FORMERLY USED DEFENSE SITE ASSATEAGUE ISLAND PUBLIC MEETING

May 2nd, 2019

U.S. Army Corps of Engineers
Baltimore District

US Army Corps of Engineers ®

Assateague Island Environmental Education Center

7206 National Seashore Lane

Berlin, MD

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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).

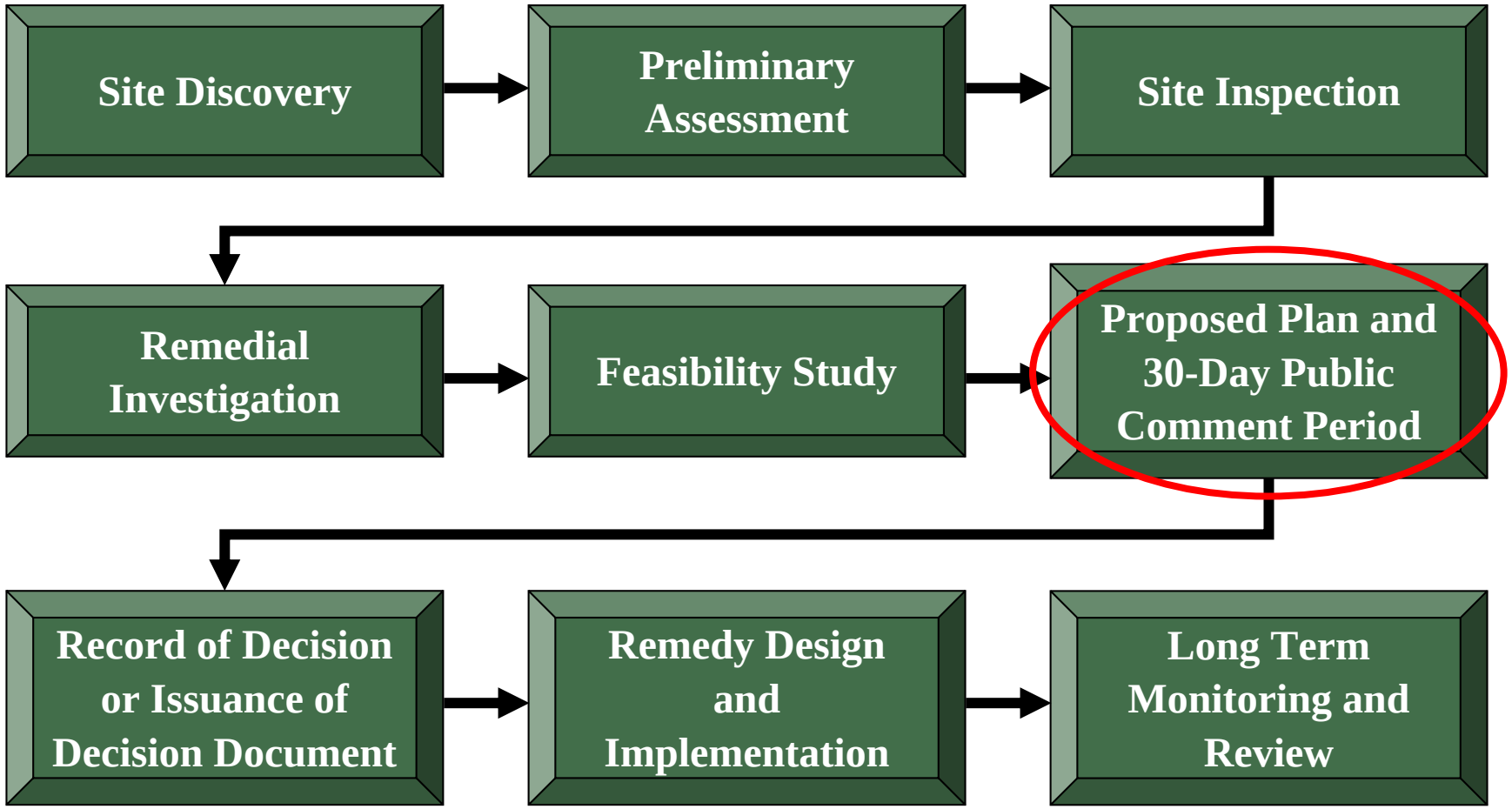
INTRODUCTION

- 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

AGENDA

- 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



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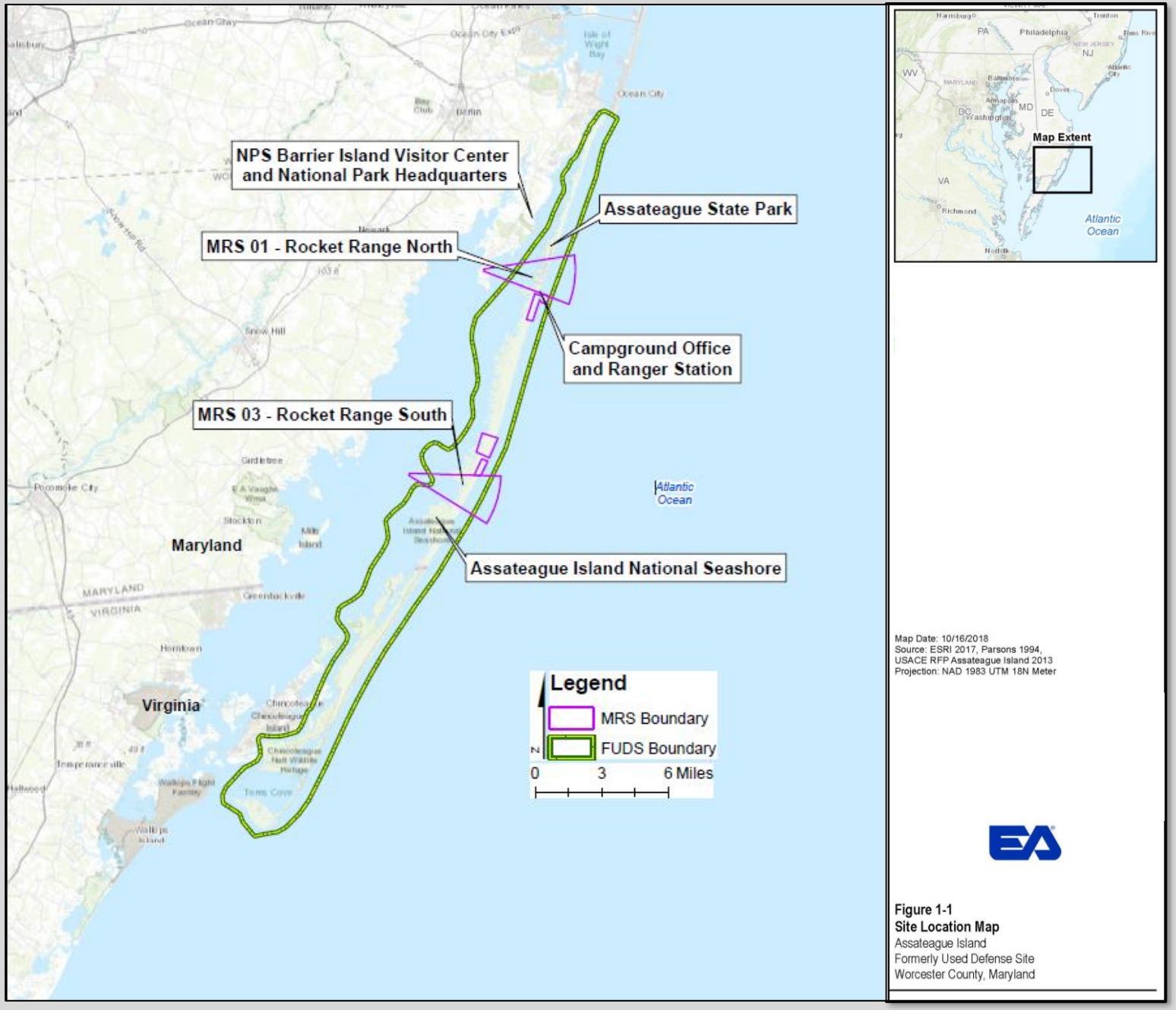
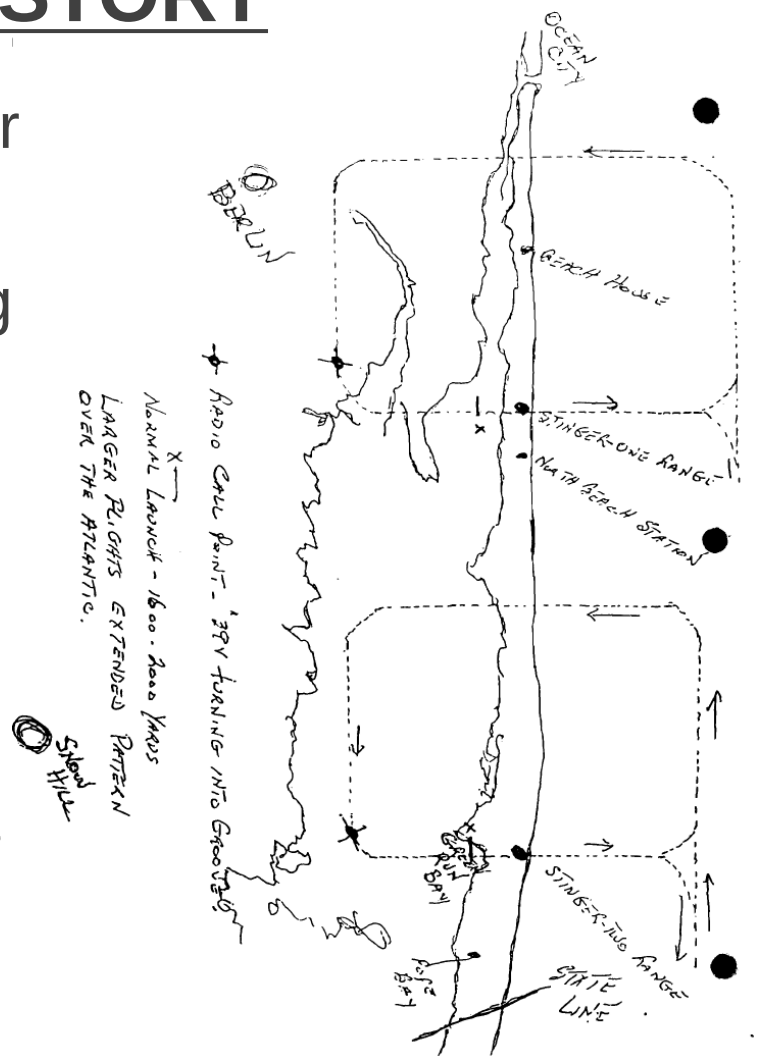
ASSATEAGUE ISLAND FORMERLY USED DEFENSE

