GETTING AROUND THEORETICAL ROADBLOCKS IN CULTURAL LANDSCAPE RECONSTRUCTION

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ABSTRACT

The body of existing CRM field inspection and testing reports which exist as "gray literature" can be a prime resource for the reconstruction of regional prehistoric cultural landscapes. These endeavors are not without pitfalls, however, and this paper points out and lists ways of getting through such problems as sample size and accuracy, dealing with "persistent place" sites, temporal control, distribution analysis, and establishing and testing expectations concerning environmental versus cultural change over time. The experiences discussed in this paper were gained while conducting dissertation research using 431 prehistoric sites, 1119 obsidian hydration readings, and radiocarbon data to reconstruct and explain temporal changes in settlement patterns in and around the Clear Lake Basin of northern California.

Introduction

The cultural landscape concept, or the attempted reconstruction of a past people's perception of their world, environment, and economic choices, may not be possible. However, it is possible to reconstruct their settlement system, the general ecosystem of which they were a part, and, at least on a large group level, the economic system which allowed them to subsist. Such reconstructions will run into several problems and biases both in the archaeological record itself and in the way archaeologists gather information.

Environmental Reconstruction

In most regions, research by biologists and geologists can be used to get a good picture of the prehistoric environment and ecosystem which was in place during the period, or periods, of study. Pollen cores have been taken and analyzed from most regions around California, and climatologists interested in environmental change during the past 10,000 years have recorded vast amounts of information. In most regions, it will not be possible to paint an acre-by-acre picture of ecozones and plant communities. However, it is usually possible to reconstruct regional environmental trends over time. In cultural landscape studies which focus on cultural change, general environmental trends over time are essential pieces of the puzzle.

Most of this information can be found in US Geological Survey publications and in the geology libraries of your local university.

Settlement Pattern Reconstruction

Site Distribution Analysis

In exploratory data analysis (Read 1985:60-86), site distribution analysis is essential in discovering patterns inherent in the data. In dealing with prehistoric sites, locational cluster analysis combined with intuitive clustering can be used to break up a large regional data set into smaller homogeneous groups of sites which may be clustered along drainages, ridge tops, along lakeshores, or in upland or lowland valleys. These clusters will often represent the whims of the prehistoric inhabitants (see Figures 1 and 2 for examples).

Many archaeologists run into trouble by speculating or developing ideas about the cultural past before doing the exploratory data

analysis. These preconceived notions often cause the investigator to collect data in a biased way. On such data sets, the statistical analysis does nothing more than support the preconceived bias. This concept was pointed out to me years ago by Martin Baumhoff (1981) when he said, "Don't superimpose your arbitrary labels on the data, let the data show you its own structure." Of course, at the same time he was telling me this, he was breaking sites up into arbitrary groupings which he called "camps, hamlets, and villages."

Once inherent, geographic clusters of site locations have been established, then other exploratory techniques (e.g. period of use, site area) can be applied to the resources in each cluster to further divide the data set into smaller and more meaningful groups. For example, statistically significant size categories of lakeshore sites can be compared to those of upland sites to arrive at meaningful hypotheses concerning the number of inhabitants, resource extraction, site use, and seasonal mobility. At each level of statistical exploration, new groupings or clusters of data come to light. Some of these data clusters will represent the decisions of the prehistoric people, and some will represent the background noise inherent in the archaeological record. The trick is to be able to distinguish between the two.

The following discussion will outline some of the problems and solutions in this endeavor.

Remnant Settlement Pattern

The researcher attempting to reconstruct a prehistoric settlement pattern must never lose sight of the fact that all that's left to discover is a remnant of the original settlement system (Groube 1981, Moseley 1983, Dewar and McBride 1992). Les Groube (1981:188-189) talks about holes in the data:

A Crater is a hole in the data caused by natural or human activities which occurred after the site was abandoned (e.g. sites unobservable during field inspections due to silt overburden, erosion, or other destructive activities).

A Bias Hole is a lack of data due to inadequate sampling by the archaeologist (e.g. large regions which have never been inspected).

A Black Hole is a culturally significant absence of archaeological data caused by the original activities of the prehistoric people being studied (e.g. a cultural "no-mans-land" between two groups who didn't get along).

These "holes" in the data are just a few examples of the data-related problems and biases which reconstructions of prehistoric settlement patterns run into. Some of the following solutions will help to identify which holes occur in the data.

