2. Severity of Incident (MRS 03)

Severity of Explosive Incident, Matrix 2: Severity vs. Likelihood of Encounter		Access Conditions (Frequency of Use) <sup>(b)</sup>				
		Frequent: Regular, or inevitable occurrences	Likely: Several or numerous occurrences	Occasional: Sporadic or intermittent occurrences	Seldom: Infrequent; rare occurrences	Unlikely: Not probable
Severity Associated with Specific Munitions Items <sup>(a)</sup>	<b>Catastrophic/Critical:</b> May result in 1 or more deaths, permanent total or partial disability, or hospitalization	A	A	B	B	D
	<b>Modest:</b> May result in 1 (or more) injury resulting in emergency medical treatment, without hospitalization	B	B	B	C	D
	<b>Minor:</b> May result in 1 or more injuries requiring first aid or medical treatment	B	C	C	C	D
	<b>Improbable:</b> No injury is anticipated	D	D	D	D	D
	<p>(a) There is currently no scale for ranking the explosive nature of munitions, and it; therefore, requires coordination with qualified UXO professionals on the project team. Initiatives are underway to evaluate these considerations of scale. There must be a defined munitions item having an explosive nature and a defined exposure scenario. Additionally, the degrees of hazards differentiate between intact UXO and munitions components such as rocket motors, fuzes, discarded military munitions, and explosive soils. Decision logic to support the selection on this scale must be supported by the CSM, and documented in the project reports. Additional research in this subject area in the future may allow for additional refinement within these categories so that site-specific conditions will be the primary factor for project team determination once MEC types onsite have been determined.</p> <p>(b) Note that with data collected from physical remediation, it is possible to support an unlikely determination for Matrix 1 and Matrix 2.</p> <p>"A" indicates conditions most likely to result in determination of an unacceptable risk.</p> <p>"D" indicates conditions most likely to result in determination of an acceptable risk.</p>					

## Risk Management Methodology



Matrix 3. Likelihood of Detonation (MRS 03)

Likelihood of Detonation, Matrix 3: Munitions Sensitivity vs. Likelihood of Energy to be Imparted		Likelihood to Impart Energy on an Item <sup>(b)</sup>		
		High: (e.g., areas planned for development, or seasonally tilled)	Modest: (e.g., undeveloped, wildlife refuge, parks)	Inconsequential: (e.g., not anticipated, prevented, mitigated)
Sensitivity: <sup>(a)</sup> Susceptibility to Detonation	<b>High:</b> (e.g., classified as sensitive)	1	1	3
	<b>Moderate:</b> (e.g., high explosive or pyrotechnics)	1	2	3
	<b>Low:</b> (e.g., propellant of bulk secondary explosives)	1	3	3
	<b>Not Sensitive</b>	2	3	3
		<p>(a) The Sensitivity categories are scaled highest to lowest, similar to the MRSPP Table 1: Munitions Type Data Elements Table. While the scale of sensitivity in Matrix 3 is similar to MRSPP Table 1, the matrix must have the flexibility to consider the inclusion of unlisted or undefined items, such as fuzes having small amounts of primary charge and not attached to a booster charge, which may be less sensitive than fuzes with large amounts of primary charge or any fuze connected to a booster charge. Selections must be supported by identifying the specific munitions on the MRS (listed with correct nomenclature).</p> <p>(b) The likelihood to impart energy on an item can be high for farmed land that is regularly tilled or areas where development is planned. Moderate areas may include parks or areas where digging is manual or limited. Areas that are inconsequential will include areas where digging is not anticipated, or otherwise mitigated to prevent imparting energy on an item. The project team will consider land use, specifically types and amount of energy imparted at the site that will result in an interaction with a munitions item. The project team will document the justification for selection on the scale.</p>		

## Risk Management Methodology



## RISK MANAGEMENT METHODOLOGY

Table 2: Evaluation for MRS 03

Matrix	Evaluation	Risk
#1 Likelihood of Encounter	Amount of Live Munitions – None Found	Unlikely
#2 Severity of Incident	Encounters with Live Munitions Items - None	Improbable – No Injury Anticipated
#3 Likelihood of Detonation	Sensitivity of Detonation – Not Sensitive	Inconsequential – Not Likely to Impart Energy
# 4 Site Conditions	Unlikely, Improbable, Not Sensitive	<b>ACCEPTABLE SITE CONDITIONS</b>

Risk Management Methodology

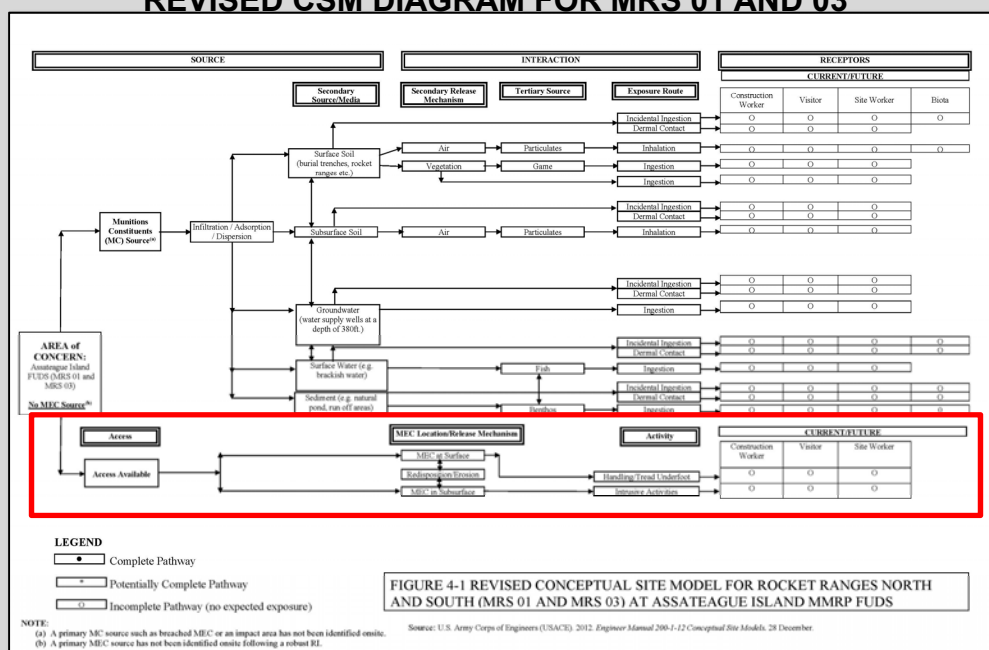


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## REVISED CSM DIAGRAM FOR MRS 01 AND 03



## INVESTIGATION CONCLUSIONS

- **MRS 01**
  - Only training activities occurred at MRS 01.
  - Evidence of practice munitions use only.
  - Over 99% munitions debris was from practice rockets.
  - No spotting charges nor propellant was found in any of the items.
  - **No live munitions identified.**
- **MRS 03**
  - Historically only 2 pieces of munitions debris from 5-in. practice rockets identified.
  - Area not likely continued use as Rocket Range.
  - **No live munitions identified.**

RI Conclusions

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## CONCLUSIONS – PRACTICE BOMBS

- the 3-lb Mk 23 practice bombs and 4.5-lb Mk 43 practice bombs can contain spotting charges, if they did not function as intended. Shell (casing) for the spotting charge during this time period 1944 – 47 was made of cardboard.
- Severe environmental conditions make it unlikely that a spotting charge has remained intact after 70 plus years.
- However spotting charges in practice bombs have been known to be encountered intact at other sites.
- Less than 1%, out of ~ 1000 pieces of munitions debris found, only 6 practice bombs – **rare find**



RI Conclusions

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## CONCLUSIONS – PRACTICE ROCKETS

- The 2.25-in. practice rockets, 3.25-in. practice rockets, 3.5-in. practice rockets, 5-in. practice rockets and the 20-mm practice projectile can contain propellant – 99% of munitions debris was practice rockets.
- Discovery of practice rocket munitions debris and 20-mm munitions debris in the target area confirms practice rockets and inert 20-mm projectiles were fired at the site, and thus, the explosive component was expended prior to deposition.



RI Conclusions



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## INVESTIGATION CONCLUSIONS

**Total Pieces of Munitions Debris Found =**  
**985**

**Historically on Surface = 531**

**Historically within Sub-Surface = 351**

**RI Found in Sub-Surface = 102**

**RI Found on Surface = 1**

**NO LIVE MUNITIONS FOUND**

**at MRS 01 and MRS 03**

RI Conclusions



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## **INVESTIGATION CONCLUSIONS**

**No live munitions identified**

**Proposed Plan  
NO FURTHER ACTION  
At MRS 01 (Northern) and MRS 03 (Southern)**

RI Conclusions



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## **WAYS TO COMMENT – COMMENT PERIOD APRIL 29<sup>TH</sup> – JUNE 3<sup>RD</sup>.**

- Orally at tonight's meeting (stenographer).
- Fill out a written form and turn it tonight.
- Email or mail your written comments by June 3, 2019.
- Documents available at:



[www.nab.usace.army.mil/Missions/Environmental/Formerly-Used-Defense-Sites/](http://www.nab.usace.army.mil/Missions/Environmental/Formerly-Used-Defense-Sites/)

Email: [Christopher.P.Gardner@usace.army.mil](mailto:Christopher.P.Gardner@usace.army.mil)  
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2 Hopkins Plaza  
Baltimore, MD 21201

Path Forward



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## NEXT STEPS

- **Following Public Comment Period (April 29 – June 3, 2019)**
  - Proposed plan will consider all applicable comments
- Prepare a **Decision Document**, take public comments under consideration, public comments will be addressed within the responsiveness summary.
- **Final Decision Document** placed in the library and online.

Path Forward



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### EMERGENCY CONTACT:

Park Dispatch Office:  
(757) 898-0058  
Or call 911

Visit the 3Rs Explosives Safety Education website: [www.denix.osd.mil/uxo](http://www.denix.osd.mil/uxo)

## Follow the 3Rs



**Recognize**  
Recognize when you may have  
encountered a munition



**Retreat**  
Do not touch, move, or disturb  
it, but carefully leave the area.



**Report**  
Immediately notify the  
National Park Service or  
contact local authorities (911).



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# Questions?



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## **PUBLIC MEETING MINUTES**

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**U.S. ARMY CORPS OF ENGINEERS, BALTIMORE DISTRICT  
FORMERLY UTILIZED DEFENSE SITE**

**PUBLIC MEETING ON PROPOSED PLAN  
FOR  
ASSATEAGUE ISLAND**

**MAY 2, 2019, 6:00 P.M.**

**ASSATEAGUE ISLAND ENVIRONMENTAL EDUCATION CENTER, BERLIN,  
MARYLAND**

The following is a transcript of a public meeting held on Thursday, May 2, 2019 at the Assateague Island Environmental Education Center, Berlin, Maryland. *[Information included in brackets in italics was added to the transcript to reflect corrections to the transcript or to clarify a discussion].*

**POSTER SESSION**

U.S. Army Corps of Engineers (USACE) and EA Engineering (contractor to the U.S. Army Corps of Engineers) staff were available to discuss displayed posters about the history of Assateague Island and the Remedial Investigation and answer questions from 6:00 pm to 6:40 pm. No community members entered comments into the record during the poster session.

**INTRODUCTIONS AND PRESENTATION**

**Ms. Emily Cline:**

I'm Emily with EA Engineering and I'm here to support the public meeting. There are handouts at the front table. They talk about public comments and the Proposed Plan. There is a comment form and information on how you submit comments. I'll turn it over to Liza Finley from the Army Corps of Engineers.

**Ms. Liza Finley:**

Good evening and thank you for coming out to the meeting. My name is Liza Finley, and I'm the Project Manager for the Formerly Used Defense Site located on Assateague Island. I work for the Army Corps of Engineers, Baltimore District. [Slide 1] The reason why we are here is to share with you the Military Munitions Remedial Investigation that occurred last year and give you an overview of the results. Based on the results of the Remedial Investigation, we generated the Proposed Plan, which explains the preferred approach for the site. We share the preferred approach with the public in a public meeting and also provide the opportunity to comment on that Proposed Plan; this is an opportunity for the public to have input.

[Slide 2] I work for the Army Corps of Engineers and am joined by two colleagues tonight, Todd Steelman, our ordnance specialist, and Tom Colozza, our geophysicist (geotechnical specialist). EA Engineering is a contractor who works for the Army Corps of Engineers, and here tonight from EA is Mike O'Neill, Project Manager, and Emily Cline, Deputy Project Manager.

Representatives present from the National Park Service include Deborah Darden, Superintendent of the National Seashore; Bill Hulslander, Chief of Resource Management; and Walt West, Chief of Law Enforcement for the National Park Seashore. Also, with us is Ira May from the Maryland Department of the Environment, also located in Baltimore.

[Slide 3] We are here to discuss the Remedial Investigation and subsequent Proposed Plan. I'll explain briefly the environmental response process, Mike is going to go over the site history and Remedial Investigation, I'll discuss the risk evaluation based on the results of the Remedial Investigation, and then we will cover the summary and conclusions the Army Corps of Engineers has come to which were then incorporated into the Proposed Plan. If you have any questions as we go along, please ask. Available to you at the back of the Proposed Plan is an acronym list. We will try not to talk in acronyms tonight, but if you do not understand something, please stop us and ask us to explain. Some common acronyms we use are MEC which is munitions and explosives of concern, and MD which is munitions debris. With respect to the rocket ranges, in the Military Munitions Response Program, we call the northern range MRS 01 which is Munitions Response Site, and the southern range is MRS 03.

[Slide 4] This is the environmental response process. Initially we do historical research to see if a Formerly Used Defense Site might potentially pose some type of danger, and if we believe it might, we do a site visit to determine whether or not it is something we have to more thoroughly investigate. In the case of Assateague Island, especially because of all the munitions that have come up onshore in previous years, it warranted a more thorough investigation to make sure that we understood what was present here. We did a Remedial Investigation which was conducted in the Fall of 2017 and Spring of 2018. The step we are at now is the Proposed Plan stage and there is the opportunity where we communicate with the public what we have been doing, our findings, and what we propose to do going forward.

[Slide 5] This is an image of Assateague Island, and these are the locations of the ranges. The northern range is basically right next to the Ranger Station. The southern range is about 10 to 15 miles south of there.

I'm going to turn it over to Mike O'Neill now, and he is going to go over the site history and some of the previous investigations that have occurred over the years to inform you what we have found consistently over time.

**Mr. Mike O'Neill:**

I'll go over the site history and also the Remedial Investigation results.

[Slide 6] The original Navy spotter was located and interviewed, and he drew the location of the ranges on Assateague Island. The Navy established the ranges in 1944, and the Navy and Army Air Corps used them until about 1947. The planes would come from Chincoteague Naval Air Station, fly up the coast, come across to the north of the northern range, head south, turn east and bomb the target. This was an air-to-ground range used for target practice and the aircraft used practice bombs, inert 20-millimeter (mm) projectiles fired from machine guns on the aircraft, and

practice rockets. After the use of the range, the Navy reportedly cleaned up the range and buried the munitions debris.

[Slide 7] In 1965, Assateague Island was established as the National Seashore. The first incident of something being found at the site occurred in 1988 when munitions debris was exposed on the shore after a nor'easter when sand was eroded away. In 1988, 14 [20] items were recovered. By the time the Explosives Ordnance Disposal team investigated, they found and removed 14 items in the subsurface and six items on the surface.

[Slide 7] In 1991, the information was provided to the Corps of Engineers, and they conducted an inventory project report to establish that the former military use occurred. If such use occurred and the site is deemed eligible, then the Corps of Engineers can investigate and use taxpayers' dollars to clean up any hazards from former Navy or Army use of the site. The Corps found a few munitions debris items during their visit in the southern range and northern range. In 1992, the Corps decided to do an interim investigation and recommended sending a team out to look at the northern range. If you stopped at the poster session earlier, you saw on the poster that the investigation occurred to the north of the target and burial area. They swept the area but did not find any munitions debris. In 1994, they performed historical research at the National Archives to look for additional information about the ranges. They also located the spotter who was with the Navy and stationed at Assateague who identified the location of the ranges, so the Army was able to line up the location of the ranges.

[Mr. O'Neill displayed two maps: MRS 01 on Slide 8 and MRS 03 on Slide 9] I'm going to be showing you the location of each of the investigations. This is where the 1988 investigation was performed. This was the location of the 1992 investigation. For the Inventory Project Report site visit, they walked both the northern and southern rocket ranges.

[Slide 10] In 1995, a Site Investigation was completed, and during this investigation they created grids in the northern and southern ranges and investigated the grids with metal detectors and dug up any items they detected. They found 145 items only in the northern rocket range (MRS 01); nothing was found in the southern rocket range (MRS 03). During this investigation, they also found an area with a large concentration of items, along the shoreline; which they recommended for a future investigation. This area was investigated during the 1998 time-critical removal action. During the 1988 [1998] removal action they found 212 items, 3 of which were the small practice bombs and the rest were practice rockets. In 2003, as part of a follow-up to the 1998 investigation, the Corps of Engineers sent a team to walk the beaches with metal detectors. No munitions debris was found.

[Slide 11] In 2007, Corps of Engineers performed a Site Inspection which is different from a Site Investigation as the Site Inspection includes munitions constituents sampling. The bombs and rockets have some metals associated with them, and if the items contained explosives, there might be some residue of explosives in the area. In 2007, the contractor for the Corps of Engineers sampled in the northern and southern rocket ranges—performing soil, groundwater, and sediment sampling. They also walked the site with a metal detector, but there was no intrusive investigation, no digging was done. The sampling results showed that no explosives were



detected. Two metals were detected above screening levels; one was an elevated detection of aluminum in a groundwater sample, but the sample contained a lot of suspended sediment which likely caused the elevated detection. Antimony was also detected in soils, but all antimony concentrations were below naturally occurring background concentrations. Sampling data is compared to State *[Federal]* established criteria, which looks at both the ecological and human *[receptors]*. No further action was recommended for munitions constituents based on the sampling results. Metal detectors did detect some metallic items, so the site moved forward to a Remedial Investigation.

The site was not classified as a high priority site because nothing explosive was previously found. The site was put into the inventory with all the other *[munitions]* sites being managed by the Corps of Engineer. Sites where explosive munitions have been found have a higher priority.

