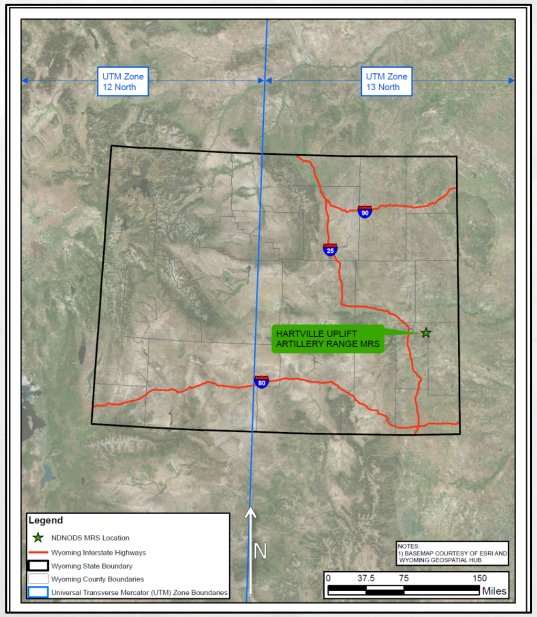
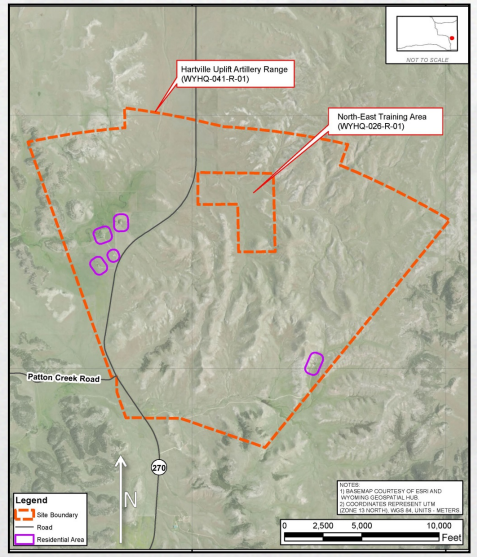
Hartville Uplift Artillery Range
Remedial Investigation & Feasibility Study

Hartville Uplift Artillery Range

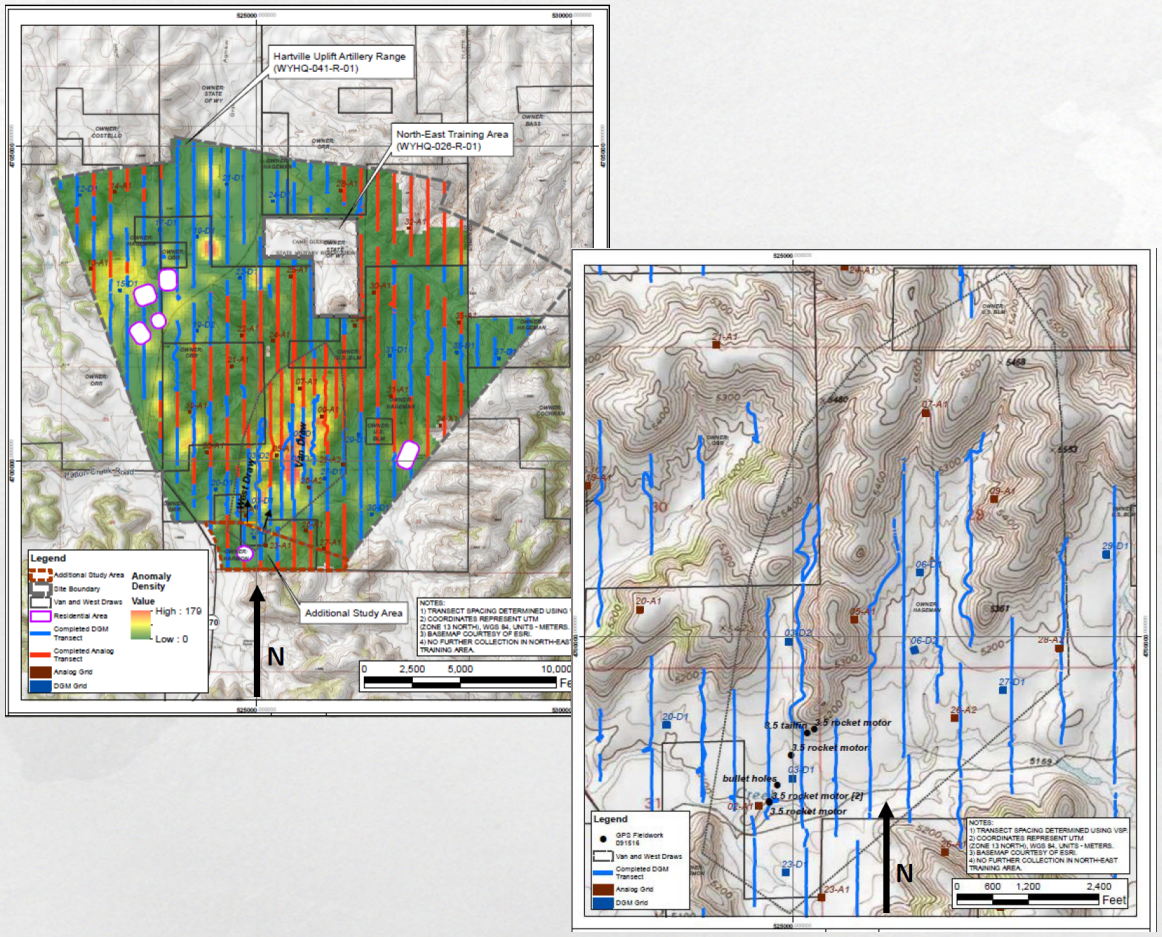
- Army National Guard Non-DoD Non-Operational Defense Site
- North of Guernsey (~12 miles) in Platte and Goshen counties
- Bisected by Hartville Highway (WY 270)
- Used for ranching/ grazing
- 8,022.95 acres
- Excludes the North-East Training Area MRS (372.93 acres)





