



Army Small Arms Training Range Environmental Best Management Practices (BMP) Manual

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Leading Change for Installation Excellence



Project Execution



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Outline

- **Objective**
- **BMP Manual Content**
- **Range Evaluation Process**
- **BMP Methods**
- **BMP Selection**
- **Example**
- **Points of Contact**



Objective

- To provide an overview of the Army Small Arms Training Range Best Management Practice Manual



BMP Manual Content

Provide guidance for range evaluation and best management practices to mitigate metals mobility and soil erosion issues

- **Methods of evaluating metal mobility problems**
- **Identify range design and maintenance methods**
- **Guidance for selection of appropriate methods**
- **Implementation guidance**
- **General guidance (cost estimation, funding sources, assessing performance, etc.)**



Range Evaluation

- **Step I Range Evaluation**
- **Step II Additional Data Collection (optional)**
- **Step III BMP Implementation Requirements**



Range Evaluation

- **Watershed delineation**
- **Background and range use information**
- **Range Evaluation Software Tool (REST) Analysis**
- **Range Checks**
 - **Identify metals source zones on the range or impact areas within a defined watershed**
 - **Identify predominant metals transport factors and mechanisms at work**
- **Conceptual Site Model Development**



Range Evaluation

- **Watershed delineation**
 - **Represents a functional environmental boundary**
 - **Multiple ranges generally impact a common sub-watershed**
 - **Follows current regulatory guidance for non-point source watershed assessment and management**



Range Evaluation

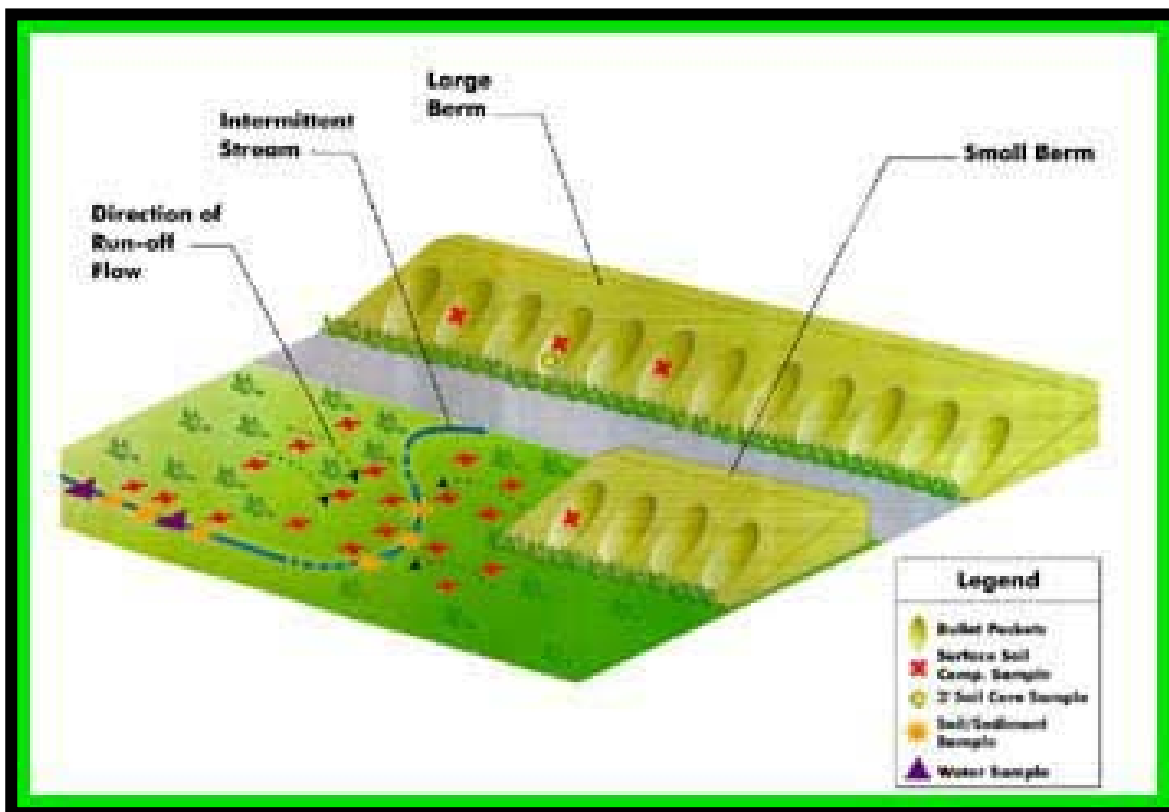
- **Site Background and range use information**
 - Soil type, geology, and subsurface stratigraphy
 - Groundwater depth, flow characteristics, and classification
 - Surface water characteristics and classification
 - Climate/precipitation
 - Range use (training type, munitions used, estimated annual throughput/# of rounds fired, range/land historical use, etc.)



