DERP FORUM

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Weight-of-Evidence Considerations in Munitions Response

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Outline

- The weight-of-evidence approach
- Role of weight-of-evidence in munitions response
- Using the weight-of-evidence approach to support remedial action decisions

Weight-of-Evidence Approach

- Weight-of-evidence decision making is the process of **assembling, weighing, and evaluating** evidence to come to a scientifically defensible conclusion
  - Used when scientific questions can only be answered using several lines of evidence, e.g., *risk assessment*
  - Involves both quantitative and qualitative approaches
- Weight-of-evidence consists of systematically weighing and evaluating evidence, leading to a conclusion best supported by ALL the evidence
  - Considers data **relevance**, **strength** and **reliability**

Why Use Weight-of-Evidence Approach for Munitions Response?

- Unlike traditional chemical cleanups, munitions sites do not have a clearly defined endpoint based on regulatory standards or acceptable risk
- Munitions cleanup decisions must therefor rely on a weight-of-evidence approach
  - Familiar concept found in scientific and regulatory literature
  - Avoids relying solely on any one piece of information
  - Allows us to make informed defensible decisions
- How do we use weight-of-evidence?
  - CSM documents our evidence
  - DUA evaluates evidence to support decisions

Changing Roles of the Weight-of-Evidence

- RI collects evidence to build and refine the CSM
  - Projection of what the site looks like
- ROD relies on the CSM to support cleanup decisions
  - CSM of known and sufficient quality
- Cleanup relies on the CSM for design assumptions
  - RD/RA technical approach based on RI CSM
  - Continuous evaluation of new information that may either confirm or change the CSM

Role of Weight-of-Evidence in Remedy Selection

- Weight-of-evidence used to support remedy selection
  - Areas for remedial action – source, nature & extent
  - Remediation goals – clear basis and justification
  - Efficacy of remedial alternatives – technical limitations
  - Residual hazards and risks – long-term management tools
- What builds the weight of evidence?
  - Confidence in the CSM – relevance, strength & reliability
  - Bounding uncertainty – identifying unknowns, data gaps, assumptions
  - Quality of RI field data – adherence to QAPP
  - Confidence in exposure profiles – uncertainty, hazards, consequences
  - Confidence in remedial technology – technical challenges
- Data Usability Assessment
  - Feasibility Study is the DUA in support of remedial action decisions