[Mr. O'Neill displayed a map of MRS 01 on Slide 12.] Again, this is the area where the time-critical removal action was performed (pointing to the map). During the 1995 Site Investigation, the *[145]* items were removed from these grids. During the 1995 Site Investigation, they did find some items in this area (Mr. O'Neill points to the map), and this area was marked on the map for potential future investigation. This is the range layout that the Corps of Engineers has in their database, and you can see when we lined up where the Navy spotter said the range was located, it does not line up with this shape. We focused our investigation to try and find any targets and disposal areas. If you visited with Tom *[Colozza]* during the poster session, you heard that we took a portion of the 3,000 acres and then used statistics to determine how many lines or transects were needed during the investigation in each area.

[Mr. O'Neill displayed a map of MRS 03 on Slide 13.] This is MRS 03, the southern rocket range, where they did some grids, but no munitions debris was found. Historically, the only times items were found were in 1991 and 1994.

**Ms. Finley:** (Ms. Finley points to the map and the range fan in purple) Are there any reports of items being found at the peak of the range fan?

[Slide 13] When EA started the project, we went through and revised the Conceptual Site Model. The range fan drawn on the map matches the typical World War II range fan found in manuals (Mr. O'Neill points to the map). We expanded the range fan, so it is wider as there is some variation. However, if you look, the target is in the middle of that area. I explained at the poster session, when we set out to do the Remedial Investigation, we had contingencies built in to follow any findings to determine if there was more than one target or if the target was much larger or if there were disposal areas. The purple range fan is not the correct range fan for this site and the Remedial Investigation Area shape where the remedial investigation was focused more accurately depicts how the area was used for military training. (Mr. O'Neill traces the route used for the range and shows the approximate location of where the munitions items were fired from).

[Slide 14] In 2013, there was another storm which eroded significant amounts of sand, and 213 items were exposed along the shoreline. The ordnance team responded after the storm and removed the items, all of which were determined to be munitions debris. In 2013, the Corps of

Engineers followed up with another site visit and found an additional 19 munitions debris items on the northern range; nothing was found in the southern rocket range. This is approximately where the items were found in 2013.

[Slide 14] Over the years, the National Park Service accumulated 250 pieces of munitions debris; these items were inspected *[by EA during the Remedial Investigation]* and disposed of *[by EA]*..

[Slide 15] Nothing has changed over the years in terms of our understanding of MRS 01; the source of the munitions debris is still suspected to be in the middle of the range where the munitions debris has been found.

This slide [Slide 16] is a chart depicting a summary of the munitions debris found to date (excluding the remedial investigation results). A total of 882 pieces of munitions debris was found of various sizes. Only four *[five]* practice bombs had been found prior to the remedial investigation and only one 20-millimeter casing, with the majority of the items being debris from the 2.25-inch rockets.

[Slide 17] The focus of the remedial investigation was to find the nature and extent of munitions and explosives of concern and any associated munitions constituents. Even though we said in 2007 there were no munitions constituent issues, we still had a contingency in the Remedial Investigation to look for munition constituents. If we uncovered a pit, and the contents did not match anything we had seen previously, we would have grabbed some samples and analyzed them for metals and explosives. Or if we found munitions and explosives of concern (explosive items) that we had to destroy in place, then we would have sampled for metals and explosives. Our purpose was to assess the risks and hazards for current and future exposures to the public.

[Slide 18] Digital geophysics mapping (DGM) which is a high-tech system used to detect metallic items such as munitions or munitions debris below the ground surface, with the benefit of a Global Positioning System (GPS) to be able to easily re-locate the item below the surface. It is a record of everything we saw, and it is a very efficient way to collect this data as it is all electronic. You collect and analyze the data and determine if the anomaly is munitions debris or just a metal object, like a nail. The path spacing or transects are determined based on the size of the item you are looking for. If you are looking for a target area 150-feet wide, then you would have transects spaced 150 feet apart. If you are looking for a disposal area 15 feet wide, then you would put your transects 15 feet wide.

[Slide 19] The data is then processed, and the background noise level is determined. Then we determine which objects are higher than background; the higher the signal, the bigger the object or it could be a cluster of objects like a disposal area. This becomes a target of interest, to be investigated (excavated). We determined anything found in the water would be excavated. On the land, since it is used as beach, we anticipated finding a significant amount of metal objects, could be millions, so we did a statistical sampling and dug up a certain number of objects, those with the greatest potential to be munitions debris. In some cases where we found a large signal and suspected a disposal area, we used a mini excavator to investigate these large, generally deeper signals. In one case, (pointing to the photo on the slide) we found part of the metal target. This photo shows the crew digging up another object (pointing to another photo on the slide).

[Slide 20] This graphic shows all the points/dots indicating where a metal object was detected, with the colors indicating different densities [of metal objects]. The pink shows an area with lot of items.

[Slide 21] We broke up the field activities. We did the water investigation activities in the fall, from November through January when sand had migrated up on the beach, so we are closer to anything in the water. This is us in the ocean (pointing to a photo on the slide). This is the boat we used. This is the back bay. We used divers in the water. They are coming up with whatever they find.

[Slide 22] The land investigation activities were done in the spring and they were more of a challenge because of existing vegetation and sand dunes which are vegetated. We did not want to remove the vegetation, so we worked around the dunes using pony trails and using different types of equipment such as two guys carrying a piece of equipment or using a different piece of equipment on the beach (pointing to a photo on the slide). We performed the digital geophysics mapping on the beaches, collected and processed the data, and selected objects to excavate.

[Slide 23] This graphic shows the results of the metal detector surveys around the dunes and the curved lines and what we found during our surveys [*on the land and in the water*].

[Slide 24] This is a summary of what we planned and collected [*during the investigation*]. This shows the number of acres we planned to collect mapping data on and what we actually collected. This is for the back bay and ocean. We were able to get more area than we planned.

[Slide 25] This slide shows the land areas and the area planned versus what we collected. We were close to getting what we planned but we did have a couple areas where we could not get data.

[Slide 26] One issue we had was an area in the surf zone where we could not use a boat or walk or dive in this area for safety reasons. This is the area where the pink rectangle is shown in the water from the 1995 findings. We tried to get into that area. We went by boat [*during high tide*] we went along the beach at low tide, but we were not able to get close to this area. We planned to collect data on 4.4 acres and actually performed magnetometer sweeps of 2.5 [*2.7*] acres at extremely low tides.

[Slide 26] We also overestimated the beach area we wanted to investigate for disposal areas. When we looked at aerial photographs, what we thought was the beach was actually part of the dunes. We were sweeping the beach to look for disposal areas which were not located in the dunes. In 1944, the shoreline was much further to the east, but it migrated, such that the disposal area which would have been high and dry [*in 1944*] was now in the surf zone and it is likely that they saw [*a disposal area*] when they did the time-critical removal action. The acreage we covered represents the whole [*current*] beach area.

[Slide 27] We made adjustments to the transects to minimize vegetation removal and go around the grasses. We got good coverage of the areas. We were prepared to create grids and do extra surveys in gridded areas if the GPS lost a signal if we went thru wooded areas. As a result of having good GPS coverage we did not lose the signal.

[Slide 28] At MRS 01 we are confident based on the coverage we achieved and what we dug up that few to no live munitions will be encountered [*in MRS 01*]. We achieved 150 foot spacing, we found one target in the northern rocket range, and we did not identify any additional disposal areas, but we did find the area where the time-critical removal action occurred. This is a summary which shows we achieved what we were looking to accomplish in the remedial investigation, and we are confident in the results.

**Question from Community Member:** With the type of equipment were you using, how deep below the ground can you detect objects?

The type of munitions you are looking for determine the depth you can see. We were digging up objects down to five feet. We can detect objects deeper, but it depends on what you are looking for and how big the object is. The signals from a rocket and the former target were fairly large so we could see deeper (greater than 6 ft in some instances). But if you were looking for a 20 mm slug, you will not see them that deep.

[Slide 29] At MRS 03, this is the transect data we collected. [Slide 30] We had good coverage in the water, and every metallic signal was excavated. [Slide 31] On the land, we had some disparity, as we were trying to get 66 acres, but we only covered 33 acres.

[Slide 32] We had the same surf zone/safety issue at MRS 03 that we had in MRS 01 northern rocket range. The southern rocket range has a leg that extends up the beach, which was included in the range fans to look for potential disposal areas. We also had a similar issue with the size of the beach that we had in the northern rocket range (we thought we were looking at beach on the aerials, but it was actually vegetated dunes thus the actual beach acreage where a disposal area would have been located was reduced). Again, we did not go up on the dunes. [Slide 33] We had enough coverage and confidence to say few to no live munitions will be encountered, we never found a target, and we never found a disposal area in the southern rocket range MRS 03.

[Slide 34] This slide shows what it looks like when we were done digging up all the selected metallic signals. You have three different colors red, white, and green. The red dots indicate all the pieces of munitions debris found; the white dots indicate no contact which means there is something there, but we cannot get to it for safety reasons or it moved in the ocean currents; the green dots indicate metallic cultural debris such as a nail or tent stake. (Mr. O'Neill pointing at the slide and noting where the tent stakes and nails were found).

[Slide 35] In the water for the northern rocket range we investigated 109 targets; 13 were munition debris, 62 were too deep to reach or they were mobile or moving around so they had moved with the currents. There were 34 that were anchors and cans and other things [*cultural debris*]. No live munitions were found.

[Slide 36] On the land 336 items were investigated; 51 pieces were munitions debris (mainly practice rocket debris, [*one practice bomb and one 20-mm inert projectile*]). We found the target, we dug down about 6 feet and found the corner of the target. We also found cultural debris. We had some items we could not get to [*31 items*] due to the hole collapsing [*collapsing sands and water entering the hole*]. No live munitions were found.

[Slide 37] This is a summary slide. We found over 400 targets. No live munitions were found. We located the former target area (Mr. O'Neill points to the photos on the slide showing the excavated area). We found munitions debris in the area of the 1998 *[time critical]* removal action. There seemed to be more items in this area.

[Slide 38] This *[table]* summarizes what was found in MRS 01 *[during the RI]* mainly practice rockets, one 20-mm, and one practice bomb.

[Slide 39] Mr. O'Neill: This *[figure]* shows the intrusive investigation results at MRS 03 with green dots showing where we found cultural debris. There are no red dots as we did not find munitions debris, and white dots show items that were buried too deep to find. Ms. Finley: What about the black dot? Mr. O'Neill: That is the remnants of the former Green Run Lifesaving Station.

[Slide 40] On the water 41 items were investigated; we investigated every anomaly we identified. We had some items *[17 items]* we could not get to safely due to the hole collapsing *[collapsing sands and water entering the hole]*. We also found cultural debris *[14 items]*. No live munitions were found.

[Slide 41] We had 219 targets on land, 62 no finds. Some of the no finds were very weak signals indicating small items like nails. 148 items were identified as cultural debris, no live munitions or munitions debris was found.

[Slide 42] This is slide showing the summary. This is Green Run Life Saving Station and other *[cultural]* debris.

[Slide 43] In the end, we inspected everything to determine if there is any explosive hazard associated with any item. We are looking to see if the rocket is fired. We are looking at the practice rocket to see if it has a spotting charge, which looks like a shot gun shell. We then certify all the munitions debris as safe, we drummed the items, and shipped the debris off-site. The cultural debris is drummed and recycled.

[Slide 44] We investigated a sufficient area that gave us a confidence level to say that few to no live munition items will be encountered *[in MRS 01]*. We confirmed the expanded location of the target, and no live munitions were found. One of our conclusions is that everything has been fired or expended so there is no hazard.

[Slide 45] Similarly with MRS 03, we covered enough area and found no live munitions or munitions debris and we are confident that few to no live munitions will be found. We never found a target or disposal area and no live munitions or munitions debris was identified.

I'm going to turn it back over to Liza.

**Ms. Liza Finley:**

[Slide 46] After the Remedial Investigation is done, we consider everything we found out in the field and do a risk evaluation of those items and determine whether or not the area needs further remediation, or the conditions are acceptable and considered safe. There are four parts to the

matrix of risk evaluation: the likelihood of encountering live munitions, the severity of the incident if a live munition is encountered, the likelihood of detonation of the munitions item [*and the summary table*]. As Mike [*O'Neill*] said, the types of items we found such as practice rockets which in the action of being fired expended propellant, so they do not pose any explosive hazard. The practice bombs we found, and we only found about six [*five*] over the years and one during the remedial investigation, could have had a spotting charge and if the charge did not go off properly when the bomb was dropped; then there is a potential for the spotting charge to remain intact. This is how we approached the risk evaluation of the encounters.

[Slide 47] This is the risk matrix we used. This is a park so we assumed there is no prohibition to access, anyone can go to the beach. We did have historically live munitions used, and there is a potential for an encounter with an intact spotting charge we had to choose seldom, because it would be a very rare occurrence.

[Slide 48] The next matrix is evaluating the severity of an encounter and given that the practice bomb could have had a small spotting charge, there is a possibility that if an intact spotting charge was encountered it could cause harm. However, for this to happen, first it would have had to not function properly when the bomb was dropped, second would be that the spotting charge would have to remain intact in this environment which is fairly harsh for the last 70 years. Third, a person would have to encounter it and to date the Corps of Engineers has found approximately 1000 items all of which were munitions debris with only six practice bombs, so less than 1 percent [*practice bombs*] have been found. The fourth condition that would have to occur is that someone would need to pick up the practice bomb and manipulate it so the spotting charge in the practice bomb would ignite and go off. They would also have to hold the practice bomb in a certain way that would actually injure their hand. So, if all those things occurred there would be consideration of a modest injury resulting in emergency medical treatment.

[Slide 49] This [*matrix*] is the likelihood of detonation. Given that the munitions contained propellant and black powder, which have a low sensitivity to detonation, so [*the likelihood of*] detonation is low.

[Slide 50] We summarize all the matrices, and for the northern range [*MRS 01*], and concluded that it is considered a very rare occurrence that a practice bomb would even be encountered, a rare occurrence of injury, and low sensitivity of detonation. Based on our evaluation, the conditions are acceptable given the rare chance of even encountering a practice bomb with an intact spotting charge.

[Slide 51] For the southern range, because the only items found were two munition debris items from rockets with no explosive (propellants) left in the rocket, it was considered very unlikely any live munitions would be encountered. [Slides 52 and 53] Since there is no explosive hazard, no injury is anticipated and since there are no explosives in the rocket there is low sensitivity of detonation. [Slide 54] Based on our evaluation, we determined the southern boundary range conditions are acceptable.



[Slide 55] We re-evaluated the Conceptual Site Model and given that we did not find any live munitions, we do not have a complete pathway for these various scenarios of a site worker or visitor, and we do not have any occurrences of encounters.

[Slide 56] In summary, the northern rocket range was used only for training and practice munitions were used; over 99% of the munitions debris was practice rockets with no propellant in any of the items and one practice bomb with no spotting charge. In the southern rocket range only 2 pieces of munitions debris from 5-in. practice rockets were identified. The area was not likely continually used as a Rocket Range as it may have been too far to travel. No live munitions were identified.

[Slides 57 and 58] During the 1940s, when the practice bombs and spotting charges were used, the cartridges for the spotting charges were made of cardboard, so with the environmental conditions out here it is unlikely they would have sustained for more than 70 years and remain intact. Less than one percent of the items found out here were practice bombs. There have been other sites where intact spotting charges have been found so we cannot say one will never be found, but there is only a very small chance.

[Slide 59] In conclusion, 985 pieces of munitions debris were found from all the environmental events, 531 were found on the surface and 351 were found subsurface as part of the past investigations. During our recent Remedial Investigation, we found 102 items in the subsurface and one inert 20 millimeter projectile on the surface after a heavy storm, so it was probably a subsurface item. No live munitions have been found so the risk from an explosive hazard is negligible.

[Slide 60] In our Proposed Plan which you have we are recommending no further remedial action so we would not be coming out to the site anymore and doing any more investigations to find munitions debris. If some type of live munition were to be found in the future, that would change the Conceptual Site Model and we [*Army Corps of Engineers*] would return to do a further investigation.

[Slide 61] Tonight, you have an ability to comment, and if you have a question or comment you can speak to the stenographer in the back Katrina [Harris], and she will formally capture your question or comment. In the back of the Proposed Plan is a comment sheet that you can fill out and provide to us, or you can send it by regular mail or by email to the addresses provided. This is the chance for the public to have input on what we are doing going forward, and at this point in time, the Corps of Engineers is planning no further remedial action to occur at this site.

[Slide 62] The comment period started Monday April 29 and goes through June 3. Once we collect all the comments, applicable comments will be addressed in the Responsiveness Summary in the Decision Document. The final Decision Document will be placed in the library and also be available online.

[Slide 63] This slide shows our warnings, the 3 Rs: recognize, retreat, and report. If you encounter something like these photographs, which are rusted out items, on the property, you

should recognize it might be a munition, remove yourself from the location, and report it to the Park Service or if they are not available, call 911.

Are there questions?

**Community Member:** If I look at the map with the range fan, the likelihood of encountering a munition item near that apex would be practically zero?

**Ms. Finley:** Yes, that is correct.

**Community Member:** We received a letter seven years ago from the Colonel at the Corps of Engineers saying there might be munitions on my property. Why hasn't my property been cleared?

**Ms. Finley:** As Mike stated, the range fan shown on these maps has not been updated and is not correct. Based on the Remedial Investigation, we would not anticipate you finding any munitions on your property. I will take the letter to our Public Affairs Officer and recommend the Corps of Engineers send a new letter identifying where the firing point was in the back bay and that property owners should not anticipate any munitions being present on their properties.

Any other questions or comments? [None were offered.]

Thank you for coming to the meeting.

### **CLOSING**

The presentation and comment/question period ended at 7:49 pm. U.S. Army Corps of Engineers, EA Engineering, and Maryland Department of the Environment staff remained after the formal presentations to continue to provide information and answer any questions. No additional questions were received.

Submitted by,  
Katrina A. Harris  
Meeting Recorder

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## **PUBLIC MEETING HANDOUTS**

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Please Print Your Comments Below:

Your input on the Proposed Plan for the Assateague Island FUDS is important to USACE. Comments provided by the public are valuable in helping USACE select a final remedy for the site.

