Trial Use of the
USACE Risk Management Method

Case Studies, Initial Findings and

Panel Discussion

Case Study 1

Fort Hancock FUDS

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Project Overview

- **Project Name:** Fort Hancock

- **Location:** Monmouth County, NJ

- **Project No.** C02NJ000403

- **ΔCost to Use:** Minimal Impact

- **State Concurrence:** Yes

- **Key Interest in this Project:**

  – Nation's First Proving Ground. Heavily used public beach approximately 5-10 miles from New York City. Sensitive species (globally rare maritime holly forest) that cannot be disturbed.

  – Site has been in the RI Stage for a long period (due to staggered ROEs from National Park Service for individual MRSs, processed as Addenda): RI Work Plan finalized 2011--RI Addendum #3 Report finalized 2018.

Beach Environment

– Open pubic access

– Dunal topography

– Sensitive species

- *Cannot* be cut
- *Prevents some* access

Results of the RI

– Multiple MRSs derived from range firing points and impact/target areas

– Multiple munition types recovered from various MRSs, including 75 mm projectiles, 3-in Stokes mortars, 5-in and 8-in projectiles (5-in and 8-in shown below)

– Presentation focuses on MRS-4 (shown in red)

MRS-4
73 acres
(includes
3,000-Yard
Impact Area)

2 MEC items (75mm projectile and
3-in Stokes mortar) and misc MD
items found in CMUA

MRS-4
73 acres
(includes
3,000-Yard
Impact Area)

Legend
- Anomalies
- Transects
- Impact Area
- Clusters: High Anomaly Density
- Clusters: Lower Anomaly Density
- MRS-4

Legend
- Reduced MRS footprint to CMUA based on DGM data (MEC/MD findings)
- Impact Area
- MRS-4

