‘Scapes: Inserting Culture in Prehistoric Landscapes

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Abstract

There has long been a reciprocal exchange of ideas and technologies between Geography and archaeology. The spatial nature and material focus of archaeology makes it an ideal discipline in which to apply and test many geographical methods and techniques. Likewise the insight into culture, both past and present, is very pertinent to many geography interpretations. Over the last two decades, as the focus on landscape in archaeology has moved from a fringe consideration to a widespread area of inquiry, discussion has focused on particular activities or features within the landscape. By looking at these specific topics it has been possible for archaeologists to drill deeper than traditional holistic perspectives and interpret details within the landscape. This paper will give examples of three of these specific ‘scapes’ including taskscapes, viewscapes, and resourcescapes, and how these can be used to support a holistic interpretation of landscape.

Introduction

At the base of any archaeology or GIS project is the need for data. In the case of studying past cultural landscapes it is the role of archaeology to provide data regarding locations of habitations, raw materials, symbolic or sacred features in the landscape, workshop areas, refuse deposits, and even stand alone finds. Each piece of data that is available, whether material object or extant feature, for a given area will help create a more fully realized model or interpretation of the landscape that is in consideration. At first the role of the GIS in archaeology appears to be that of a repository, a database, for the archaeological and related data. However, GIS provides much more than the database functionality through its visualization and cartographic tools, data analysis tools and algorithms, and even through its simplest querying functionality. By allowing several sources of data to be viewed concurrently, in an exploratory manner, new questions often arise about relationships in the data that are not seen in separate data sets, but seemingly jump out at the researcher when either viewed or modeled in tandem.

Geospatial technologies have been used in archaeology for decades beginning with the use of remotely sensed images such as aerial photographs in the search for and mapping of archaeological sites and features (Deuel 1969). Geographic concepts in archaeology go back even further with Carl Sauer's work and early influence on Cultural Geography (Sauer 1925). Truly, archaeology's basic data collection is tightly bound with spatial measurements of in-the-field recording of sites and excavations and even extends beyond traditional 2D surface mapping into the third dimension as measurements in excavations extend subsurface and extant features are measured above ground level. These forms of spatial information, whether referred to as location, place, space, landscape, or even data all amount to information that fits well within a GIS. Over the last twenty years archaeologists and GIScientists have outlined how the culturally relevant location data from archaeological surveys and excavations can be used in a multitude of ways (Allen et. al. 1990, Lock and Stancic 1995, Lock 2000, Wescott and Brandon 2000, Gillings and Wheatley 2002).

From predictive models to intrasite analysis, GIS has been adapted to support archaeological investigations to a mix of great success and disappointment. While the successes are readily attributable to the spatial nature of most archaeological information, the disappointments are often related to a lack of understanding of issues, technical and methodological, that are inherent in GIS. Lock and Molyneaux's (2008) recent text, for example, focuses on one of the most overlooked issues in dealing with spatial information, the impact of scale. Scale related issues such as the Modifiable Areal Unit Problem, ecological fallacy, or others must be understood to be avoided or to at least understand how they impact the use of GIS at large. This is not to suggest that Geographic Information Systems and the data used in a GIS are unavoidably flawed. Instead it is to state that users of any methodology, technique,

technology, or tool must first understand the strengths and weaknesses of their chosen approach to gain the optimal results.

In the case of studying landscapes or similar cultural phenomena GIS has one unavoidable issue, the lack of techniques for analyzing qualitative information. Whether this qualitative information is field data such as photos and field notes, or associated research such as a literature review of local sites it is possible to store the information but GIScientists are just beginning to approach the spatial analysis of text, images, audio and other qualitative data sources using GIS applications (Bodenhamer et al forthcoming). It is possible to address this issue through the loose coupling of qualitative analysis packages with GIS, but this remains a kludge at best. Therefore it is necessary, for spatial analysis purposes, to focus on the location and attribute information within the GIS, however this should be done in tandem with the archaeologists' expert knowledge of qualitative and aspatial information that is not currently supported in GIS software packages.