You may use the space below to write your comments, then fold and mail to The U.S. Army Corps of Engineers, Baltimore District 2 Hopkins Plaza Baltimore, MD 21201 to the attention of Mr. Christopher Gardner. Comments must be postmarked by June 3<sup>rd</sup>, 2019. If you have questions regarding the comment period, please contact Mr. Christopher Gardner at (410) 962-2626.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



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## Acronyms

ASIS	Assateague Island National Seashore
ASR	Archive Search Report
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DD	Decision Document
DoD	U.S. Department of Defense
DMM	Discarded Military Munitions
EOD	Explosive Ordnance Disposal
ft	feet
FUDS	Formerly Used Defense Site
In.	inch(es)
INPR	Inventory Project Report
MC	Munitions constituents
MD	Munitions debris or Maryland
MDAS	Munitions documented as safe
MEC	Munitions and explosives of concern
mm	millimeter
MMRP	Military Munitions Response Program
MRS	Munitions Response Site
Navy	United States Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OEW	Ordnance and explosive waste
PP	Proposed Plan
RAO	Remedial Action Objective
RI	Remedial Investigation
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
SLERA	Screening level ecological risk assessment
TCRA	Time Critical Removal Action
TP	Target Practice
USACE	U.S. Army Corps of Engineers
UXO	Unexploded Ordnance
WWII	World War II

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## Background

Assateague Island is a 37-mile-long, 17,522-acre barrier island, located along the eastern shore of Maryland and Virginia on the Delmarva Peninsula. The Formerly Used Defense Site areas, totaling approximately 7,000 acres, are located in the northern portion of the island and are owned by National Park Service and the State of Maryland.

During World War II, from 1944 - 1947, the U.S. Navy used two areas on the island, Rocket Range North and Rocket Range South, for air-to-ground target practice; using practice rockets, and a few practice bombs and projectiles. Most of the aircraft originated from naval air stations located in Chincoteague, Virginia, and Manteo, North Carolina. It was reported that the Department of Defense created two to three burial areas for spent munitions at the end of the war during site cleanup of the target areas.

Explosive ordnance demolition teams have previously recovered rocket motors, practice rockets and inert ballistic tips from the northern rocket range. In addition, a practice bomb and 20mm casing have been found.

The U.S. Army Corps of Engineers completed a Remedial Investigation in the spring of 2018. The team found no live munitions or explosives of concern during the thorough investigation. Only munitions debris was uncovered, which poses no explosive risk.

However, given the dynamic environment of the beach, moving sands and surf, there is a possibility that additional munitions items may be uncovered. Therefore, as a precaution, if you encounter any item that resembles a munition please follow the 3Rs as indicated inside this brochure.



## Assateague Island Formerly Used Defense Site Berlin, MD

### Assateague Island Information

### 3Rs Safety Guide

#### Emergency Contact

If you suspect a munition

## Call 911

Emergency Assateague Island Contact:  
National Park Service,  
Park Dispatch Office  
(757) 898-0058

For additional project information contact the  
U.S. Army Corps of Engineers,  
Corporate Communication Office at:  
1-800-434-0988 or  
cenab-cc@usace.army.mil

Learn and follow the 3Rs  
of explosives safety



Visit the US Army's Explosive Safety Education website:  
[www.denix.osd.mil/uxo](http://www.denix.osd.mil/uxo)



US Army Corps  
of Engineers®



# Follow the 3Rs



## Recognize when you may have encountered a munition.

Recognizing when you may have encountered a munition is the most important step in reducing the risk of injury or death. Munitions may be encountered on land or in the water. They may be easy or hard to identify.

To avoid the risk of injury or death:

- ▶ Never move, touch or disturb a munition or suspect munition
- ▶ Be aware that munitions do not become safer with age, in fact they may become more dangerous
- ▶ Don't be tempted to take or keep a munition as a souvenir

Munitions come in many sizes, shapes and colors. Some may look like bullets or bombs while others look like pipes, small cans or even a car muffler. Whether whole or in parts, new or old, shiny or rusty, munitions can still explode. The easiest way to avoid injury or death is to heed warnings and follow the 3Rs if you suspect you have encountered a munition.



## Do not touch, move or disturb it, but carefully leave the area.

Avoid death or injury by recognizing that you may have encountered a munition and promptly retreating from the area.

If you encounter what you believe is a munition, do not touch, move or disturb it. Instead, immediately and carefully leave the area by retracing your steps—going out the way you entered. Once safely away from the munition, mark the path (e.g., with a piece of clothing) so response personnel can find the munition.



## Immediately notify local authorities by calling 911.

Protect yourself, your family, your friends and your community by immediately reporting suspected munitions to the police.

Help us by providing as much information as possible about what you saw and where you saw it. This will help the police and military or civilian explosive ordnance disposal personnel find, evaluate and address the situation.

If you believe you may have encountered a munition, **call 911** and report:

- ▶ The area where you encountered it.
- ▶ Its general description. Remember, do not approach touch, move or disturb it.
- ▶ When possible, provide:
  - Its estimated size
  - Its shape
  - Any visible markings, including coloring



## Glossary

**Administrative Record file:** Site information is compiled in an Administrative Record file and placed in the general Installation Restoration Program information repository for public review.

**Anomaly:** Something that deviates from what is standard, normal, or expected. As it relates to this document, an anomaly is a suspected metallic object that is identified using magnetometers, a type of metal detector.

**Archive Search Report (ASR):** A detailed investigation to report on past MEC activities conducted on an installation. The principal purpose of the Archives Search is to assemble historical records and available field data, assess potential ordnance presence, and recommend follow-up actions at a FUDS. There are four general steps in an Archives Search: records search phase, site safety and health plan, site survey; archives search report including risk assessment

**Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA):** A Federal law enacted in 1980 and amended in 1986 by the Superfund Amendments and Reauthorization Act, which concerns investigation and response actions regarding hazardous substances, pollutants, and contaminants.

**Decision Document (DD):** A public document that describes the remedy selected for a site, the basis for the choice of that remedy, and provides responses to public comments.

**Digital Geophysical Mapping:** The use of specialized instruments on the ground surface to detect metallic items such as munitions or munitions debris below the ground. The instruments used are known as sensors.

**Ecological Risk Screening:** An evaluation of the risk posed to the environment if remedial activities are not performed at the site.

**Explosive Ordnance Disposal (EOD):** A specialized organization made up of personnel specially trained to destroy munitions.

**Formerly Used Defense Site (FUDS):** A FUDS includes property that was owned by, leased to, or otherwise possessed by the United States and under the jurisdiction of the Secretary (including governmental entities that are the legal predecessors of DoD or its components) that were transferred from DoD control prior to 17 October 1986. The term "Secretary" means the Secretary of Defense and the Secretaries of each the

Military Departments, as well as the Secretaries of any predecessor department or agency.

**Groundwater:** Subsurface water that occurs in soils and geologic formations that are fully saturated.

**Human Health Risk Assessment:** An evaluation of the risk posed to human health should remedial activities not be implemented.

**Inventory Project Report (INPR):** The report resulting from the preliminary assessment of eligibility. The INPR includes data as well as a recommendation for further action and guides investigators through further site studies. The INPR documents whether a property and projects are eligible for the FUDS program.

**Military Munitions:** All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the DoD, the U.S. Coast Guard, the U.S. Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives, and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof.

The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, devices, and nuclear components, other than nonnuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed.

**Military Munitions Response Program (MMRP):** The DoD developed the Military Munitions Response Program (MMRP) in 2001 to address munitions-related concerns, including explosive safety, environmental, and health hazards from releases of unexploded ordnance (UXO), discarded military munitions (DDM), and munitions constituents found at locations other than operational ranges on active and Base Realignment and Closure (BRAC) installations and Formerly Used Defense Sites (FUDS) properties. The MMRP addresses non-operational range lands with suspected or known hazards from munitions and explosives of concern (MEC) which occurred prior to September 2002, but are not already included with an

Installation Response Program (IRP) site cleanup activity.

**Munitions and Explosives of Concern (MEC):** This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means:

- (A) UXO, as defined in 10 U.S.C. 101(e)(5);
- (B) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710(e)(2); or
- (C) Munitions constituents (e.g., TNT, RDX), as defined in 10 U.S.C. 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

**Munitions Constituents (MC):** Any materials originating from UXO, DMM, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions.

**Munitions Debris (MD):** Remnants of munitions (e.g., penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization or disposal.

**Material Documented as Safe (MDAS):** Munitions or munitions-related items that have been assessed by qualified personnel and documented as not presenting an explosive hazard.

**Munitions Response Site (MRS):** A site that was formerly used to train soldiers in how to use weapons but is no longer in use. An MRS may contain munitions and/or munitions constituents. An MRS requires some action to address munitions explosive hazards and/or munitions constituent contamination.

**No Further Action:** A determination for sites where a CERCLA remedial or removal action has been conducted that, based on analysis of chemical concentrations remaining in place and risks they may pose to human health and the environment, no additional actions are required. The response is complete because site contaminants have been remediated in accordance with all applicable laws and regulations. The site is protective of human health and the environment.

**Ordnance and Explosive Waste (OEI):** Consists of either (1) or (2) below:

- (1) Ammunition, ammunition components, chemical or biological warfare material or explosives that have been abandoned, expelled from demolition pits or burning pads, lost, discarded, buried, or fired. Such ammunition, ammunition components, and explosives are no longer under accountable

record control of any Department of Defense organization or activity.

- (2) Explosive soil, which refers to mixtures of explosives in soil, sand, clay or other solid media at concentrations such that the mixture itself is explosive.

**Proposed Plan:** In the first step in the remedy selection process, the lead agency identifies the alternative that best meets the requirements in CERCLA 300.430(f)(1) and presents that alternative to the public in a proposed plan. The purpose of the proposed plan is to supplement the RI and provide the public with a reasonable opportunity to comment on the proposed remedial action, and to participate in the selection of remedial action at a site.

**Public Comment Period:** The time allowed for the members of an affected community to express views and concerns regarding an action proposed to be taken by USACE.

**Receptors:** Humans, animals, or plants that may be exposed to risks from contaminants related to a site.

**Remedial Action:** Action of the lead remedial agent that addresses a contaminant, hazard, receptor, or the connection between the receptor and the hazard, which is taken to eliminate or minimize the risk to the receptor at a remedial site.

**Remedial Action Objective (RAO):** Objectives of remedial actions that are developed based on contaminated media, contaminants of concern, potential receptors and exposure scenarios, human health and ecological risk assessment, and attainment of regulatory cleanup levels, if any exist.

**Remedial Investigation (RI):** A study of a facility that supports the selection of a remedy where hazardous substances have been disposed or released. The RI identifies the nature and extent of contamination at the facility.

**Risk Management Methodology:** A risk evaluation method for munitions and explosives of concern used to provide information to support risk management decisions upon completion of site characterization; develop remedial action objectives; and provide a basis for assessing achievement of remedial action objectives relative to acceptable end states.

**Screening Level Ecological Risk Assessment (SLERA):** An evaluation of the risk posed to the environment if remedial activities are not performed at the site

**Site Inspection (SI):** Activities undertaken to determine the presence, type, distribution, density, and location of



contaminants, including MEC. Includes physical detection and identification of MEC as well as chemical sampling and monitoring.

**Spotter:** An enlisted person who communicates with a gunner (in aircraft or on the ground) and orders or advises adjustment of fire on a target by observations.

**Sweep:** The action of walking over an area using a metal detector to find munitions and munitions debris up to 6 inches below surface of the soil or sediment or to find metallic anomalies in the subsurface soils or sediments.

**Time Critical Removal Action (TCRA):** Removal actions conducted to respond to an imminent danger posed by the release or threat of release, where cleanup

or stabilization actions must be initiated within six months to reduce risk to public health or the environment.

**U.S. Army Corps of Engineers (USACE):** A branch of the DoD with special expertise in carrying out CERCLA/NCP investigations and response actions at former DoD sites.

**U.S. Department of Defense (DoD):** an executive branch department of the federal government of the United States charged with coordinating and supervising all agencies and functions of the government concerned directly with national security and the United States Armed Forces.

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# Assateague Island Formerly Used Defense Site, MD

**U.S. ARMY CORPS OF ENGINEERS**  
**FACT SHEET as of May 1, 2019**

**BUILDING STRONG®**

**AUTHORIZATION:** Defense Environmental Restoration Program

**TYPE OF PROJECT:** Military Munitions Response Program Formerly Used Defense Site

**PROJECT PHASE:** Remedial Investigation/Feasibility Study

**CONGRESSIONAL INTEREST:** Senators **Cardin** and **Van Hollen (MD)** and Representative **Harris (MD-01)**



**BACKGROUND:** Assateague Island is a 37-mile-long barrier island that parallels the Atlantic Coast of Maryland and Virginia. The entire island contains approximately 17,522 acres. The US Navy used two target areas on the island, Rocket Range North and Rocket Range South, for air-to-ground practice strafing for land based aircraft from Naval Air Station at Chincoteague, VA, and at Naval Air Station Manteo, NC, from 1944 until 1947. The formerly used defense site (FUDS) target areas are located in the northern portion of Assateague Island in Maryland, approximately 7,000 acres (~1400 on land and ~ 5300 in water). Explosive ordnance demolition teams called to the site have previously recovered munitions debris from practice rockets including motors and other pieces, practice bombs, and a 20 mm casing. No live munitions nor explosives of concern were found and all items recovered were determined to be munitions debris classified as “munitions documented as safe”.

The FUDS is currently owned by the National Park Service (NPS), and the State of Maryland, however the entire area is managed by the NPS. The island is used primarily as a national seashore, a wildlife refuge and a state park. Within a 2-mile radius there are a few residential areas but no industrial presence. Educational materials have been provided to NPS regarding previous findings and appropriate safety protocol.

A Site Inspection (SI) of the FUDS was completed in 2007. The SI recommended that a Remedial Investigation (RI) be performed. A contract for the investigation through decision document was awarded in FY16. The remedial investigation field work was conducted fall 2017 and spring 2018.

**STATUS:** The RI field investigation work was completed in the spring of 2018. No live munitions nor explosives of concern were located during the thorough investigation of both target areas. Only munitions debris was uncovered, which poses no explosive risk. USACE has finalized the RI Report, which based on the results outlined, recommends no further action. A draft final proposed plan has been generated recommending no further action. A public meeting, May 2<sup>nd</sup>, 2019, at 6 – 8 pm, and a 30-day comment period April 29<sup>th</sup>, 2019 – June 3<sup>rd</sup>, 2019 has been scheduled to present the no further action proposed plan for the Assateague Island FUDS.

**For more information** regarding the Assateague Island FUDS project, please contact Liza Finley at: mail code, CENAB-ENE-C; desk phone, (410) 962-2683; and e-mail, [Liza.Finley@USACE.army.mil](mailto:Liza.Finley@USACE.army.mil). Or our webpage at <https://www.nab.usace.army.mil/Missions/Environmental/Formerly-Used-Defense-Sites/Assateague-Island-FUDS/>

**U.S. ARMY CORPS OF ENGINEERS – BALTIMORE DISTRICT**  
2 Hopkins Plaza, Baltimore, MD 21201

<http://www.nab.usace.army.mil>

Page 1 of 1

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**PROPOSED PLAN RELEASED TO THE PUBLIC**  
*(Available as a handout at the Public Meeting)*

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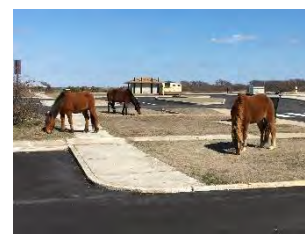


**US Army Corps  
of Engineers®**

# Proposed Plan

## Assateague Island FUDS

Worcester County, Maryland



April 2019

### 1 Introduction

This **Proposed Plan** identifies the Preferred Approach for the Assateague Island **Formerly Used Defense Site (FUDS)** and provides the rationale for this preference. The **U.S. Army Corp of Engineers (USACE)** proposes **no remedial action** is necessary for protection of human health and the environment at two Munitions Response Sites (MRS): Rocket Range North (MRS 01) and Rocket Range South (MRS 03), located in Worcester County, Maryland.

This document is issued by USACE for the Army as the **U.S. Department of Defense's (DoD)** administrative agent for the FUDS program. USACE will make the final decision on the Preferred Approach for the Assateague Island FUDS after reviewing and considering all information submitted during the public comment period. USACE may modify the Preferred Approach or select another action based on new information or public comments. Therefore, public comment on the Proposed Plan is invited and encouraged. Information on how to participate in this decision-making process is presented below and in Section 7.

USACE is issuing this Proposed Plan as part of its public participation responsibilities under the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)** and Section 300.430 (f)(3) of the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP, 40 C.F.R. part 300)**. This Proposed Plan summarizes information that can be found in greater detail in the Final Remedial Investigation Report and other documents contained in the **Administrative Record file** for this site. This plan summarizes the following:

- Site background and previous investigations (Section 2)
- Site characteristics (Section 3)
- Scope and role of response action (Section 4)
- Site risks (Section 5)
- Preferred Approach rationale (Section 6)
- Opportunities for public participation (Section 7).

A glossary defining terms (identified by bold text) used in this document is included; as well as an acronym list and a document reference page.

### Mark your Calendar for the Public Comment Period

**Public Comment Period** - April 29<sup>th</sup>, 2019  
through June 3<sup>rd</sup>, 2019

#### Submit Written Comments

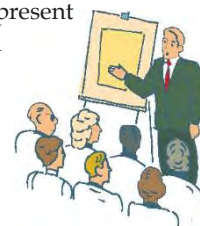


USACE will accept written comments on the Proposed Plan during the public comment period. To submit comments or obtain further information please refer to the insert page at end of proposed plan.

**Attend the Public Meeting** - May 2<sup>nd</sup>, 2019  
**Time** - 6:00 pm – 8:00 pm

**Place** – Assateague Island Environmental Education Center  
7206 National Seashore Lane, Berlin, MD 21811

USACE will hold a public meeting to present the Proposed Plan. Verbal and written comments will be accepted during the public comment period, and at the public meeting.



#### Location of Information Repository

For more information about the Assateague Island FUDS, use

<https://www.nab.usace.army.mil/Missions/Environmental/Formerly-Used-Defense-Sites/>  
or see the Information Repository at the following location:

**Worcester County Library - Berlin Branch 13 Harrison Ave, Berlin, MD 21811**



## 2 Site Background

### 2.1 Site Description and Background

The Assateague Island FUDS encompasses the 37-mile-long barrier island located along the eastern shore of Maryland and Virginia on the Delmarva Peninsula (**Figure 1**). From 1944 to 1947, the U.S. Navy (Navy) and the U.S. Army Air Corps established two separate rocket ranges on Assateague Island, the northern (MRS 01) and the southern (MRS 03) (see **Figure 1**), which were used by the Navy during World War II (WWII) for target practice by land-based aircraft.



