ABSTRACT

This thesis uses a geographic information system (GIS) to demonstrate spatial analysis techniques in order to examine changes to a prehistoric society of Native American Wappo dating from 2450 to 1950 years before present (BP) from the Upper Archaic Period in the Napa Valley of California. This cemetery was excavated by Pacific Legacy Inc., a private cultural resources management firm, in compliance with the National Historic Preservation Act (NHPA) and the California Environmental Quality Act (CEQA) for a flood control project. While Pacific Legacy Inc. analyzed the burials on an individual basis, they did not conduct a spatial analysis. They incorporated their data into a simple spreadsheet to look for patterns. This thesis serves as a complimentary spatial examination of the burials based on spatial data. The dataset is incomplete as it was not collected using a consistent, systematic methodology. Additional burials related to the dataset had also been removed from the site before excavation by erosion and other archaeological excavations. This paper demonstrates select spatial analysis techniques using this dataset as an example. This thesis examines the distribution of the burials within the cemetery to identify spatial patterns based on burial attributes and artifact distribution. Spatial autocorrelation, cluster analysis, and grouping analysis focus on identifying burial clusters and individual burial outliers. A form of interpolation known as kriging was used to estimate the dates for the burials that were not subjected to Accelerator Mass Spectrometry (AMS) Radiocarbon dating. The burials were then grouped into corresponding date ranges covering one hundred year time spans. This experimental study allows for identification of changes to society by analyzing the change in burial attributes and artifact types over the course of the Upper Archaic Period. Due to the incomplete nature of the dataset, only two conclusions could be reached with the remaining findings considered suggestive. There is clustering based on bone preservation and the spatial analysis results tend to vary depending on different excavation techniques. Possible clustering of depth, wealth diversity index, directly associated shell beads, and directly associated pendants may reflect certain aspects of ancient society. The possible clustering of artifact association, total tools, tool diversity index, indirectly associated bifaces, indirectly associated edge-modified flakes, indirectly associated unifaces, and indirectly associated pestles can likely be explained due to differing excavation techniques. Possible clustering of natural obsidian needles may be explained as naturally occurring in the soil. Dental caries were found to be possibly dispersed, which is likely just a random occurrence. The experimental radiocarbon date interpolation allowed for an examination of changes to CA-NAP- 399 over a five hundred year period. Thus results from the analyses in this report should not be seen as definitive nor should they be used as foundations for further archaeological analysis. The main purpose here is to demonstrate how spatial analysis may be used with data of this type.