REVITALIZING THE PAST: APPLYING GIS TO ORPHANED ARCHAEOLOGICAL COLLECTIONS AT ANTELOPE VALLEY COLLEGE

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The prevalence of orphaned archaeological collections has warranted widespread discussion regarding their research potential. Due to the gap in time between in-field and post-field practices, a multitude of challenges exist. At Antelope Valley College (AVC), most collections were excavated over 50 years ago, from throughout the western Mojave Desert. Site collections range in terms of their documentation, level of analysis, and overall lack of publication. With a recent department focus on orphaned collections, AVC students have worked to revitalize the documentation of these collections by digitizing sites into ArcGIS from topographic maps to provide a more comprehensive picture of the spatial distribution of hunting-gathering focused procurement systems in the western Mojave region. Methods for digitizing site data include reviewing site documentation and categorizing sites into various activity/habitation types prior to plotting their location in ArcGIS. Spatial analysis tools were used to understand the distribution of settlement patterns across the landscape and their association to varied resources and environments. The results of this analysis contribute new insights to our current understanding of how past peoples organized and occupied the prehistoric landscape of the western Mojave Desert. This article presents the process and importance of revisiting orphaned archaeological collections with new methods, technologies, and paradigms.

AVC ARCHAEOLOGICAL COLLECTIONS

AVC archaeological excavations took place between 1969 and 2006 (Figure 1). A total of 322 sites have been documented by the AVC Anthropology Department. Excavations and recoveries from these sites vary in complexity and the quantity of cultural materials. Accordingly, documentation of the sites further ranges in terms of quality, context, and overall organization, making it extremely difficult to understand the relationships between sites throughout the Antelope Valley.

Methods

The set of methods for this project were twofold: (1) digitizing the data and (2) examining the data through spatial analysis tools in ArcGIS. Methods for digitizing AVC site data included a step-by-step plan that first involved scanning physical site records from all previously documented AVC site locations throughout the Antelope Valley (Figure 2). Previous methods of documenting site locations used the Public Lands Survey System (PLSS) wherein sites were plotted based on township, range, and section to the smallest quarter section, which did not provide exact locations. In order to convert township and range data, we overlaid historical topographic maps (https://ngmdb.usgs.gov/ngmdb/ngmdb_home.html) into ArcGIS to obtain the UTM coordinates for AVC sites.

Figure 1. Antelope Valley field crew, 1983.

