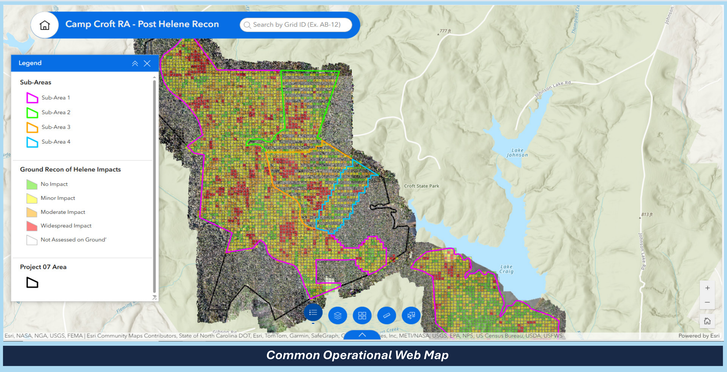
From Impact to Action:
Geospatial Planning for Post-Helene Munitions Response at Former Camp Croft, SC

Author: Jake Vera , Geophysicist - Weston Solutions
Email: J.Vera@WestonSolutions.com | 507-550-1660

Background

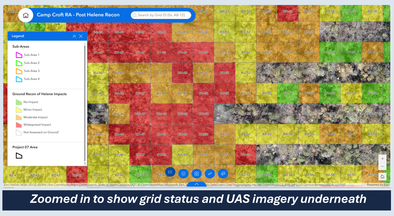
Weston was contracted by the U.S. Army Engineering and Support Center, Huntsville, to carry out a comprehensive remedial action at the Former Camp Croft Maneuver Area/Croft State Park Munitions Response Site (MRS) in Spartanburg, SC. The project aimed to mitigate munitions and explosives of concern (MEC) from past military training activities, which posed safety risks to park visitors and workers.

Fieldwork for the project was conducted between 2021 and 2023. During this period, Weston employed advanced geophysical classification (AGC) and simultaneous localization and mapping (SLAM) technologies to detect and remove buried munitions across 717 acres, ensuring minimal environmental impact and improved remediation efficiency.



Common Operational Web Map

In late 2024, concurrent to the award of the Phase II task order, severe weather resulting from Hurricane Helene devastated South Carolina including Croft State Park. The Consequently, the Weston team assessed the impacts to site conditions throughout the project to support the remediation efforts. Using GIS technology, the team evaluated the extent of the hurricane damage for impacts to access limitations and debris that could affect upcoming operations. These spatial assessments are essential for understanding both the cost implications and the complex work sequencing required to safely and effectively carry out the upcoming munitions response activities.



Zoomed in to show grid status and UAS imagery underneath

UAS imagery showing extent of damage following Hurricane Helene

The Data

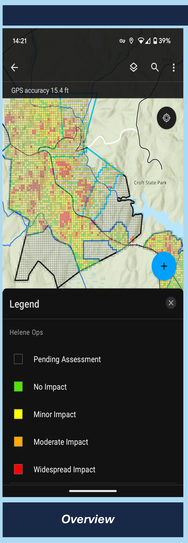
Survey123 and Field Maps were utilized for site navigation and for logging impact information from both the drone survey and boots-on-the-ground efforts. The entire MRS is broken into 100ft x 100ft grids, with each grid assigned a hurricane impact category ranging from No Impact, Minor Impact, Moderate Impact, to Widespread Impact. Data were collected over approximately 1,277 acres using Unmanned Aircraft System (UAS) overflights, with 967 of those acres also surveyed on foot. The ground surveys served to validate the UAS data and gather additional details on hurricane impacts not visible from aerial imagery.

Site Conditions

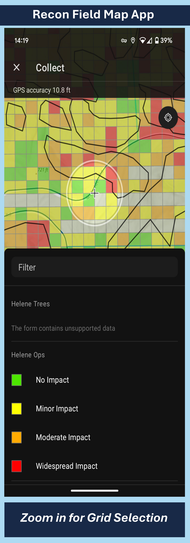
Solution

To support field coordination and stakeholder collaboration, we deployed an ArcGIS Online Project Delivery Subscription (PDS) for the Former Camp Croft Maneuver Area/Croft State Park MRS. This enabled seamless integration of data from the field teams, the UAS team, and project team, allowing stakeholders to visualize and access qualified data in near real time as it was collected and reviewed.