- 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.



ASSATEAGUE ISLAND SITE HISTORY

- Two practice ranges used by the Navy and Army Air Corps from 1944 to 1947.
- Air-to-ground practice bombing, rocket, and strafing range.
- Navy reportedly cleaned up the site and buried debris from the ranges.
- In 1965, Assateague Island established as a national seashore.
- Environmental investigations began after munitions debris was found in 1988.



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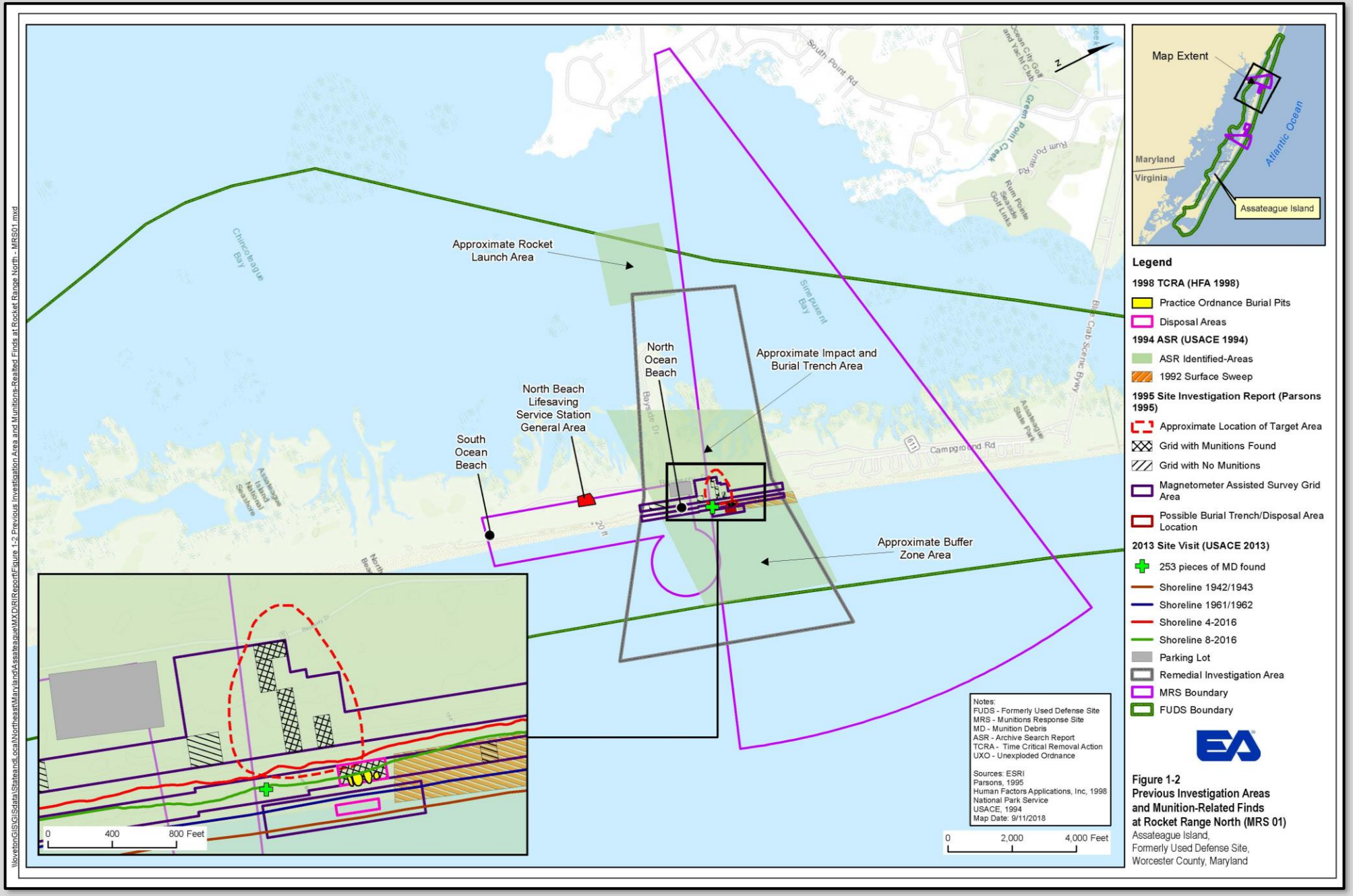
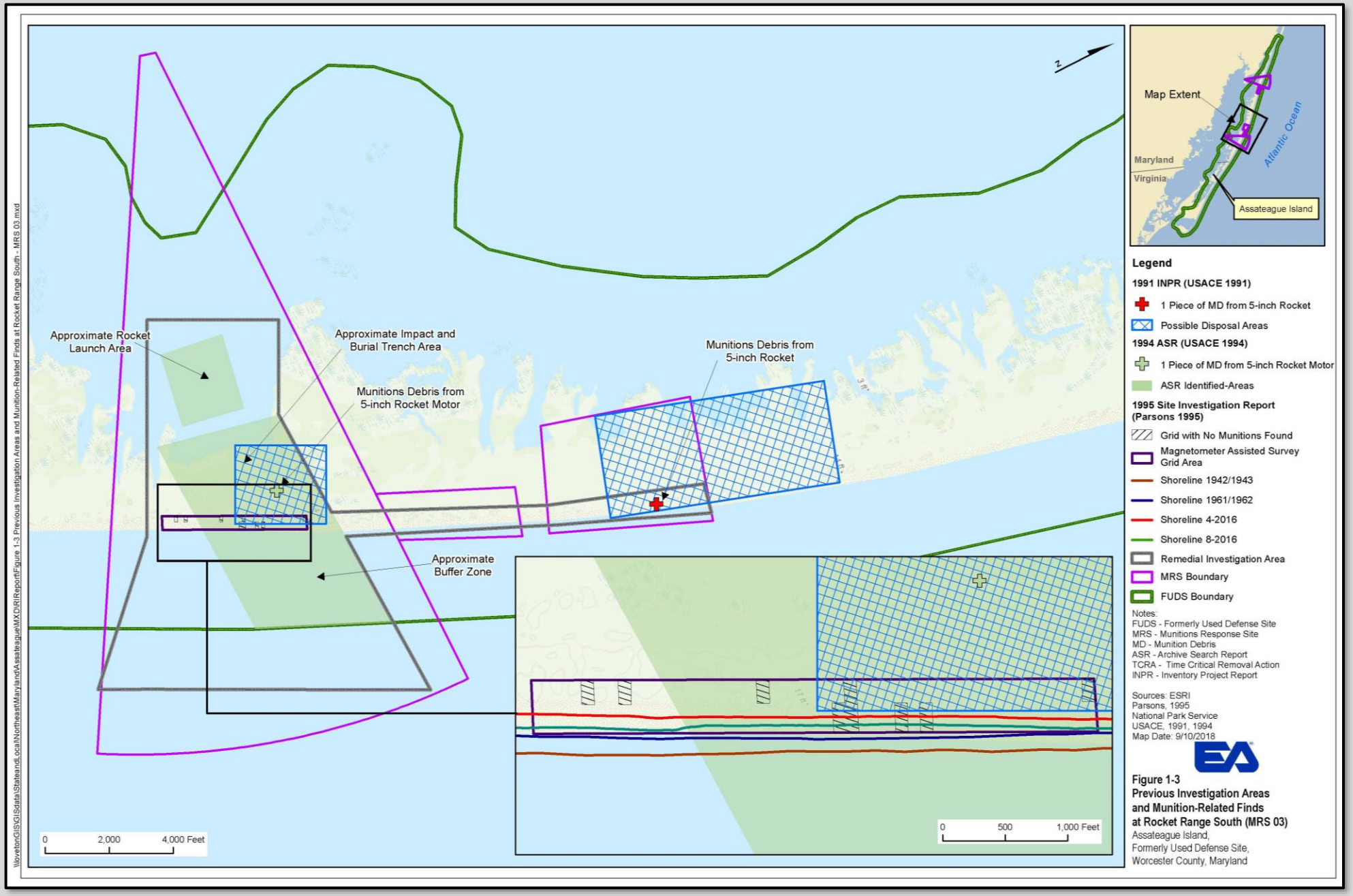
ASSATEAGUE ISLAND PREVIOUS INVESTIGATIONS

