Materializing Ontology in Monumental Form
Engaging the Ontological in the Okeechobee Basin, Florida

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Many archaeological studies in the past decade have begun engaging with the ontological turn that has been occurring in the discipline of anthropology. Of primary interest to archaeologists is how ontologies are materialized and thus become visible in the archaeological record. However, few archaeologists have evaluated how ontologies can affect monumental practices and their products. This research focuses on how an ontology can be materialized as monumental architecture by presenting a case study of the Belle Glade archaeological culture, located in the Kissimmee-Okeechobee-Everglades (KOE) watershed of southern Florida. I argue that Belle Glade monumental architecture is the materialization of three principles—relatedness, circularity, and place-centeredness—exhibited in Native American ontologies. These principles are embodied in the form of the monuments, which invoke citations to the relatedness between the earth, sky, and water through their emplacement in flowing water, alignments to celestial events, and alignments to other places on the landscape.

Key words: ontology, monumentality, Belle Glade, South Florida, landscape, Kissimmee-Okeechobee-Everglades watershed

The Kissimmee-Okeechobee-Everglades (KOE) watershed is a notably understudied region in Florida archaeology (Griffin 2002:140; Johnson 1991:1–3, 30; Milanich 1994:281; Milanich and Fairbanks 1980:181). Yet because of its uniqueness the region deserves more attention than it has been given. The people who inhabited the KOE watershed, associated with the Belle Glade archaeological culture, practiced a way of life distinct from the rest of the Southeast. Instead of an agricultural focus supplemented by hunting, fishing, and gathering, they focused primarily on fishing (Hale 1984, 1989; Johnson 1990, 1991; Milanich 1994), placed settlements on tree islands in an aqueous landscape, almost exclusively manufactured a plainware pottery (Porter 1951; Sears 1994), and practiced subaqueous burial (Hale 1989; Sears 1994; Will 2002).

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However, one of the most conspicuous aspects of the Belle Glade culture is monumentality, with architectural forms ranging from circular ditches to geometric arrays of earthen architecture. This differs greatly from other areas of the Greater Southeast, where monumental architecture generally takes the form of conical earthen mounds and flat-topped platform mounds situated around plazas (Blitz 2010; Jefferies 2004; Smith 1986; Steponaitis 1986). In contrast, the Belle Glade monumental architecture incorporates linear and circular earthen ridges along with conical mounds attached to these ridges/embankments to frame partial enclosures around large, central midden-mounds (Johnson 1991, 1996). The high degree of alterity exhibited in the culture and its associated monumental practices distinguishes the Belle Glade culture from other Southeastern groups, and it differentiates Belle Glade architecture from those forms built elsewhere.

The alterity of these monumental constructions is the driving force behind this research. Previous researchers have evaluated these constructions primarily in terms of economic interpretations (Carr 1985, 2012a, 2012b; Hale 1984, 1989; Sears 1994), with fewer ceremonial (Colvin 2015; Hall 1976; Thompson 2016) and sociopolitical (Thompson and Pluckhahn 2012, 2014) interpretations being offered. Since many of these interpretations have not stood up to rigorous testing (Johnson 1990, 1991; Lawres 2015, 2016; Lawres and Colvin 2016; Thompson et al. 2013), a different approach is necessary. I argue that the alterity of the Belle Glade monumental landscape provides a context conducive to an ontological approach. In the remainder of this article I present an overview of the Belle Glade archaeological culture and its associated landscape. I then reevaluate the Belle Glade monuments from an ontological framework to demonstrate they embody several persistent themes or principles—relatedness, circularity, and place-centeredness—exhibited in Native American ontologies. These principles are exhibited by the monuments in several ways, including their overall form, their emplacement in specific locations, and through alignments to celestial events and to other monumental places.

ENGAGING THE ONTOLOGICAL TURN

Over the past two decades the discipline of anthropology has witnessed what is referred to as "the ontological turn," which has been concerned with anti-representationalism along with theoretical frameworks, philosophies, and methodologies that allow for alternative ontologies in interpretation (Alberti and Bray 2009; Alberti et al. 2011; Carrithers et al. 2010; Harrison-Buck 2012; Kelly 2014; Palaček and Risjord 2012; Sivado 2015; Vigh and Sausdal 2014). The focus, however, has been on the ontologies themselves. Ontologies are defined as the understandings of a reality or lived world and how that world or reality exists (Graeber 2015:15). It is imperative for us to acknowledge that there is not a single understanding of the world, and that these understandings are highly variable. This implies there is not a single world, but an endless possibility of multiple worlds existing side-by-side and comingling with one another (Hanks and Severi 2014), because every cultural group has the potential to understand *a* reality or cognized world that exists as something fundamentally different from the realities understood by others (Marquardt 1992b:109; Marquardt and Crumley 1987:6).

