Non-Invasive Burial Determination Using Near Surface Geophysical Survey and Soil Chemical Testing at Fort Hood, Texas and Camp Lejeune, North Carolina

Project # 03-193

Background:

Archaeological resources can sometimes encroach on training lands, reducing the capability to train. Effective reduction of this encroachment must be performed in a manner meeting National Register of Historic Places (NRHP) evaluation criteria in a cost- and time-effective manner. Traditional archaeological evaluation consists of resource excavation to determine if NRHP criteria are met. Geophysical/remote sensing techniques offer an opportunity to "see" what lies below the ground's surface with minimum or no excavation.

Determining the location and extent of historic cemeteries and Native American burials during archaeological survey can be an emotional issue, especially when it is believed burials may be present. Often, resources with "possible" burials are not evaluated, continuing encroachment on training lands.

Soil tests, such as humic acid and Ph level readings, in conjunction with geophysical testing have provided police departments with leads to the location of burials. Successfully applying this approach at DoD installations with archaeological resources could reduce land encumbered with "possible" burial locations by determining the presence of a burial without the emotional controversy surrounding excavations.

Core sampling at a rockshelter site

Objective:

Establish a methodology for geophysical testing and chemical sampling with sufficient accuracy to determine if a burial or other archaeological materials are not present, thus producing a NRHP eligibility assessment of "No Historic properties."

Summary of Approach:

The project created a methodology utilizing non-invasive techniques to identify potential burial anomalies; sample soil from these anomalies; and define chemical signatures that would positively identify the anomaly as a burial. These goals were addressed in succession. Intensive geophysical data collection techniques were defined ensuring adequate data collection for the chemical signature development phase of the project. Resources at two military installations, Fort Hood (Texas) and Camp Lejeune (North Carolina) provided a test of differing environmental conditions (Central Plains versus Coastal) as well as different site types (Rockshelters, open sites, Historic cemeteries).

Benefit:

The project benefits DoD by defining a model to reduce costs for archaeological assessments and improve management of archaeological resources. Reduction of costs for assessment are achieved by pinpointing key areas within the resource for traditional excavation procedures as needed. This approach also reduces consultation costs as an amicable, non-invasive alternative for "possible" burial site assessment.

Accomplishments:

The geophysical methodology provided highly accurate, useful information to direct archaeological soil sample collection at all resources tested. Based on the reliability and accuracy of the method, future work within rockshelters and sandy sites at a more intense interval is recommended for collection. Though collection time was increased by about a third over traditional archeological methodologies, it reduced subsequent investigations by at least half the time while providing better data. Resource-specific chemical tests identified a few broad trends within the data indicating potential differences between burials and the environment. Unfortunately, these trends were not consistent across differences in resource types or environmental variables. Based on these results, it appears that no overarching predictive or confidence limits can be created for burials against the environment on a broad scale using the current research path. However, the results support the recommendation to conduct additional research to refine these techniques.

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