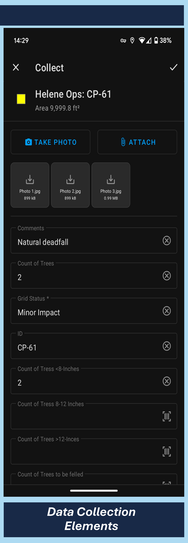
Recon Field Map App



Overview



Zoom in for Grid Selection



Data Collection Elements

On-the-Ground Data Collection and Visualization

High-resolution post-Hurricane Helene UAS imagery was made available to reconnaissance teams via Field Maps. Using Field Maps and Survey123, field crews conducted boots-on-the-ground QA assessments within each 100ft x 100ft grid across the Phase II task order area. They verified impact categories, captured geotagged photos, and recorded condition assessments, ensuring consistent and structured data collection across the site.

This information was automatically integrated into a centralized web map, enabling real-time visualization and spatial analysis of geophysical survey data from earlier operations, alongside insights from post-Hurricane Helene reconnaissance. By overlaying color-coded grid cells onto existing operational data, the team could clearly assess the extent of storm-related damage across the large site—distinguishing areas of high, moderate, and low impact in relation to both pre-Helene activities and planned post-Helene remediation. These visual patterns highlighted where additional planning and site preparation were needed. The map played a critical role in shaping the remediation strategy and effectively communicating key findings to the client.

Real-time Collaboration and Strategic Remediation

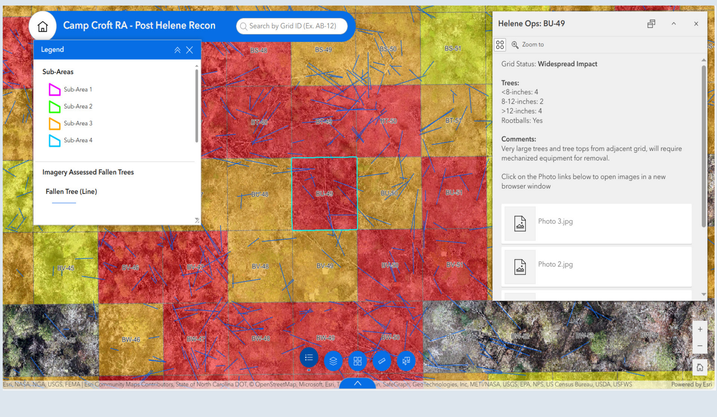
The platform also enhanced field-to-office collaboration by allowing teams to monitor progress, identify areas of concern, and adapt to site conditions in real-time. This dynamic capability proved especially valuable given the site's complex terrain and environmental sensitivities.

By embedding geospatial intelligence into our workflow, we significantly improved the accuracy, transparency, and responsiveness of our assessments, providing a strong foundation to guide the upcoming remediation efforts. This approach demonstrated the power of integrated GIS in supporting complex environmental projects with dynamic site conditions.

Project Success Post-Hurricane Assessment

The Camp Croft remedial action project has successfully integrated AGC and SLAM technologies to address the risks posed by historical military munitions at Croft State Park. A Centralized GIS-based Common Operating Web Map served as the foundation for visualizing these data—supporting informed decision making, improving coordination, and enhancing communication across project stakeholders.

When Hurricane Helene caused severe storm damage to this site, the team quickly adapted by building a post-disaster assessment directly into this existing geospatial framework. The integration of post-disaster UAS imagery and field reconnaissance data allowed teams to assess site wide storm impacts through color coded grid overlays – clearly distinguishing areas of high, moderate, and low damage. This allowed the team to visualize where previous operational work remained intact, where additional preparation was required, and how best to sequence upcoming remediation activities with additional operations due to the damage.



Real-time Mobile GIS for Adaptive Field Operations

Mobile GIS tools enabled real-time data sharing between reconnaissance teams, UAS operations, and project managers. Field crews collected and verified impact data using standardized grids, photos, and field forms—all linked into a centralized system. This allowed stakeholders to monitor progress, validate findings, and adapt strategies in a distributed setting.

The ability to visualize and adapt field strategies in real time—despite challenging site conditions—proved instrumental in protecting both the environment and surrounding community. This comprehensive, GIS-enabled approach not only protected public safety but also demonstrated a scalable, repeatable model for assessing post-disaster site conditions. The methods developed here provide a resilient framework that can now apply to future sites facing similar challenges, enhancing responsiveness and preparedness in dynamic field environments.