Executive Summary, Research Readiness Level Assessment, and Technology Transfer

A Statewide Geographic Information System (GIS) as a Predictive Tool for Locating Deeply Buried Archeological Deposits in Nebraska (PHASE II)

Research Objectives

The proposed project will add to the existing Phase I GIS-based data repository of all Nebraska geoarchaeological information including: published and unpublished reports or portions of reports, bibliographies, stratigraphic profiles, radiocarbon ages, maps, notes, and photographs. These data will be linked to specific LSAs in specific stream valleys and drainage basins. The GIS will allow us to visualize the data in the form of maps and diagrams and reveal temporal and spatial patterns of landscape evolution in drainage basins. Moreover, the GIS will allow users to look at the data in a way that is quickly understood and easily shared.

Background

During 2016-2018, the Nebraska State Historical Society (now History Nebraska, HN) and the Kansas Geological Survey collaborated on a research project funded through the NDOT Research Program. The effort created a GIS-based prediction tool to better estimate where deeply buried, and difficult to identify, archeological sites are likely to occur. The project serves to assist NDOT environmental planners and cultural resource consultants with an enhanced method to identify and avoid significant cultural properties during the transportation planning process (Layzell and Mandel 2018 and Layzell et al. 2018).

The proposed project is designed to systematically gather this disparate information, create a digital repository of it, and distill the data in a Geographic Information System format for all areas of the state not covered during Phase I of the program. For cultural resource specialists involved in project planning and development, this will greatly enhance the ability to predict where these types of resources may or may not occur. As a result, planners and cultural resource specialists will be in a better position to determine if additional targeted investigations are necessary or if a project area is likely to be free of deeply buried sites

Conclusion

This project developed a GIS to assist with the identification of deeply buried archeological sites in alluvial settings across Nebraska with the exception of the Sandhills region. Soil survey data, previous geoarchaeological investigations, landform position, and other information was used to rank the potential of any stream valley setting as low, low-moderate, moderate-high, or high potential to contain buried soils (paleosols). While the presence of buried soils does not necessarily translate to presence of buried archeological sites, the potential for such sites is far greater in paleosols. The GIS can be used by NDOT and other agencies with statutory historic preservation obligations, to identify tracts on proposed construction projects that might require deep mechanical testing (backhoe or coring) in search of buried archeological properties.

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Interested in finding out more?
Final report is available at:
NDOT Research Website

NDOT Recommendations Based of Completed Research

The results of a state-wide assessment of deep subsurface archeological and geoarchaeological data provided significant benefit to the NDOT environmental compliance program. The study added to the existing Phase I GIS-based data repository of all Nebraska geoarchaeological information including: published and unpublished reports or portions of reports, bibliographies, stratigraphic profiles, radiocarbon ages, maps, notes, and photographs. The effort created a GIS-based prediction tool to better estimate where deeply buried, and difficult to identify, archeological sites are likely to occur particularly along stream and river floodplains, terraces, and alluvial fans.

The data acquired from this research allowed the development of field strategies (such as close stream bank examination or mechanical testing) during the early identification phase of projects to identify and ideally avoid impacts to deeply buried archeological deposits.

The Department is continuing the effort to update the deep subsurface archeological and geoarchaeological information with a third and final phase of the project focusing on the Nebraska Sandhills, a region that encompasses much of central and western Nebraska PHASE III-The Sandhills Region starting July 2022.

- *As provided by Stacy Stupka, Lead TAC Member*

Research Readiness Level (RRL) Assessment

Level 3: Development –

Research/Technology developed in an operational environment (real-world situation).

Technology Transfer

Journal Papers Submitted for Review and In Progress Journal Papers and Theses

- Layzell, A.L., Mandel, R.D., 2019. Using soil survey data as a predictive tool for locating deeply buried archaeological deposits in stream valleys of the Midwest, USA. Geoarchaeology 34(1), 80–99. doi.org/10.1002/gea.21707

Conference Presentations

- Ziska, C., Johnson, N.L., Layzell, A.L., 2019. The Nebraska Buried Sites GIS in Practice: Initial Results and Next Steps. 77th Plains Anthropological Conference, Bloomington, IN. Oct. 16-19.
- Layzell, A.L., Mandel, R.D., Ziska, C., Bozell, R., 2016. Developing a Geographic Information System (GIS) as a Predictive Tool for Locating Deeply Buried Archaeological Deposits in Nebraska. 74th Plains Anthropological Conference, Lincoln, NE

Lectures

- Geoarchaeology (ANTH 517), University of Kansas, Department of Anthropology, February 2022.
- Geoarchaeology (ANTH 517), University of Kansas, Department of Anthropology, February 2020.

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