Remedy Selection Case Study

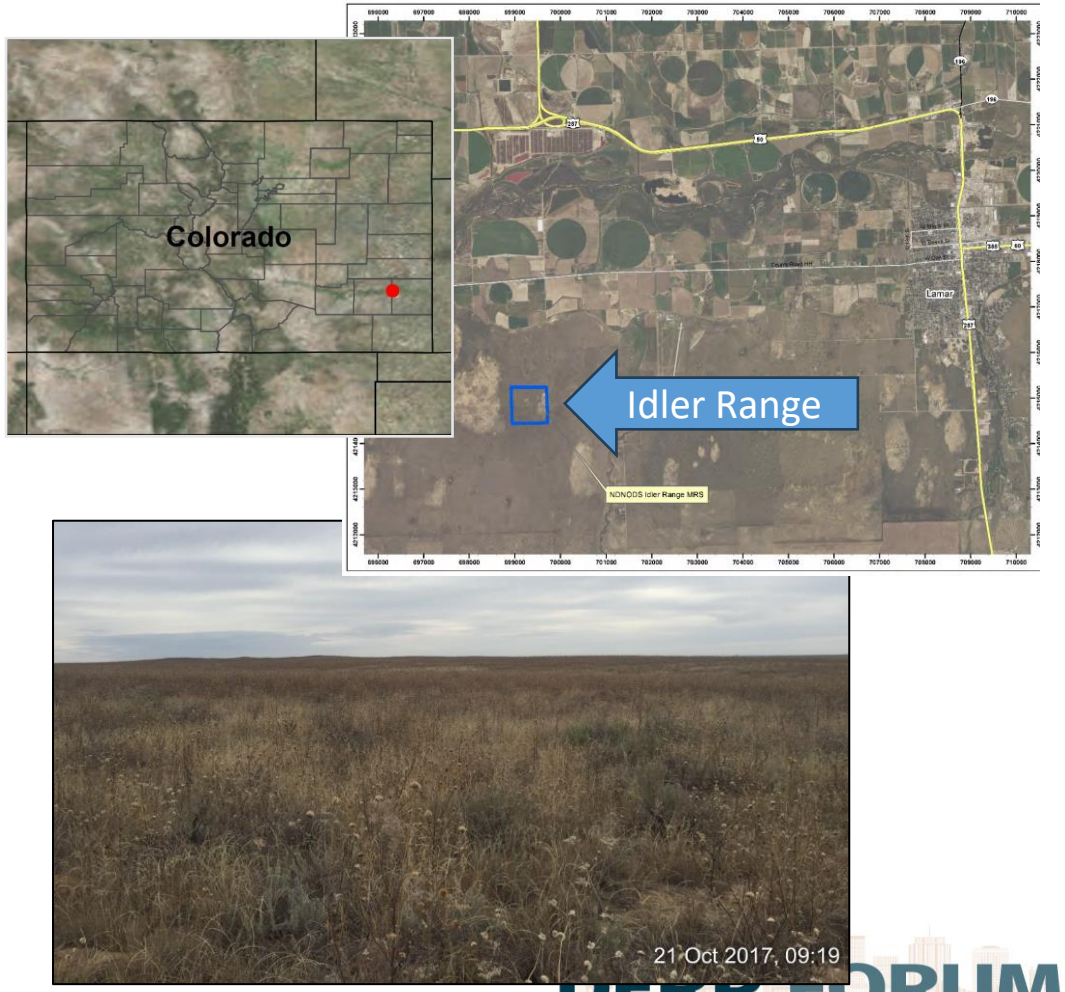
Idler Range[1]

1. Review key aspects of the CSM
2. Consider the weight of evidence in support of decision-making
3. What decision would you support and why?

Note 1: This is a real site in southeastern Colorado

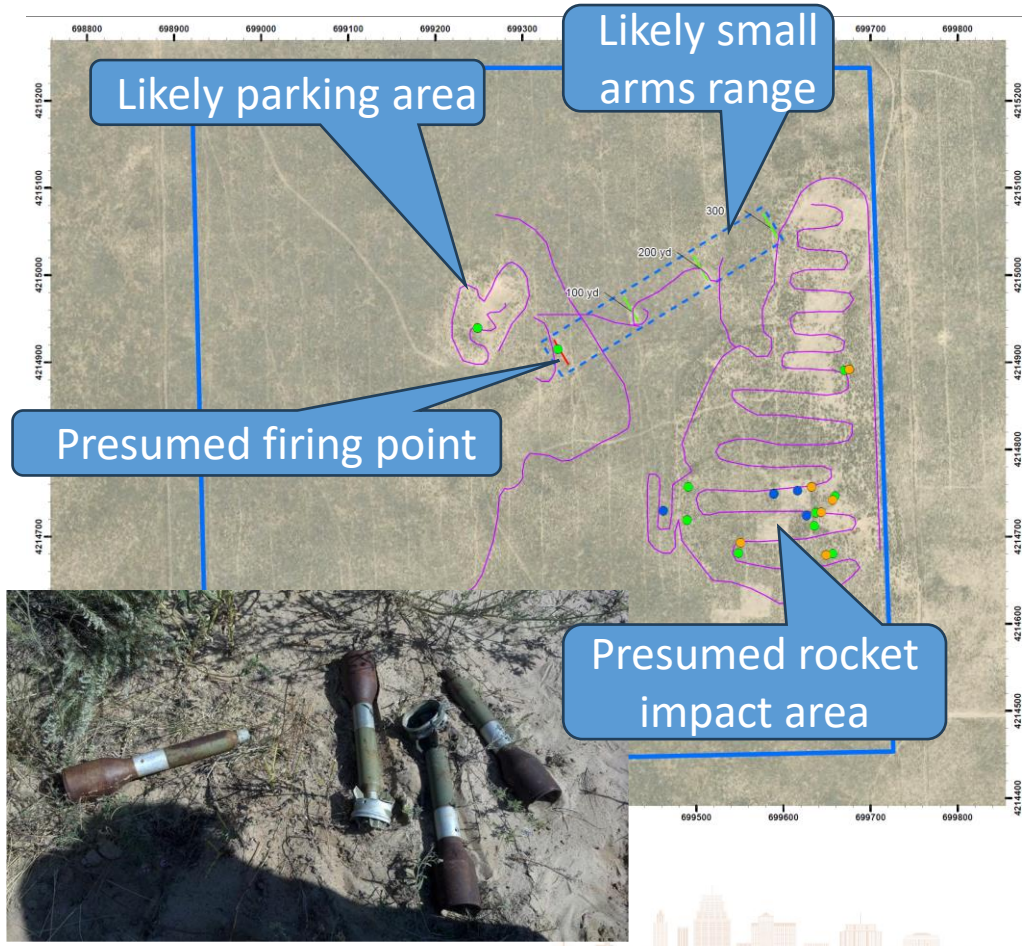
Case Study - Idler Range
Site Background