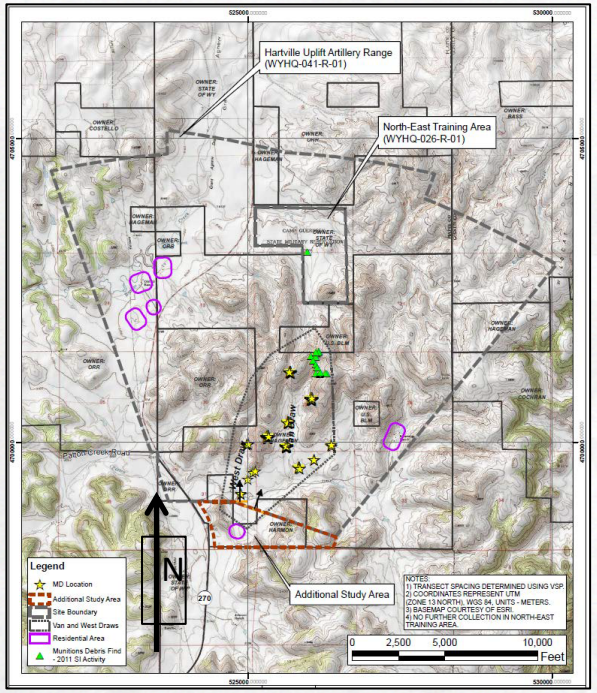
Site Characterization Approach

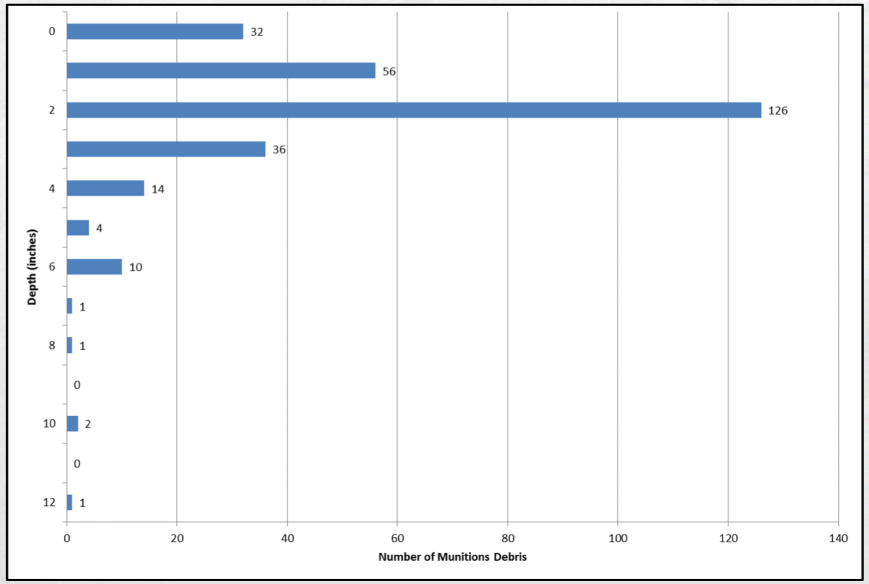
- Transect Data Collection:
  - DGM data on 39 parallel transects; 183,771 linear feet of transects
  - Analog data on 45 parallel transects; 184,666 linear feet of transects
- Excluded areas
  - Proximity to populated areas
  - Electromagnetic interference
- Grid Characterization:
  - DGM: Twenty (20) 100-foot by 100-foot grids were placed in both high and low use areas
  - Analog: Twenty-four (24) 100-foot by 100-foot grids were placed in both high and low density areas
  - Each grid contained one (1) seed item (i.e., medium industry standard object [ISO])
  - Conducted 100% geophysical coverage of each grid
  - Dug 100% of subsurface anomalies within each grid