Within the study of prehistoric landscapes, the depth of inquiry tied to specific activities is limited due to the lack of direct observation. Through the use of ethnoarchaeology, ethnography, and existing spatial models of human/environment interaction, we can address some of the challenges in studying prehistoric landscapes and postulate possible and even, in some cases, probable scenarios of activities within a cultural landscape. A few of the aspects of cultural activities that have been modeled within a landscape and discussed in the literature include resourcescapes (Rouse forthcoming), taskscapes (Ingold 1993) and visualscapes (Llobera 2003). Each of these 'scapes' is tied to how people interact with specific objects or features within a landscape. For example, in order to create a tool such as a pot there are certain materials that are required to begin. The potter must have an appropriate source of clay, a tempering

agent, wood to build a fire, any materials needed for decoration, and so on. Each resource must be acquired before the potter can begin. While the specific cognitive processes of the potter cannot be modeled, the location of sources for the required materials can be mapped. From the locations of the materials it is possible to consider the optimal path, the best sources, or the route that might serve additional needs (e.g., foraging). This example of what might be referred to as a 'resourcescape' and how we might build models and interpretations around them is simplistic, but shows the potential of integrating archaeology's focus on material culture with the spatial modeling capabilities of GIS.

Role of 'scapes

The availability of GIS, as suggested above, has had a significant impact on archaeologists' ability to look broadly at past cultural landscapes and to drill down to look at specific aspects of activity and interaction within landscapes. The GIS technology provides a conduit for the spatial data that is acquired through archaeological fieldwork and the spatial analyses and modeling techniques that have been developed by archaeologists, geographers and others over the last century and incorporated into modern software.

The concept of a taskscape was proposed by Ingold (1993) in his consideration of the temporality of landscape. In his description of the concept of a *taskscape,* Ingold (1993) states that "tasks are the constitutive acts of dwelling" (158), those activities that are conducted within a social context of life and a "taskscape is an array of related activities" (158). Taskscapes, then, are the sequence of acts that are conducted individually or by a group as part of dwelling. These taskscapes can be specific or broad, encompassing a range of activities from a daily task such as hunting or gathering to rituals such as burial or mound building. The role of spatial analyses in

understanding movement related to tasks such as agriculture has been outlined in texts such as *The Early Mesoamerican Village* (Flannery 1976). Flannery (1976) looked at the role of *site catchments* to discuss how far villagers are likely to travel for various activities. It was determined that the area within 2.5 kilometers (km) of the village could support the agricultural needs of the community, the area within 5km could have supported most of the mineral resources, and the range for hunters could have extended as far as 15km from the village. In an exploratory approach that questioned how far away materials have traveled to arrive within a given village, specific quarries and similar material sites that are further away were connected to other tasks such as knapping, pottery making, and etc. Through such analyses, Flannery and others have been able to compare material remains uncovered through excavation to determine the type of physical environment and area required to support a population and show areas that were likely used for various tasks.

An example of defining a taskscape is the creation of shell mound features. In the building of a shell mound a known material (i.e. shellfish) is required which has a limited area of availability. The connection to a water feature then is self evident, as shellfish are a marine animal. The purpose of the shell is also known, the remains of foodstuffs. Over time as shellfish are collected and processed, the mussel removed, and the shells deposited in a single location, the mound grows. While there are different methods of deposit that create different sizes and shapes of shell mounds (generally with a regional variation), the taskscape remains mostly the same: collect shellfish in the water feature (river, ocean, lake, etc), take to processing area (to be smoked open, cracked, etc), and pile remaining shells in a designated area (Figure 1). The activity of building a shell mound is also tied to the task of procuring foodstuffs. The interconnection or intersecting of taskscapes generally occurs within a landscape of interest;

however it is also possible for a taskscape to have portions that fall outside of the landscape being studied. An example of this might include the trade of the shell remains with groups outside of the landscape or of other materials, not available in the local landscape, being traded into the area.

