

# Predicting Settlement Patterns in the Valle de la Plata, Columbia

Geog 575

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## Presentation Outline

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2. Design objectives
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4. Intended applications
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## Background

- University of Pittsburgh, under the direction of Robert D. Drennan conducted archaeological surveys in the region over a period of ten years.
- A GIS dataset was developed as a result of these surveys.
- The dataset was comprised of different raster datasets + tabular data and dxf files.
- Sites in the area date from early formative (500 AD) to classic (AD 1400).
- Known as the San Agustin culture which are characterized by many small independent chiefdoms.
- Not as complex as their Inca or Moche' Neighbors to the south or the Maya to the north.
- Best known for their large stone figurines and burial mounds.

## Stone Figures



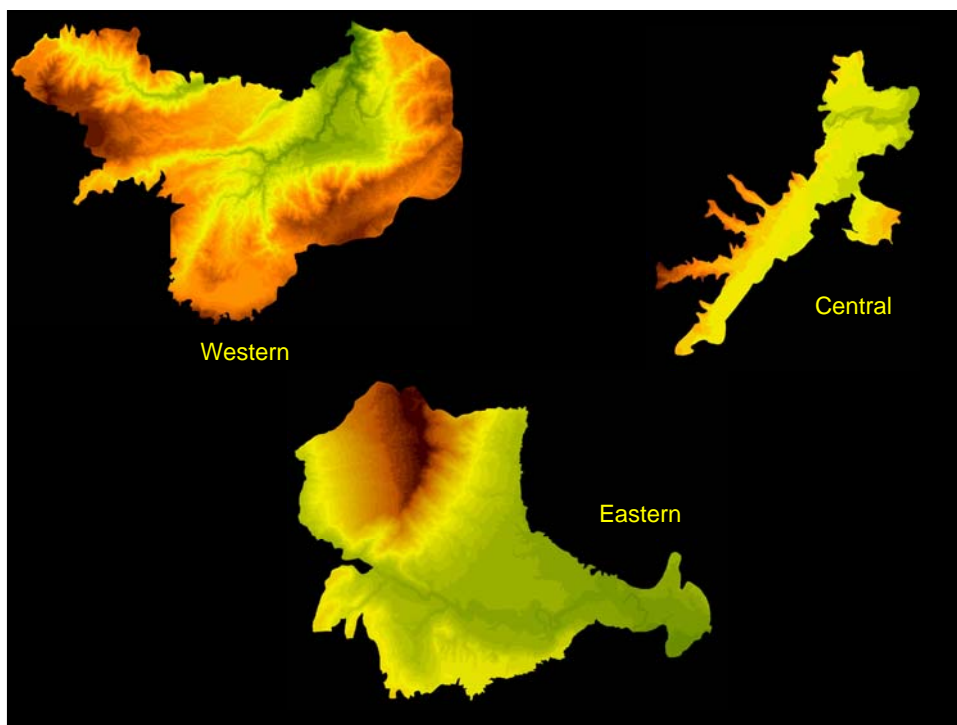
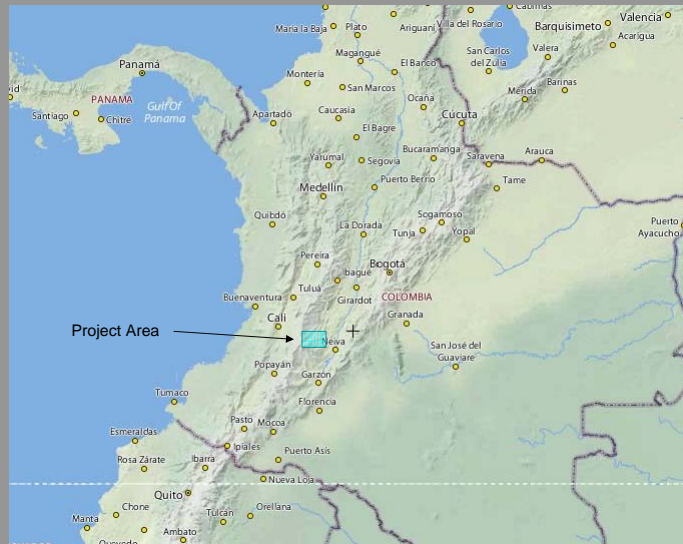
## Overview of Western Survey Zone