This approach has recently been criticized for several reasons (Bessire and Bond 2014; Descola 2014; Fischer 2014; Graeber 2015; Lenclud 2014; Ramos 2012; Swenson 2015; van Oyen 2016). The most vehement critique argues the focus on alternative ontologies and the associated dissolution of Cartesian dichotomies has the effect of shifting the focus of political agendas in order to redefine who and what is worthy of being protected from modernization and eradication (Bessire and Bond 2014:442; Graeber 2015:31–34). The claim is that this is a political move on the part of anthropologists to save what they deem worthy of saving. Bessire and Bond (2014) and Graeber (2015) argue this is a dangerous move on the part of anthropologists, and I agree. However, Bessire and Bond (2014:442–45; see also Ramos 2012) claim that it has a secondary effect of reifying the dichotomy of modern vs. primitive peoples. This critique stems from the abandonment of the colonialist frameworks of early anthropologists (e.g., Tylor 2010 [1871]) that viewed animism, for example, as a primitive retention (Harrison-Buck 2012; VanPool and Newsome 2012). Rather than viewing alternative ontologies as a trademark of primitiveness, as Bessire and Bond are suggesting is happening, we should view them from the standpoint of alterity. After all, alterity forms the core of the anthropological project.

Furthermore, all ontologies, whether or not they stem from Western society, are based on astute observations of a lived reality. None are "primitive." Many of those observations and understandings that do not stem from the epistemology of Western science are coming to light in various scientific disciplines. For instance, the relationality inherent in the ontologies discussed in much of the literature is replicated in the relational order theories of physics, chaos theory, and ecology. If the complexity of these understandings of Indigenous peoples is seen as primitive, then why would such principles be found in the understandings of multiple disciplines of Western science? What is at issue here is not the ontologies themselves, but rather the methods used in gaining the knowledge they are based on. However, in order to avoid trivializing such alternative ontologies we do need to be careful not to paint a picture of primitiveness out of alterity. Instead, we need to move past this criticism by emphasizing the complexity inherent in such ways of understanding a reality.

Van Oyen (2016) offers another criticism, arguing that the recent flood of archaeological literature focusing on relationality and relational frameworks, stemming from the ontological turn, has become so great as to border on triviality. Although this is true in some respects, there is still great utility in evaluating the archaeological record in terms of relationality and alternative ontologies more broadly. By examining ontological understandings of a world, we can view the effects those understandings have on cultural practices because of the mutually constitutive relationship between ontologies, culture, and practice. Ontologies provide a cognized understanding of a world; culture feeds off that knowledge to provide norms, rules, sociohistorical structures, and socially accepted practices for interacting with and within that world (Feibleman 1951). In other words, culture is a form of "applied ontology" (Feibleman 1951) or a translation of ontology (Hanks and Severi 2014) wherein the appropriate ways of interacting with and within that reality are drawn from the understanding of that reality. The performance of practices, in turn, reinforces culture by adhering to its rules, norms, and structures (sensu Giddens 1986). Thus, studying ontologies is important in anthropological discourse because it can further our understandings of the underlying structures that affect culture and practice. As such, understanding ontologies is pertinent to understanding practices, especially those related to cosmologies and symbolism (VanPool and Newsome 2012:259), and in cases of extreme alterity where practices might otherwise seem abnormal.

Another major criticism of the ontological approach is aimed at the ability of anthropologists to understand alternative ontologies (Bessire and Bond 2014; Graeber 2015; Ramos 2012). This criticism is most cogently argued by Graeber (2015), who correctly notes that it is impossible for any one person to fully comprehend a reality. Rather, each person will only grasp some portion of it. This is why there are so many different scientific disciplines, each one devoted to understanding a portion of the reality of our world, and each one having a range of specialists devoted to understanding a single component of that world. Cultural knowledge is similarly fragmented and distributed, which leads to different specialists within a cultural group. It is the combined knowledge of multiple group members that bring one *closer* to a comprehensive understanding. Thus, I agree that it is impossible for an anthropologist to *fully* understand an ontology, even their own. However, because of the relationship between ontology, culture, and practice, it is fruitful to attempt an understanding of ontological fragments so we have a better comprehension of how they may have affected the practices materialized in the archaeological record. The inability to fully comprehend ontologies has also led to the neglect of ontological variability and, ultimately, to overgeneralizations of ontologies (Bessire and Bond 2014; Graeber 2015; Harrison-Buck 2012; Ramos 2012). This is problematic because each cultural group has the potential to adhere to different ontologies. Thus, attributing a generalized form of ontology (e.g., relational, totemistic) to an entire region can mask variability.

