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Analyzing landform patterns in the monumental landscape of the northern Great Lakes, 1200–1600 CE

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ABSTRACT

Monuments create permanent and predictable contexts and so they offered a particularly powerful way for past societies to reconfigure their landscapes in response to variable social and ecological factors. We examine the monumental landscape of the Late Precontact (ca. 1200–1600 CE) northern Great Lakes using a longstanding tool of landscape archaeology, Geographic Information Systems (GIS). In line with the growing recognition of the need to move beyond point-to-point GIS analyses to realize dynamic insights into past landscapes, we turned to multivariate total landscape geospatial modeling increasingly common in ecology. Specifically, we used a total landscape model of landforms—a compound, stable, and archaeologically relevant measure of landscape heterogeneity. We conducted a multi-scalar computation of Shannon's equitability to assess landform diversity in terms of both abundance and evenness and examined the positioning of monumental earthwork enclosures across north-central Michigan in relation to this measure. We found enclosures were non-randomly located in areas with high landform abundance and evenness, a nuanced positioning that patterned regionally but also relied on detailed, local socioecological knowledge. The positioning of earthwork enclosures in areas of increased landform diversity was one way indigenous communities crafted a monumental landscape to navigate the restricted social, economic, and ideological setting of Late Precontact (ca. 1200–1600 CE). Our study offers one example of the ways archaeologists can harness the power of geospatial technologies to gain insight into the variegated landscapes people inhabited in the past—places that were composed of ecology, other peoples, non-human beings and the constant flow of interactions between them.

1. Introduction

The human-space relationship has been central to all people at all times. Human communities constantly move within and through space and as they do, they enter into an iterative cycle of encounter with a heterogeneous mix of physical, ecological, and social variables, actively learning about these variables, inscribing space with such culturally acquired knowledge, and layering their surroundings with meaning. Landscape is the material manifestation of this iterative process, of the relation between humans and the environment (Crumley, 1994: 6). Landscapes are constituted by "a pattern of activities collapsed into an array of features" (Ingold, 1993: 162). Places and their meanings are anchored to the features of the landscape and these are "continually woven into the fabric of social life" (Basso, 1996: 110). Features on a landscape become symbols of and symbols for a way of living; landscapes both contain the material remains from a way of living and the physical and material reality of landscapes also constrains and directs ways of living (Basso, 1996: 63). This situation embodies the dialectical relationship between people and landscape; people both inhabit landscape and are inhabited by it in return (Basso, 1996: 102).

The archaeological record holds a deep chronicle of how humans inscribe in an enduring way their presence on their surroundings (Low and Lawrence-Zúñiga, 2003: 13). Archaeologists have increasingly capitalized on this fact, and landscape archaeology continues to grow, incorporating an ever-expanding and diverse range of theoretical and methodological approaches, as evidenced by the papers in this special issue. While there is a continuum of ancient human-material intervention in landscapes (cf. Knapp and Ashmore, 1999), in this paper we focus on one particular type of landscape found commonly throughout human history: monumental landscapes. To analyze our case study of the monumental landscape of the Late Precontact (ca. 1200–1600 CE) northern Great Lakes (Fig. 1), we turn to a tool with a long history in archaeological landscape research, Geographic Information Systems (GIS).

In the very nascency of Archaeological GIS, a subset of scholars called on the discipline to harness the analytical potential of GIS for

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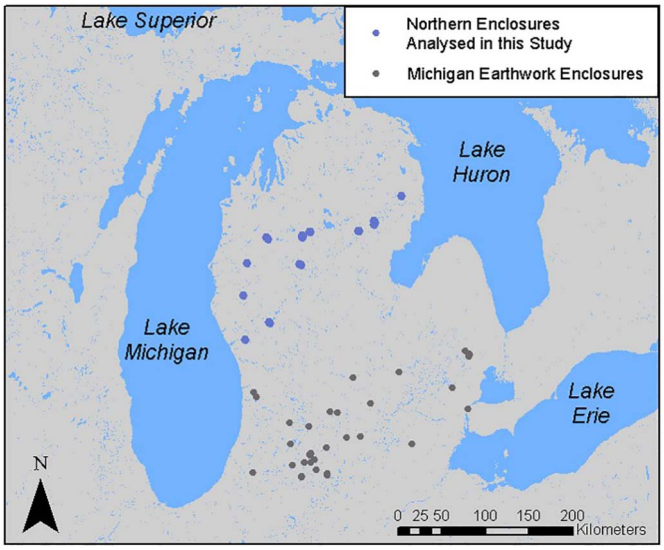

Fig. 1. Northern Great Lakes regional setting and archival database of all earthwork enclosures in Michigan. The north-central Michigan cluster analyzed is differentiated in blue. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

considering past social landscapes in new and critical ways (cf. Gaffney et al., 1996; Llobera, 1996; Lock and Harris, 1996; Madry and Crumley, 1990; Maschner, 1996; van Leusen, 2002; Wheatley and Gillings, 2000; see McCoy and Ladefoged, 2009 for a detailed summary of the progress of many of these efforts). Today, the computing efficiency and robust geospatial modeling techniques available to us demands that archaeologists push ever more forward the analytic boundaries of GIS in studying past landscapes. We argue that a critical way to do this is to build multivariate total landscape models. We offer one example of how such an approach can help archaeologists continue to build our understandings of the variegated landscapes people inhabited in the past—places that were composed of ecology, other peoples, non-human beings and the constant flow of interactions between them.