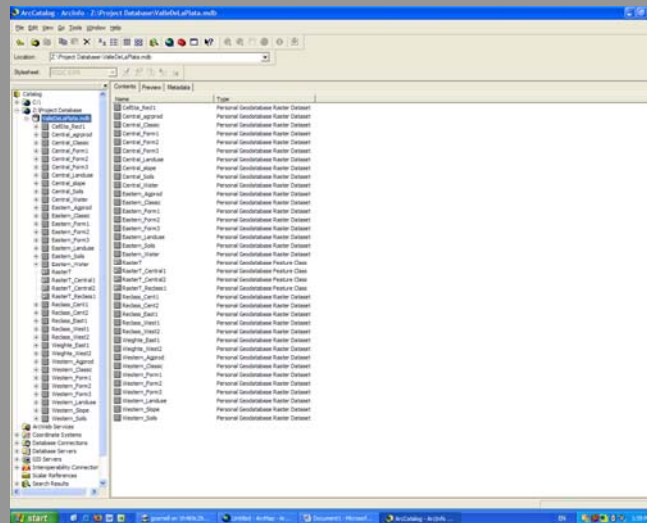
## Design Objectives

- Integrate the different data files into a single geodatabase for use on this project and in future projects.
- Test the validity of building a predictive model for site location.
- Design the model so that it may be used with different datasets on different projects.

## Data Layer Specifications and Geographic Extents



## Project Database



## Intended applications

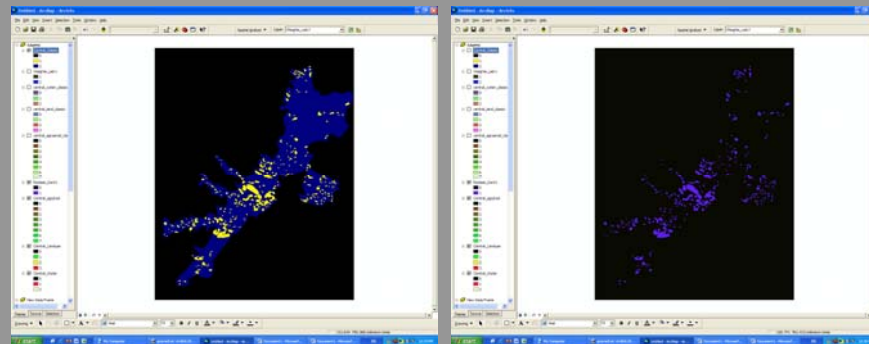
1. To generate a predictive model for site locations.
2. Streamline future archaeological surveys in the area.
3. Other potential uses might include estimating population densities based on this predictive model.

## **Methods and Techniques**

1. Reclassification
2. Raster Calculator (Map algebra)
3. Weighted Overlay

## **Demonstration application**

## Occupation Sites Reclassified



Eastern Zone:

Agricultural Production + Access to Water + Modern Land Use



Weighted Overlay



= Predictive Model

Western Zone:

Agricultural Production + Slope + Modern Land Use

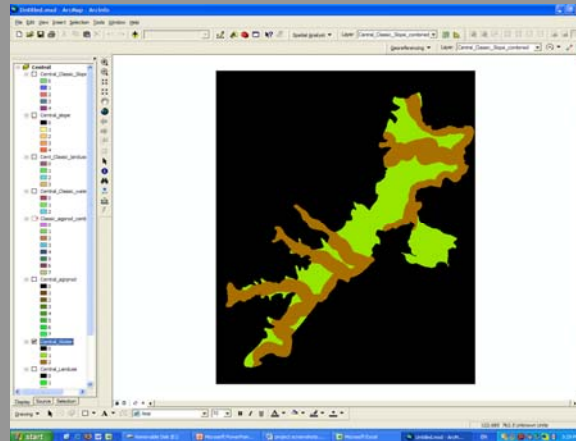


Weighted Overlay

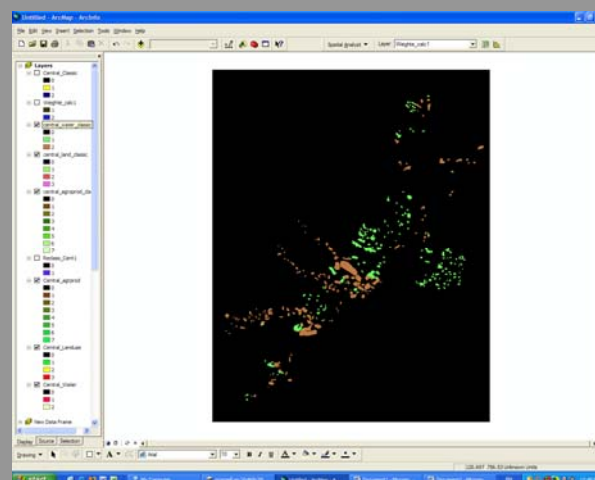


= Predictive Model

## Proximity to water layer

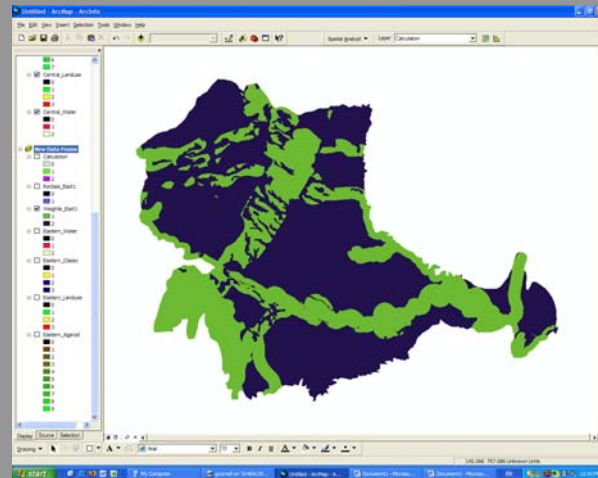


## Proximity to water combined with site locations

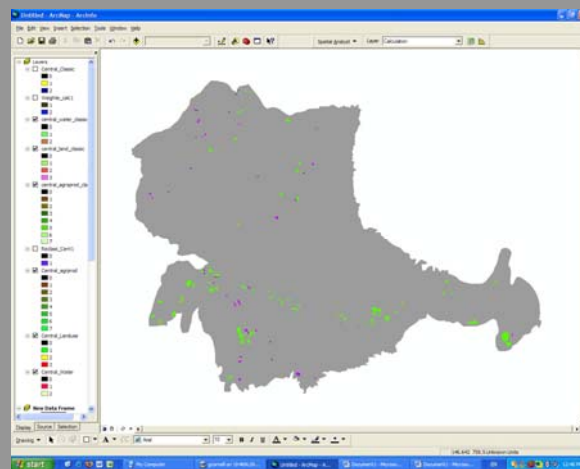




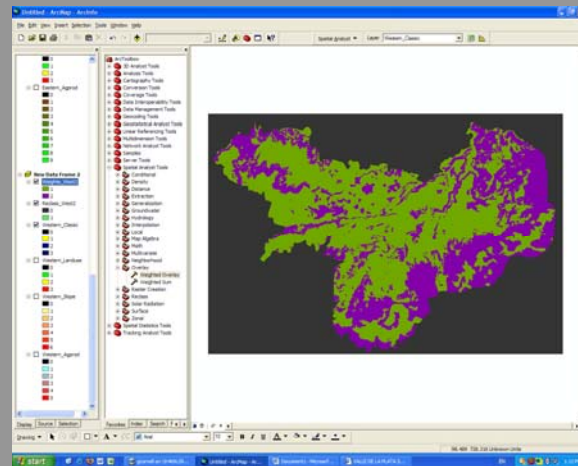
Using model from central zone to predict where sites are located for eastern zone



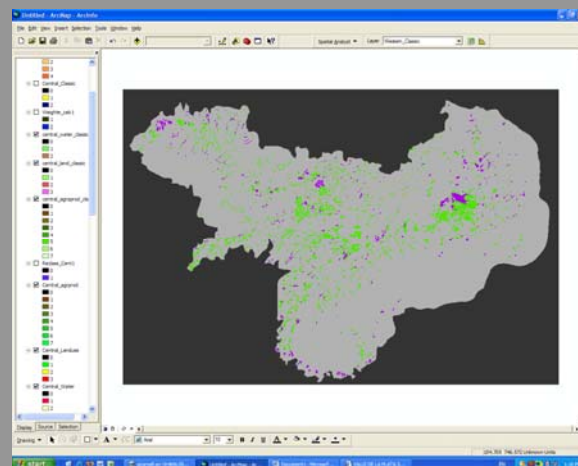
Result of weighted overlay combined with re-classed settlements



## Weighted overlay using slope, agricultural production, and land use layers



## Result of weighted overlay



## Results

- Eastern Zone

High Likelihood of site: 82%

Low likelihood of site: 18%

- Western Zone

High Likelihood of site: 80%

Low likelihood of site: 20%

## Limitations and quality statements

1. Raster dataset for the project area was not ideally suited to the task at hand
  - Different areas had different classifications making comparisons difficult
  - Central Zone had a complete data set while the western zone was missing water and the eastern zone was missing slope.
  - Some of the data was already reclassified so we did not have raw data to work with in some cases.
2. Quality of data collection in the field. Is it consistent across the three survey areas?
3. Lack of supporting reference materials.
4. Difficulty finding additional map data from Columbian sources.

## References:

Valle de la Plata Settlement Dataset: <http://www.pitt.edu/~laad/vdlpsurv/index.html>

Jennings, Jesse D. , *Ancient South Americans*, San Francisco, W.H. Freeman and Company, 1983

Chang, Kang-tsung, *Introduction to Geographic Information Systems*, New York, McGraw-Hill, 2008

Herrera, Luisa Fernanda, Robert D. Drennan, and Carlos A. Uribe: Editors. *Prehispanic Chiefdoms in the Valle de La Plata, Volume 1: The Environmental Context of Human Habitation*. University of Pittsburgh Latin American Archaeology Publications, Pittsburgh, 1989



## Questions ??