- 1988 Case Incident
  - Munitions debris items washed up on shore (6) and found in subsurface (14); Explosive Ordnance Disposal team response.
- 1991 Inventory Project Report
  - Historical review and a site visit to determine if a munitions investigation was necessary.
- 1992 Interim Sweep of North Ocean Beach
  - Metal detector-assisted “sweep” where munitions debris was previously found.
- 1994 Archive Search Report
  - Summary of previous investigations and historical use of the island by the DoD.

PREVIOUS INVESTIGATIONS - MRS 01



PREVIOUS INVESTIGATIONS – MRS 03



ASSATEAGUE ISLAND PREVIOUS INVESTIGATIONS

- 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

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PREVIOUS INVESTIGATIONS – SAMPLING

- 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.

PREVIOUS INVESTIGATIONS - MRS 01

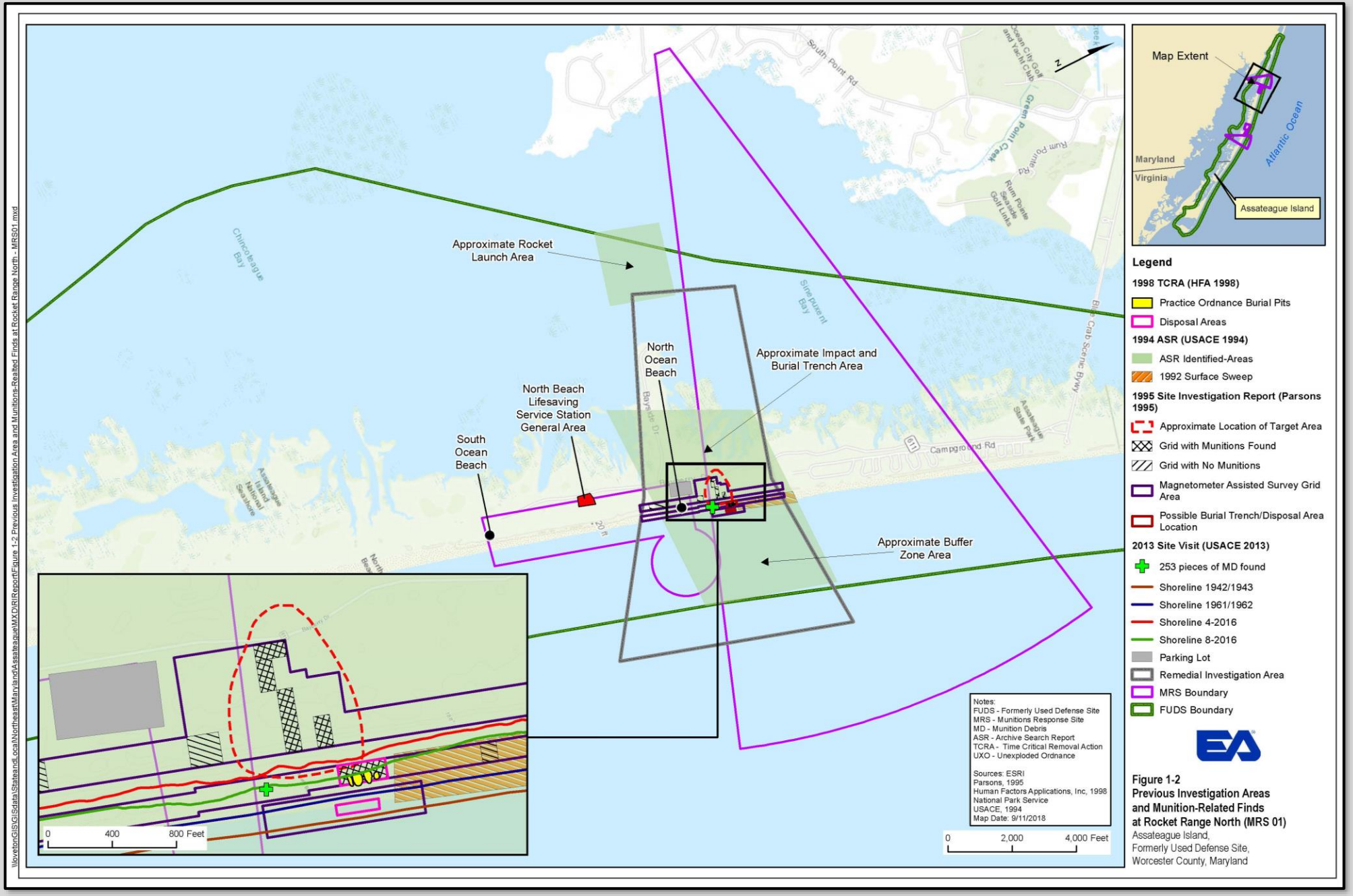
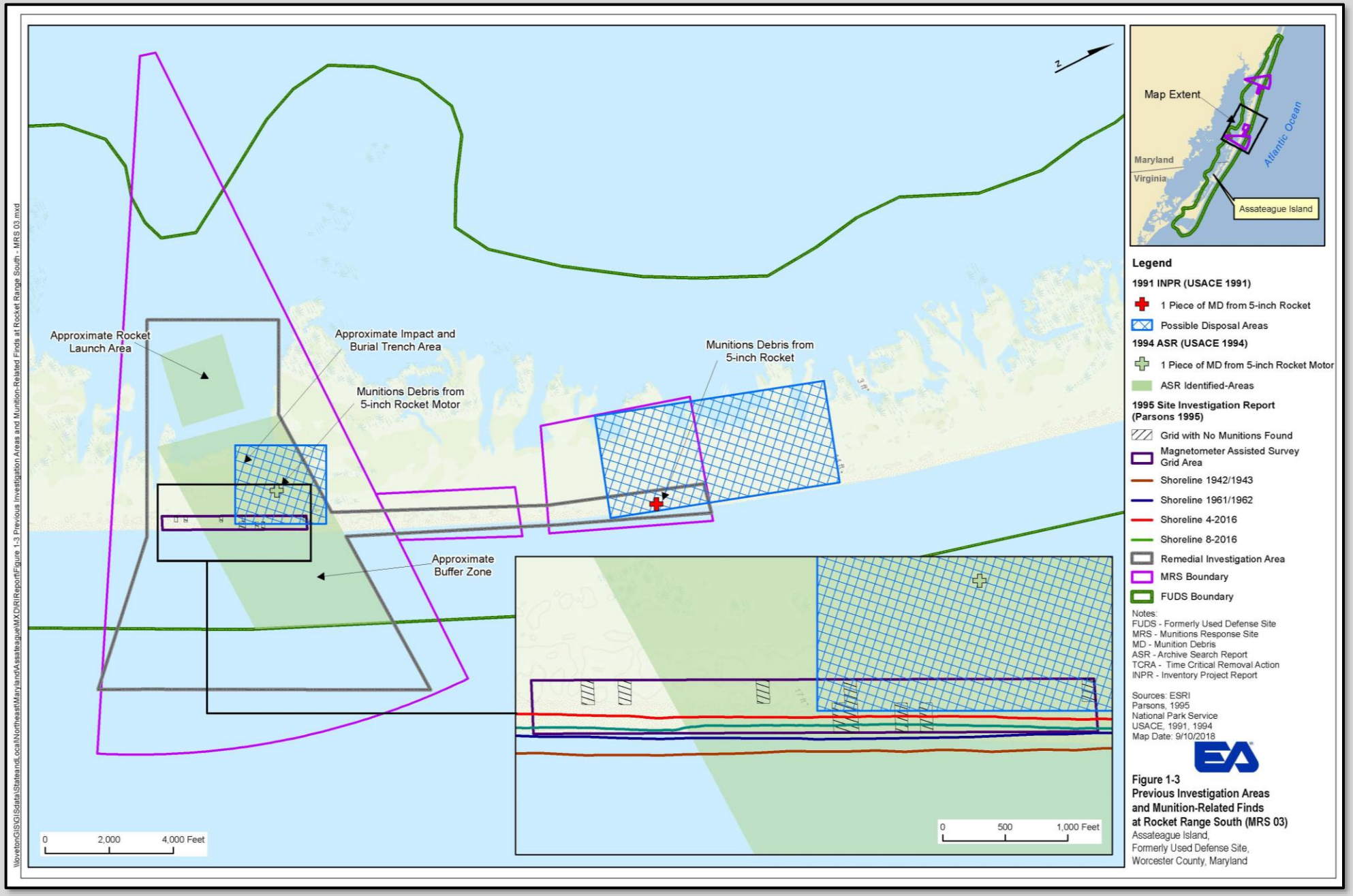


