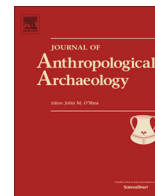




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Extrinsic site defensibility and landscape-based archaeological inference: An example from the Northwest Coast



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ABSTRACT

People make decisions in the context of their physical and social environments. Therefore, when inferring the choices that people may have made in the past, archaeologists should consider—to the extent possible—the environmental context(s) of decision making. In this paper, I attempt to build stronger inferences about the nature of defensive decision-making by characterizing the defensibility of a given landscape and treating it as a population from which a sample of archaeological sites may be considered. I develop a spatial defensibility index that may be calculated for any and all points on a raster landscape (a digital elevation model). I then calculate the defensibility of a large region in Gulf of Georgia and lower Fraser River valley of British Columbia, and assess the defensibility of a large sample of recorded pre- and post-contact archaeological sites in light of the baseline defensibility of the landscape. I find that while residential sites are generally built in more defensible places on the landscape, previously identified “defensive” sites (trench embankment sites) are not necessarily in *unusually* defensible places. These and similar methods ought to be employed whenever archaeologists attempt to infer defensive decision-making, and are essential for cross-cultural study of warfare and conflict.

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“I shall not today attempt further to define the kinds of material I understand to be embraced within that shorthand description; and perhaps I could never succeed in intelligibly doing so. But I know it when I see it, and the motion picture involved in this case is not that.”

— Justice Potter Stewart, *concurring opinion in Jacobellis v. Ohio* 378 U.S. 184 (1964), regarding whether the film *The Lovers* constituted “hard-core pornography.”

1. Introduction

The standard by which we as archaeologists have often judged defensiveness is similar to the way in which US Supreme Court Justice Potter Stewart judged hard-core pornography: we know it when we see it. And to a certain extent, we do. Inaccessible places with imposing or enclosing architecture are immediately recognizable as “unusual” to even the most amateur archaeologist; and, based on prior experience and our innate capacity for pattern recognition, we characterize those places as “defensive”. What is more, our descriptions and justifications of defensiveness in the

literature are not lacking in detail (cf. Maschner and Reedy-Maschner, 1998, 32–37). We amply describe what we see. But, just as Justice Stewart’s phrase is infamous in the context of a Supreme Court opinion (maybe unfairly so; Gewirtz, 1996), perhaps intuition should not qualify as the standard by which we make archaeological inference.¹

Recently, several archaeologists have attempted to better define defensiveness (several in the context of Northwest Coast archaeology; Sakaguchi et al., 2010; Martindale and Supernant, 2009; Jones, 2010; LeBlanc, 1999; Schaepe, 2006; Lambert, 2002). LeBlanc (1999, 55–74), in his volume on warfare in the US Southwest, outlined settlement pattern evidence for warfare² (LeBlanc, 1999, 55–56; see also Lambert, 2002, 209–210):

¹ A glossarial note: human may act *defensively* (an adverb), while a place or building is *defensible* (an adjective). An archaeologist sometimes infers *defensiveness*—the degree to which an action is defensive—by discussing the *defensibility* of a place. Places or structures themselves are not defensive, though the act of constructing them may be. This distinction has not been universally recognized, but I will adhere to it here.

² LeBlanc (1999, 7), following Meggitt (1977), defined warfare as “a state or period of armed hostility existing between politically autonomous communities, which at such times regard the actions (violent or otherwise) of their members against the opponents as legitimate expressions of the sovereign policy of the community”. Thus, some of the archaeological indicators of between-group hostility might not apply to smaller-scale feuding.

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1. Site configurations
 - Evidence for sites being planned and laid out for defense.
 - Evidence for sites increasing in size over time.
 - Evidence for smaller sites being abandoned before larger sites.
 - Evidence for rapid construction of sites.
2. Site on defensible landforms
 - Evidence that smaller sites are on more defensible landforms than larger sites.
 - Evidence for sites located to provide secure domestic water supplies.
3. Site distributions
 - Evidence for clustering with empty zones between clusters.
 - The sequence of site abandonment within clusters.
 - The sequence of cluster abandonment among clusters in a region.
4. Sites located for line-of-sight communication
 - Evidence that line-of-sight links were bounded and so define site alliances.

LeBlanc (1999) focused on aspects of defensive behavior as among the most archaeologically visible evidence for warfare. Settlements are designed to be defensible spaces and are located in defensible places; both are defensive responses to expected aggression. Furthermore, LeBlanc (1999) emphasized temporal trends in defensive behavior over time: sites become larger, settlement clusters become more separated, and sites and clusters are abandoned from least-defensible to most-defensible. Violence and defensiveness of the type that leaves an archaeological signal is not usually a local one-off event but a process of mutually reinforcing actions at a regional level.