2. Monuments of the Late Precontact northern Great Lakes (ca. 1200–1600 CE)

Building monuments was "one way past societies spatially and materially reconfigured their cultural landscapes in response to the variable social and ecological factors that they encountered" (Howey et al., 2016: 7443). While a range of responses to socioecological variability are possible, the construction of a monument is a purposeful and more permanent investment in the marking and commemoration of a place (Lekson, 1999; Trigger, 1990). Monuments symbolize something specific for all (or the great majority) of the people who built and used them (Bernardini, 2004: 333). Monuments are, then, landscape features with legitimizing and attractive qualities. They inscribe knowledge about the significance of a place on a public, elaborate scale making it understandable across space and time and, as symbolically charged places, they attract people to them, ensuring, then, engagement with the places they mark and between the people they welcome (cf. Artursson et al., 2016; Bradley, 1998; DeBoer and Blitz, 1991; Dillehay, 2007; Howey, 2012). Monuments create permanent, meaningful, easily interpretable, consistent, and predictable contexts and so they offered a particularly powerful means for past societies faced with navigating the diverse, and at times, conflicting social, economic, political, and ecological demands of their landscapes.

The Eastern United States has a spectacular and millennia long trajectory of earthen monument construction from Watson Brake (Middle Archaic, ca. 3350–3000 BCE) to Poverty Point (Late Archaic, ca.1500–1300 BCE) to Adena constructions (Early Woodland, ca. 1000 BCE to 100 BCE) to Hopewellian earthworks (Middle Woodland, ca. 1–500 CE), to Effigy Mounds (Late Woodland ca. 500–1200 CE), to the mound and temple complexes of the Mississippian period (ca. 1000–1600 CE) (see Bernardini, 2004; Carr and Case (2005) (eds.); Gibson, 2007; Kidder, 2002; Lepper, 2005; Miller, 2015; Milner, 2004; Sassaman, 2005; Saunders et al., 2005; Sherwood and Kidder, 2011). While not as elaborate as elsewhere in the Eastern United States, monument construction nevertheless came to form an important part of the ways hunter-gatherer-fisher and low-level horticulturalist societies of the Late Precontact (ca. 1000/1100 to 1600 CE) period in the northern Great Lakes responded to changing social, economic, political, and ecological demands across their landscape.

Before the Late Precontact period, communities throughout the northern Great Lakes had practiced a broad spectrum strategy of foraging in which groups could move easily between resource zones on the shorelines of the Great Lakes, inland mixed deciduous and coniferous forests, lakes, wetlands, and rivers for millennia (Howey, 2012). After ca. 1000/1100 CE, more efficient production and consumption of food resources, including both cultivated and wild, brought some changes to this system. Along the coasts of the northern Great Lakes, fishing practices intensified and specialized on seasonal spawns and these activities assumed new importance (Cleland, 1982). Inland from the coasts, foraging of locally available resources, including acorns and wild berries, also intensified (Dunham, 2009). Finally, low-level maize cultivation also became a more prominent part of local subsistence practices in the northern Great Lakes during this period (Crawford et al., 1997; Katzenberg et al., 1995; Martin, 2008; O'Shea, 2003).

The harsh and unpredictable climate of the northern Great Lakes meant that maize cultivation was always marked by a high risk of failure, risk that was somewhat mitigated by a lake-effect micro-climate along the coasts of Lake Michigan and Huron that extended the growing season. Accordingly, the scale of maize cultivation and the importance of maize in local economies varied across the region, largely in ways aligned with lake-effect climactic amelioration (Dunham, 2009; Hart and Lovis, 2013; Holman and Lovis, 2008; O'Gorman, 2007; O'Gorman and Lovis, 2006; O'Shea, 2003).

Maize cultivation faced improved production prospects when local hunter-gatherer-fisher-emergent horticulturalist communities scheduled more time in their annual mobility rounds on the Great Lakes shorelines. Intensified Great Lakes fishing likewise drew people into deeper interactions with the coast. As the coastal mixed economy with attendant longer term coastal occupations grew, groups living inland found the geographic circuits in which they could carry out their annual mobility round reduced by the more intensive local interactions and restricted ranges of movement along the coasts having, then, to operate in what Holman and Krist (2001:19) termed more restricted "seasonal districts".

Together, these subsistence shifts precipitated behavioral shifts including the "restructuring of patterns of settlement, territoriality, subsistence scheduling, and social alliance" (O'Shea, 2003: 6). During Late Precontact, the northern Great Lakes saw an increase in community size, the emergence of territorial systems with less permeable boundaries, the formalization of decision making, and the development of corporate groups (Cleland, 1982, 1992; Holman and Lovis, 2008; O'Shea and Milner, 2002). With the local wild resource base as well as the emergent horticultural system marked by seasonal variability and high unpredictability year-to-year, reductions in the spatial ranges that communities could exploit to harvest food heightened the risk of experiencing resource failure and scarcity (Howey and Frederick, 2016; O'Shea, 2003). Such processes threatened the well-being of communities who could previously move, interact, and trade freely. We have suggested that, within this context, "dual needs arose to (*i*) maximize and extend the use life of local resources and (*ii*) increase interaction with other communities occupying different territories and resource bases" (Howey et al., 2016: 7445; see also Howey, 2012).