Sample Size and Accuracy

Problem

Unless you are going to personally walk thousands of acres and record hundreds of sites, you will probably end up using the results of field work conducted by other archaeologists. This is where the CRM inventory gray literature can be utilized. Depending on the area, you may have to utilize field work done by many different researchers. The implications should be obvious: all archaeologists bring different biases with them to the field, differences in field coverage, in how sites or non-sites are perceived, recording techniques, and in determining site size. All of these variations and biases distort the collected archaeological data.

During my dissertation research, I reviewed all CRM inventory reports for the Clear Lake Basin. For my particular project, I decided that I could only use those studies which actually:

(1) listed the exact number of acres inventoried;
(2) where only intensive walk-over inspections had been conducted; and
(3) where the location and size of each cultural resource had been recorded.

Out of 371 reports only 133 passed these three requirements (Parker 1994:111-112). The

studies had been conducted by 35 different archaeologists.

Histograms of site size for sites recorded by the 35 archaeologists indicated statistically unprecedented numbers of sites which fell within the 20 x 30, 30 x 30, 40 x 40, and 50 x 50 meter size range. The statistical improbability of so many sites falling into such "regular" size ranges indicated that the field person was visually "guessing" at site size and putting a "convenient" number on the field form (Parker 1994:136). (See Figure 3.)

Fix

If a large and diverse region is the focus of your cultural landscape study, the location and amount of area covered by each inventory report must be plotted to insure that adequate coverage is available for all geographical and ecological zones. Of course, plotting survey areas is routinely done at the Information Centers, so this data is readily available.

It may be necessary to conduct field work in areas which are under-represented. It will definitely be necessary to double check a sample of those areas which had been inspected to determine accuracy of reports. If site size is a critical component of your study, some sites may need to be rechecked in the field. This work can control for some of the bias holes mentioned earlier.

Even without going into the field, a disparity in the amount of survey coverage in different environmental/geographic zones can be controlled for by calculating the number of sites per sq. km. of area surveyed for each zone. These calculations can provide site densities for each zone which may indicate the prehistoric importance of each zone to the people using them (see Table 1).

Persistent Place Sites

Problem

If site size or changes in settlement pattern over time is a focus in your study, you will run into the problem of "Persistent Place Sites." These are areas of favored human habitation through several time periods due to the popularity of a geographic location, proximity to critical resources, etc. (Schlanger 1992). Persistent place sites are often extremely large. In my research area, any sites greater than 10,000 to 20,000 sq. meters turned out to be persistent place sites. The largest, single component "village" sites were in the 8,000 sq. meter size range.

The persistent place problem prompted Dewar and McBride (1992:229) to state that "it is wrong to link settlement size with settlement type." They point to the obvious fact that a single site may represent several occupations.

Fix

It may be possible, through the use of multiple radiocarbon or hydration readings, to sort out the various periods of use of a persistent place site. However, determining the size of the site during each use period is not possible without extensive field work and analysis (usually cost prohibitive for most regional studies).

For this reason, persistent place site locations can be used in reconstructions of settlement pattern change over time; however, it is probably wise to drop these sites from regional site size analysis so they don't skew the data.

Temporal Control

Problem

Expense is probably the biggest problem facing the archaeologist who wants to shed light on temporal changes in a large regional cultural landscape. Whether the focus is looking at the cultural landscape during a single time period or changes in the cultural landscape through time, temporal control is essential. The good news is, temporal control is possible. The bad news is, it's very expensive.

Fix

During a study of 431 sites, I was able to secure 1119 obsidian hydration samples from 100 of the sites. Using Jones and Beck's work (1992:182), I found that a reasonably good idea of the different time periods of use for each site

could be obtained with a minimum of 5 samples per site (see Figure 4). Hydration is probably the least expensive of the methods available to determine period of use. If I were forced to obtain 5 radiocarbon samples for each site, the temporal control portion of my study would have cost a minimum of $125,000.

In the Clear Lake Basin study, I was able to increase the number of datable sites slightly by using diagnostic artifacts and a few radiocarbon dates. However, only one or two use periods could be identified for these sites, rather than the whole range of periods gathered through the use of hydration. In California, diagnostic artifacts alone will not be sufficient for any detailed temporal control on site use. This is due to the relatively long, and sometimes open ended, time spans of most "diagnostic" materials.