Jones (2010) presented a GIS analysis of Iroquois settlement locations in which he operationalized several of the ideas outlined above. Jones (2010, Table 2) quantified the influence of defensibility as a function of site viewshed size, accessibility, and the presence of a palisade. Site viewshed, or the portion of the surrounding landscape visible from within or immediately adjacent to a settlement, is commonly considered an important aspect of landscape defensibility. People inhabiting settlements with large viewsheds are more likely to see an enemy approaching, and may be able to communicate visually with nearby allies to coordinate a defensive response. Viewshed size can be enhanced by constructing tall towers or large buildings. However, Kantner and Hobgood (2003) found that tower kivas at several sites in the US Southwest did not increase long-distance visibility, perhaps limiting peoples' ability to enhance visual communication networks for defense. Jones (2010, 7) also defined a binary measure of accessibility: settlement accessibility is "restricted" if over 50 percent of the settlement boundary is at a greater than 45 degree slope. Jones (2010, 10) used discriminant function analysis to weigh site defensibility against other geospatial indices and found that, when Iroquois villages were compared to random points on the landscape, defensibility was not a significant factor in village placement.

Several archaeologists working in the Northwest Coast and western sub-Arctic of North America have also assessed the defensibility of archaeological sites. Schaepe (2006) presented a geospatial analysis of rock fortification sites in the lower Fraser River canyon of British Columbia. Schaepe (2006) defined four types of rock fortifications that may be differentiated based on construction and geographic position (Schaepe, 2006, 689). He then tested the hypothesis that rock fortification sites in the lower Fraser River canyon form a defensive network "linked by line of sight communication and functioning to monitor and regulate canoe travel within the canyon" Schaepe, 2006, 695. He finds that such a system could indeed have been used to communicate up and down the canyon, but does not comment on whether such a system is

probable given alternative site locations. Schaepe (2006) implicitly considers viewshed size and particularly line-of-sight to other rock fortifications to characterize defensible sites. Martindale and Supernant (2009) developed multivariate index of site defensiveness as a means of standardizing measures across archaeological sites (discussed at length below); they calculated the index using field and topographic maps, and site visits. Supernant (2011) extended the studies by Schaepe (2006) and Martindale and Supernant (2009) by reconsidering rock fortification sites in the lower Fraser River, calculating the defensiveness index for each site as well as performing a cumulative viewshed analysis of all of the sites to characterize the defended landscape. Supernant (2011, 278) found that while the fortification sites on their own are not particularly defensible, the sites are likely distributed with respect to other sites on the landscape, presumably so as to increase their cumulative visual coverage. Furthermore, the rock fortification network may have added to the perception of defensibility in the eyes of possible aggressors (Supernant, 2011, 292). Sakaguchi et al. (2010) similarly used a GIS to develop an index for sites in middle Fraser River on the Canadian Plateau, incorporating viewshed size and proximity to probable pedestrian routes into their analysis. They report that a shift to more defensible site locations correlates positively with increased osteological indicators of violence (Sakaguchi et al., 2010, 1182). Defensiveness is argued by all of these authors as being critical to our understanding of the role of conflict in structuring human behavior. Other researchers have presented thorough reviews of the history of warfare and violence on the Northwest Coast, though they are less explicit about defining defensibility (Angelbeck, 2009; Angelbeck, 2007; Lambert, 2002; Maschner and Reedy-Maschner, 1998; Moss and Erlandson, 1992).

This study joins those mentioned above in further defining and clarifying notions of defensiveness. Specifically, I am interested in how archaeologists may better infer defensiveness from the archaeological record. I argue that we may only judge an action—such as choosing to build *here* and not *there*—to be defensive if such an action is unlikely to have been randomly drawn from the set of potential actions. I will return to this epistemological argument below, but allow me to briefly return to Justice Potter's decision from the epigraph. To "know it when we see it" implies that knowledge is situated within an environmental context (what has been *seen before*); in this case, the set of all movies, pornographic or otherwise, viewed by Justice Potter prior to his opinion. If that set had been primarily pornographic, it would be hard for any potential film to stand out to him as overly-explicit; if it had been primarily puritanical, *The Lovers* might have seemed hardcore indeed. Justice Potter's opinion reflected the backdrop of his prior movie-viewing experience. What is the appropriate backdrop for the archaeological inference of defensive decision-making?

1.1. An index of site defensiveness

Martindale and Supernant (2009) identified and reviewed a trend prevalent in the literature on archaeological defensive structures: the exclusive use of heuristic models (e.g., "defensive locations are high locations", "defensive locations have escape routes") that are under-specified and therefore not reproducible or easily comparable between case studies. And while heuristic assertions have allowed for the identification of many apparently defensive sites on the NW Coast and elsewhere, they have not allowed these sites to be compared to each other in a standardized fashion. Their goal was to present a formal index of defensiveness that may be applied uniformly across archaeological sites. Martindale and Supernant (2009) note that the index they have come up with is imperfect, and ought to be improved against more archaeological and modern data.

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