**Figure 1: Munitions Response Sites (MRS) at the Assateague Island FUDS.**

The training activities on Assateague Island consisted of air-to-ground target practice; using practice rockets and practice bombs, as well as inert 20-millimeter (mm) projectiles used for strafing. Most of the planes that used these ranges originated from Chincoteague Naval Air Station and traveled up the eastern shore of Assateague Island. Once north of the target area, the planes circled around the Island and fired eastward during the approach to the western shore of Assateague. The practice munitions reportedly discharged smoke on impact. At the end of WWII, it was reported that the DoD created two (possibly three) burial areas during site

cleanup for the spent munitions used. The locations of the rocket ranges are based on an interview with, and drawings provided by, a Navy veteran who was the “spotter” stationed at Assateague Island during a portion of WWII. The veteran drew the ranges from memory and described very specifically the operations.

In 1943, the Chincoteague National Wildlife Refuge was established, and in 1965, Assateague Island was established as a national seashore. Assateague Island is currently owned by the National Park Service (NPS), the State of Maryland (MD), the U.S. Fish and Wildlife Service, the State of Virginia, and the U.S. Coast Guard. The FUDS property where the munitions response sites are located is owned by NPS and State of MD.

### 2.2 Summary of Previous Investigations

#### Case Incident – 1988

In July 1988, Army and Navy **Explosive Ordnance Disposal (EOD)** Teams were deployed to Assateague Island when WWII era ordnance<sup>1</sup> washed ashore onto North Ocean Beach in the Rocket Range North (MRS 01). From 14-15 July 1988, the Army ordnance team recovered and disposed of four inert 5-inch (in.) rockets that had washed ashore. At the time of the deployment, it was noted that it appeared that the ordnance was coming from what was described as a “hole” approximately 15 meters offshore. From 16-20 July 1988, the Navy ordnance team also arrived at the site and conducted an underwater survey of the area around the “hole.” Following the survey, the “hole” was believed to be a trench historically dug to bury expended items found during range clearance operations in the late 1940s. The ordnance items recovered by both ordnance teams totaled: 11 inert 2.25-in. rockets (rocket motors and heads), 6 inert 5-in. rockets (2 were only rocket heads), 2 inert 3.25-in. rocket heads, and numerous ballistic tips used to improve the aerodynamics of practice rockets.

#### Inventory Project Report – 1991

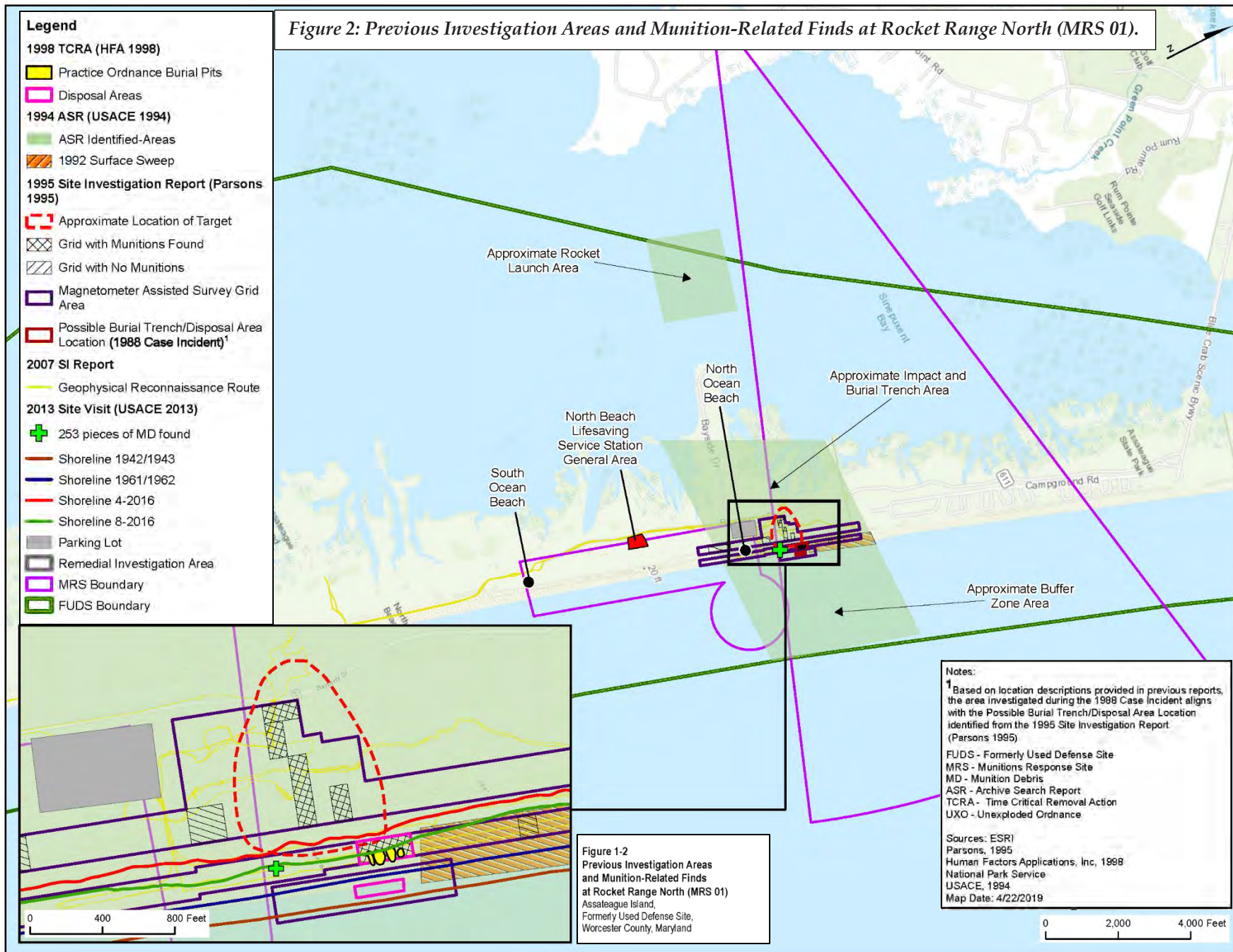
An **Inventory Project Report (INPR)** was prepared for Assateague Island by USACE Baltimore District. The report identified the entire 17,552-acre island as a FUDS property.

Use of Assateague Island by DoD was substantiated by the Navy spotter's statements that he had worked on the northern range (MRS 01) (**Figure 2**), and also from

<sup>1</sup> The term “ordnance” was the precursor to the term “munitions and explosives of concern (MEC)” and was used to

describe any munitions-related items, including inert munitions debris.

Figure 2: Previous Investigation Areas and Munition-Related Finds at Rocket Range North (MRS 01).



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former residents of the island at that time who stated that the Navy had used Assateague Island. Additionally, DoD use was also confirmed by the discovery of ordnance at the reported location of MRS 01 and the offshore "hole" believed to represent an ordnance burial trench (Figure 2).

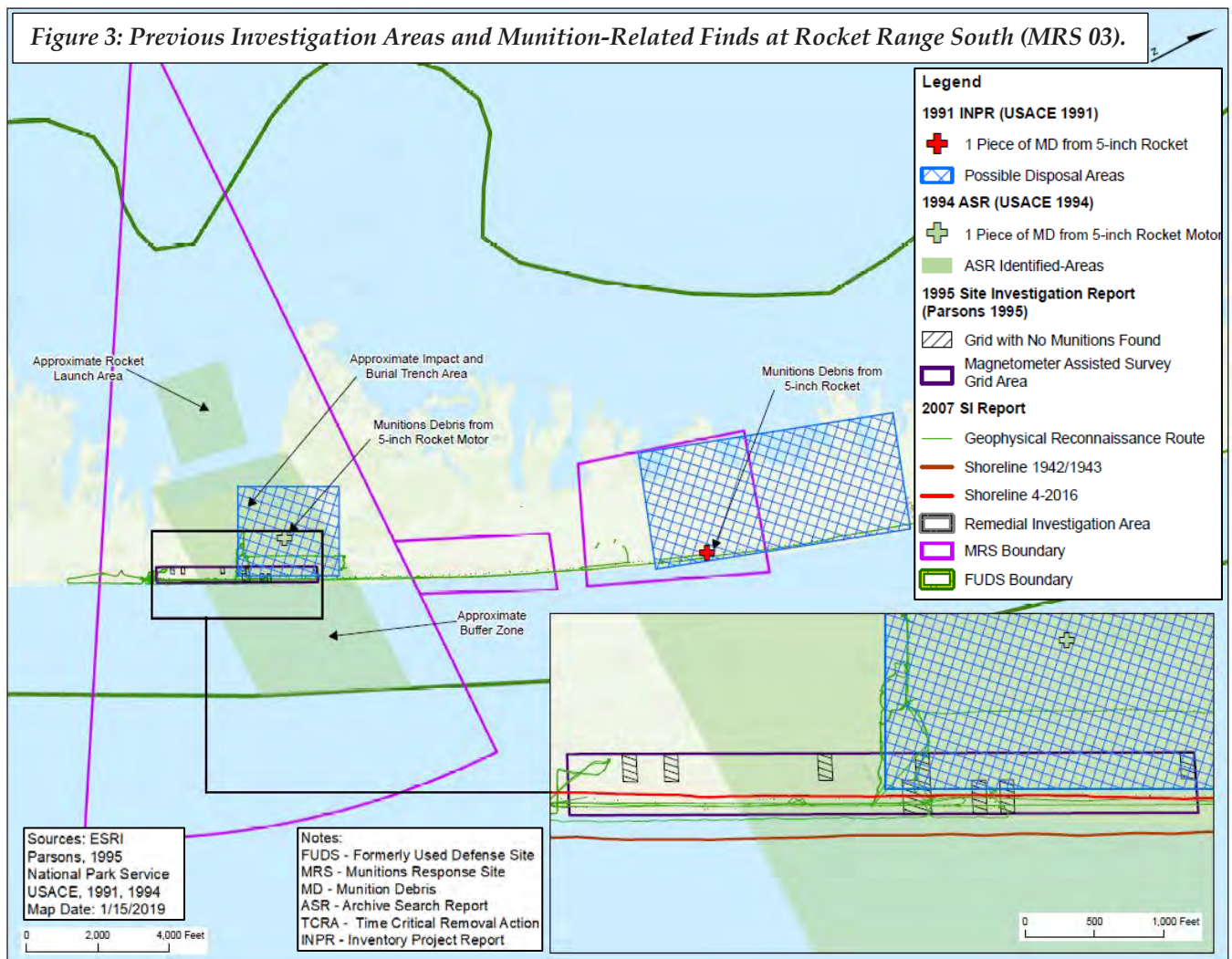
In 1991, a site visit was conducted to complete the INPR for Assateague Island. During the site visit, the field team was shown an expended inert Mark 43 practice bomb and 20-mm Target Practice (TP) projectile casing (inert) that had been found previously by an NPS ranger and subsequently identified as **munitions debris (MD)**. Additional munitions debris (part of a 5-inch rocket) was identified near the reported location of the southern rocket range (MRS 03) during the site visit (Figure 3). The INPR concluded that an **ordnance and explosive waste (OEI; precursor to Military Munitions Response Program [MMRP])** investigation was warranted and a large-scale clearance was recommended.

## Interim Sweep of North Ocean Beach - 1992

As recommended by the 1991 INPR, an instrument-assisted (metal detector) "sweep" of the North Ocean Beach area (near MRS 01) was conducted in 1992 where ordnance had previously washed ashore. Over a 3-week period, a 570,000-square foot area of the beach was swept by ordnance teams using metal detectors to locate and identify metallic items. During this investigation, no ordnance nor ordnance-related items were discovered, however cultural debris including fencing and metal piping were discovered and reported.

## Archive Search Report - 1994

The **Archive Search Report (ASR)** provided a summary of the previous investigations, results of the historic records search, a site description, and findings from the associated site inspection. The ASR noted two target ranges, identified as MRS 01 and MRS 02 (subsequently renamed MRS 03), that were developed on Assateague Island in the mid-1940s and used for target practice by the Navy (Figures 2 and 3).



During the 1993 visual reconnaissance conducted for the ASR, munitions debris from a 3.25-in. rocket was observed in the sand dunes at MRS 01 and munitions debris from an expended 5-in. high-velocity aircraft rocket was identified at MRS 03. No ordnance disposal/burial areas were observed at either MRS.

The ASR recommended further investigation for MRS 01 and MRS 03 to evaluate the potential presence of **munitions and explosives of concern (MEC)** and/or **munitions constituents (MC)**.

### Site Investigation Report – 1995

USACE's Huntsville Center conducted a site investigation on Assateague Island to determine the nature and extent of potential live munitions. Field work focused on the beach and dune zones within each MRS where the probability of encountering munitions associated with the targets and burial trenches would be the highest. Two grid systems were set up in both areas and an instrument-assisted sweep of the areas was conducted at 50 ft intervals (**Figures 2 and 3**).

Eighteen grids in MRS 01 and nine grids in MRS 03 were selected for intrusive (subsurface) investigations to a depth of 2 ft below ground surface (bgs). The sweeps in the northern area revealed 20 munitions debris items on the surface and 125 munitions debris items in the subsurface. All munitions debris items were consistent with previous inert or practice munitions, including practice rockets and practice bombs. The number and location of surface and subsurface munitions debris confirmed the location of the target area as previously identified by the former range spotter. Additionally, suspect burial trenches, one on the shoreline and one in the surf, were identified at MRS 01. Partial excavation of the burial trench on the shoreline uncovered an additional 36 items, all of which were determined to be inert.

At MRS 03, no live munitions nor explosives of concern or munitions debris items were identified on the surface or in the subsurface during the instrument-assisted sweeps. The report concluded that MRS 03 may have been cleaned up when DoD use of the site ceased.

### Time Critical Removal Action – 1998

USACE's Huntsville Center conducted a **Time Critical Removal Action (TCRA)** within MRS 01. The action addressed a suspect disposal/burial area where 150 munitions were exposed after a storm. The TCRA was conducted on approximately 2.41 acres of MRS 01 (**Figure 2**). This was the same area reported in the 1995 Site Investigation Report as the suspect burial trench located on the shoreline. Twelve grids were investigated to a depth of 4 ft bgs resulting in 212 pieces of munitions

debris being removed from the disposal/burial area in MRS 01. The munitions debris was consistent with previously identified items, primarily practice rockets and practice bombs.

### Baltimore District Site Visit – 2003

USACE Baltimore District completed a site visit to further characterize the potential munitions and explosive risk on Assateague Island as part of long-term monitoring for the 1998 TCRA. Another instrument-assisted sweep was conducted to assess the impact/target areas and potential disposal/burial areas along the beach areas at MRS 01 and MRS 03. Suspect metallic **anomalies** and two possible burial pits were located at MRS 01. Additionally, "several dozen" anomalies were identified in the area of MRS 03. No removal action was completed as a result of the sweep.

### Site Inspection – 2007

A **Site Inspection (SI)** was performed by USACE to evaluate if a live munitions or munition constituents (chemicals related to the munitions) hazard existed at the Assateague Island FUDS and if further response was warranted. The site inspection included instrument-assisted sweeps of the property as well as environmental sampling and laboratory analysis. Instrument-assisted sweeps were conducted across approximately 32 acres within or adjacent to the two MRSs to identify any potential MEC or munitions debris (**Figures 2 and 3**). Cultural debris (bottle caps, barbed wire, etc.) and possible munitions debris, metal fragments that were badly corroded and difficult to identify, were identified at MRS 01 during the site inspection. Additionally, numerous underground metallic anomalies were detected at the FUDS. However, intrusive investigations (i.e., digging on anomalies) were not conducted during the site inspection, this activity is usually performed as part of the more thorough **remedial investigation (RI)** to identify anomalies in the subsurface. No live munitions nor munitions debris was identified at MRS 03 during the site inspection.

To evaluate whether a release of munitions constituents had occurred, USACE collected environmental samples, including soil (surface and subsurface), **groundwater**, sediment, and surface water samples. The environmental samples were analyzed for explosives and metals that were associated with the munitions known to have been used at the Assateague Island FUDS.

One munitions constituent (aluminum) was reported above the human health screening criteria for groundwater in MRS 03. No other munitions constituents were reported above human health



screening criteria for surface water, sediment, soil, or groundwater in either MRS. The sample with the elevated aluminum concentrations was collected from a temporary well that likely contained suspended sediment particles that contributed to the elevated levels of aluminum. As such, aluminum was not considered a chemical of potential concern.

Since the Assateague Island FUDS contains wetland areas and valuable habitat for ecological **receptors** that is regulated by the Maryland and Virginia Coastal Zone Management Programs, a **screening level ecological risk assessment (SLERA)** was conducted using the munitions constituents sampling results. The SLERA identified one chemical (antimony) as exceeding ecological soil screening criteria at both MRSs; however, detected antimony concentrations were within the range of background concentrations found in the area's soils. Therefore, these exceedances were considered insignificant and antimony was not retained as a chemical of potential ecological concern in either MRS. No other munitions constituents were reported above the ecological screening criteria.

No live munitions were identified at the FUDS, therefore, the site inspection concluded that munitions and explosive risk was low to moderate: based on the types of munitions debris that was discovered, that the previous finds at the site were only munitions debris, and that there were numerous anomalies detected in the subsurface not identified. As a result, the site inspection recommended a remedial investigation for both MRS 01 and MRS 03. Based on risk screening results, no risks for exposure to munitions constituents were identified.

### **Explosive Ordnance Disposal Team - 2013**

On 24 June 2013, a team responded to a discovery of additional munitions debris that had washed up on the beach in MRS 01. A total of 234 munitions debris items were identified at MRS 01 and safely disposed of by the team.

### **USACE Site Visit - 2013**

Subsequent to the action above, USACE Baltimore District personnel conducted an instrument-assisted sweep of the suspect impact areas in each MRS (approximately 14 acres) and an additional 19 munitions debris items were recovered and removed from MRS 01; however, no munitions debris was identified in MRS 03.

### **Findings - 2017**

On 12 June 2017, NPS notified USACE that munitions debris had been found in MRS 01 which were consistent with items previously found and removed from the area.

NPS also reported items in the water that were half-buried in a vertical position, creating a swimming hazard. NPS posted signs in the area to alert swimmers of the dangers and to prevent swimming in the area. As of 3 July 2017, the items were naturally re-buried by sand and were no longer considered a swimming hazard.