Testing Environmentally vs Culturally-Motivated Change Over Time

Problem

Most archaeologists have a "cultural" bias and want to find a *cultural* reason for a perceived change in technology or settlement system over time. I was no different when I began my 17 year study of the Clear Lake Basin cultural landscape.

Fix

Several steps are necessary to avoid biases, even your own. The first step is to *dump* your preconceived notions, and then back this up by collecting, reviewing, and analyzing the various data sets separately. Chances are that your preconceived notions were derived from the work of others who had their own biases affecting their judgment.

Forget everything you think you know about the paleoenvironment and environmental changes which occurred in your study area. Go to the geology, biology, and climatology departments and library sections and reconstruct this information from the primary sources.

Then, *forget* everything you think you know about changes in prehistoric technology over time in your region. *Dump* all those "convenient" cultural historical handles such as "early, middle, late" which may have been useful in the 1950s and 60s, and start with an unbiased blank page.

Then *use* a cultural anthropological theory such as cultural ecology, least cost, or other economic models to retrodict (see Note) the initial occupation, population growth and change in your region. Such models can also be used to retrodict the technological changes one might expect to find as a response to, or in concert with, changing environment, population, etc.

Blindly, using theory and paleoenvironmental data, put together a list of archaeological expectations for each time period, environmental change, and ecological landscape (e.g. where should sites be, what resources used, technology expected).

Then, go to the existing archaeological record of technological change, and your regional exploratory data analysis (which has sites sorted out into meaningful groupings). Don't go to the "bias laden" synthesis of your area, but go to the original site reports which discovered and quantified the technological items. Compare your theoretical expectations with the reality of the existing archaeological record.

In my case, even after working in the region for 15 years, I was surprised by periods during which I expected cultural change when none had occurred, periods when I expected population shifts and discovered none, and yes, even periods when the changes I expected were more dramatic than I had guessed.

Conclusion

There are theoretical difficulties to overcome which may force you to dump much of your current belief about the region you are studying. This research may also put you at odds with the ideas of other researchers in your area, most of whom have spent years looking at a single tree (or site) and haven't realized that they were standing in a forest.

However, cultural landscape reconstruction is possible, is a fascinating area of study, is one

of the few research efforts which can utilize the existing gray literature derived from CRM work, and can provide the backbone for specific and focused studies on regional cultural process and change. It often provides a fresh approach which goes far beyond the "historical reconstruction" which is still the dominant focus of research in most areas.

Note

"Retrodict" is a term which refers to the hypothesis construction work that prehistorians (and sometimes historians) conduct. Just as the term "predict" refers to a guess about what will happen in the future based on some existing information, retrodict refers to a guess about what happened in the past based on existing information (e.g. the archaeological record).

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Table 1. Example of determining regional site densities based on unequal field survey coverage.

Zone	Hectares Surveyed	# of sites	Density (sites/100 h)
I	1,809.1	117	6.46
II	2,909.89	41	1.40
III	9,022.7	128	1.41