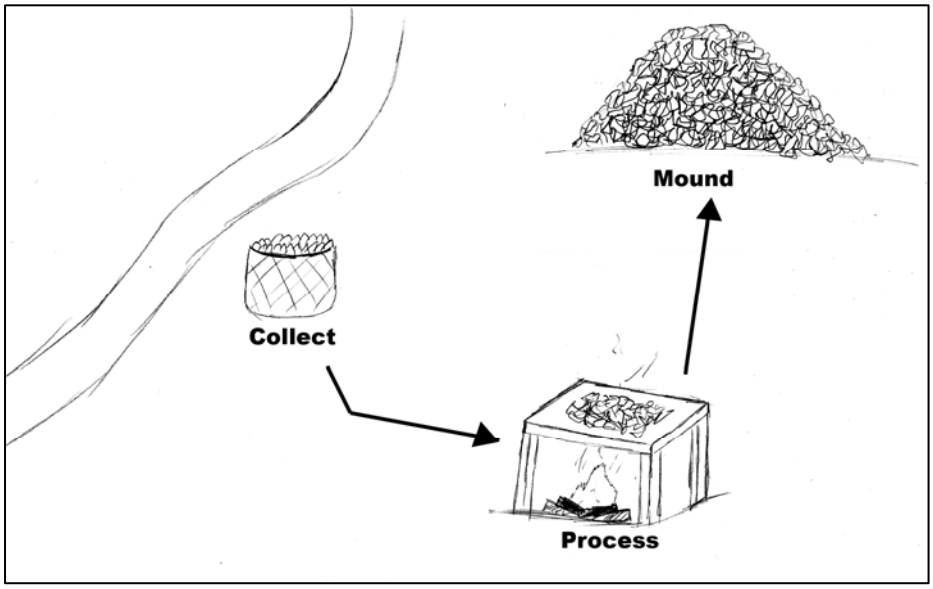

Figure 1. Interconnected tasks

Through archaeological data it possible to locate activity areas such as shell mounds, processing areas, and possibly even shellfish harvesting locations. By bringing this data into a GIS it is possible to look for likely routes between these areas to outline the taskscape. Adding the outline of the taskscape to other identified taskscapes it to possible to begin looking at broader movements and connections within the cultural landscape. The ability to conduct spatial analyses on the available spatial and cultural data within a GIS allows for new insights to be garnered more rapidly than ever before.

Just as tasks can be used to define an area of interest through the movement and activities related to the tasks, what is visible within an area can also outline a landscape. The utility of viewshed, intervisibility, or isovist analyses in delineating areas visible from one or more points can be used to better understand a range of issues within a cultural landscape. As has been discussed elsewhere (Rouse 2004), the use of visibility metrics such as simple viewsheds or

more complex indices such as those proposed by the landscape architect Tadahiko Higuchi (1983) provide an approach to understanding features or objects within a landscape that may have had significance in the daily or sacred lives of prehistoric peoples. This concept has been formalized within GIScience by archaeologist Marcos Llobera (2003) who proposed the use of the term *visualscape* to refer to broader visibility issues within open landscapes, similar to the urban landscape concept of *isovist* (Benedikt 1979).

Llobera (2003) defines a visualscape as "the **spatial representation** of any **visual property** generated by, or associated with, a **spatial configuration**." (30, emphasis per original text) Just as there are different types of landscapes based on culture, physical features, or task, visualscapes vary by visual property. Llobera (2003) focuses on three visual properties in his discussion of visualscapes: cumulative (or total) viewsheds, visual prominence, and visual exposure. *Cumulative viewsheds* have been used as a way of determining areas that are commonly visible from different locations in a landscape (Wheatley 1995) and are the result of running viewshed analyses from multiple points of observation. *Visual prominence* is a measure of a given feature standing out against the surrounding area (neighborhood). Visually prominent features can act as territorial landmarks or navigational markers within a landscape (Llobera 2003). *Visual exposure* is a description of "how much of a feature or a terrain is visible at each location…" (Llobera 2003: 40)

Llobera's discussion of *visual angles* as part of measuring visual exposure focuses on how an object or feature is viewed as opposed to if it is visible or not. For example, from a distance, the portion of a view that a 10m tall earthen mound occupies is minimal and the angle from viewer to the apex of the mound is similarly small (Figure 2). The portion of a view that the mound would encompass when the observer is standing near the base of the mound would be

significant as would the angle from the viewer to apex of the mound (Figure 3). The ability to capture such a personal idea as a view and utilize it to understand cultural attachment to, or delineation of, a landscape is exciting. The process can be used to support a phenomenological understanding of the experience of landscape while also offering a semiotic approach to landscape studies by highlighting possible symbolic features.