Range Evaluation

Range Evaluation Software Tool (REST) (optional)

Software tool that provides a screening level indication of potential lead mobility issues





Range Evaluation

- **Range Checks**
 - **Identify metals source zones on the range or impact areas within a defined watershed**
 - **Identify predominant metals transport factors and mechanisms at work**
 - **Conditions of rounds**
 - **Land/erosion characteristics**
 - **Stormwater flow patterns**
 - **Proximity to water resources**



Range Evaluation

- **Conceptual Site Model Development**
 - Written description of environmental conditions in the range area based on previously gathered data (i.e. Range Checks, REST, etc.)
 - Documents assumptions, contaminants of concern, potential migration pathways, and potential for human exposure or water quality impacts
 - Identifies specific areas of migration potential



Additional Data Collection (optional)

- **Limited Field Sampling**
 - **Performed for confirmation of the preliminary assessment results**
 - **Further identification and prioritization of environmental concerns**



BMP Methods

- **Metals Migration Prevention**

 - Operational Methods

 - Vegetative Solutions

 - Stormwater Management

 - Berm Design and Structural Enhancements

 - Geosynthetic Materials

 - Soil Amendments

- **Pollution Prevention**

 - Bullet Traps

- **Lead Removal**



Operational Methods

- **Firing lane usage management**
- **Minimize or eliminate firing into water resources**
- **Vegetative cover sustainment**
- **Improved range maintenance practices**
- **Existing BMP inspection and maintenance**



Vegetative Solutions



- Vegetative cover establishment and sustainment
- Aerial seeding of inaccessible impact areas
- Grassed channels/swales
- Riparian buffer zones
- Erosion control mats and mulches



Storm Water Management



- Land shaping
- Diversion channels
- Check dams
- Turnouts and level spreaders
- Riprap aprons
- Sediment barriers
- Dry detention ponds
- Sand filters



Berm Design and Structural Enhancements

- Berm design
- Berm structural enhancements





Other Miscellaneous BMPs

- **Geosynthetic Materials**
 - Geosynthetic liner systems
- **Soil Amendments**
 - Lime amendments
 - Phosphate amendments
- **Pollution Prevention**
 - Bullet Traps
- **Lead Removal**



BMP Methods

- **Manual describes the following for each recommended BMP:**
 - **BMP Description**
 - **Benefit**
 - **Applicability**
 - **Limitations**
 - **Implementation Guidance**
 - **Maintenance Requirements**
 - **Cost Elements**
- **Also identifies potential funding sources**



BMP Selection

- **Four Step Process to select BMP**
 - **Range Type**
 - **Transport Mechanism**
 - **Site Specific Physical Characteristics**
 - **Final selection based on trade-off analysis of applicable alternatives**



Points of Contact

- **Program Lead:**

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INSTALLATION MANAGEMENT COMMAND



“Sustain, Support and Defend”



BMP Application Example



Typical 25-Meter Range





Typical Berm Erosion





BMP Implementation



Before... → ...After