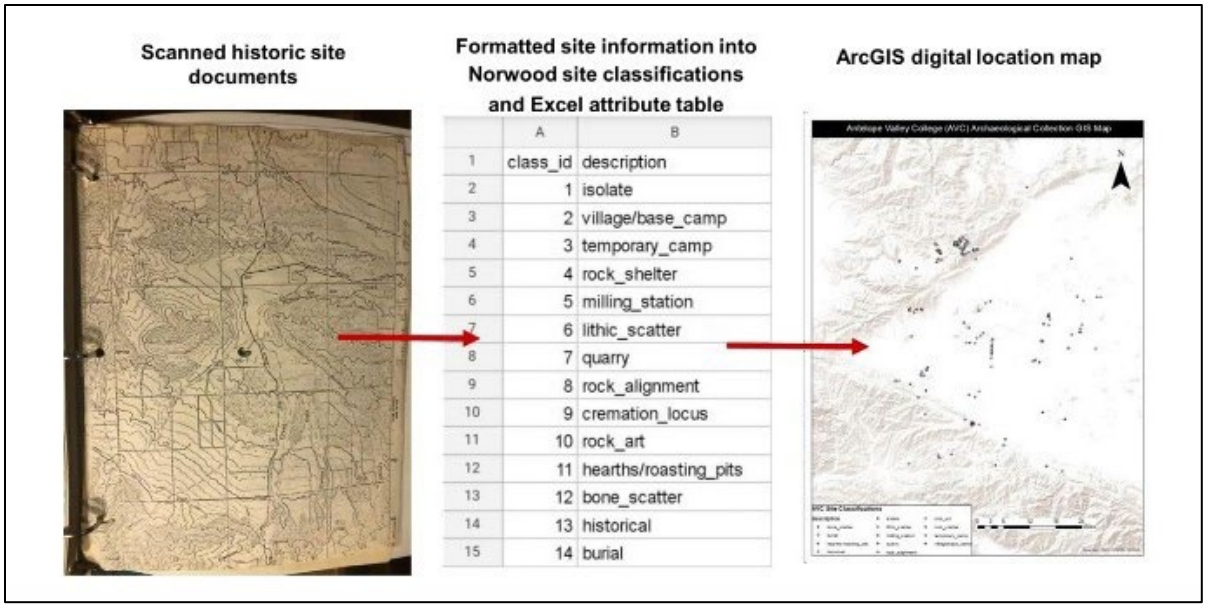

Figure 2. Methodology outline.

We then reviewed original AVC documents to assign each site a specific type based on Norwood's (1987) site classifications. These classifications included: isolate, village/base camp, temporary camp, rock shelter, milling station, lithic scatter, quarry, rock alignment, cremation locus, rock art, hearths/roasting pits, and bone scatter. In order to accommodate the diverse site types excavated by AVC, we added two additional classifications: historical and burial sites. Norwood's classifications were chosen because they denote the diverse nature of activities by native inhabitants of the western Mojave Desert. His work derives from early research at Edwards Air Force Base in which classifications were drawn from relevant site inventories. Site classifications include definitions which outline different attributes pertinent to the western Mojave. For example, when discussing a lithic scatter site type, Norwood (1987) described the local and non-local material

types, where flake scatters had been documented, heat-treating practices, and common reduction patterns. This level of detail proved to be important when designating site types to the collection of AVC sites.

Once site types were identified, we compiled an attribute table listing locational data, AVC site numbers, and their type in Excel. The attribute table was then imported into ArcGIS and a color-coded site map was generated based on the different types of sites. This color-coded site map was made to visually represent what types of AVC sites were distributed across the western Mojave.

Hotspot Analysis

With all AVC sites now mapped in ArcGIS, we observed a clustering of different sites in the Tehachapi region. We hypothesize that these sites are not independent of one another, rather their close proximity and range of activities suggest an organized system of land-use patterns.

To visualize the clustering of sites in the Tehachapi region, we used the "Hot Spot Analysis Tool" within ArcGIS to identify the density of sites in the area. Upon further examination of the site records, all site types outlined by Norwood (#1-#12) were identified in this region (Figure 3). The results of the Hot Spot analysis helped to support our hypothesis that the clustering of Tehachapi sites could be considered a large occupational zone, comprised of varied economic and social practices.

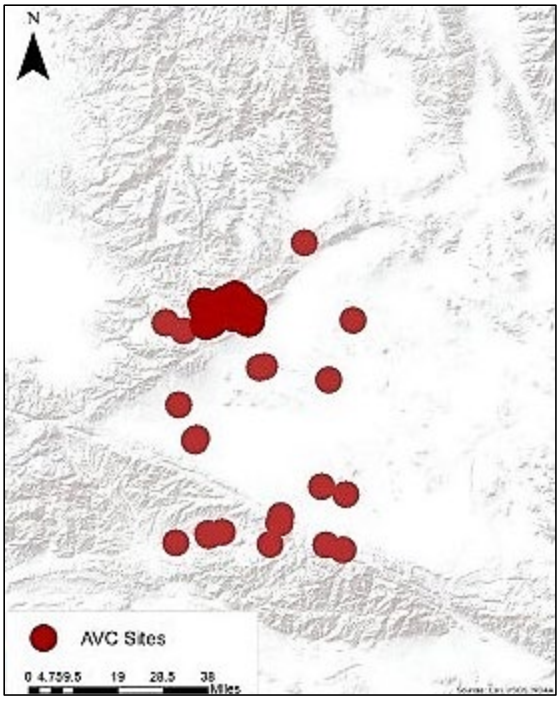

Figure 3. Hotspot analysis results map.