Fort Hancock Case Study #1

Focus on MRS-4

- CMUA
- 3,000 yd target area
- MEC: 3-in Stokes mortar, 75mm projectile (shown below), plus misc MD
- MRS footprint was ultimately reduced to CMUA based on MEC and MD finds
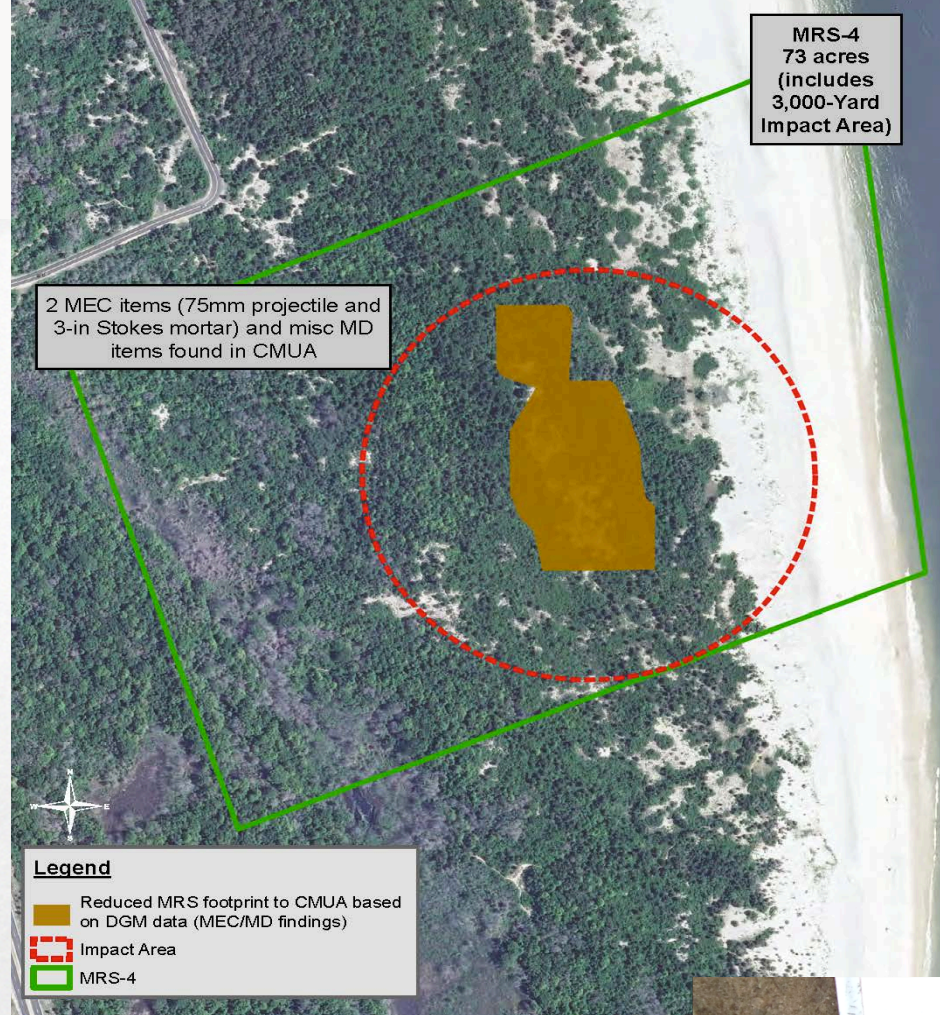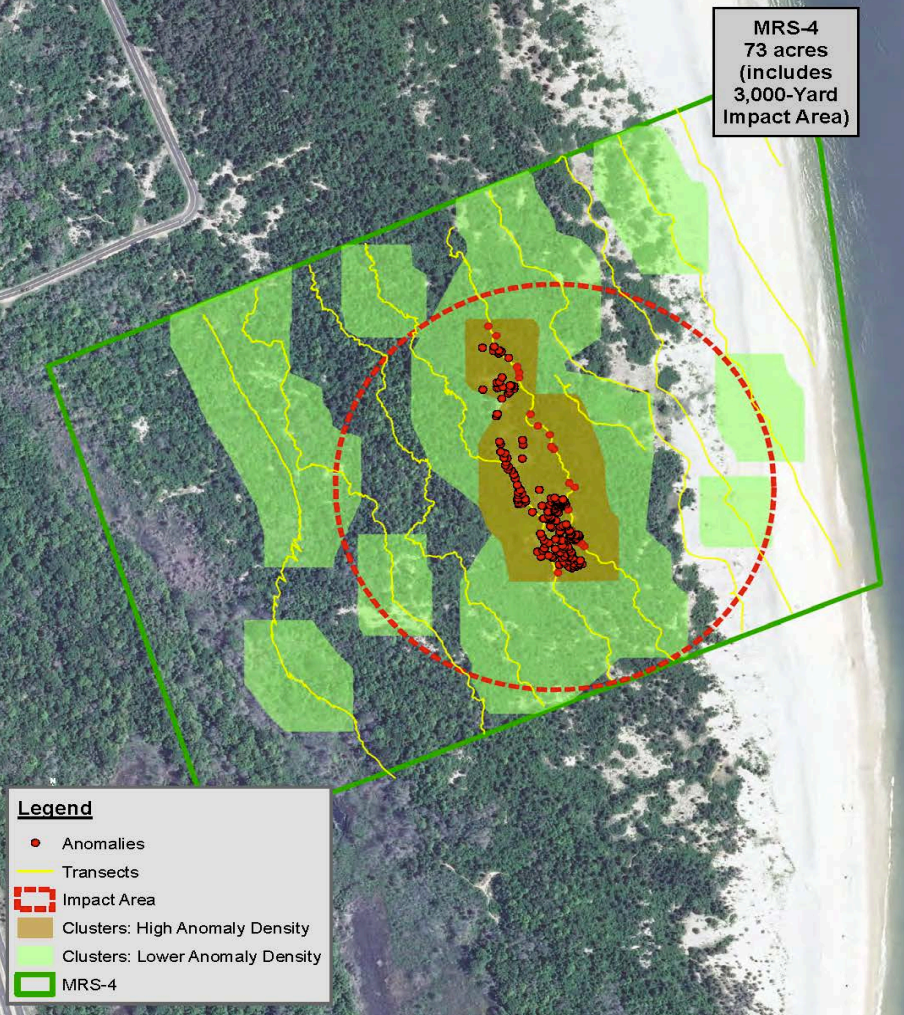
MRS-4 DGM Investigation

- 16,700 LF of transect data
- VSP analysis of anomaly clusters
- 14 100ft x 100ft grids with 100% excavation
- 474 anomalies investigated
- CMUA delineated in center of target area