- 153-acre site in southeast Colorado
- County population 12,551
- Open grasslands, flat topography
- Ranch land used for seasonal cattle grazing and occasional hunting
- Property fenced for ranching but does not preclude access
- No land use controls
- Land use not expected to change



Case Study - Idler Range
Munitions Conceptual Site Model

- Colorado Army National Guard training exercises at site 1950 – 1956
  - Reportedly training limited to practice rockets & small arms
- PA/SI identified munitions debris and recommended further investigation
  - Site visit and limited visual transects
  - Several areas of disturbed vegetation identified and searched
  - 3.5-inch practice rocket debris found in some of the disturbed areas



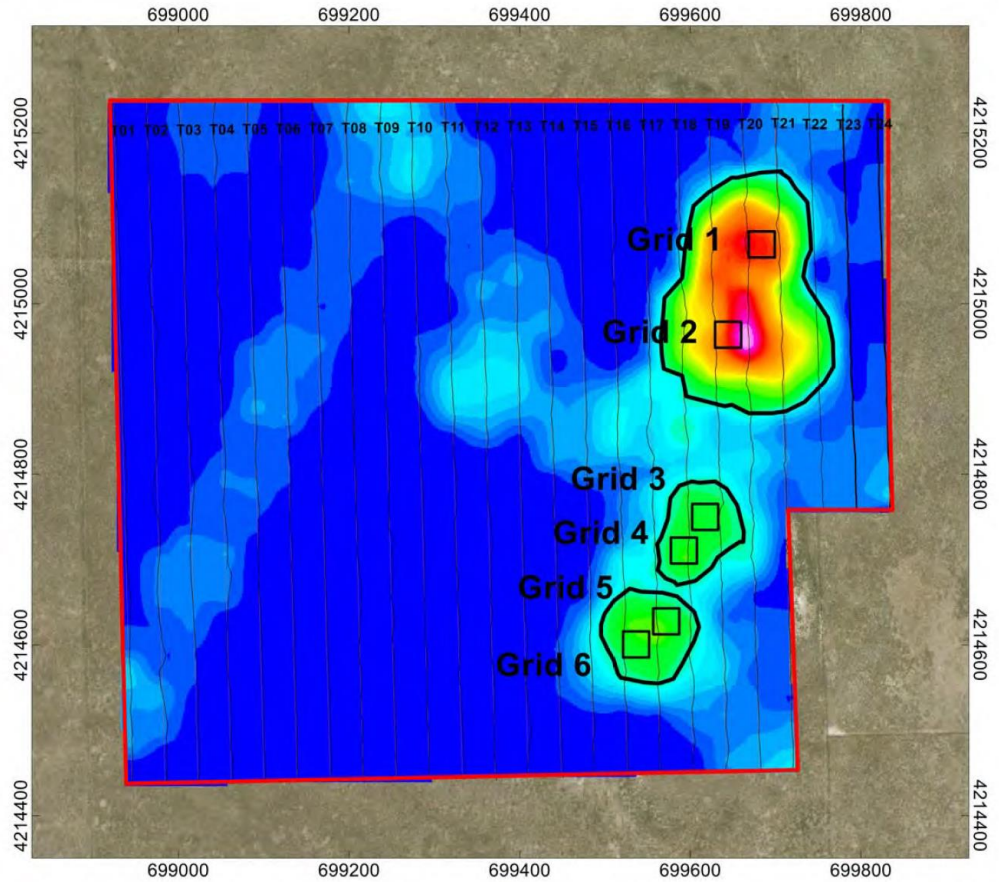
Case Study - Idler Range
Building Evidence to Support Remedy Selection

