University of Texas, San Antonio

Overview

Do particular places in the Mimbres-Mogollon landscape confer greater resilience to environmental perturbations? My dissertation project will investigate this question by surveying and analyzing prehistoric settlement patterns in southeastern Arizona's York-Duncan Valley. Trends including continuity of occupation, aggregation and dispersal, and ceramic diversity will be aligned with regional paleoclimate reconstructions showing periods of minimal and maximal precipitation. Patterns will suggest whether populations in certain parts of the river valley were resilient to severe climatic fluctuations. The survey prediction model shown here is a useful first step in stratifying a large sample universe. Known prehistoric sites in the study area generally conform to the model, with a prediction rate of 90.4 percent of sites located in zones of medium to high probability.



Survey Design



Gila River, southeast Arizona



Rock ring, FS-15 site

- The survey design incorporates a land evaluation aspect that considers agriculturally-productive zones, and other relevant ecological variables including river geomorphology and Mimbres-Mogollon site preferences, which are integrated into a geospatial information system predictive model.
- To evaluate the methodology, model outputs are then compared to known prehistoric sites in the study area. The model will support proposed dissertation research on the role of place in enhancing resilience, as shown by site occupational persistence and aggregation and dispersal trends.



Archaeological Site Prospecting in the Upper Gila River Valley, Arizona Mary Whisenhunt

Mountair

Agriculturally Productive Zones



enhances our ability to understand the conditions that framed prehistoric settlement decisions. To digitally chart agriculturally productive areas, maps from the 1950 U.S. Soil Conservation Service and DeWall's (1978) soil data are used.

• Mapping the extent of the prehistoric floodplain was accomplished by outlining and digitizing the extent of the Pima alluvium soils. The broadest floodplains are located near the Duncan and Round Mountain areas. The model predicts a higher incidence of sites located near **Round Mountain and other zones with** significant floodplain coverage.

prehistoric irrigable lands; adapted from Doolittle 2014. Legend Study Area Flood Plain Limit Agriculturally Agriculturally Productive (Moderate Workability) productive zones Agriculturally Productive Soils and the floodplain Gila River limit on the upper Gila River, Arizona Modern farming near the upper Gila River, Arizona

• Mapping agriculturally productive areas



River Geomorphology and Site Locations

Stream reach boundaries near and upstream of Round Mountain

River valley bottoms with optimal geomorphic and/or hydrologic conditions enable lower-risk farming in semiarid environments. We should expect higher site densities and aggregated sites in places with optimal stream reach boundaries that foster the formation of alluvial deposition.

Constrictior





- **Mogollon settlement** patterns in river valleys in New Mexico were considered and digitized in the model. Other variables include landform choice, distance from water, & proximity to productive soils.
- Model outputs show 4 probability categories that correspond to zones of high, medium, low and improbable site occurrence. Outputs are compared to the small sample size of known sites in the study area.

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 The small sample of known archaeological sites in the York-Duncan Valley is consistent with the model, with a prediction rate of 90.4 percent of sites located within zones of medium to high probability. However, while pithouses on terraces adjacent to the Gila River correlate with model outputs; those located on isolated knolls do not. Attempting to spatially model each individual knoll, and at a host of elevations, would generate an output with far too many false positives.

• The model represents a useful first step in identifying residential occupations across a broad temporal continuum.

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