A framework that circumvents these pitfalls must be developed. This framework must (1) emphasize the complexity of the ontology in question; (2) accentuate the affects that ontology has on historical practices; (3) acknowledge that the totality of the ontology in question will not be comprehended; and (4) avoid attributing a generalized ontological form to a cultural group but use existing evidence to reveal aspects of that ontology.

However, in the context of this study few ethnohistoric and ethnographic data are available for establishing the foundational aspects of a Belle Glade ontology. In the absence of such data I draw from the philosophical literature of contemporary Native American groups in order to identify themes, or principles (sensu Norton-Smith 2010), that are pervasive in Native thought. Although there is not a singular Native American ontology, the presence of persistent themes suggests that *some aspects* of the ontology of the source population (Pitblado 2011) survived many generations of cultural transmission and the effects of European colonization (Sanger 2015:57). Drawing from such pervasive themes from multiple groups with common ancestral roots can be useful in reconstructing the ontology of a prehistoric population without a known, extant descendant population. Further, the use of these themes takes Native concepts seriously, which Graeber (2015) claims is the greatest strength of the ontological turn.

The first of these themes is the "principle of relatedness" (Burkhart 2004:16). In the context of Native American thought, this principle refers to an understanding that everything in a world is related and interconnected with everything else in that world (Burkhart 2004; Cajete 2000; Cordova 2007; Deloria 1999, 2003; Fixico 2003; Norton-Smith 2010; Plerotti and Wildcat 2000; Salmon 2000; Verney 2004; Waters 2004). Underlying this principle is a conception of personhood that extends beyond humans to include animals, plants, water, stones, celestial bodies, geological formations, things, and places (Cajete 2000; Cordova 2007; Deloria 1999, 2003; Norton-Smith 2010; Salmón 2000; Plerotti and Wildcat 2000). This relatedness is not given or inherent but is performance-based, meaning relations are formed and maintained on a continual and reciprocal basis. Because other-than-human entities are characterized as persons, there is a moral obligation among Native cultural groups to treat these entities with respect since they are often considered to be members of the same community as humans (Burkhart 2004; Cajete 2000; Cordova 2007; Deloria 1999, 2003; Plerotti and Wildcat 2000). These obligations make it necessary to maintain balance in relations, a key theme in many Native religious traditions and practices (Buckley 2000; Deloria 2003; Fixico 2003; Griffin-Pearce 2000; Martin 1991, 2000; Salmón 2000; Sullivan 2000).

The second theme is the principle of circularity, which refers to how Native Americans conceptualize time and space as circles and cycles (Deloria 2003; Fixico 2003; Jojola 2004; Norton-Smith 2010; Plerotti and Wildcat 2000). Native Americans have a strong tendency to think of history in terms of space and place rather than as a chronology of events (Deloria 2003), which suggests that time and space are fundamentally interconnected. This is tied to how Native Americans have related to and observed their environments for millennia. Native Americans relied on astute observations of landscape patterns to adjust their annual land-use patterns (Fixico 2003; Norton-Smith 2010). Thus, their primary frame of reference for the passage of time was seasonal cycles and celestial movements, which are circular phenomena. There is also a spatial component to circularity. The sun's path is an obvious case because of its movement across the sky on a daily cycle, but also its annual movement along the horizon. There is also a human spatial component to these cycles. Native Americans timed movements across the landscape according to these seasonal cycles in order to collect specific seasonal resources available in different locations across the landscape (Fixico 2003; Jojola 2004; Norton-Smith 2010).

The third, and final, pervasive principle is that of place-centeredness, which refers to the centrality of places in how Native American cultural groups understand their worlds (Cajete 2000; Cordova 2007; Deloria 2003; Jojola 2004; Norton-Smith 2010; Plerotti and Wildcat 2000; Verney 2004; Waters 2004). Places, along with the practices and experiences that happen within them, are also central to Native American identity and religious traditions (Cajete 2000; Deloria 2003; Waters 2004). How they come to hold such a centrality in thought is tied to the principles of relatedness and circularity. As people move through a landscape according to temporal cycles, they come to the same places year after year. Over time this leads to relationships being developed with the place itself and important meanings being attributed to these places. As Deloria (2003:65–66) notes, spiritual experiences and revelations that occur in specific places are significant to Native peoples. These places and events are remembered so others can communicate with the spirits of the place through ceremonial practices that also create and maintain the relations between people and place. Because of this, places gain a sacred quality, which ties them into religious traditions with sacred centers. These sacred places can be natural landscape features, places where significant events happened, places where a religious revelation was experienced, and places where spiritual entities reveal themselves (Deloria 1999, 2003; Norton-Smith 2010; Waters 2004). Because of the principle of relatedness, Native peoples have an obligation to perform ceremonial practices at these sacred places in order to maintain balance in their relations with them.