### **Remedial Investigation - 2019**

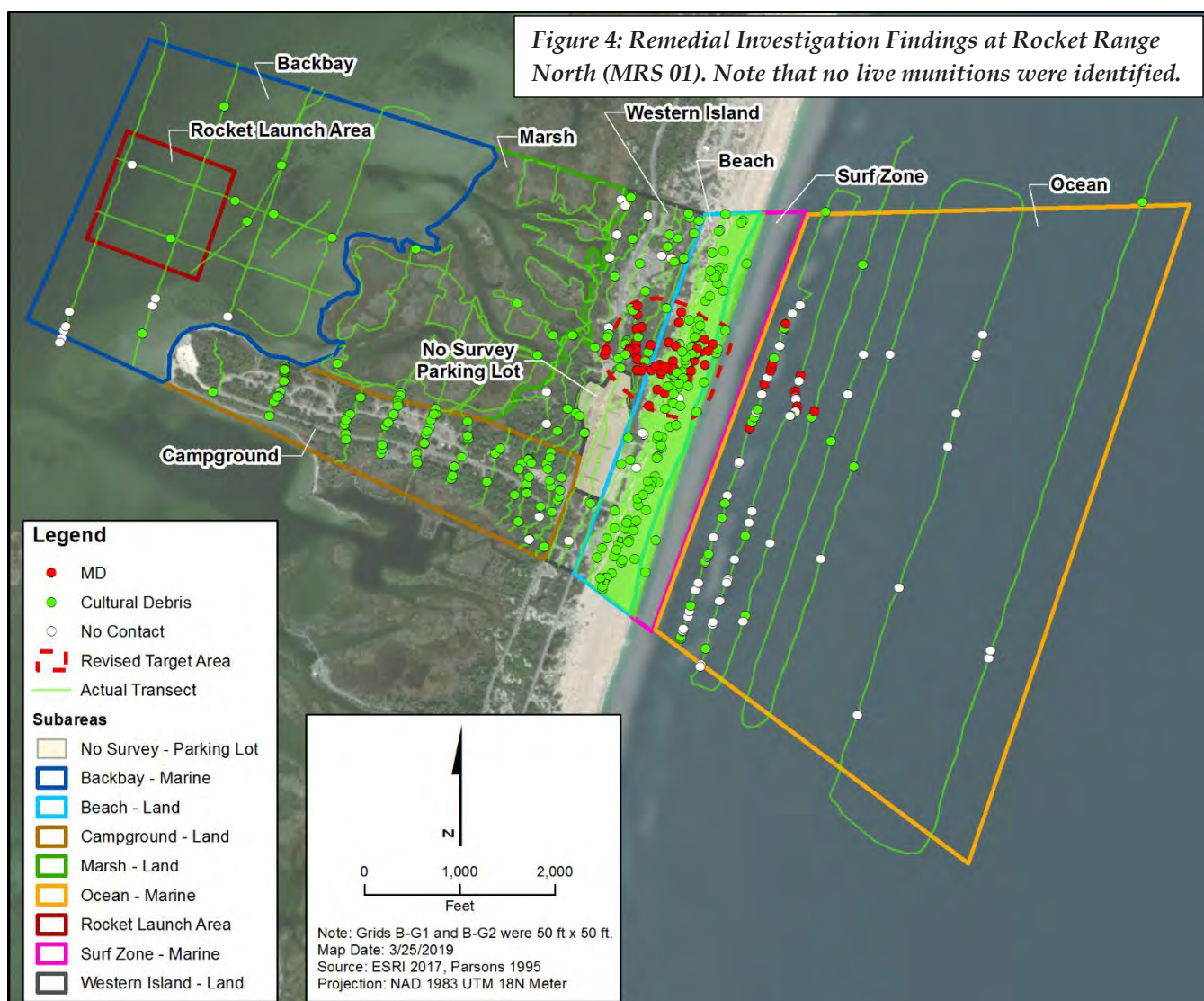
As recommended by the 2007 site inspection, a remedial investigation was conducted to characterize the nature and extent of potential munitions and explosives of concern at Rocket Range North (MRS 01) and Rocket Range South (MRS 03). To accomplish this, **digital geophysical mapping (DGM)** data were collected on land and in the water at MRS 01 and MRS 03 by foot, motorized vehicle, and by boat along transects (**Photos 1 and 2**). The DGM data presents hits or "**anomalies**" measured by the instrumentation on the surface and in the subsurface. The DGM data were later analyzed to identify areas with a high-density of anomalies (e.g., target areas or burial areas) and for specific subsurface anomalies or "targets" (**Figures 4 and 5**) to dig up during the intrusive investigation. Teams of unexploded ordnance (UXO) technicians dug up the target anomalies on land and in the water and categorized the items. All items were categorized as either munitions safe to dispose of or cultural debris (such as tent stakes, barbed wire, cans, etc.). No live munitions nor explosive hazards were identified. The results of the intrusive investigations for each MRS are discussed below.



*Photos 1 and 2: Land-based digital geophysical mapping on the beach and in the marsh.*

### **Rocket Range North (MRS 01)**

At MRS 01, a total of 445 anomalies located both on land and in the water were selected to be intrusively investigated (i.e., dug up and categorized) (**Figure 4**). Of the 445 anomalies investigated, only 64 were categorized as being related to munitions, all of which were



identified as munitions debris. All munitions debris identified at MRS 01 was located in and around the former target area and was consistent with munitions debris items historically found at the site, including practice rockets, practice bombs, and inert 20-mm TP projectiles and casings. The practice rockets and the 20-mm TP projectile can contain propellant and the practice bombs can contain spotting charges if they did not function as intended. However, neither spotting charges nor propellant was found in any of the items. Due to the harsh conditions at the site (i.e., exposure to salt water), the majority of the items had severe rust and corrosion. No live munitions have ever been identified at MRS 01. Therefore, the remedial investigation concluded that any military munitions encountered in the future at MRS 01 are anticipated to be only munitions debris.

#### **Rocket Range South (MRS 03)**

At MRS 03, 260 anomalies were intrusively investigated both on land and in the water (**Figure 5**). None of the 260

anomalies investigated were related to munitions. Historically, only two pieces of munitions debris from practice rockets were reportedly found at MRS 03. Based on the findings of the remedial investigation and the previous investigations, the remedial investigation report concluded that it is unlikely MRS 03 was used by the Navy as a practice bombing and strafing range. No munitions debris was identified during the remedial investigation nor have live munitions ever been identified at MRS 03.

#### **Remedial Investigation Conclusions**

Based on the findings of the remedial investigation, no munitions nor explosives of concern were identified at either MRS, and as such, there is no unacceptable risk to human health or the environment. Therefore, no remedial action is recommended for MRS 01 and MRS 03.



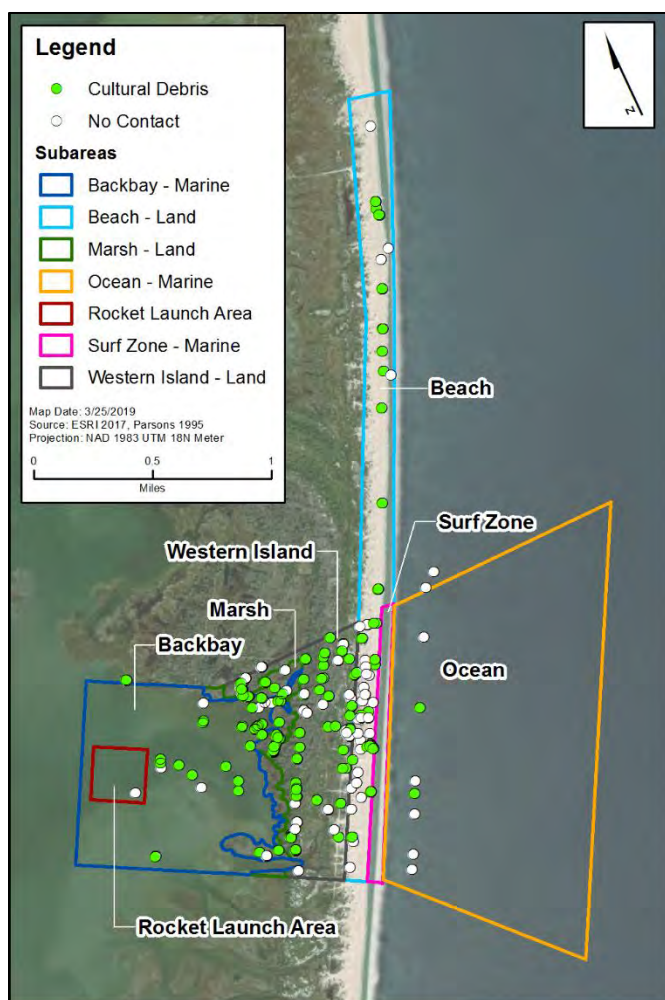


Figure 5: Remedial Investigation Findings at Rocket Range South (MRS 03). Note that no munitions debris or live munitions were identified.

### Summary of Previous Investigation Findings

Historically, MRS 01 and MRS 03 were used as rocket ranges (Figure 6) where training consisted of air-to-ground target practice, using inert and practice munitions (i.e., rockets, bombs, and 20-mm projectiles). Since investigations began at the site approximately 30 years ago, no evidence of the use of live munitions (containing explosives) has been found at the MRSs or anywhere on the Assateague Island FUDS. Munitions debris items found to date at the Assateague Island FUDS confirm the types of ordnance used and their associated low hazard. As concluded in the remedial investigation report, no further action is recommended for MRS 01 and MRS 03.

## 3 Site Characteristics

MRS 01 is situated on the northern portion of Assateague Island approximately 10 miles south of Ocean City, Maryland and MRS 03 is located approximately 10 miles

south of MRS 01. MRS 01 encompasses 3,412.2 acres that overlap Assateague Island State Park to the north and the Assateague Island National Seashore to the south (Figure 6). MRS 03 is located entirely on the Assateague Island National Seashore and encompasses 3,245.5 acres. Approximately 80 percent of the MRSs are located in water (i.e., Atlantic Ocean or Chincoteague Bay); while the remaining portions of land consists of beaches, sand dunes, and dense brushy areas. No freshwater streams or river are located on Assateague Island; however, numerous salt-marsh wetlands and freshwater wetlands are present on and surrounding the Island.

The topography of the Island is relatively flat with elevations that range from sea level to approximately 15 ft. Barrier islands like Assateague are dynamic in nature; summer to winter high-tide lines may vary up to 40 meters at MRS 01 and 60 meters at MRS 03. Because of

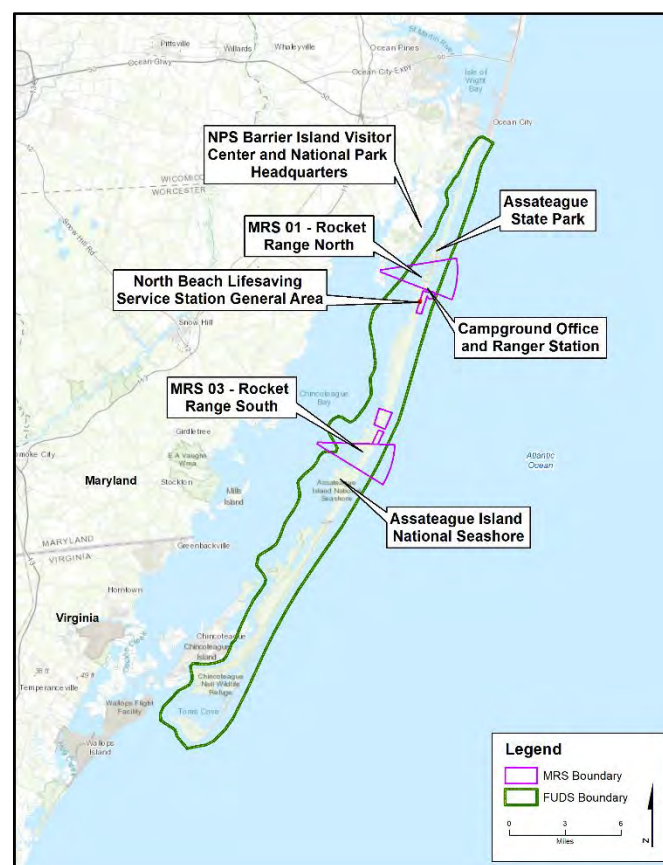


Figure 6: Munitions Response Sites and layout of the Assateague Island FUDS

the dynamic conditions along the shoreline (i.e., barrier island subject to extreme wind and wave energy), items buried in the subsurface could potentially migrate to the surface or be covered with additional sands/sediment.

Additionally, the shoreline has steadily migrated towards the west over the past 60 years claiming

portions of the eastern shore that were previously exposed (**Figures 2 and 3**).

Both MRSs are designated as recreational areas as part of the Assateague Island National Seashore, and as such, public access to the MRSs is unlimited. No permanent residences are located on either MRS, but approximately 350 campsites and 1 back country campground are located on MRS 01 and MRS 03, respectively. MRS 01 is located near the Assateague Island National Seashore Ranger Station and North Ocean Beach parking lot (**Figure 6**) and receives a significant influx of visitors during the summer months (up to 7,500 visitors per day). MRS 03 is only accessible by foot or by vehicle with an Over-Sand Vehicle Special Use Permit. Due to the remote nature of MRS 03, visitor use is significantly less than MRS 01 (less than 1,500 visitors annually).

## 4 Scope and Role of Response

The site inspection report determined that there were no munitions constituents on the FUDS that posed a risk to human health or the environment at MRS 01 or at MRS 03 of the Assateague Island FUDS.

The remedial investigation report noted that no live munitions or explosives of concern had been identified at either MRS 01 or 03; therefore, the remedial investigation concluded that acceptable conditions exist (i.e., negligible risk is posed by the FUDS).

Based on the results of the remedial investigation, no remedial action is proposed for the two MRSs at the Assateague Island FUDS. Therefore, no **remedial action objectives (RAOs)** were developed nor remedial alternatives considered.

## 5 Summary of Site Risks

A detailed discussion of the risk screening performed on the munitions constituents at the two MRSs at the Assateague Island FUDS can be found in the 2007 site inspection report.

For the munitions debris identified on the FUDS, a detailed discussion of the risk management methodology used to assess the explosive risk posed is presented for MRS 01 and MRS 03 within the remedial investigation report.

### Human Health Risk Assessment

No human health risk assessment was warranted for MRS 01 or MRS 03 based on the risk screening of the

analytical results from the sampling conducted during the site inspection. As such, no unacceptable risks to human receptors associated with munitions constituents were identified for MRS 01 or MRS 03.

### Ecological Risk Screening

Based on the findings of the screening level ecological risk assessment conducted during the 2007 site inspection, antimony was the only chemical potentially associated with the munitions used on site that was reported with a concentration above its ecological screening level. However, the antimony concentrations were consistent with background values in the area and are likely not related to the munitions found on site. Therefore, no munitions constituents were identified to pose a risk for ecological receptors at MRS 01 or MRS 03.

### Risk Management Methodology

The Risk Management Methodology (USACE 2016) is the current evaluation system being used to assess risk from live munitions and explosives of concern at military munitions response FUDS and it accounts for a variety of factors related to the potential risks at a given MRS. These factors include the likelihood of encountering live munitions/explosives (accessibility), the severity of an explosive incident should one occur (severity), and the likelihood of a detonation (sensitivity of the items) (**Tables 1 and 2**). The methodology utilizes these factors to illustrate site-specific conditions and differentiate acceptable from unacceptable conditions.

*Table 1: Evaluation for MRS 01*

Matrix	Evaluation	Risk
#1 Likelihood of Encounter	Amount of Live Munitions – None Found	Seldom
#2 Severity of Incident	Encounters with Live Munitions Items - None	Rare Occurrence – Modest Injury
#3 Likelihood of Detonation	Sensitivity of Detonation - Low	Low
# 4 Site Conditions	Seldom to Encounter, Rare Occurrence of Injury, Low Sensitivity	ACCEPTABLE SITE CONDITIONS

Sufficient area was investigated during the remedial investigation to support the conclusions presented in the Risk Management Methodology. Although practice and inert munitions have been identified at both MRSs, no live munitions (i.e., containing explosives) have been found.

Since no live munitions nor explosives of concern have been identified at either MRS 01 or MRS 03 during previous investigations or during the remedial investigation, it is unlikely for a future encounter to occur. Therefore, the Risk Management Methodology evaluation for both MRS 01 and MRS 03, determined acceptable site conditions.

**Table 2: Evaluation for MRS 03**

Matrix	Evaluation	Risk
#1 Likelihood of Encounter	Amount of Live Munitions – None Found	Unlikely
#2 Severity of Incident	Encounters with Live Munitions Items - None	Improbable – No Injury Anticipated
#3 Likelihood of Detonation	Sensitivity of Detonation – Not Sensitive	Inconsequential – Not Likely to Impart Energy
# 4 Site Conditions	Unlikely, Improbable, Not Sensitive	ACCEPTABLE SITE CONDITIONS

## 6 Preferred Approach

Based on the results of the remedial investigation for the Assateague Island FUDS, there is no unacceptable risk to human health or the environment at the site. Therefore, the Proposed Plan for the FUDS site is a **No Action** decision, recommended by USACE.

A community relations program is currently being conducted for the Assateague Island FUDS and input from the public is a key element in the decision-making process. USACE has provided complete information regarding the investigation of the Assateague Island FUDS in the Administrative Record file for the site at the Worcester County Library - Berlin Branch and will be available at the public meeting. In addition, for easy

access the remedial investigation report and the proposed plan can be obtained electronically at <https://www.nab.usace.army.mil/Missions/Environmental/Formerly-Used-Defense-Sites/>.

This Proposed Plan fulfills the public participation requirements of CERCLA Section 117(a), which specifies that the lead agency (i.e., USACE) must publish a plan outlining any remedial alternatives evaluated for the site and identifying the proposed decision. All documents referenced in this Proposed Plan are available for public review as part of the Administrative Record file at the Worcester County Library - Berlin Branch.

The public comment period for the Proposed Plan is an opportunity to provide input regarding the proposed No Action decision for MRS 01 and MRS 03. The public comment period will be held from April 29<sup>th</sup> to June 3<sup>rd</sup>, 2019, and the public meeting will be held on May 2<sup>nd</sup>, 2019, at 6:00 pm (see below for details). All interested parties are encouraged to attend the meeting to learn more about the Assateague Island FUDS from the project team members. The public meeting will also provide an additional opportunity to submit comments to USACE on the Proposed Plan.