Site Characterization Results

- DGM: 111 target anomalies investigated
- Analog: 358 target anomalies investigated
- No MEC encountered during RI; MEC previously found





RI RMM Outputs – High Use Area

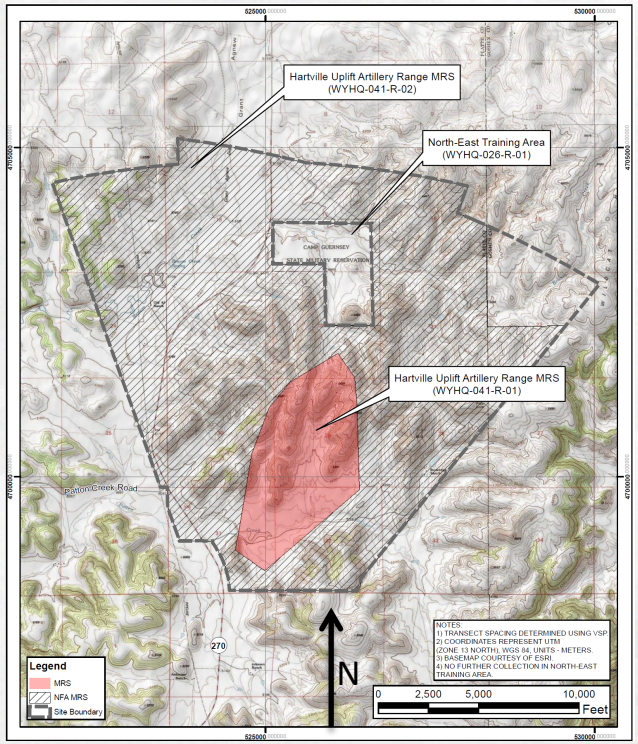
Likelihood of Encounter, Matrix 1: Amount of MEC vs. Access Conditions		Access Conditions (frequency of use)			
		Regular (e.g., daily use, open access)	**Often** (e.g., less regular or periodic use, some access)	**Intermittent** (e.g., some irregular use, or access limited)	**Rare** (e.g., very limited use, access prevented)
Amount of MEC	• MEC is visible on the surface and detected in the subsurface.	**Frequent**	**Frequent**	**Likely**	**Occasional**
	• The area is identified as a Concentrated Munitions Use Area (CMUA) where MEC is known or suspected (e.g., MD indicative of MEC is identified) to be present in 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% 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 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% 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% 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**

Severity of Explosive Incident, Matrix 2: Severity vs. Likelihood of Encounter		Likelihood of Encounter				
		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	**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

Likelihood of Detonation, Matrix 3: Munitions Sensitivity vs. Likelihood of Energy to be Imparted		Likelihood to Impart Energy on an Item		
		High e.g., areas planned for development	**Modest** e.g., undeveloped, wildlife refuge, parks	**Inconsequential** e.g., not anticipated, prevented, mitigated
Sensitivity: Susceptibility to Detonation	**High Sensitivity**	1	1	3
	Moderate (e.g., high explosive (HE) or pyrotechnics)	1	2	3
	Low (e.g., propellant or bulk secondary explosives)	1	3	3
	Not Sensitive	2	3	3

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

RI Conclusions



- Low Use Area
  - No evidence of munitions use
  - Acceptable risk
- Hight Use Area
  - No risk for MC
  - Unacceptable risk for MEC/MD
- Create two (2) separate MRSs
  - Reduce the acreage of the Hartville Uplift Artillery Range MRS (WYHQ-041-R-01) from 8,287.15 acres to 969.12 acres and move forward to a Feasibility Study
  - Create a new Hartville Uplift Artillery Range MRS (WYHQ-041-R-02) encompassing 7,318.04 with a recommendation of recommendation of No Further Action

Hartville Uplift Artillery Range Feasibility Study

- Analyzed 969.12 acres
- 4 landowners; 3 private landowners & Bureau of Land Management
- 95% of acreage belongs to private landowners
- Most of land used for residential and agricultural purposes, including livestock grazing
- Remedial Action Objective: Reduce the unacceptable risk due to the presence of artillery projectiles (e.g., 76mm and 81mm) from the surface and subsurface (within twelve [12] inches below ground surface)xx