Figure 1-2
Previous Investigation Areas and Munition-Related Finds at Rocket Range North (MRS 01)
Assateague Island,
Formerly Used Defense Site,
Worcester County, Maryland

PREVIOUS INVESTIGATIONS – MRS 03



ASSATEAGUE ISLAND PREVIOUS INVESTIGATIONS

- 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.

PREVIOUS INVESTIGATIONS - MRS 01

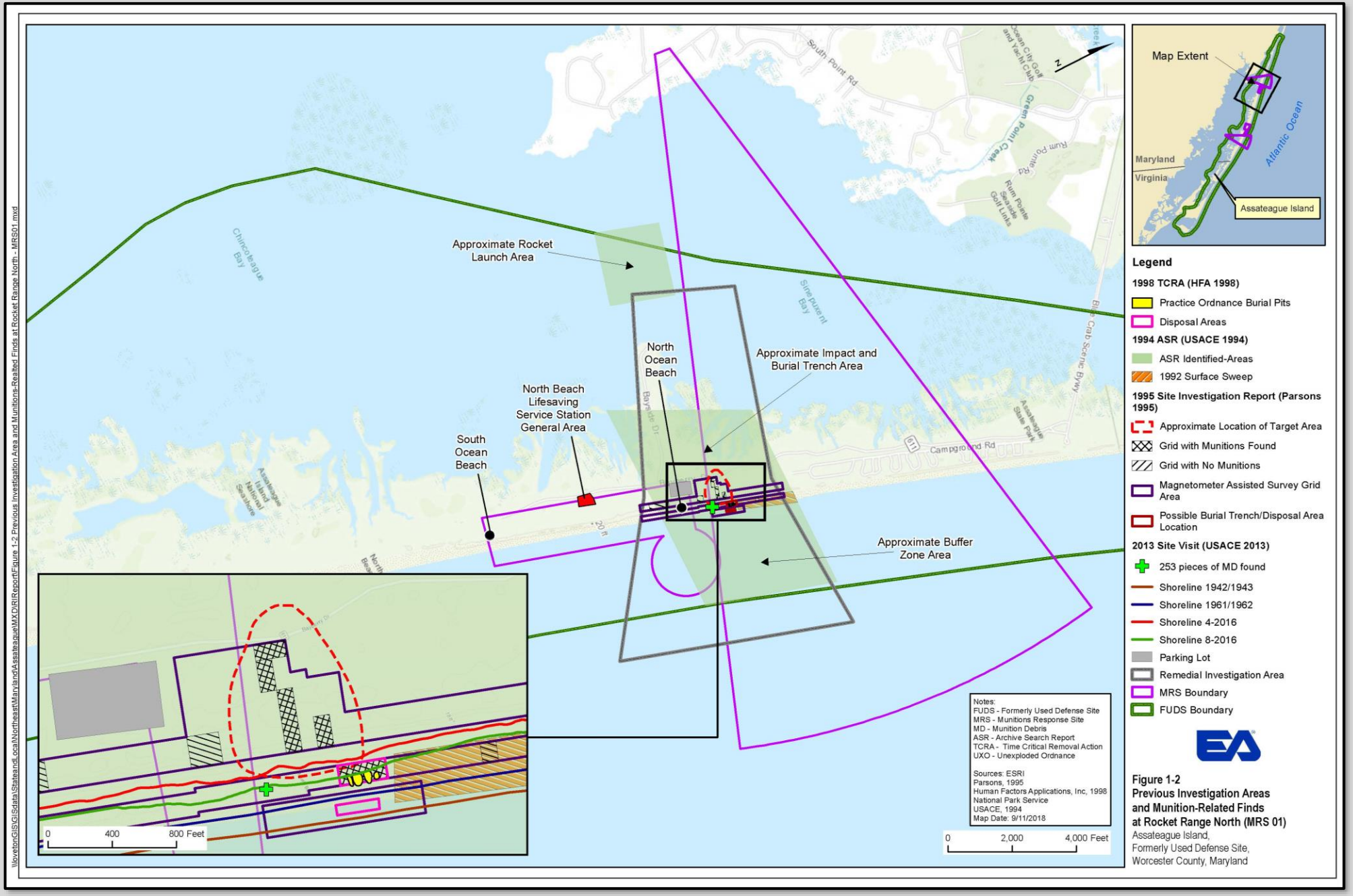


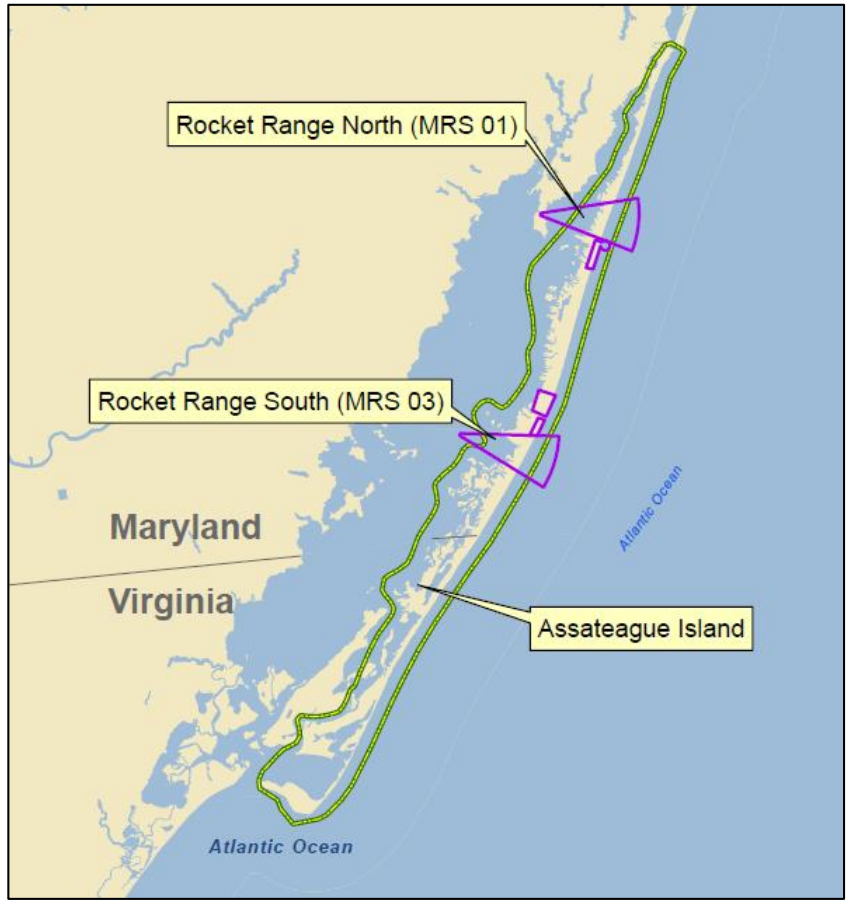
Figure 1-2
Previous Investigation Areas and Munition-Related Finds at Rocket Range North (MRS 01)
Assateague Island,
Formerly Used Defense Site,
Worcester County, Maryland

MUNITIONS DEBRIS HISTORICALLY FOUND

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**

REMEDIAL INVESTIGATION

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.

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WHAT IS DIGITAL GEOPHYSICAL MAPPING AND HOW IS IT COLLECTED?