The insert page may be used to provide comments to USACE, although the use of this form is not required. Comments must be postmarked no later than June 3<sup>rd</sup>, 2019. On the basis of comments or new information, USACE may modify the proposed decision or choose another alternative, if appropriate. USACE will summarize and respond to comments in a responsiveness summary, which will become part of the official **Decision Document (DD)**. After the public comment period, USACE will determine whether the Proposed Plan should be modified on the basis of comments received. After modification, or if no modification is necessary, the Decision Document will be signed by USACE.

## 7 Mark your Calendar for the Public Comment Period

### Public Comment Period

April 29<sup>th</sup>, 2019 through June 3<sup>rd</sup>, 2019



### Submit Written Comments

USACE will accept written comments on the Proposed Plan during the public comment period. To submit comments or obtain further information please refer to the insert page.

### Attend the Public Meeting

May 2<sup>nd</sup>, 2019 at 6:00 – 8:00 PM  
Assateague Island Environmental Education Center  
7206 National Seashore Lane  
Berlin, MD 21811

USACE will hold a public meeting to explain the Proposed Plan. Verbal and written comments will be accepted during the public comment period, including at the meeting.

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Please Print Your Comments Below:

Your input on the Proposed Plan for the Assateague Island FUDS is important to USACE. Comments provided by the public are valuable in helping USACE select a final remedy for the site.

You may use the space below to write your comments, then fold and mail to The U.S. Army Corps of Engineers, Baltimore District 2 Hopkins Plaza Baltimore, MD 21201 to the attention of Mr. Christopher Gardner. Comments must be postmarked by June 3<sup>rd</sup>, 2019. If you have questions regarding the comment period, please contact Mr. Christopher Gardner at (410) 962-2626.

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## Glossary

**Administrative Record file:** Site information is compiled in an Administrative Record file and placed in the general Installation Restoration Program information repository for public review.

**Anomaly:** Something that deviates from what is standard, normal, or expected. As it relates to this document, an anomaly is a suspected metallic object that is identified using magnetometers, a type of metal detector.

**Archive Search Report (ASR):** A detailed investigation to report on past MEC activities conducted on an installation. The principal purpose of the Archives Search is to assemble historical records and available field data, assess potential ordnance presence, and recommend follow-up actions at a FUDS. There are four general steps in an Archives Search: records search phase, site safety and health plan, site survey; archives search report including risk assessment

**Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA):** A Federal law enacted in 1980 and amended in 1986 by the Superfund Amendments and Reauthorization Act, which concerns investigation and response actions regarding hazardous substances, pollutants, and contaminants.

**Decision Document (DD):** A public document that describes the remedy selected for a site, the basis for the choice of that remedy, and provides responses to public comments.

**Digital Geophysical Mapping:** The use of specialized instruments on the ground surface to detect metallic items such as munitions or munitions debris below the ground. The instruments used are known as sensors.

**Ecological Risk Screening:** An evaluation of the risk posed to the environment if remedial activities are not performed at the site.

**Explosive Ordnance Disposal (EOD):** A specialized organization made up of personnel specially trained to destroy munitions.

**Formerly Used Defense Site (FUDS):** A FUDS includes property that was owned by, leased to, or otherwise possessed by the United States and under the jurisdiction of the Secretary (including governmental entities that are the legal predecessors of DoD or its components) that were transferred from DoD control prior to 17 October 1986. The term "Secretary" means the Secretary of Defense and the Secretaries of each the

Military Departments, as well as the Secretaries of any predecessor department or agency.

**Groundwater:** Subsurface water that occurs in soils and geologic formations that are fully saturated.

**Human Health Risk Assessment:** An evaluation of the risk posed to human health should remedial activities not be implemented.

**Inventory Project Report (INPR):** The report resulting from the preliminary assessment of eligibility. The INPR includes data as well as a recommendation for further action and guides investigators through further site studies. The INPR documents whether a property and projects are eligible for the FUDS program.

**Military Munitions:** All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the DoD, the U.S. Coast Guard, the U.S. Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives, and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof.

The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, devices, and nuclear components, other than nonnuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed.

**Military Munitions Response Program (MMRP):** The DoD developed the Military Munitions Response Program (MMRP) in 2001 to address munitions-related concerns, including explosive safety, environmental, and health hazards from releases of unexploded ordnance (UXO), discarded military munitions (DDM), and munitions constituents found at locations other than operational ranges on active and Base Realignment and Closure (BRAC) installations and Formerly Used Defense Sites (FUDS) properties. The MMRP addresses non-operational range lands with suspected or known hazards from munitions and explosives of concern (MEC) which occurred prior to September 2002, but are not already included with an

Installation Response Program (IRP) site cleanup activity.

**Munitions and Explosives of Concern (MEC):** This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means:

- (A) UXO, as defined in 10 U.S.C. 101(e)(5);
- (B) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710(e)(2); or
- (C) Munitions constituents (e.g., TNT, RDX), as defined in 10 U.S.C. 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

**Munitions Constituents (MC):** Any materials originating from UXO, DMM, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions.

**Munitions Debris (MD):** Remnants of munitions (e.g., penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization or disposal.

**Material Documented as Safe (MDAS):** Munitions or munitions-related items that have been assessed by qualified personnel and documented as not presenting an explosive hazard.

**Munitions Response Site (MRS):** A site that was formerly used to train soldiers in how to use weapons but is no longer in use. An MRS may contain munitions and/or munitions constituents. An MRS requires some action to address munitions explosive hazards and/or munitions constituent contamination.

**No Further Action:** A determination for sites where a CERCLA remedial or removal action has been conducted that, based on analysis of chemical concentrations remaining in place and risks they may pose to human health and the environment, no additional actions are required. The response is complete because site contaminants have been remediated in accordance with all applicable laws and regulations. The site is protective of human health and the environment.

**Ordnance and Explosive Waste (OEW):** Consists of either (1) or (2) below:

- (1) Ammunition, ammunition components, chemical or biological warfare material or explosives that have been abandoned, expelled from demolition pits or burning pads, lost, discarded, buried, or fired. Such ammunition, ammunition components, and explosives are no longer under accountable

record control of any Department of Defense organization or activity.

- (2) Explosive soil, which refers to mixtures of explosives in soil, sand, clay or other solid media at concentrations such that the mixture itself is explosive.

**Proposed Plan:** In the first step in the remedy selection process, the lead agency identifies the alternative that best meets the requirements in CERCLA 300.430(f)(1) and presents that alternative to the public in a proposed plan. The purpose of the proposed plan is to supplement the RI and provide the public with a reasonable opportunity to comment on the proposed remedial action, and to participate in the selection of remedial action at a site.

**Public Comment Period:** The time allowed for the members of an affected community to express views and concerns regarding an action proposed to be taken by USACE.

**Receptors:** Humans, animals, or plants that may be exposed to risks from contaminants related to a site.

**Remedial Action:** Action of the lead remedial agent that addresses a contaminant, hazard, receptor, or the connection between the receptor and the hazard, which is taken to eliminate or minimize the risk to the receptor at a remedial site.

**Remedial Action Objective (RAO):** Objectives of remedial actions that are developed based on contaminated media, contaminants of concern, potential receptors and exposure scenarios, human health and ecological risk assessment, and attainment of regulatory cleanup levels, if any exist.

**Remedial Investigation (RI):** A study of a facility that supports the selection of a remedy where hazardous substances have been disposed or released. The RI identifies the nature and extent of contamination at the facility.

**Risk Management Methodology:** A risk evaluation method for munitions and explosives of concern used to provide information to support risk management decisions upon completion of site characterization; develop remedial action objectives; and provide a basis for assessing achievement of remedial action objectives relative to acceptable end states.

**Screening Level Ecological Risk Assessment (SLERA):** An evaluation of the risk posed to the environment if remedial activities are not performed at the site

**Site Inspection (SI):** Activities undertaken to determine the presence, type, distribution, density, and location of

contaminants, including MEC. Includes physical detection and identification of MEC as well as chemical sampling and monitoring.

**Spotter:** An enlisted person who communicates with a gunner (in aircraft or on the ground) and orders or advises adjustment of fire on a target by observations.

**Sweep:** The action of walking over an area using a metal detector to find munitions and munitions debris up to 6 inches below surface of the soil or sediment or to find metallic anomalies in the subsurface soils or sediments.

**Time Critical Removal Action (TCRA):** Removal actions conducted to respond to an imminent danger posed by the release or threat of release, where cleanup

or stabilization actions must be initiated within six months to reduce risk to public health or the environment.

**U.S. Army Corps of Engineers (USACE):** A branch of the DoD with special expertise in carrying out CERCLA/NCP investigations and response actions at former DoD sites.

**U.S. Department of Defense (DoD):** an executive branch department of the federal government of the United States charged with coordinating and supervising all agencies and functions of the government concerned directly with national security and the United States Armed Forces.

## Acronyms

ASIS	Assateague Island National Seashore
ASR	Archive Search Report
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DD	Decision Document
DoD	U.S. Department of Defense
DMM	Discarded Military Munitions
EOD	Explosive Ordnance Disposal
ft	feet
FUDS	Formerly Used Defense Site
In.	inch(es)
INPR	Inventory Project Report
MC	Munitions constituents
MD	Munitions debris or Maryland
MDAS	Munitions documented as safe
MEC	Munitions and explosives of concern
mm	millimeter
MMRP	Military Munitions Response Program
MRS	Munitions Response Site
Navy	United States Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OEW	Ordnance and explosive waste
PP	Proposed Plan
RAO	Remedial Action Objective
RI	Remedial Investigation
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
SLERA	Screening level ecological risk assessment
TCRA	Time Critical Removal Action
TP	Target Practice
USACE	U.S. Army Corps of Engineers
UXO	Unexploded Ordnance
WWII	World War II

## References

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Human Factors Applications, Inc. 1998. *Removal Action Report Ordnance and Explosives (OE) Time Critical Removal Action Assateague Island Worcester County, Maryland. Final. Prepared for U.S. Army Corps of Engineers Engineering and Support Center, Huntsville. August.*

Parsons Engineering Science, Inc. 1995. *Site Investigation Report Assateague Island Worcester County, Maryland and Accomack County, Virginia.*

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———. 2016. *Decision Logic to Assess Risks Associated with Explosive Hazards, and to Develop Remedial Action Objectives (RAOs) for Munition Response Sites (MRS). 7 December.*

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## **PUBLIC MEETING POSTERS**

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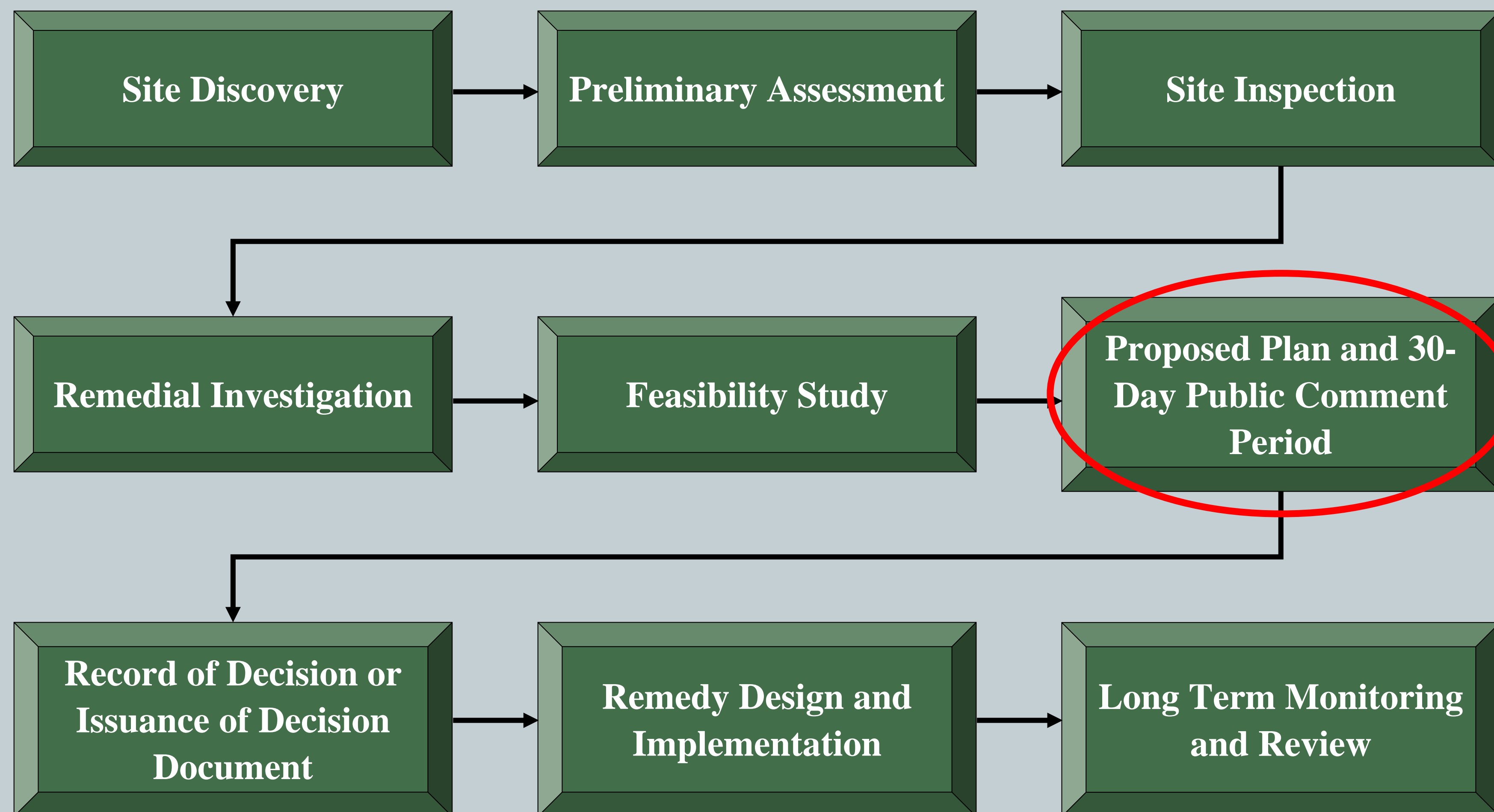


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# Public Meeting – May 2, 2019

## Assateague Island FUDS Proposed Plan

### Environmental Response Process



### Proposed Plan and Preferred Approach

This Proposed Plan identifies the preferred approach for the Assateague Island Formerly Used Defense Site (FUDS) and provides the rationale for this preference which can be found in greater detail in the Final Remedial Investigation Report (USACE 2019) and other documents contained in the **Information Repository**.

As a result of the Remedial Investigation completed at the Assateague Island FUDS, the current site conditions have been determined to be acceptable for Munitions Response Site (MRS) 01 and MRS 03. Therefore, as part of the CERCLA process for the FUDS, **No Further Action (NFA)** is recommended by USACE as the preferred approach.

### Public Comment Period for Proposed Plan

➤ The Proposed Plan comment period is from April 29<sup>th</sup> through June 3<sup>rd</sup>, 2019. The USACE will consider all relevant comments prior to making the final decision. To submit comments or obtain further information please refer to the insert page at end of proposed plan.

Send written comments to:

Christopher Gardner  
USACE Baltimore District  
2 Hopkins Plaza Baltimore,  
MD 21201

Email:

[Christopher.P.Gardner@usace.army.mil](mailto:Christopher.P.Gardner@usace.army.mil)

Phone: (410) 962-2626

### Location of Information Repository

For more information about the Assateague Island FUDS, use <https://www.nab.usace.army.mil/Missions/Environmental/Formerly-Used-Defense-Sites/>

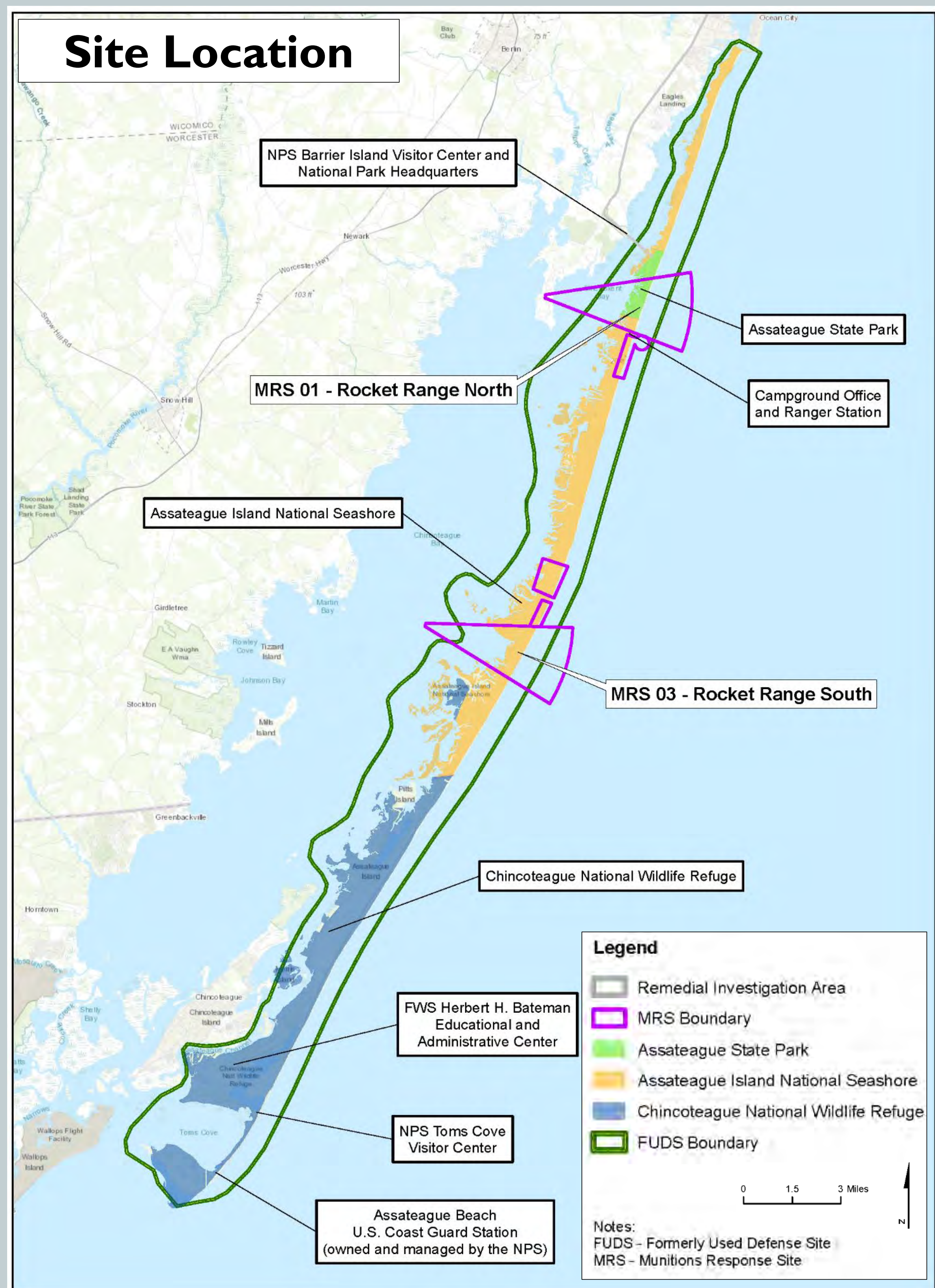
Or visit the Information Repository at the **Worcester County Library - Berlin Branch**  
**13 Harrison Ave, Berlin, MD 21811.**





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# Assateague Island Site History



- Two practice ranges used by the Navy from approximately 1944 to 1947.
- Air-to-ground practice bombing, rocket, and strafing range.
- Surface debris in target areas was reported as cleaned up and buried.
- Assateague Island established as a national seashore in 1965.
- First Reported incident of munitions debris/EOD response in 1988.
- Multiple investigations over the years.
- Currently Assateague Island serves as public lands for recreation.