Feasibility Study Alternatives

- Alternative 1: No Action
- Alternative 2: Land Use Controls (LUCs) and Construction Support
- Alternative 3: MEC Surface Removal with LUCs
- Alternative 4: MEC Surface and Subsurface Removal (Analog and Advanced Geophysical Classification) to achieve unlimited use/unlimited exposure (UU/UE)

Alternatives Screening Considerations

- Private landowners are not going to stop using their land as intended
- Implementation of LUCs does not change likelihood of encounter
- Physical removal of explosive hazard changes the site condition

Feasibility Study Alternatives Screening: Matrix 1

Table 3-1: Matrix 1, Likelihood of Encounter

Amount of MEC vs Access Conditions		Access Conditions: 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	• 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 to be present in 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 • MEC concentration is below a project-specific threshold to support this selection (e.g., less than 1.0/acre at 95% confidence)	Likely	Occasional / 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 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% 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% confidence)	Seldom	Seldom	Unlikely	Unlikely
	• Investigation of the MRS does not identify evidence of MEC presence, or • A DERP response has been conducted that will achieve UU/UE	Unlikely	Unlikely	Unlikely	Unlikely

CMUA = Concentrated Munitions Use Area
DERP = Defense Environmental Restoration Program
EOD = Explosive Ordnance Disposal
MD = munitions debris
MEC = munitions and explosives of concern
MMRP = Military Munitions Response Program
MRS = munitions response site
UU/UE = unlimited use / unrestricted exposure

Risk scoring based on present conditions
Risk scoring following proposed remedial action – LUCs & Construction Support
Risk scoring following proposed remedial action – Surface Removal and LUCs
Risk scoring following proposed remedial action – Surface & Subsurface Removal

Feasibility Study Alternatives Screening: Matrices 2 – 4

Table 3-2: Matrix 2, Severity of Explosive Incident

Severity vs Likelihood of Encounter		Likelihood of Encounter				
		Frequent	Likely	Occasional	Seldom	Unlikely
Severity Associated with Specific MEC Items	**Catastrophic/Critical**: may result in 1 or more deaths, permanent total or partial disability of hospitalization	A	A	B B	B	D
	Modest: may result in 1 or more injury resulting in emergency medical treatment, without hospitalization	B	B	C	C	D
	Minor: may result in 1 or more injuries requiring first aid or medical treatment	B	C	D	C	D
	Improbable: no injury anticipated	D	D		D	D

MEC = munitions and explosives of concern

Risk scoring based on present conditions
Risk scoring following proposed remedial action – LUCs & Construction Support
Risk scoring following proposed remedial action – Surface Removal and LUCs
Risk scoring following proposed remedial action – Surface & Subsurface Removal

Table 3-3: Matrix 3, Likelihood of Detonation

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

Risk scoring based on present conditions
Risk scoring following proposed remedial action – LUCs & Construction Support
Risk scoring following proposed remedial action – Surface Removal and LUCs
Risk scoring following proposed remedial action – Surface & Subsurface Removal

Table 3-4: Matrix 4, Acceptable and Unacceptable Site Conditions

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

Risk scoring based on present conditions
Risk scoring following proposed remedial action – LUCs & Construction Support
Risk scoring following proposed remedial action – Surface Removal and LUCs
Risk scoring following proposed remedial action – Surface & Subsurface Removal

RMM Use during RI: The Positive

- Can use on any Munitions Response project; not only applicable to FUDS
- Decision made to use RMM after start of field work
- Collect enough data to support RMM scoring (Adjust DQOs)
- “Chase the plume” to delineate High Use boundaries
- Additional data collection supported RMM results
- Easy to communicate results to stakeholders

RMM Use during RI: Challenge #1

- How do you score a MRS that's large or non-homogeneous to be scored meaningfully?
- Should the MRS be scored to the most conservative (i.e., worst case scenario) conditions?
- Should MRS be redefined based on the RMM result (or vice-versa)?

RMM Use during FS: – Challenge #2

- Use the RMM to screen alternatives to achieve RAO
- Understanding land use critical for LUC recommendations
- Difficult to manage and prevent interaction with MEC on private lands without physical removal – reduce risk!
- Alternative implementability critical when working with private landowners

Take Away

- Applicable to all MRSs (not just FUDS)
- Understand site conditions, landowners, & land use
- PDT knowledge of RMM critical for success
- RMM works for screening risk during both the RI & FS

Questions or Comments?

Victoria Kantsios, PMP
Senior Project Manager
703-418-3030
victoria.kantsios@aecom.com

John B. Haines, PG
NDNODS Project Manager
703-607-7986
john.b.haines.ctr@mail.mil