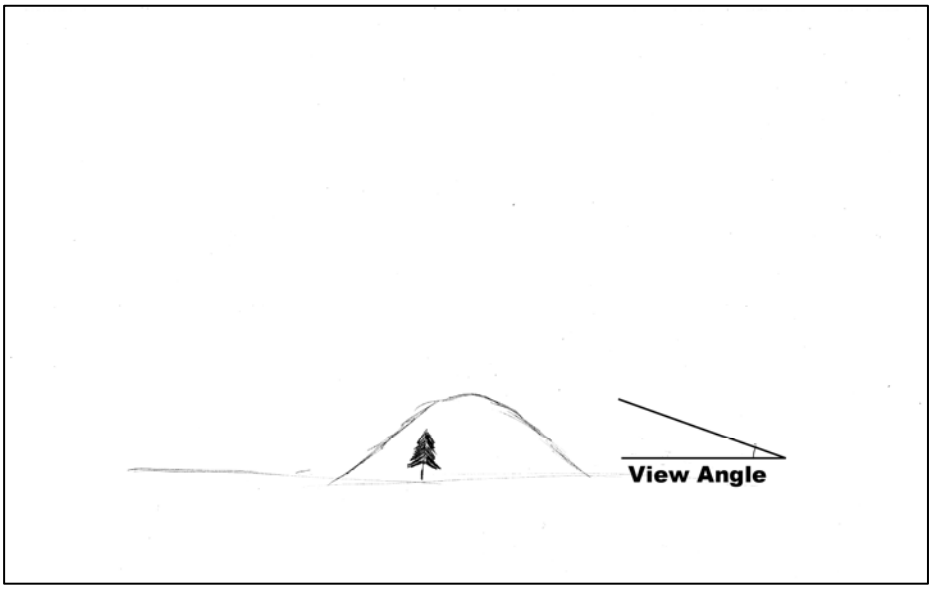

Figure 2. Feature in distance, small view angle

Connected to the delineation of a landscape based on tasks is the notion of a resourcescape. While delineation based on resources moves somewhat away from the cognitive landscapes of the taskscape and visualscape, it looks to known materials from archaeological finds. Whether raw materials or finished tools, these

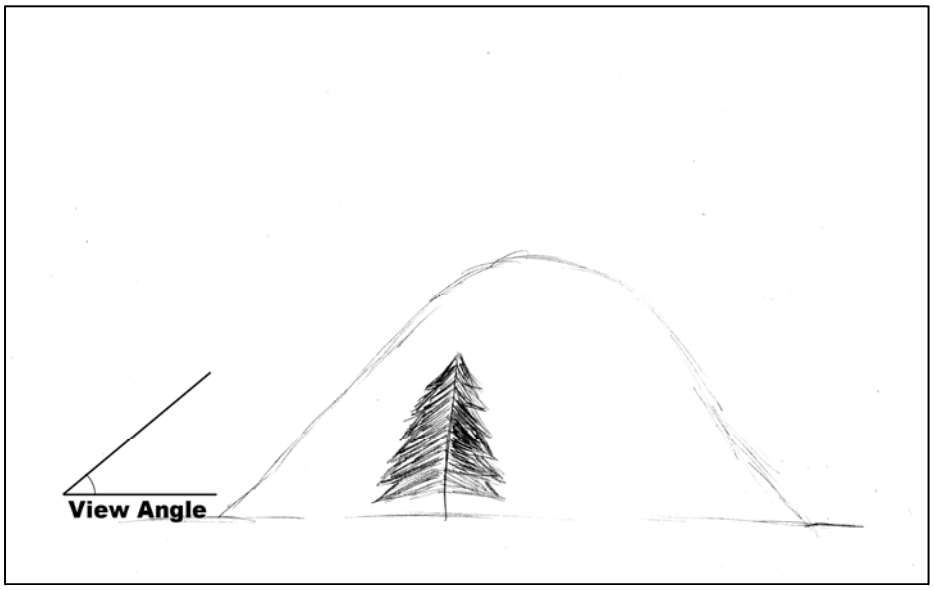

Figure 3. Close to feature, large view angle

resources can be used to find possible relationships within a cultural landscape. The example provided above focused on the acquisition of material resources need to construct pottery where the materials are separate from the task, and are instead considered with respect to how the locations of these resources are connected with each other and where the excavated artifact was recovered. Another example could revolve around the construction of an area of interest defined by the resources that were traded into a region. The Hopewell culture has exceptional examples of this phenomenon, as tools and ornaments made from conch from the Gulf of Mexico, mica from North Carolina, and other tools and resources from outside the region have been found in sites in southern Ohio.

