Archaeological Predictive Model: Orchard Combat Training Center

WORKING FROM WHAT WE KNOW TO WHAT WE DON’T KNOW

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OVERVIEW

• Predictive models help assess large areas remotely to prioritize, strategize, and allocate resources efficiently.

• Section 106 and 110 of the National Historic Preservation Act of 1966 provide the legal basis for federal protection of archaeological sites.

• We aim to utilize a predictive model to assist in land management and develop protective measures for cultural resources in the Orchard Combat Training Center (OCTC).

BACKGROUND

Michael Bishop

• BSU Alumnus Michael Bishop developed the predictive model based specifically on the geospatial elements within the region.

• In 2015, Bishop applied the model to an area of 5,500 acres followed by pedestrian survey to test results.

The Study Area: OCTC

• The OCTC is a military training center located within the Snake River Birds of Prey National Conservation Area in Southern Idaho.

• Part of the Snake River Plain and the Great Basin.

• Traditional territory of Shoshone, Bannock, and Paiute peoples.

• Idaho National Guard (IDNG) training grounds.

OBJECTIVES

• Main goal: Apply Bishop’s model to a 24,627-acre area neighboring the 2015 test area to produce a map identifying areas of high probability for encountering archaeological sites within a 30-meter buffer.

• Facilitate land management to help protect cultural resources in the OCTC, which are protected by law and important to descendant communities.

METHODS

• Using GIS software, LiDAR elevation data, and cultural point data from known sites, we created a Hydrology layer and Elevation layer in ArcMap to isolate the spots based on the statistically derived parameters from Bishop’s model shown in Table 1.

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Distance to Hydrology</th>
<th>Angle to Hydrology</th>
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</thead>
<tbody>
<tr>
<td>&gt;949 and &lt;961</td>
<td>&amp; &lt;12</td>
<td>&amp; &lt;40 and &gt;90</td>
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<tr>
<td>&gt;969 and &lt;1000</td>
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<td>&gt;1000 and &lt;1021</td>
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• Stream Ranking by Ground Anomaly

• Flow Direction of Project Area

2015 & 2020 Predicted Archaeological Sites Orchard Combat Training Center

RESULTS

• A map depicting predicted archaeological sites was successfully produced (Figure 4).

• The model’s projection resulted in four major clusters of predicted archaeological sites. Each site with a 30-meter buffer.

WHY DO THE 2015 & 2020 PREDICTED AREAS NOT CONNECT?

• For the Hydrology layer, we used “Stream Order” which ranks hydrologic features.

• In order to eliminate low ranked features such as roads, we kept streams ranked between 8-11, which represent the highest ranked 36% of streams in this area (see Figure 3).

• In the 2015 projection, streams ranked between 5-8 were kept which represent the highest ranked 50% of streams in that test area.

• It is likely that the 2020 and 2015 predicted areas would connect if we had kept the highest ranked 50% of streams. However, the goal is to test accuracy within each buffer, not to produce more predicted areas.

CHALLENGES

• Early attempts to process large amounts of data from the 24,627-acre area caused the GIS computer program to crash.

• Due to the computer’s processing capabilities, we were forced to apply a 10-meter grid to run our projection as opposed to the 1-meter grid used by Bishop.

FUTURE STEPS

• Conduct pedestrian field survey to test accuracy while providing field opportunities to fellow students.

• Recommend adjustments to the model such as additional variables to obtain a better prediction in future applications.

• Continue working with IDNG to help identify and protect cultural resources in other areas of the OCTC.

ACKNOWLEDGEMENTS

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