- Historical photos from 1947 and 1956
  - No evidence of training range features
- Some areas of disturbed vegetation present where MD was located
- RI field investigation
  - DGM transects (125’ spacing)
  - 6 Grids (100’x100’) in HD areas
  - Intrusive investigation on transects & grids

Case Study - Idler Range

Building Evidence to Support Remedy Selection

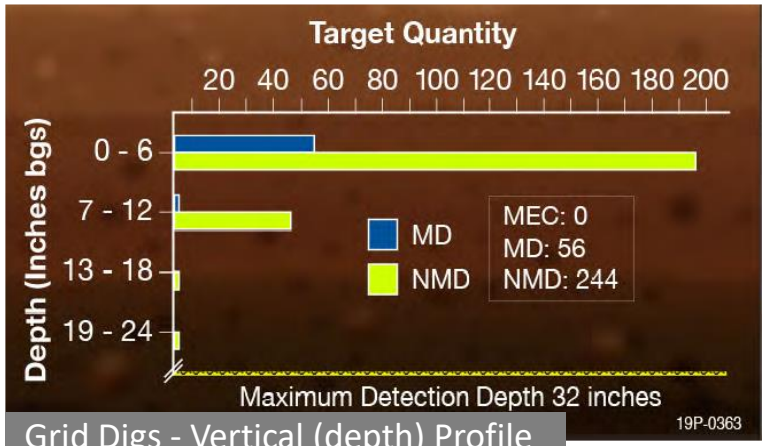
- RI Transect Results
  - 3 High anomaly density (HD) areas identified
  - No HD areas at presumed firing point
  - Very low background anomaly density
- RI Grid Locations
  - 6 grids (100’x100’)
  - 2 grids in each HD areas
- Intrusive Investigation
  - Dig all grid and transect anomalies



