Case Study: The identification of a high use area using analog sensors where digital geophsyical mapping did not

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The identification and delineation of High Use Areas (HUAs) is performed using Digital Geophysical Mapping (DGM) or Advanced Geophysical Classification (AGC) transects and analyzed using statistical tools, like Visual Sample Plan (VSP). If done right, the process readily identifies High Density (HD) areas and provides “accurate” anomaly density estimates for any potential HUAs. Transect spacing design considerations are based on the site history and conditions, known or suspected munitions use, and the anticipated background and target anomaly densities. Absent any previously collected data, background and target anomaly densities are educated guesses. Identification and delineation of the HD areas is determined by the critical density, which often is also a subjective determination. With subjectivity present at several crucial design and analysis steps, there remains the possibility of missing a HUA during a Remedial Investigation (RI).

Analog intrusive investigations performed after DGM were critical in locating an unexpected HUA at the former Camp Lucas/Fort Brady Target Range Munitions Response Site (MRS) in Chippewa County, Michigan. In this case study, an unexploded ordnance (UXO) dig team performed mag and dig transects along the 108-meter spaced transects following the completion of the DGM data collection with a Geonics EM61-Mk2. The teams found several mortar fragments in an area of elevated anomaly density, which was not identified as an HD area in the preliminary VSP analysis. Mortar training was not anticipated in the Conceptual Site Model (CSM). The preliminary VSP analysis identified three HD areas with an average target density of 245 anomalies per acre (APA) and a critical density of 110 APA. Following the identification of mortar debris, the critical density was reevaluated and lowered to 90 APA and the mortar HUA was identified with an average anomaly density of 103 APA. Additional transects were added between the original transects to further refine the HUA boundary, which ended up expanding beyond the MRS boundary. The presentation will highlight the challenges of selecting the appropriate critical density and other transect design parameters and how they can impact the characterization of the site.

The data presented here provides a prime example of the important role analog transects can play in characterizing a site. While recent guidance has devalued analog data, the emphasis should be on employing analog investigations to provide additional data that can be paired with AGC data. Analog data should be used to complement the site characterization, but not drive the investigation decisions, like where to not place a grid for further characterization. Analog data should prove most useful at sites with less developed site histories, where a substantial lack of rights-of-entry or inaccessible terrain leave large data gaps, and areas with intermingled non-munitions related debris or infrastructure that influence HD area boundaries.