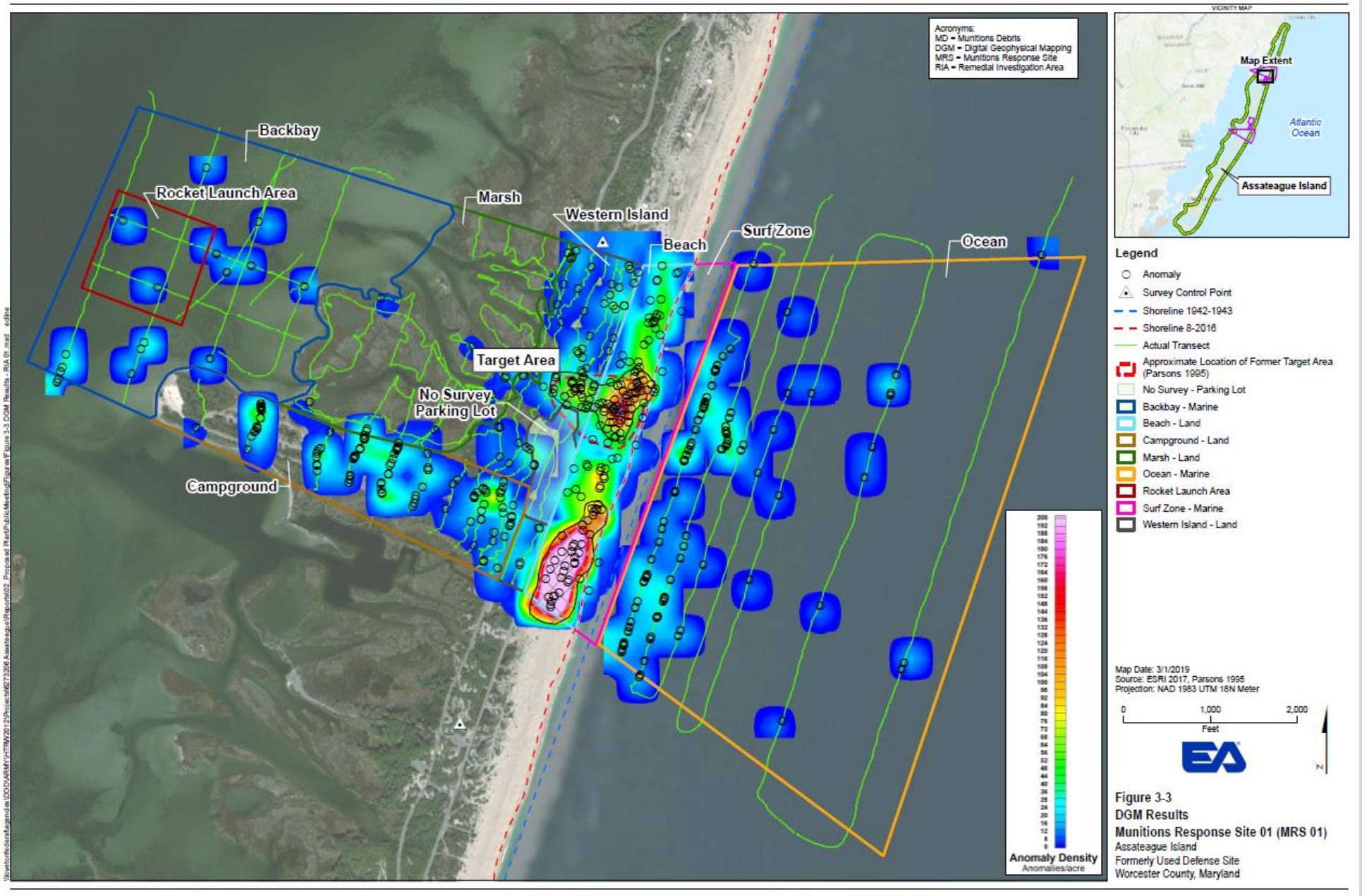
- Digital Geophysical Mapping (DGM): is use of specialized instruments on the ground surface to detect metallic items such as munitions or munitions debris below the ground surface. The instruments used are metal detectors and the signals collected are known as anomalies.

- 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.

HOW IS DGM DATA USED?

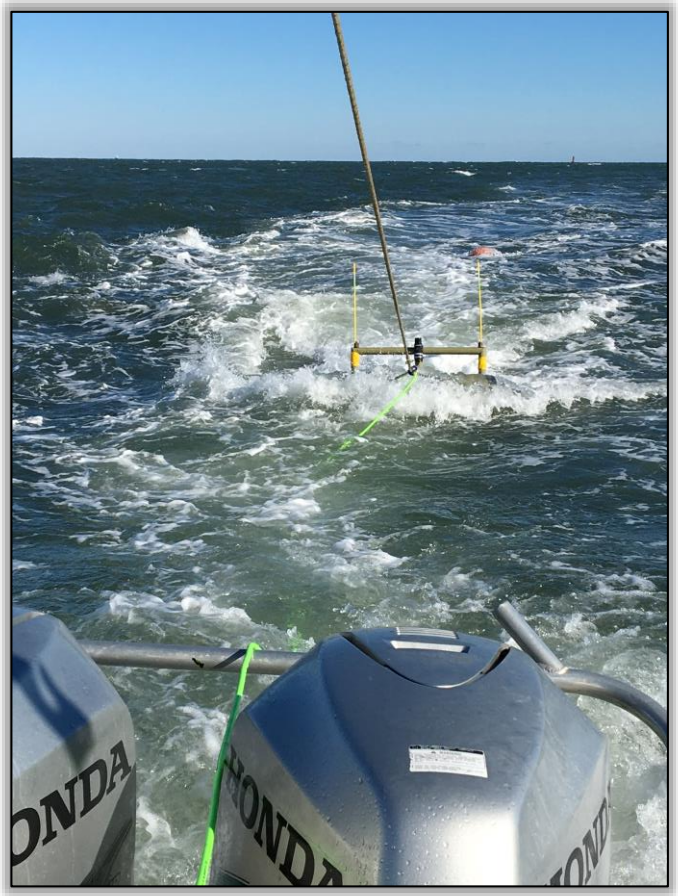
- A statistical program is used to determine how many of the signals (anomalies) detected by the instrument should be dug up to determine if it is a possible munition.
  - **Targets of Interest** – are those signals (anomalies) detected by the instrumentation that are large enough to be potentially considered 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.