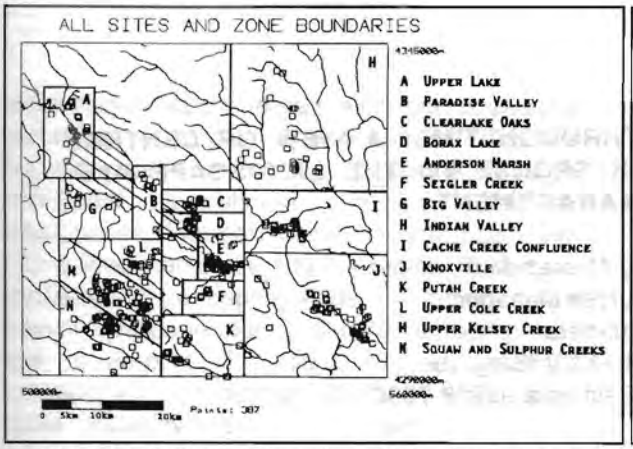

Figure 1: Intuitive Clustering of Sites by Location

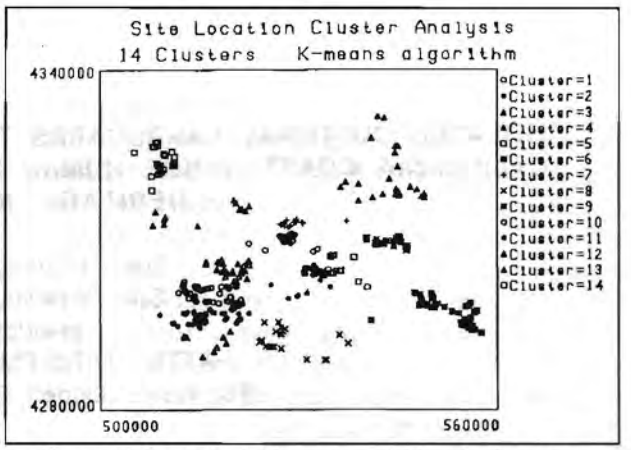

Figure 2: Statistical Clustering of Sites by Location

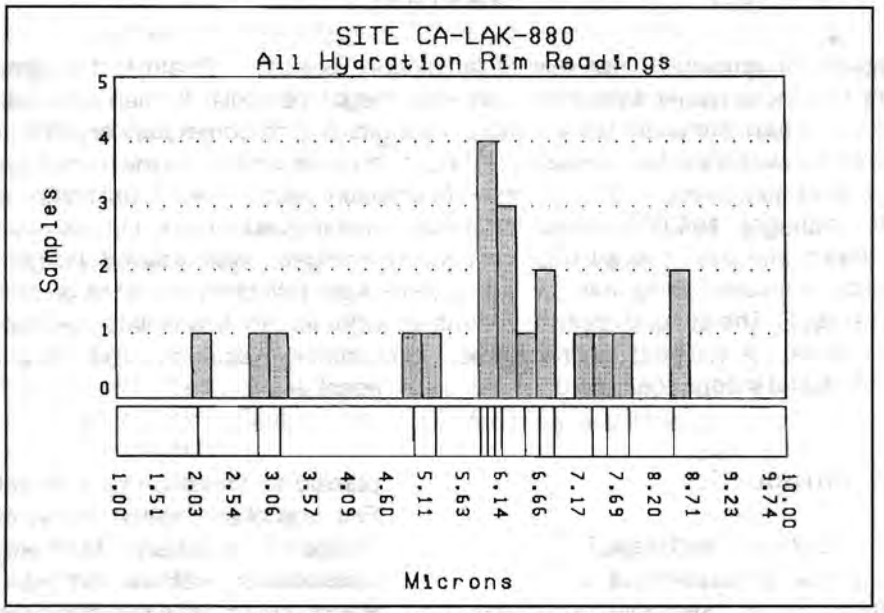

Figure 3: Size Bias Introduced by Poor Site Recording

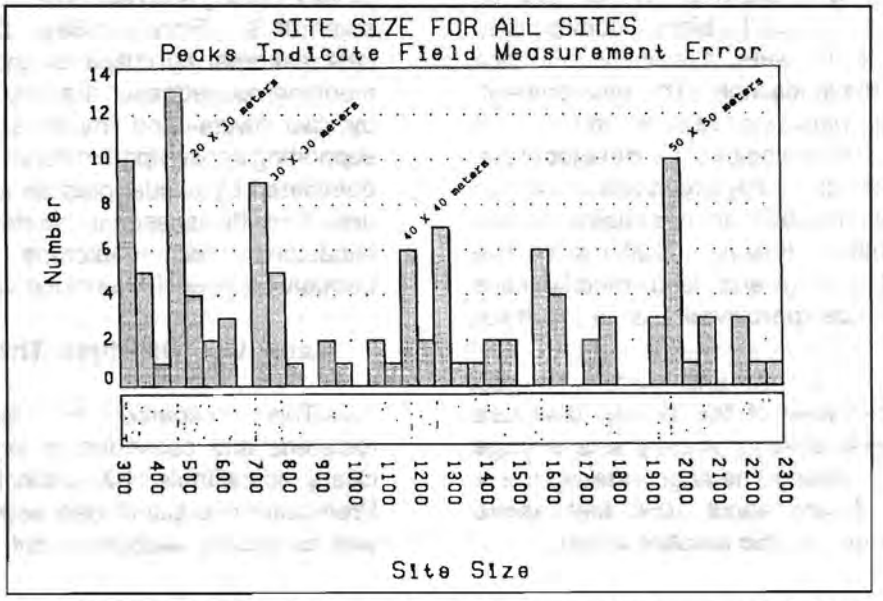

Figure 4: Multiple Hydration Readings Provide Evidence of Different periods of Site Use