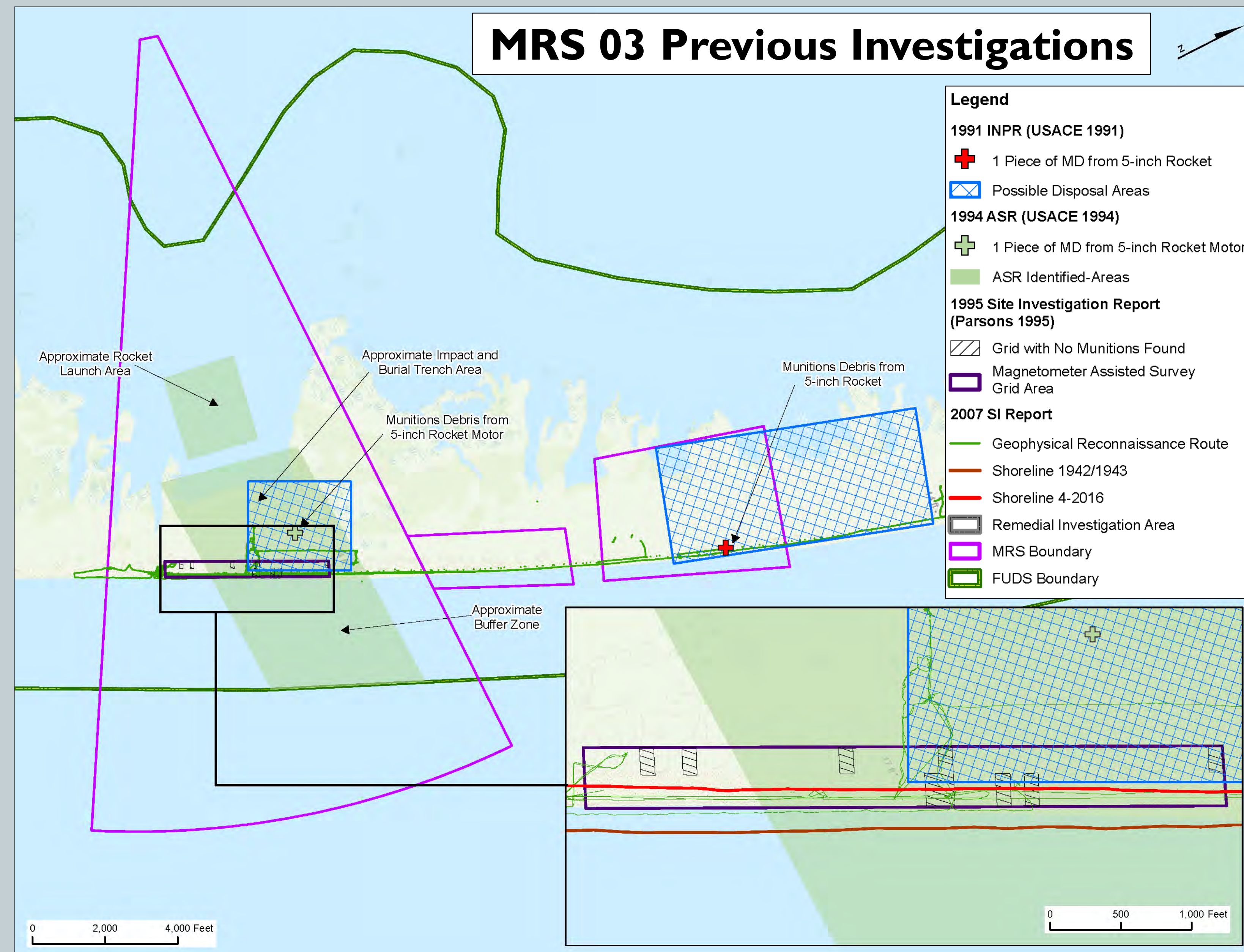
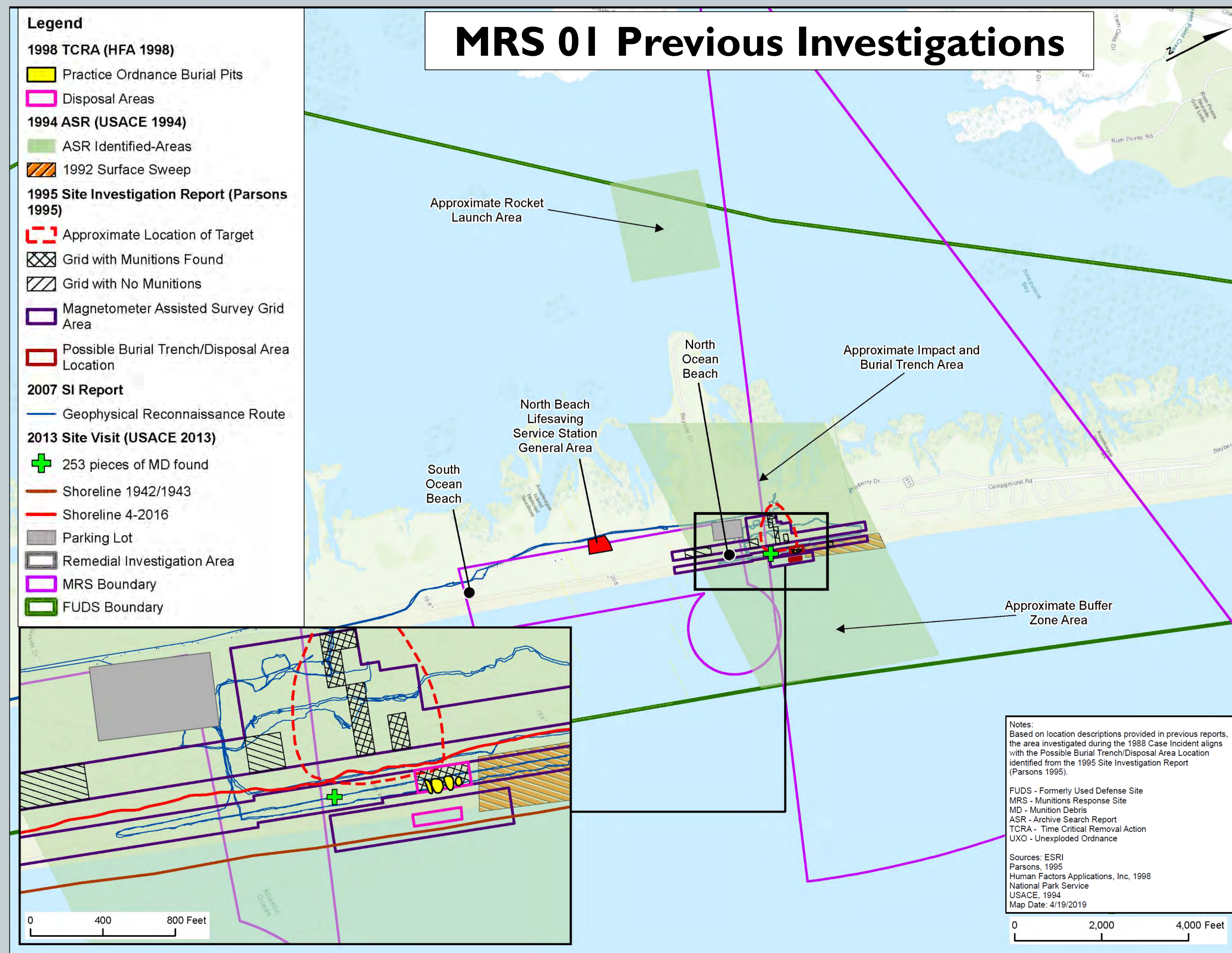


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# Assateague Island Previous Investigations

## Summary of Recovered Items during Previous Investigations

Investigation	Description	Surface		Subsurface		Total
		MEC	MD	MEC	MD	
1988 Case Incident	5-inch, 3.25-inch, and 2.25-inch practice rockets	0	5	0	14	19
1991 Inventory Project Report	Practice bomb (4.5 lb Mk 43)	0	1	0	0	1
	20-mm Projectile Casing (inert)	0	1	0	0	1
1994 Archive Search Report	3.25-inch practice rockets	0	1	0	0	1
1995 Site Investigation Report	5-inch, 3.25-inch, and 2.25-inch practice rockets	0	20	0	124	144
	"Old style" Practice bomb (type not specified)	0	0	0	1	1
1998 Time Critical Removal Action (TCRA)	5-inch, 3.25-inch, and 2.25-inch practice rockets	0	0	0	209	209
	Practice bomb (3 lb Mk 23)	0	0	0	3	3
2013 EOD Team Response	MD (type unknown)	0	234	0	0	234
2013 USACE Site Visit	MD (type unknown)	0	19	0	0	19
NPS MD Collection	MD (type unknown)	0	250	0	0	250
Total Items (found)		0	531	0	351	882



## **MRS 01:**

Total live munitions (MEC) found: 0

Total munitions debris (MD) found: 880

## **MRS 03:**

Total live munitions (MEC) found: 0

Total munitions debris (MD) found: 2

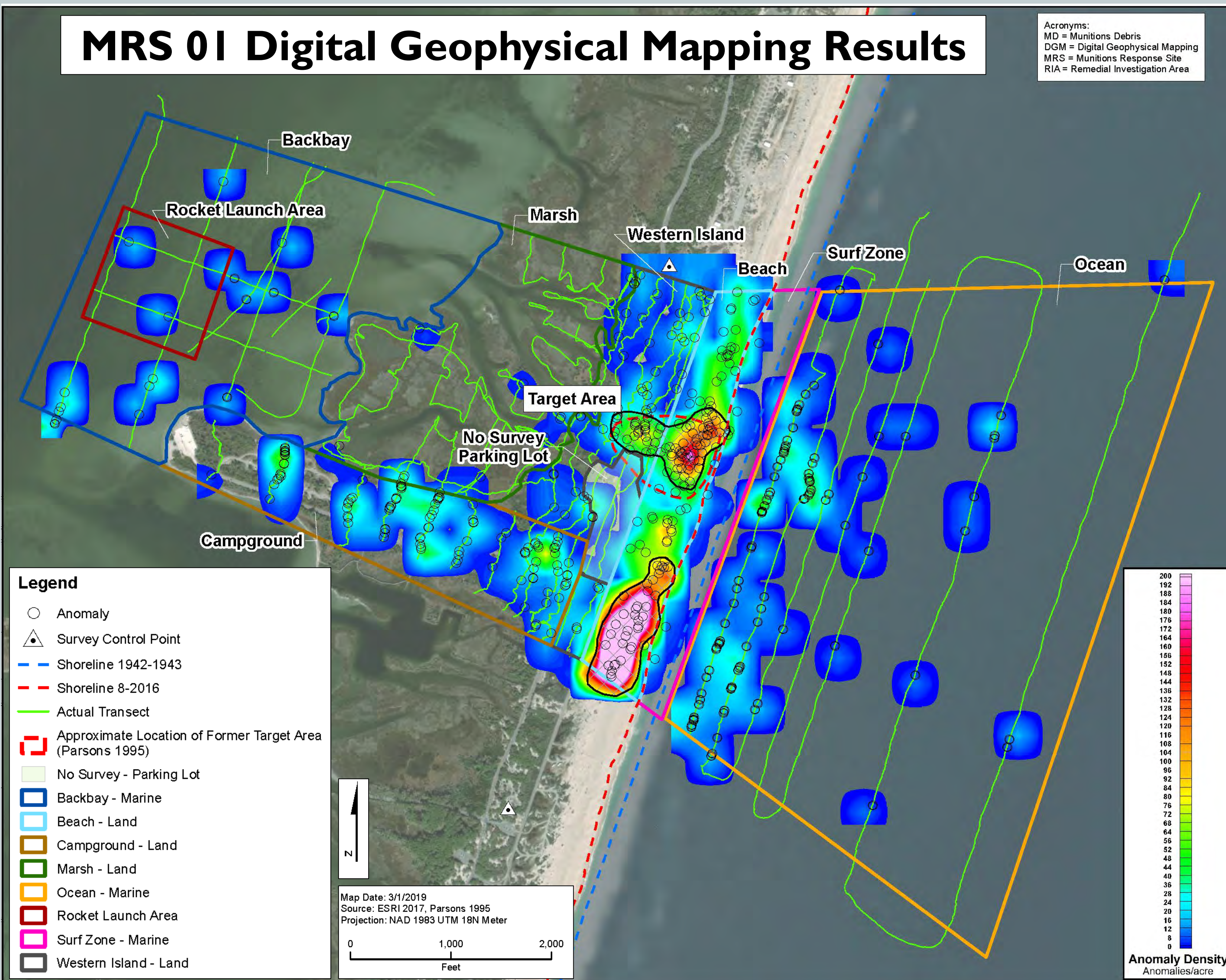




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# Remedial Investigation Results – MRS-01

## MRS 01 Digital Geophysical Mapping Results



## Summary of Intrusive Results at MRS 01

Location	Total TOIs Investigated	MEC	MD	NMRD	No Find <sup>(b)</sup>	QC Seeds	RRD
Land	336	0	90 <sup>a</sup>	246	31	7	1
Back Bay	17	0	0	8	9	0	0
Ocean	92	0	13	26	53	0	0
<b>Total</b>	<b>445</b>	<b>0</b>	<b>103</b>	<b>280</b>	<b>93</b>	<b>7</b>	<b>1</b>

a. Multiple pieces of MD were identified at several locations where MD was found.

b. No finds also includes TOIs that were too deep to excavate.

NOTES: MD = Munitions debris.

MEC = Munitions and explosives of concern.

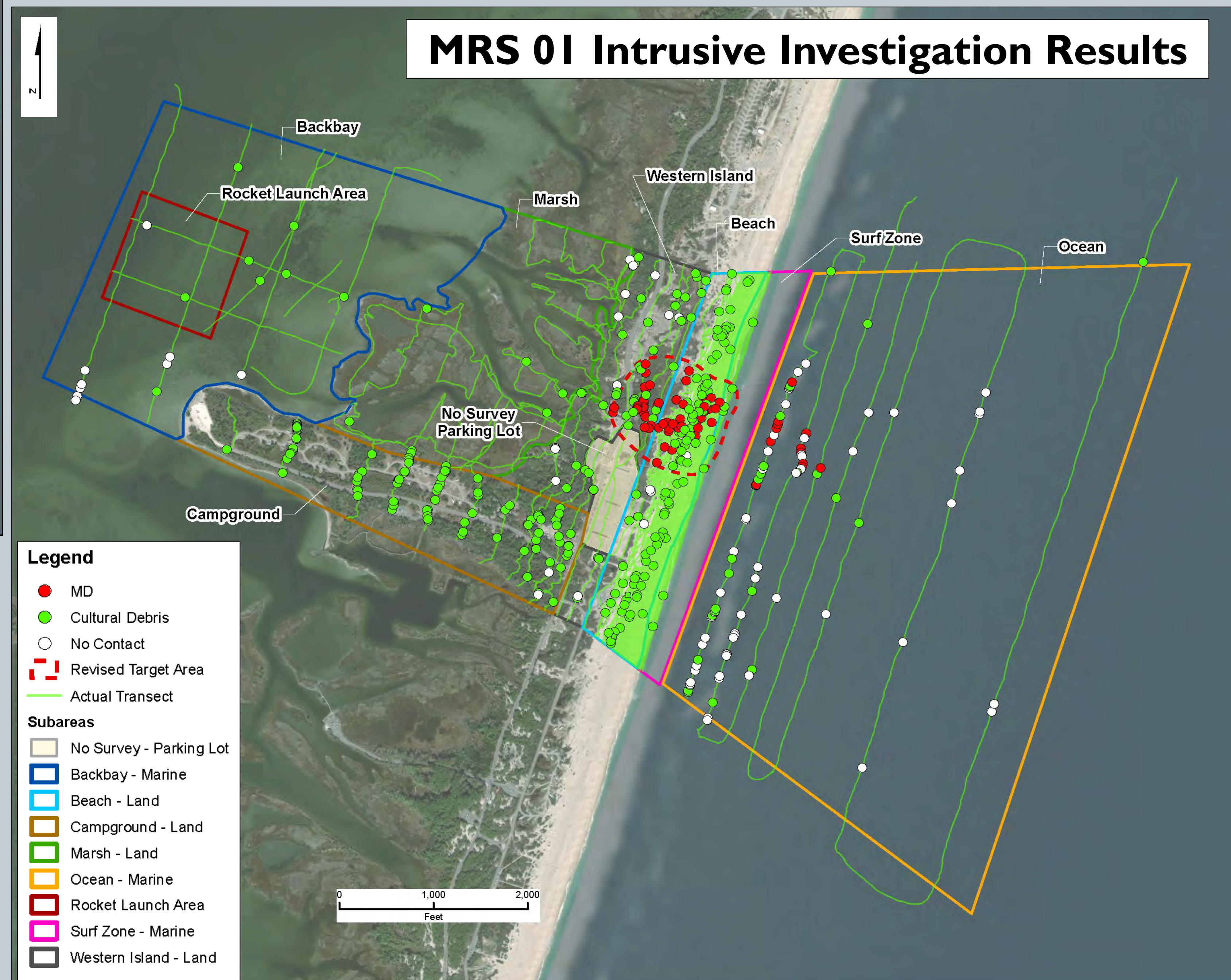
MRS = Munitions response site.