DGM DATA TARGETS OF INTEREST



OVERVIEW OF INVESTIGATION ACTIVITIES

- **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

- **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).

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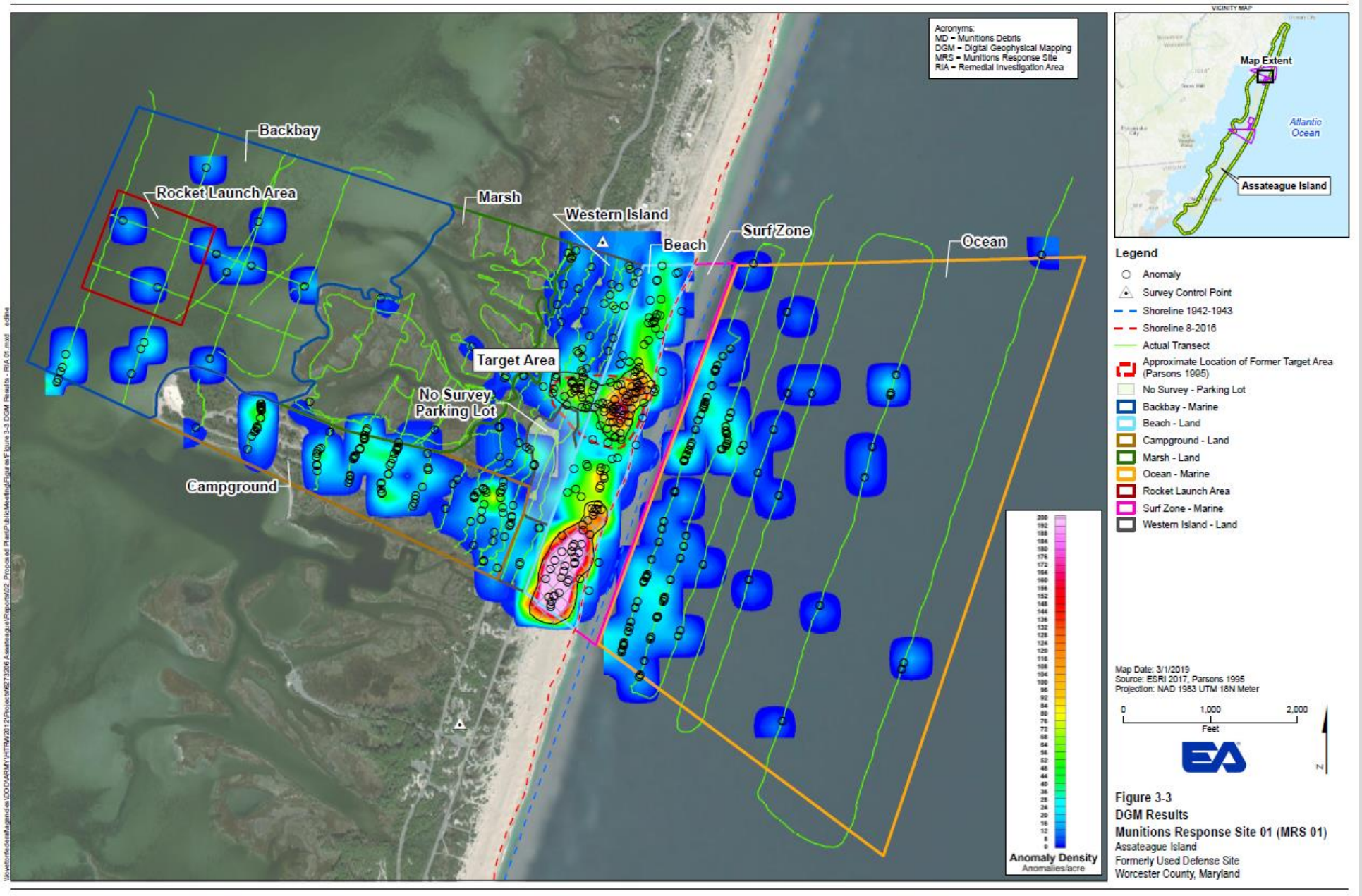
DGM INVESTIGATION RESULTS – MRS 01



DGM INVESTIGATION RESULTS – MRS 01

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
	Total	**11.1**	**8.9**	**13.0**	**10.4**

Taken from Table 3-1 in the RI.

DGM INVESTIGATION RESULTS – MRS 01

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
	Total	**51.1**	**20.4**	**50.2**	**20.0**

Taken from Table 3-2 in the RI.

DGM INVESTIGATION MODIFICATIONS – MRS 01

- **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**.

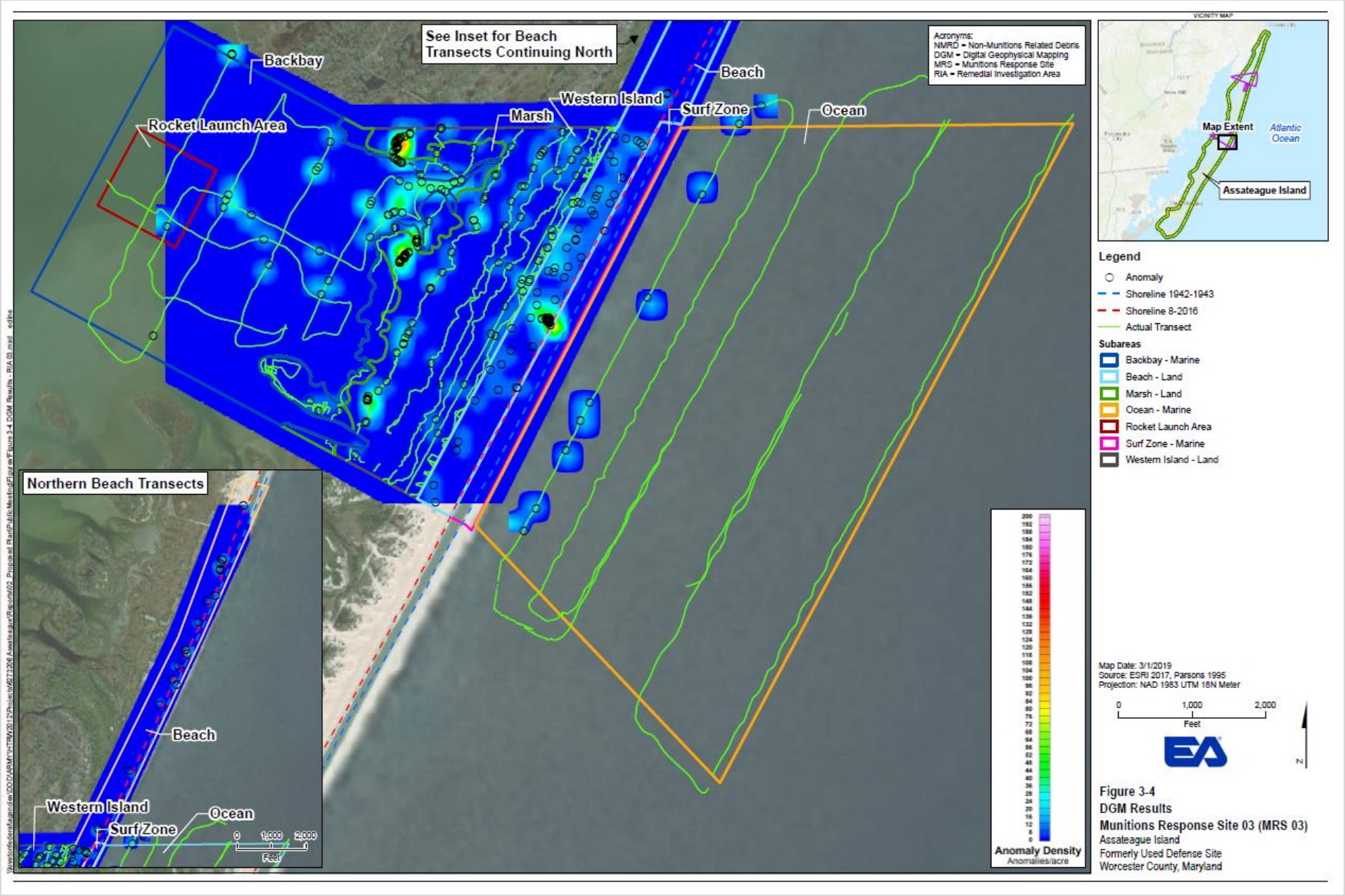
DGM INVESTIGATION MODIFICATIONS – MRS 01