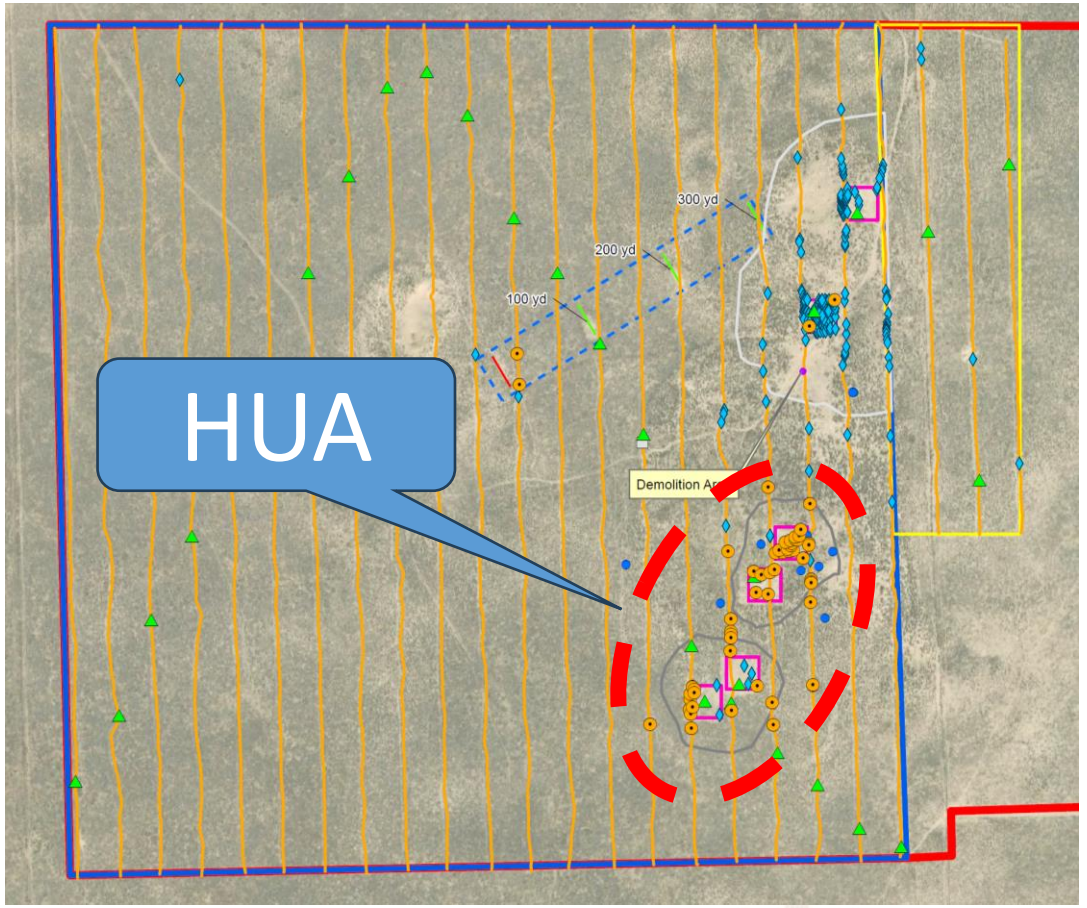
Case Study - Idler Range

Building Evidence to Support Remedy Selection

- RI Intrusive dig results
  - 0 MEC, 80 MD, 334 NMD
  - All MD related to 3.5-inch practice rockets and shallow (0-10”)
  - MD concentrated in southern HD areas
- No evidence of HE rockets