NMRD = Non-munitions related debris.

RRD = Range related debris.

TOI = Target of interest.

## MRS 01 Intrusive Investigation Results



- Digital geophysical mapping (DGM) data collected:
  - On land: 50.2 miles (20.0 acres)
  - In water: 13.0 miles (10.4 acres)

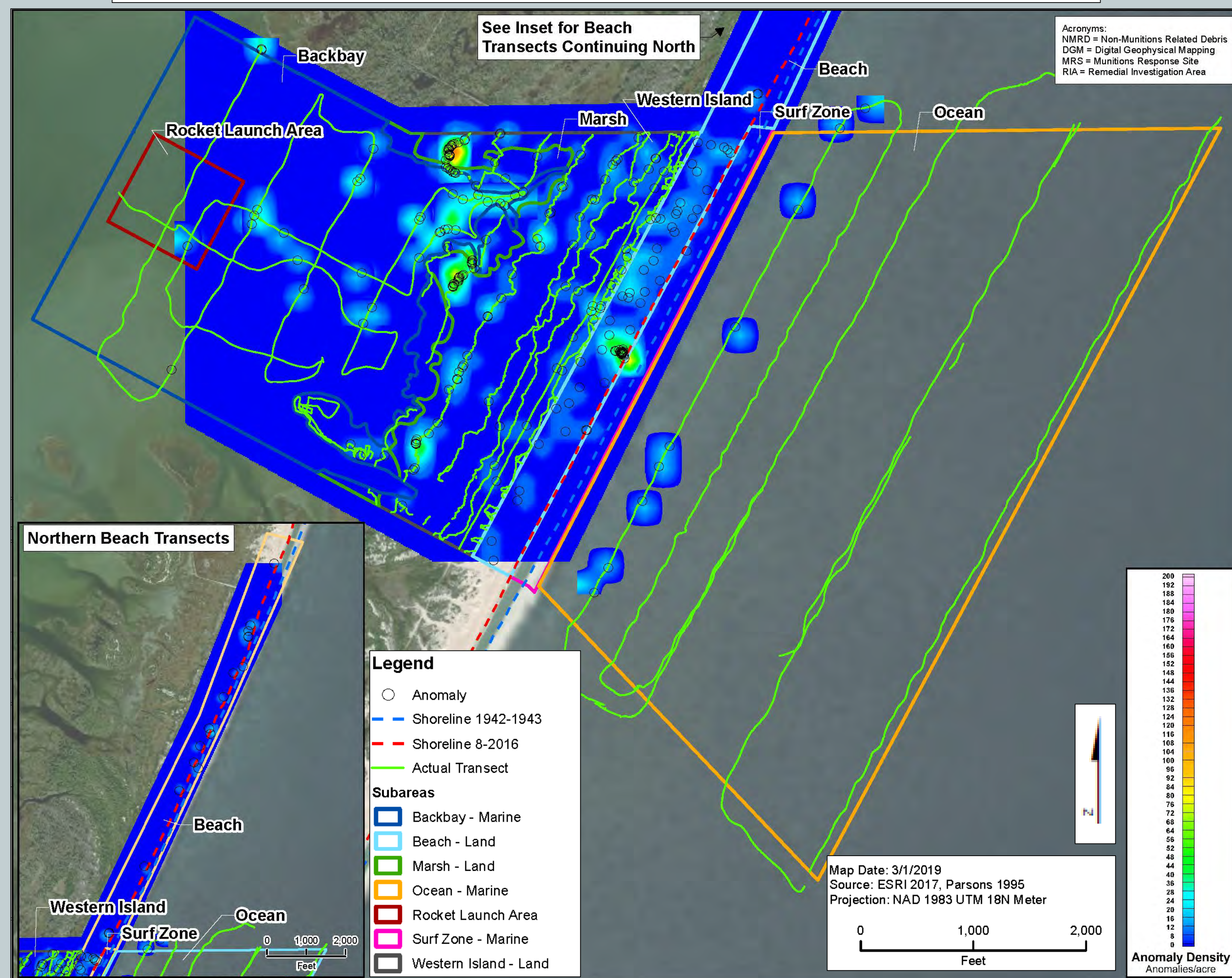




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# Remedial Investigation Results – MRS-03

## MRS 03 Digital Geophysical Mapping Results



## Summary of Intrusive Results at MRS 03

Location	Total TOIs Investigated	MEC	MD	NMRD	No Find <sup>(a)</sup>	QC Seeds	RRD
Land	219	0	0	148	62	9	0
Back Bay	32	0	0	23	9	0	0
Ocean	9	0	0	2	7	0	0
<b>Total</b>	<b>260</b>	<b>0</b>	<b>0</b>	<b>173</b>	<b>78</b>	<b>9</b>	<b>0</b>

a. No finds also includes TOIs that were too deep to excavate.

NOTES: MD = Munitions debris.

MEC = Munitions and explosives of concern.

MRS = Munitions response site.

NMRD = Non-munitions related debris.

RRD = Range related debris.

TOI = Target of interest.

## MRS 03 Intrusive Investigation Results

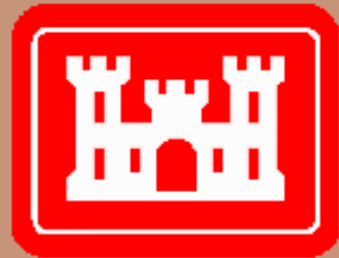


- Digital geophysical mapping (DGM) data collected:

- On land: 83.4 miles (33.1 acres)
- In water: 17.0 miles (13.6 acres)

Acronyms:  
NMRD = Non-Munitions Related Debris  
MRS = Munitions Response Site  
RI = Remedial Investigation





# Risk Management Methodology and Remedial Investigation Conclusions

## MRS 01

- Only training activities with practice munitions occurred at MRS 01.
- Over 99% munitions debris was from practice rockets.
- No propellant nor spotting charges were found in any items.
- **No live munitions identified.**

Table 1: Evaluation for MRS 01		
Matrix	Evaluation	Risk
#1 Likelihood of Encounter	Amount of Live Munitions – None Found	Seldom
#2 Severity of Incident	Encounters with Live Munitions Items - None	Rare Occurrence – Modest Injury
#3 Likelihood of Detonation	Sensitivity of Detonation - Low	Low
# 4 Site Conditions	Seldom to Encounter, Rare Occurrence of Injury, Low Sensitivity	<b>ACCEPTABLE SITE CONDITIONS</b>

## MRS 03

- Historically only 2 pieces of munitions debris from 5-in. practice rockets identified.
- Area not likely continued use as Rocket Range.
- **No live munitions identified.**

Table 2: Evaluation for MRS 03		
Matrix	Evaluation	Risk
#1 Likelihood of Encounter	Amount of Live Munitions – None Found	Unlikely
#2 Severity of Incident	Encounters with Live Munitions Items - None	Improbable – No Injury Anticipated
#3 Likelihood of Detonation	Sensitivity of Detonation – Not Sensitive	Inconsequential – Not Likely to Impart Energy
# 4 Site Conditions	Unlikely, Improbable, Not Sensitive	<b>ACCEPTABLE SITE CONDITIONS</b>

**No MEC Found at MRS 01 and MRS 03 = Acceptable Site Conditions = No Further Action**

## MRS 01

- **Matrix 1. Likelihood of Encounter = Seldom**
  - ❑ Access Conditions: Regular Access
  - ❑ Amount of MEC: Is only suspected based on historical evidence of munitions use only – No MEC encountered on site.
- **Matrix 2. Severity of Incident = C**
  - ❑ Likelihood of Encounter: Seldom (from Matrix 1)
  - ❑ Severity Associated with Specific Munitions Items: Modest
- **Matrix 3. Likelihood of Detonation = 3**
  - ❑ Sensitivity/Susceptibility to Detonation: Low
  - ❑ Likelihood to impart Energy on an Item: Modest
- **Matrix 4. Site Conditions = Acceptable**
  - ❑ Results from Matrix 2: C
  - ❑ Results from Matrix 3: 3

## MRS 03

- **Matrix 1. Likelihood of Encounter = Unlikely**
  - ❑ Access Conditions: Regular Access
  - ❑ Amount of MEC: Investigations (including RI) did not identify evidence of MEC presence
- **Matrix 2. Severity of Incident = D**
  - ❑ Likelihood of Encounter: Unlikely (from Matrix 1)
  - ❑ Severity Associated with Specific Munitions Items: Improbable
- **Matrix 3. Likelihood of Detonation = 3**
  - ❑ Sensitivity/ Susceptibility to Detonation: Not Sensitive
  - ❑ Likelihood to impart Energy on an Item: Modest
- **Matrix 4. Site Conditions = Acceptable**
  - ❑ Results from Matrix 2: D
  - ❑ Results from Matrix 3: 3





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# Munitions Debris Identified at Assateague Island



## Summary of Recovered Items at MRS 01 During the RI

Description	Surface		Subsurface		Total
	MEC	MD	MEC	MD	
Land					
20-mm Training Practice Projectile	0	1	0	0	1
2.25-in. practice rockets	0	0	0	88	88
Practice bomb (3-Pound Mark 23)	0	0	0	1	1
Water					
2.25-in. practice rockets	0	0	0	13	13
Total	0	1	0	102	103

No MD or MEC was identified at MRS 03 during the Remedial Investigation.

### NOTES:

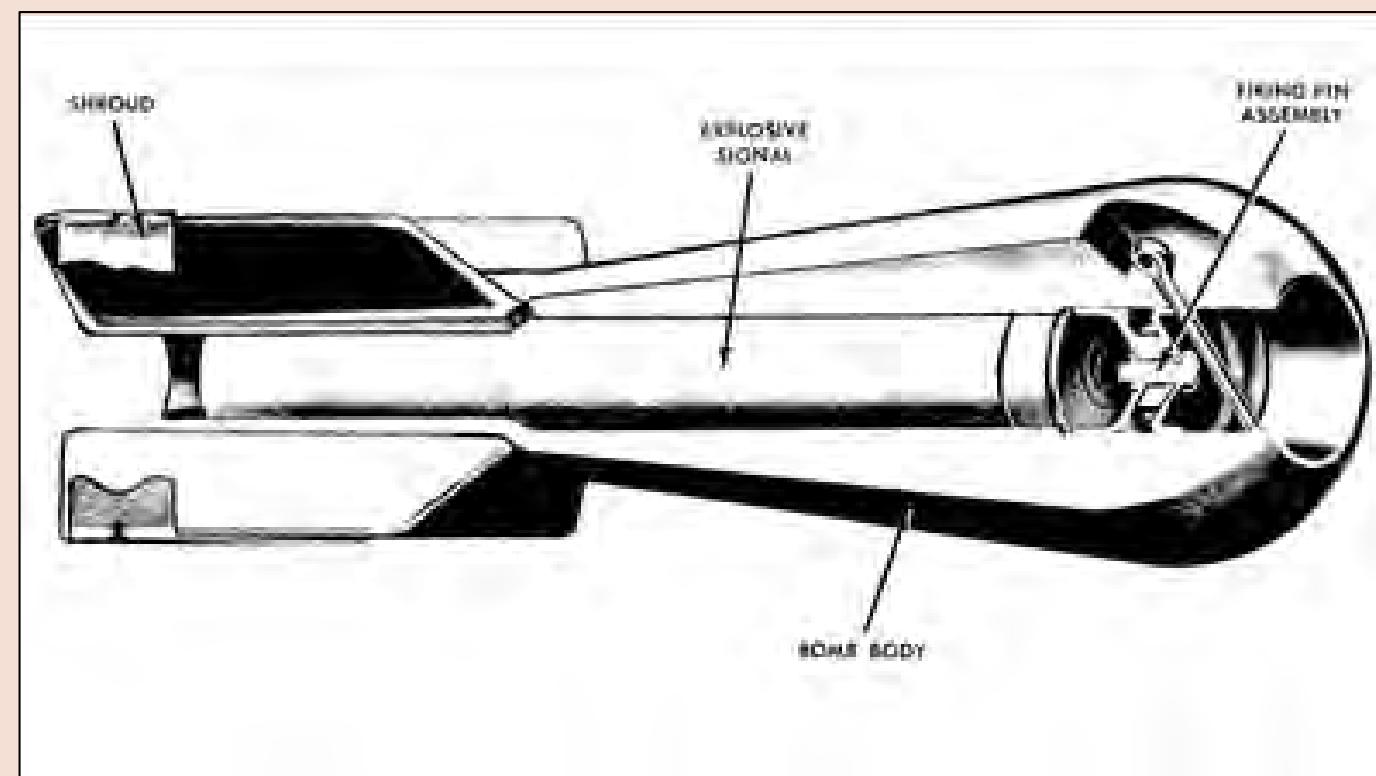
in. = Inch(es). MEC = Munitions and explosives of concern.  
MD = Munitions debris. RI = Remedial investigation.  
mm = Millimeter(s).



## Practice Bombs

➤ 3-lb Mk 23 and 4.5-lb Mk 43 practice bombs can contain spotting charges, if they did not function as intended.

Shell (casing) for the spotting charge during this time period 1944 – 47 was made of cardboard.

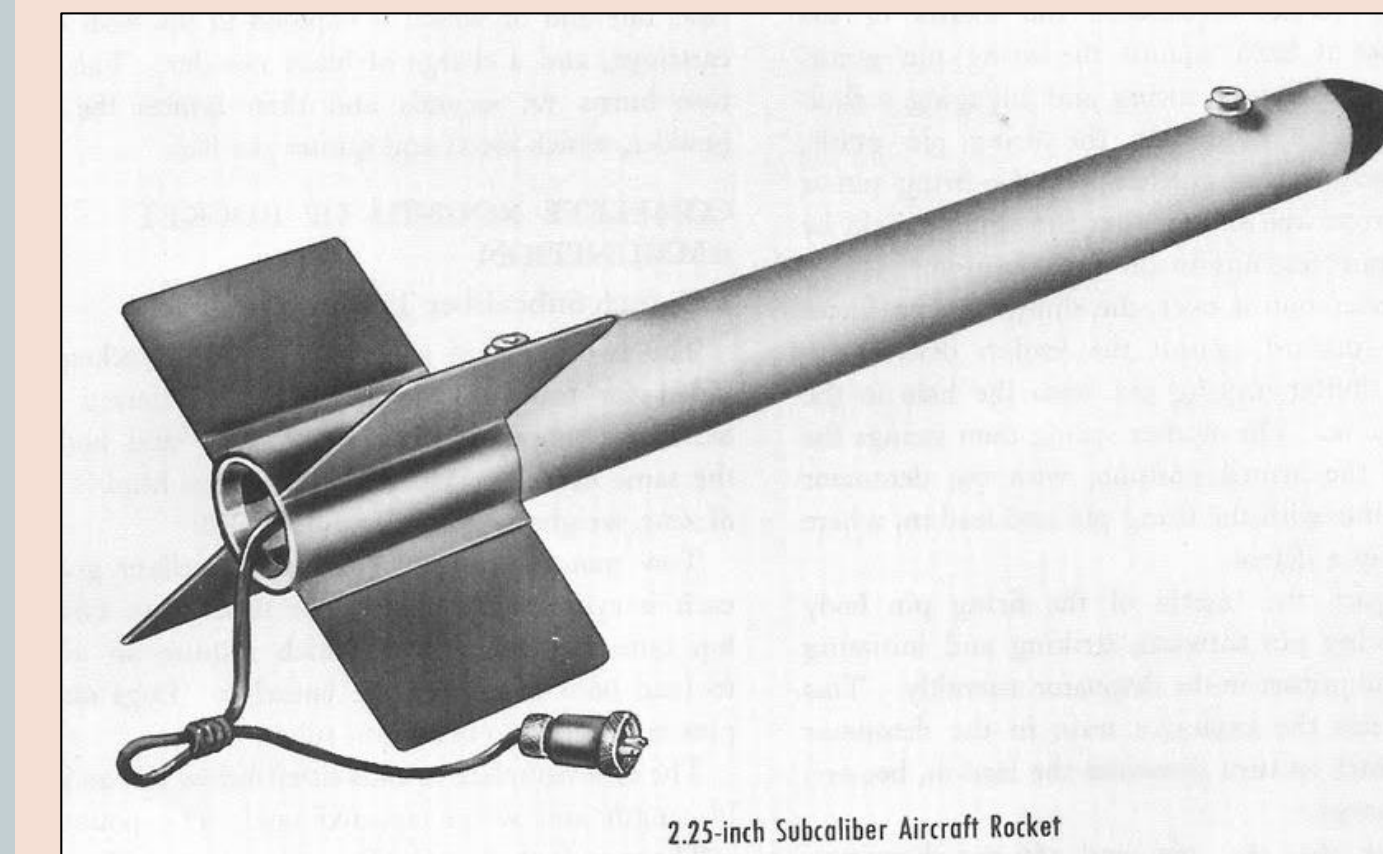


Extra long 10-gauge shotgun shells used for the MK-23 practice bomb.

- Only 1% of MD items; none found with intact spotting charge.
- Possibility to encounter practice bombs with intact spotting charge – RARE.



## Practice Rockets and Projectiles



2.25-inch Subcaliber Aircraft Rocket

- Practice rocket and 20-mm munitions debris in the target area confirms that inert and practice munitions were deposited by being fired at the target and the propellant component was expended.

➤ The 2.25-in., 3.25-in., 3.5-in., and 5-in. practice rockets and the 20-mm practice projectile can contain propellant before they are fired.







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# Recognize, Retreat, Report



## EMERGENCY CONTACT:

Park Dispatch Office:  
(757) 898-0058  
Or call 911

## Follow the 3Rs



### Recognize

Recognize when you may have encountered a munition



### Retreat

Do not touch, move, or disturb it, but carefully leave the area.



### Report

Immediately notify the  
**National Park Service** or  
contact local authorities (911).

**Visit the 3Rs Explosives Safety Education website:** [www.denix.osd.mil/uxo](http://www.denix.osd.mil/uxo)