- **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.

DGM INVESTIGATION SUMMARY – MRS 01

- **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**.

DGM INVESTIGATION RESULTS – MRS 03



DGM INVESTIGATION RESULTS – MRS 03

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
	Total	**10.75**	**8.6**	**17.0**	**13.6**

Taken from Table 3-1 in the RI.

DGM INVESTIGATION RESULTS – MRS 03

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
	Total	**163.0**	**66.2**	**83.4**	**33.1**

Taken from Table 3-3 in the RI.

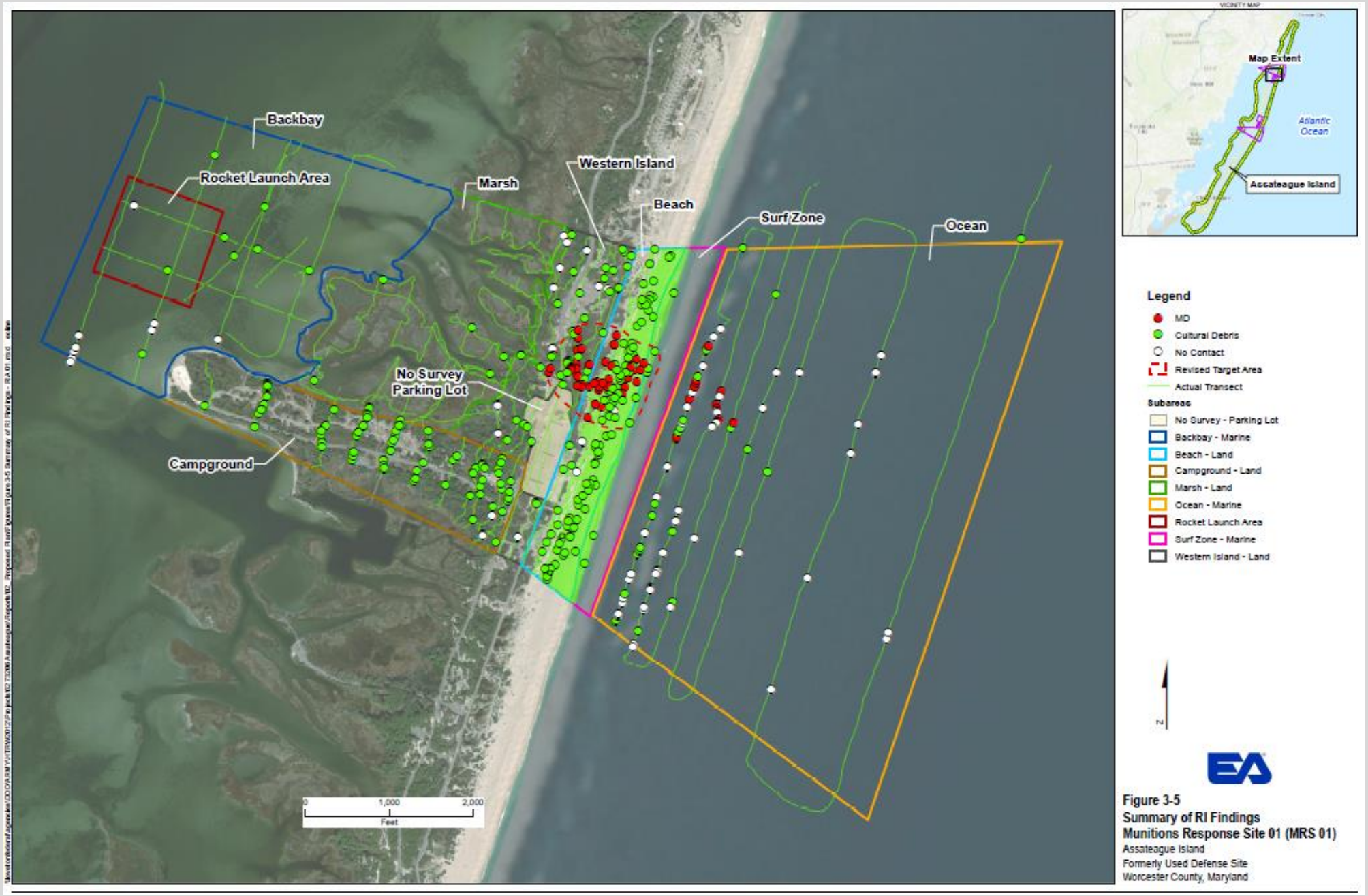
DGM INVESTIGATION MODIFICATIONS – MRS 03

- **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**.

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**.

INTRUSIVE INVESTIGATION RESULTS – MRS 01



INTRUSIVE INVESTIGATION RESULTS – MRS 01

- **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

- **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 – MRS 01

- 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 – MRS 01

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

INTRUSIVE INVESTIGATION RESULTS – MRS 03

Figure 3-6
Summary of RI Findings
Munitions Response Site 03 (MRS 03)
Assateague Island
Formerly Used Defense Site
Worcester County, Maryland

INTRUSIVE INVESTIGATION RESULTS – MRS 03

- **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 – MRS 03

- **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 – MRS 03

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

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MUNITIONS DEBRIS AND CULTURAL DEBRIS DISPOSAL

- **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
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
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.**

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.

Matrix 1. Likelihood of Encounter (MRS 01)

Likelihood of Encounter, Matrix 1: Amount of MEC vs. Access Conditions		Access Conditions (Frequency of Use) [c]			
		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)
Amount of MEC [a][b]	• 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

Matrix 2. Severity of Incident (MRS 01)

Severity of Explosive Incident, Matrix 2: Severity vs. Likelihood of Encounter		Access Conditions (Frequency of Use) [b]				
		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 [a]	**Catastrophic/Critical:** May result in 1 or more deaths, permanent total or partial disability, or hospitalization	A	A	B	B	D
	Modest: May result in 1 (or more) injury resulting in emergency medical treatment, without hospitalization	B	B	B	**C**	D
	Minor: May result in 1 or more injuries requiring first aid or medical treatment	B	C	C	C	D
	Improbable: No injury is anticipated	D	D	D	D	D

(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.

(b) Note that with data collected from physical remediation, it is possible to support an unlikely determination for Matrix 1 and Matrix 2.
"A" indicates conditions most likely to result in determination of an unacceptable risk.
"D" indicates conditions most likely to result in determination of an acceptable risk.

Matrix 3. Likelihood of Detonation (MRS 01)

Likelihood of Detonation, Matrix 3: Munitions Sensitivity vs. Likelihood of Energy to be Imparted		Likelihood to Impart Energy on an Item [b]		
		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: [a] Susceptibility to Detonation	**High:** (e.g., classified as sensitive)	1	1	3
	Moderate: (e.g., high explosive or pyrotechnics)	1	2	3
	Low: (e.g., propellant of bulk secondary explosives)	1	**3**	3
	Not Sensitive	2	3	3

(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).