THE BELLE GLADE LANDSCAPE

The Belle Glade archaeological culture is associated with the northern and central portions of the Kissimmee-Okeechobee-Everglades (KOE) watershed. The environment of the KOE we see today is drastically different than it was prior to the nineteenth- and twentieth-century projects that drained the water from southern Florida (McCally 1999; McVoy et al. 2011). The KOE is a shallow sag valley that spans approximately 400 km of a north-south swath of the southern Florida peninsula (McCally 1999; White 1970). As its name implies, this watershed is composed of three drainage basins—the Kissimmee River Basin, Lake Okeechobee Basin, and Everglades Trough. However, prior to the drainage projects, the shallow gradient of the valley—a slope rate of 0.30 m for every 11 km (Davis 1943)—and low topographic relief blurred the boundaries of these basins to form a singular coherent hydraulic system with a torpid flow of water (McCally 1999).

Beginning in the Kissimmee River Basin, water flowed southward through this shallow valley in two forms. First, as the Kissimmee River itself, and second, as sheet flow, which moved through the numerous wet prairies and broad-leaf marshes that made up the bulk of the ecosystems in this basin. The sheet flow, at a depth ranging from 0.30 to 0.45 m, moved over the Osceola Plain into the Okeechobee Basin (McVoy et al. 2011:225–26; Toth et al. 1998) for five to six months of the year; the Kissimmee River would have flowed continuously. Along with precipitation and base flow, this water would help to fill Lake Okeechobee, the central feature of the watershed with surface waters stretching over 1,770 km^2 (Brenner et al. 1990; McVoy et al. 2011). Once the lake reached its spill point, the water would discharge over its southern sill into the sawgrass plains to the south. This discharge occurred along more than 110 km of the southern shoreline for nine months of the year (McVoy et al. 2011:258). This was not a direct outflow from the southern shore of Lake Okeechobee; it occurred in a radial fashion, discharging a singular mass of sheet flow from the southern, eastern, and western shores and following the gradient into the Everglades Trough (McVoy et al. 2011:258–60).

In the northern portion of the Everglades Trough, composed of the sawgrass plains, water moved openly through the sawgrass for 9–10 months of the year at an average depth of 0.45 m (McVoy et al. 2011:246, Table 11.4). The remainder of the year the plains would be saturated because of the water-retaining characteristic of the peat soils (McCally 1999:27), but the flow would dissipate. The water flowing southward through the sawgrass plains would then transition into the ridge-and-slough landscape. Whereas the sawgrass plains have a homogenous sediment base, the ridge-and-slough landscape exhibits undulations, creating the sawgrass ridges and sloughs that give it its namesake and causing variation in water depth and flow rates (McCally 1999:10–12; McVoy et al. 2011:175–99). The sawgrass ridges were inundated for 9–10 months under an average depth of 0.45 m; the sloughs remained inundated throughout the year with depths ranging from 0.30 to 0.91 m (McVoy et al. 2011:246, Table 11.4).

The hydrology of the KOE is unique and is one of its key characteristics. Indeed, in its pre-drainage state the entirety of the watershed was inundated under flowing water for 5–6 months a year, and for 9–10 months of the year approximately three quarters of the watershed exhibited this quality. The water flowed through many ecosystems, but predominant were herbaceous wetlands. Within these aquatic ecosystems were isolated areas of dry land containing upland hardwood ecosystems known as hammocks (see Platt and Schwartz 1990; Vince et al. 1989). Essentially, these ecosystems existed as islands amidst a massive river of sheet flow.