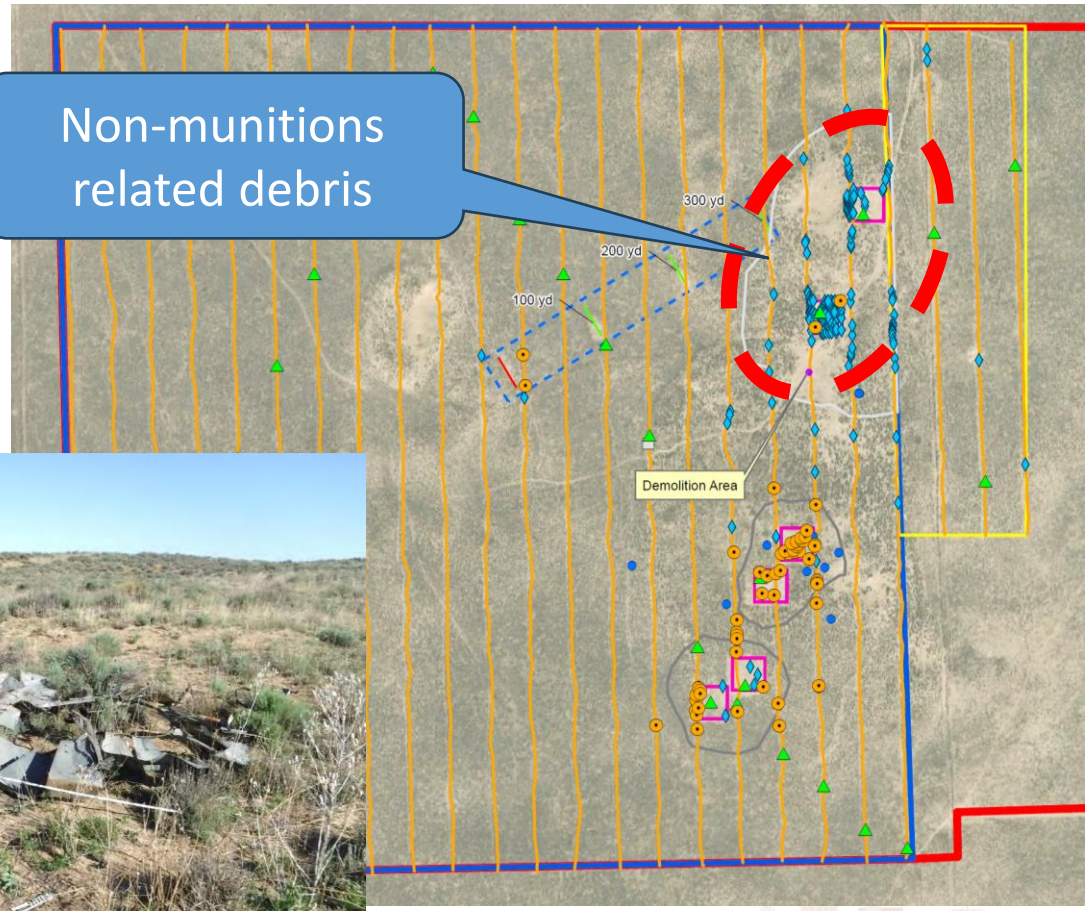
Grid Digs - Vertical (depth) Profile



Case Study - Idler Range

Building Evidence to Support Remedy Selection

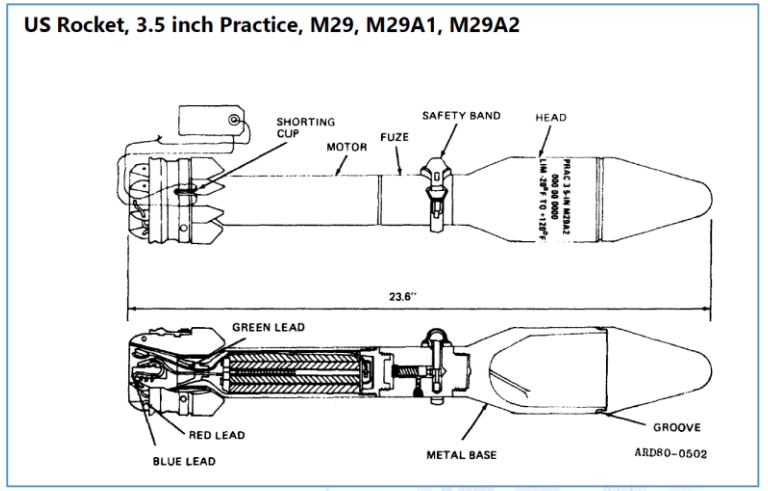
- Non-munitions debris areas
  - Evidence of abandoned windmill, old stock tanks, and ranch debris
  - 2 MD items (practice rockets)



Case Study - Idler Range

Building Evidence to Support Remedy Selection

- 3.5-inch practice rocket (M29 Series)
  - Inert cast iron warhead, M405 dummy fuze
  - Motor and tail fin section (M7 propellent)
- Direct fired anti-tank weapon
  - When fired all propellant in the motor is expended to propel the rocket forward
- Discarded rockets unlikely as this site
  - Training reported to be infrequent due to limited supply of M29 practice rockets
  - Unlikely any excess unfired M29 rockets would be discarded due to need for training