Summary of
Risk Management Matrices (RMM) – Matrix 1

Likelihood of Encounter (Amount of MEC versus Access Conditions)		Access Conditions (frequency of use)			
		Regular	Often	Intermittent	Rare
Amount of MEC	Category I (Most)	Frequent	Frequent	Likely	Occasional
	Category II	Frequent	Likely	**Occasional**	Seldom
	Category III	Likely	Occasional	Seldom	Unlikely
	Category IV	Occasional	Seldom	Unlikely	Unlikely
	Category V	Seldom	Seldom	Unlikely	Unlikely
	Category VI (Least)	Unlikely	Unlikely	Unlikely	Unlikely

- Likelihood of Encounter
  - Amount of MEC based on **CMUA, with confirmed MEC** (75mm projectile and 3-in Stokes) in subsurface
  - Access Conditions based on **Intermittent** access (inland from shore, low pedestrian traffic, semi-dense natural vegetation barriers)
  - Matrix 1 is **OCCASIONAL**

Summary of RMM - Matrix 2

Severity of Explosive Incident (Severity vs. Likelihood of Encounter)		Likelihood of Encounter (from Matrix 1)				
		Frequent	Likely	Occasional	Seldom	Unlikely
Severity	Catastrophic/Critical	A	A	**B**	B	D
	Modest	B	B	B	C	D
	Minor	B	C	C	C	D
	Improbable	D	D	D	D	D

- Severity of Incident
  - Severity is **Catastrophic/Critical** based on explosion of either MEC item
  - Likelihood of Encounter is **Occasional** based on Matrix 1
  - Matrix 2 score is **'B'**

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Summary of RMM – Matrix 3

Likelihood of Detonation (Sensitivity vs. Likelihood to Impart Energy)	Likelihood to Impart Energy on an Item		
	High	Modest	Inconsequential
High	1	1	3
Moderate	1	**2**	3
Low	1	3	3
Not Sensitive	2	3	3

(Sensitivity — row label for the four rows)

- Likelihood of Detonation
  - Sensitivity is **Moderate** based on HE associated with the MEC items
  - Likelihood to Impart Energy is **Modest** based on this being an undeveloped inland area with low pedestrian traffic
  - Matrix 3 score is **'2'**

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Summary of RMM – Matrix 4

Acceptable and Unacceptable Site Conditions		Result from Matrix 2			
		A	B	C	D
Result from Matrix 3	1	Unacceptable	Unacceptable	Unacceptable	Acceptable
	2	Unacceptable	**Unacceptable**	Acceptable	Acceptable
	3	Unacceptable	Acceptable	Acceptable	Acceptable

- Site Conditions
  - A Matrix 2 score of B and a Matrix 3 score of 2 results in **Unacceptable** Site Conditions
  - Analysis indicates that moving down or to the right of the table, Acceptable conditions could be achieved if:
    - the likelihood of encountering the MEC item was lesser, or
    - the likelihood of imparting energy was lesser

Detection. Remediation. Destruction.
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The Positive

- Allows for bright line of acceptable vs unacceptable—easy for lay person to understand.

- Standardization of process across a variety of situations (e.g., addresses 'MD only' sites, as well as MEC sites).

- Helps focus/guide the remedy selection process and how to achieve "acceptable" site conditions.

The Challenge

- Regulator approved individual matrices…
  - But provided comment suggesting that the RMM requires a higher standard of field investigation in order to properly apply it, i.e., questioned the ability to retrofit the RMM to older data/investigation design.
  - Requested verification that a properly designed investigation, with reviewed/approved DQOs, had been conducted such that the RMM selections could be supported, **or**
  - Indicated that more data that aligns with tool requirements may need to be collected.

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The Response

- While the initial RI investigation design was developed/approved in 2011, USACE was able to justify that the RMM could be reasonably applied, noting that:
  - The Work Plan-approved investigation design, based on UXO Estimator and VSP, included sufficient transects, cluster analysis, and intrusive grid investigations, to meet the project-specific MEC concentration threshold DQOs.
  - The RMM was able to be retrofit to the older data because the site-specific investigation design was appropriately rigorous and DQOs were met. But also, in this specific case, the MRS was obviously contaminated making the application of the RMM relatively straightforward.
  - The matrices only provide examples of MEC concentration thresholds, and for situations where contamination is not obvious, making a distinction between "*MEC presence based on historical discoveries*" and "*MEC presence suspected based on historical evidence of munitions use*", for example, may require constructing and achieving a more rigorous MEC concentration DQO in order to support the selection.

- This response has been accepted by the regulator, and the RI was finalized.