Lithic Resources

In order to create a map of the lithic resources available in the Tehachapi region, we used the USGS California Geologic Map Data (U.S. Geological Survey 2020) and the Obsidian Source Catalog Maps of

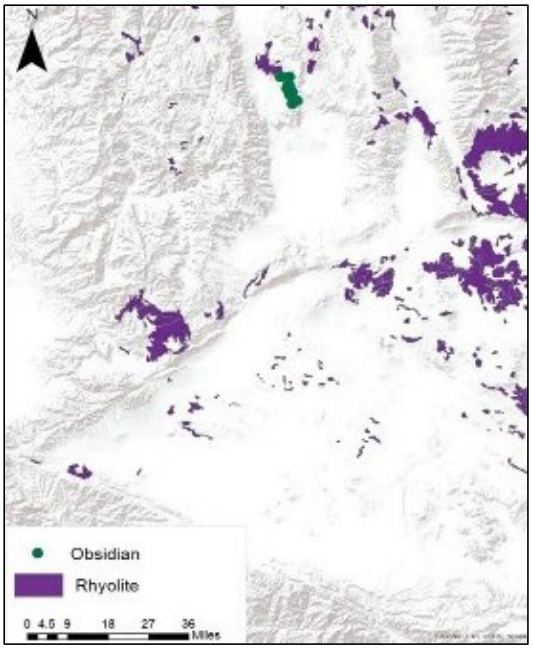

Figure 4. Lithic resources map.

Northwest Research Obsidian Studies Laboratory (2020). We identified the locations of obsidian and rhyolite lithic resources, both of which have been documented at various sites within the region (Figure 4). The closest obsidian resource found in this area is in Ridgecrest, California, about 60 miles northeast, while rhyolite was noted directly within the Tehachapi Mountains. Rhyolite is known to be a utilitarian toolstone because of its accessibility (Scharlotta 2014:239).

Rhyolite could have been a substantial resource to native people and its availability may be one of the reasons for the Tehachapi site clustering. Based on AVC site documentation, there are two quarry sites within the Tehachapi Mountain region: CA-KER-1732 (AVC-217) and CA-KER-1748 (AVC-233). Both of these sites contained dense lithic scatters with flakes representative of different lithic reduction stages, cores, and only a few complete tools.

It should be noted that within the clustering of the AVC Tehachapi sites is a large village site known as Cottonwood Creek (CA-KER-303, AVC-10). The site was excavated between 1971 and 1976 by AVC students. Sutton (2016:269) described it as a "large, complex village indicative of permanent settlement." The site has a very high diversity of artifacts, including shell beads, numerous steatite artifacts, and hundreds of projectile points (Sutton 2016:271). Also documented at Cottonwood Creek is a large cemetery postulated to hold as many as 100 individuals. Other features at Cottonwood Creek include dozens of hearths, a large, dark, and greasy midden deposit, and "wickiup-like structures." Based on AVC catalogs for Cottonwood Creek, a variety of rhyolite artifacts was documented, including projectile points, bifacially worked tools, various flake tools, numerous cores, and debitage. It is likely that this village, as well as other clustered sites in the Tehachapi area, were supported by the local supply of rhyolite.

Take Away Message

Applying GIS to AVC's orphaned collections allows for a better understanding of the varied types of previously excavated archaeological sites within the Antelope Valley. By creating a digitized record, spatial analysis tools can be employed by researchers to view land-use patterns. The use of these spatial analysis tools allows for a better understanding of past settlement patterns that were organized and occupied across the Antelope Valley and of how these settlements can correlate with variable resources that would have been utilized by native peoples.

This preliminary analysis of the Tehachapi site clustering provides important data regarding the correlation between site density and habitation complexity. Regarding the AVC sites, it is important to keep in mind that site sampling biases or other factors concerning objective recording always need to be taken into consideration. The gap between excavation and analysis is exponentially important and has proven to be challenging in attempts to render conclusions regarding the prehistory of the Antelope Valley.

This project serves as an example of how to use locational data from orphaned collections. By revisiting these collections with new methods and technologies, important information regarding the AVC archaeological collections can be more accessible and better understood.

ACKNOWLEDGEMENTS

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