

# Visualizing MSU's Campus Archaeology Excavations with Geographic Information Systems

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## Introduction

The Campus Archaeology Program (CAP) is part of the MSU Anthropology Department. For over ten years the program has been excavating on MSU's campus and teaching students archaeological field techniques. As part of the excavation process the CAP crew keeps track of every location they dig. Measurements are taken so that each hole (shovel test pit/stp) or trench (unit) that is opened is accounted for. A compass is used to take headings from nearby buildings so that we can reference where we have placed our stps. Over the years CAP has completed several surveys that have produced hundreds of shovel test pits and trenches. We use a Geographic Information System to create visualizations of where we've excavated. Each stp and unit we open is plotted on an aerial image of campus. Stps are represented by point data and units are represented by polygons. Every site that we excavate is entered into the GIS as its own layer on the aerial image.

**Terms**  
GIS: Geographic Information System  
STP: Shovel Test Pit, 1 foot wide, 1 meter deep holes dug during archaeological surveys.  
Unit: Excavation Trench  
Layer: symbols/labels that represent data  
Shapefile: Esri data storage format

## The Project

MSU's Campus Archaeology Program (CAP) works to learn from MSU's past by examining the archaeological record prior to development or changes in the landscape. Because of this mandate, CAP has excavated sites all over campus, finding artifacts that date to different times throughout the university's history, as well as finding prehistoric Native American artifacts that predate the campus. This project uses a geographic information system, ArcMap by Esri, to create an image showing where CAP has found artifacts from different time periods. The four historical periods CAP focuses on are separated into phases: phase 1 (1855-1870), phase 2 (1870-1900) and phase 3 (1900-1925) and phase 4 (1925-1955). Using GIS allows us to visualize the distribution of artifacts we have found from each of these phases.

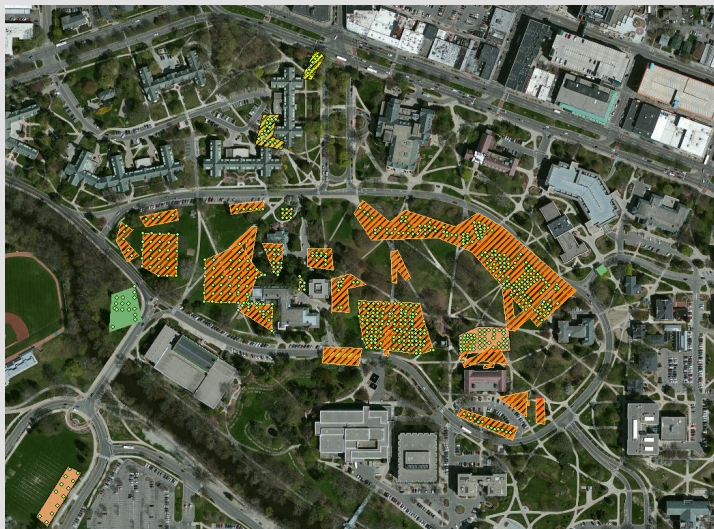


Figure 2: This image shows which sites we found artifacts that date to specific time phases. In Figure 3 the layers for each time phase can be seen. The most prominent phase was a mixture of 1 and 2. This is represented as orange stripes.



Figure 1: This image shows the oldest area of campus where the Campus Archaeology Program has focused many of our excavations. Each dot represents a shovel test pit while polygons represent units.

## Methods

Creating the image involved examining artifacts and catalog records from past excavations to get an idea of what time phases the artifacts came from. We can usually give an estimate of how old an assemblage of artifacts is depending on what we know about the site from archival research and what types of artifacts were found. Examining the artifacts from previous excavations allowed us to place most sites into one or two time phases. The next aspect of the project involved determining how to visualize this information. Created by previous students, CAP already had a master image where most of our excavations were plotted. Each excavation has its own shapefile so I was easily able to find a new aerial image and copy the shapefiles onto it. Next I created layers to represent each time phase. For each time phase layer I created polygons around the sites that dated to that specific time phase. Each

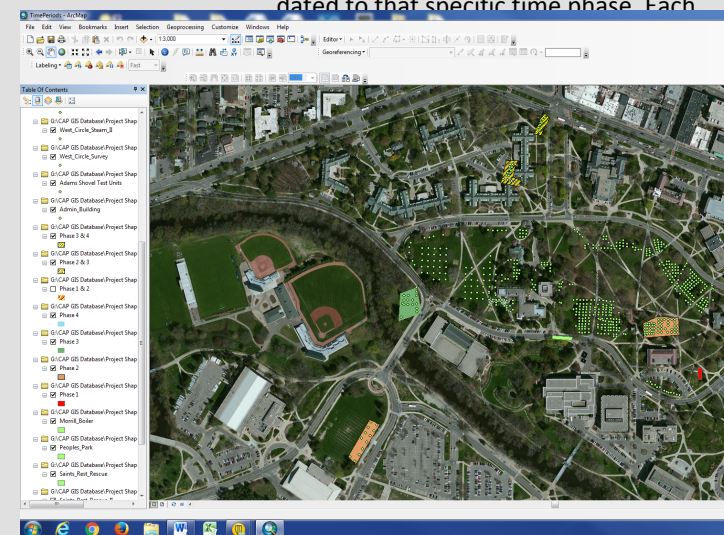


Figure 3: This is an image of the project in ArcMap. On the left side are all of the layers that are projected on the map. Each excavation site has a layer along with each phase. There are also layers that represent two phases as many sites consisted of artifacts from multiple phases. In this image, the most prominent phase (mixture of 1 and 2) is not displayed to better identify the other phases.

## Why Use GIS?

CAP's history using GIS started with former Campus Archaeologist, Chris Stawski. It was later used by former Campus Archaeologist Katie Meyers Emery in her quest to locate prehistoric sites on campus. Some of our primary uses for maintaining a GIS database consist of keeping track of to where we have previously excavated. CAP has a project created with GIS that is an aerial image of campus with a layer of historical campus buildings and features that no longer exist. The ability to reference the location of these older buildings in comparison with the present day campus is useful for locating areas where we should focus future surveys and field schools. The GIS database is also a great tool to learn about MSU's archaeological landscape which is helpful in communication with other departments on campus. The visualizations we create using GIS allow us to show departments such as Landscaping and Infrastructure, Planning and Facilities areas of high sensitivity so that we can work together to preserve MSU's heritage.

Wheatley, David, and Mark Gillings. Spatial Technology and Archaeology: The Archaeological Applications of GIS. Taylor & Francis, New York/London, 2002.