(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.

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**

Matrix 1. Likelihood of Encounter (MRS 03)

Likelihood of Encounter, Matrix 1: Amount of MEC vs. Access Conditions		Access Conditions (Frequency of Use) [c]			
		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)
Amount of MEC [a][b]	• 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

Matrix 2. Severity of Incident (MRS 03)

Severity of Explosive Incident, Matrix 2: Severity vs. Likelihood of Encounter		Access Conditions (Frequency of Use) [b]				
		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 [a]	**Catastrophic/Critical:** May result in 1 or more deaths, permanent total or partial disability, or hospitalization	A	A	B	B	D
	Modest: May result in 1 (or more) injury resulting in emergency medical treatment, without hospitalization	B	B	B	C	D
	Minor: May result in 1 or more injuries requiring first aid or medical treatment	B	C	C	C	D
	Improbable: No injury is anticipated	D	D	D	D	**D**

(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.

(b) Note that with data collected from physical remediation, it is possible to support an unlikely determination for Matrix 1 and Matrix 2.
"A" indicates conditions most likely to result in determination of an unacceptable risk.
"D" indicates conditions most likely to result in determination of an acceptable risk.

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 [b]		
		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: [a] Susceptibility to Detonation	**High:** (e.g., classified as sensitive)	1	1	3
	Moderate: (e.g., high explosive or pyrotechnics)	1	2	3
	Low: (e.g., propellant of bulk secondary explosives)	1	3	3
	Not Sensitive	2	**3**	3

(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).

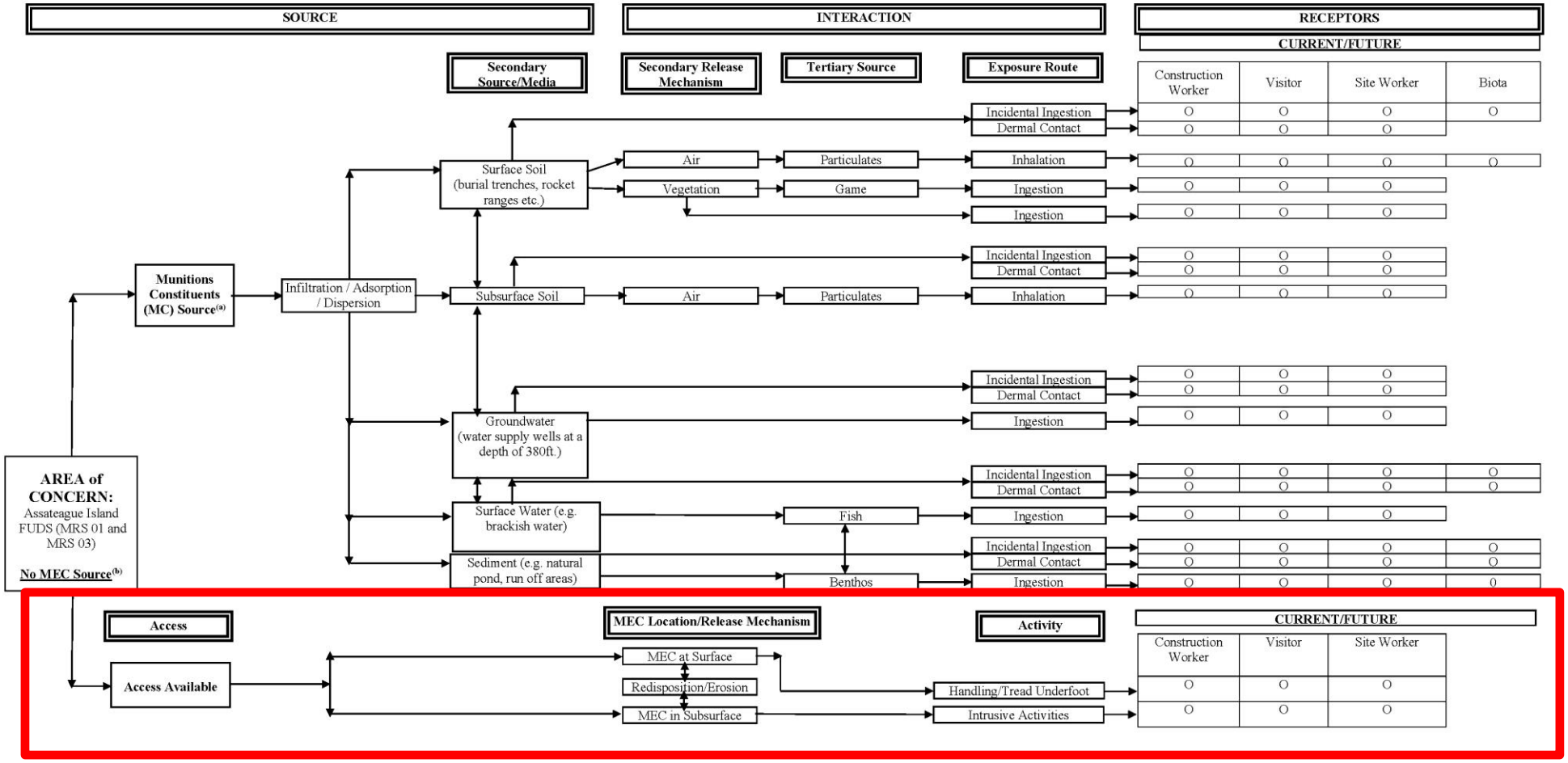
(b) The likelihood to impart energy on an item can be high for farmed land that is regularly tilled or areas where development is planned. Moderate areas may include parks or areas where digging is manual or limited. Areas that are inconsequential will include areas where digging is not anticipated, 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.

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	**ACCEPTABLE SITE CONDITIONS**

REVISED CSM DIAGRAM FOR MRS 01 AND 03



NOTE:
(a) A primary MC source such as breached MEC or an impact area has not been identified onsite.
(b) A primary MEC source has not been identified onsite following a robust RI.

FIGURE 4-1 REVISED CONCEPTUAL SITE MODEL FOR ROCKET RANGES NORTH AND SOUTH (MRS 01 AND MRS 03) AT ASSATEAGUE ISLAND MMRP FUDS

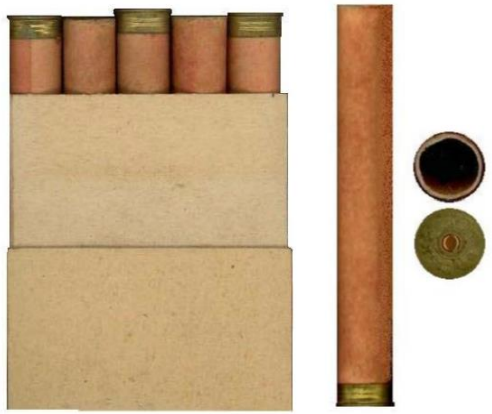
Source: U.S. Army Corps of Engineers (USACE). 2012. *Engineer Manual 200-1-12 Conceptual Site Models.* 28 December.

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**.

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 know to be encountered intact at other sites.
- Less than 1%, out of ~ 1000 pieces of munitions debris found, only 6 practice bombs – **rare find**



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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.

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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

INVESTIGATION CONCLUSIONS

No live munitions identified

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

WAYS TO COMMENT – COMMENT PERIOD APRIL 29TH – JUNE 3RD.

- 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/

Email: Christopher.P.Gardner@usace.army.mil
Mail: The U.S. Army Corps of Engineers
ATTN: Christopher Gardner
2 Hopkins Plaza
Baltimore, MD 21201

Email: Liza.Finley@usace.army.mil
Mail: The U.S. Army Corps of Engineers
ATTN: Liza Finley
2 Hopkins Plaza
Baltimore, MD 21201

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.

ORecognize
ORetreat
OReport

Follow the 3Rs

ORecognize

Recognize when you may have encountered a munition

ORetreat

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

OReport

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

EMERGENCY CONTACT:

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

Visit the 3Rs Explosives Safety Education website: www.denix.osd.mil/uxo

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Questions?