Case Study - Idler Range

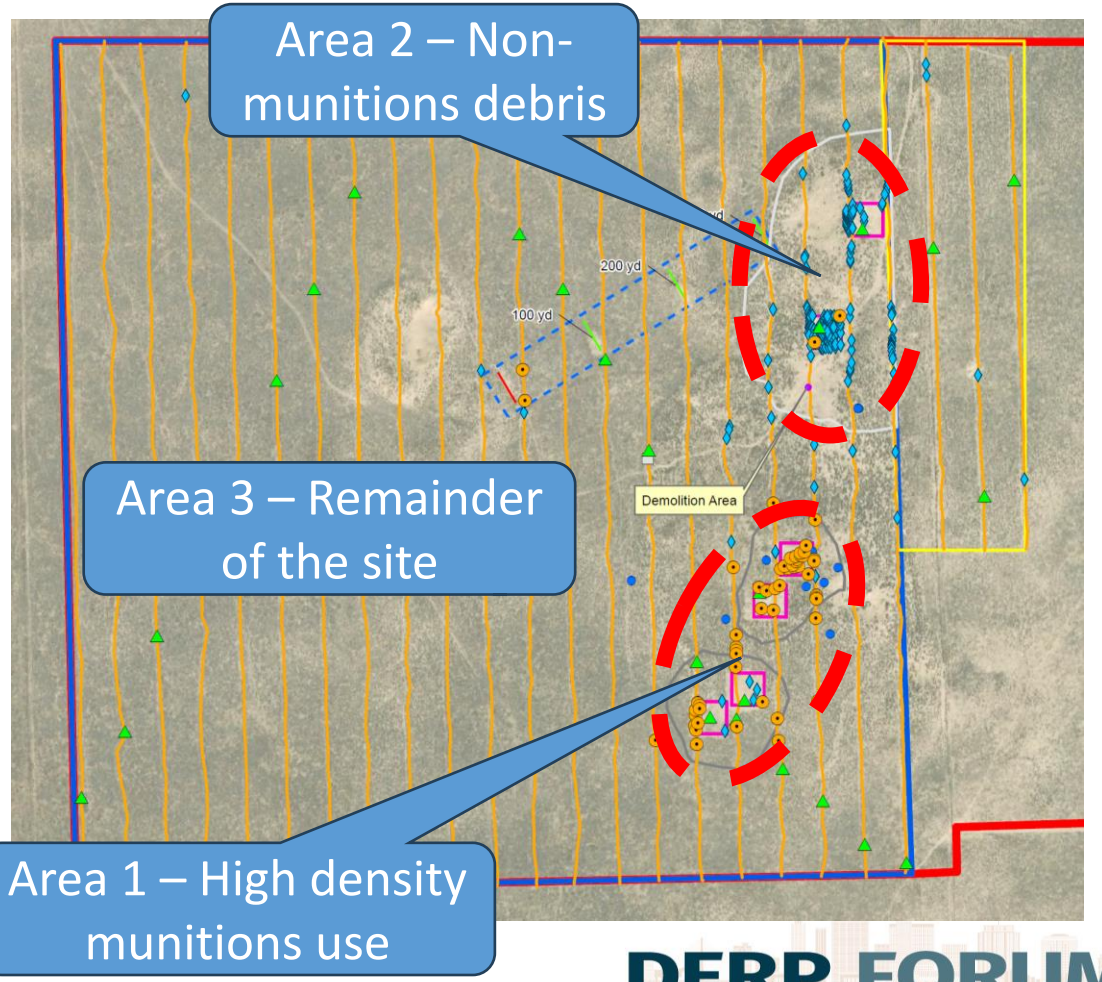
Weight-of-Evidence Decision Making

- Remedial Alternatives to consider
  - No Further Action
  - Land Use Controls
  - Surface Clearance
  - Subsurface Clearance

1. What would you select? Why?

- High density munitions use area
- Non-munitions Debris Area
- Remainder of the site

2. Would you consider UU/UE?



Questions?