A resourcescape, then, is a landscape defined by the relationship between recovered artifacts or features and their origin, either in terms of raw material or completed item. A refuse midden makes a strong example of a central feature of a resourcescape. A variety of materials can be found in a midden from food stuffs, to discarded lithic materials, to discarded ornaments. Each of these items have a source that may or may not be locatable to a point provenience, however a general map of the relationships between the materials' origin and their excavation

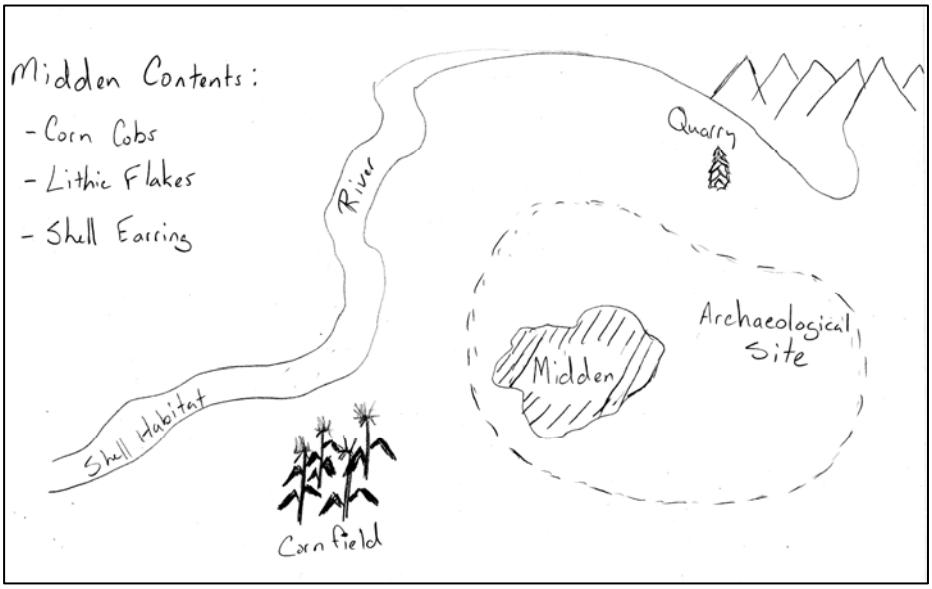

Figure 4. Resource locations.

location can be offered (Figure 4). Such a map could, as suggested above, then be used to delineate tasks that were tied to various resources.

In considering a taskscape or visualscape there are significant linkages to the prehistoric 'individual' since a task and a view are conducted by, at most a small group. A resourcescape is primarily a generalized geographic concept that does not focus on the human mechanism, but instead looks at the broader cultural or at least spatial relationships. However, each of these 'scapes', whether individual or cultural, offers potential information for use in interpreting a cultural landscape. As discussed above, GIS itself is built upon, and geared toward the use of, quantitative data, but it can be used to effectively support qualitative and cultural research. To bring the issue full circle, it is the ability to consider these deeper issues of landscapes, whether through tasks, views, or specific resources, that in turn allows for a better interpretation of the landscape as a whole.

Conclusion

Geographic Information Systems provide archaeologists the ability to both obtain a holistic perspective of a landscape *and* focus on specific issues and activities connected to the landscape. The spatial nature and material focus of archaeology play directly to the data focus of GIS and can readily take advantage of its analytical capabilities. By modeling specific connections to a landscape such as tasks conducted or visible area quantitative results can be derived to support the cultural interpretations of the area of interest. The contextual nature of a GIS is supported by the inclusion of new data and the use of the wealth of analytical functionality, just as the exploratory nature of cultural interpretations are supported by having access to a wealth of data

sources. Considering specific 'scapes' within the context of a holistic model of landscape new insights can be unearthed about past cultures.

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Note: This document outlines the conceptual underpinnings of the presentation given at the 2009 ESRI International User Conference in San Diego, CA. Detailed examples of the concepts discussed above modeled in ESRI software are available in the associated PowerPoint presentation accessible online at: http://www.jesserouse.com/presentations/esri2009

Additional information regarding this topic will be available in L. Jesse Rouse's dissertation available through West Virginia University's library website (http://www.libraries.wvu.edu) or by contacting Jesse Rouse directly (http://www.jesserouse.com/contact) in December 2009.