The peoples associated with the Belle Glade culture—known through a single historic document as the Mayaimi (Worth 2014)—situated their way of life in accordance with the characteristics of the KOE. In contrast to the agrarian lifestyle that prevailed throughout the Greater Southeast, Belle Glade subsistence was focused on aquatic resources—collected in large quantities—and supplemented with hunting and gathering (Hale 1984, 1989; Mitchell 1996). The majority of Belle Glade settlements were located on tree island hammocks, which provided not only the only consistently dry ground in the region but also easy access to the aquatic creatures inhabiting the water that surrounded the hammocks. Furthermore, the numerous small catchment basins—depression marshes or flag ponds (FNAI 2010; Whitney et al. 2004)—amidst the wet prairies and sawgrass marshes retained sufficient water during the dry season to support populations of aquatic fauna. The majority of settlements are located in the hammocks adjacent to these perennial water bodies (Lawres 2012). Further, the majority of Belle Glade settlements do not include monumental architecture other than mortuary mounds. Rather, there is a relatively small number of monumental architectural sites (see Figure 1 for distributions of site types). These differ from settlement sites because they are built features in their entirety, and unlike most of the sites in the region, they are not located in the confines of the hammocks but are instead built in flowing water ecosystems. In addition to mortuary mounds, several sites in the KOE exhibit subaqueous mortuary contexts. Fort Center has a constructed mortuary pond (Sears 1994; Thompson and Pluckhahn 2012, 2014), and at several island sites in Lake Okeechobee—Ritta, Kreamer, Grassy, and Observation Islands—people were interred in the waters of the lake itself (Hale 1984, 1989; Will 2002).

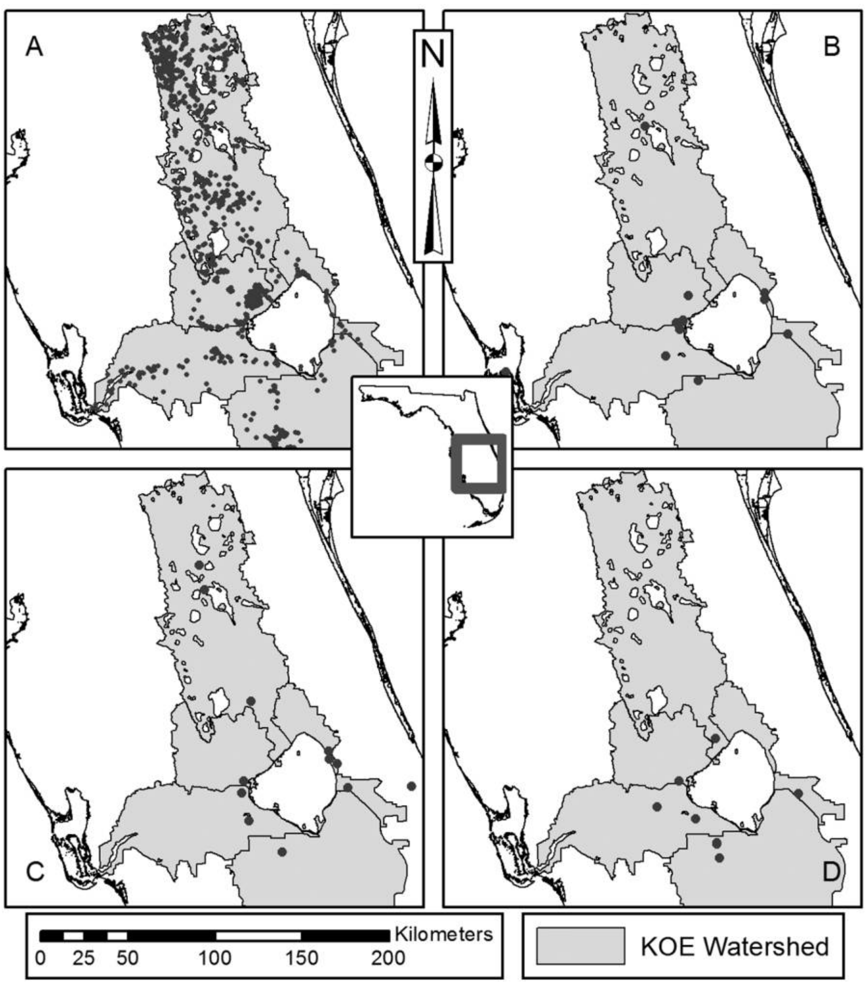

Figure 1. Distributions of Belle Glade sites. (Inset) Location of study area in central Florida. (A) Non-monumental sites/settlements; (B) Circular ditch architecture; (C) Type A circular-linear earthworks; (D) Type B circular-linear earthworks. (Watershed boundaries: NRCS 2015).

Belle Glade material culture is generally considered unspectacular in comparison with other areas of the Southeast. The predominant pottery type manufactured in the region is a plain ware known as Belle Glade Plain (Cordell 2013; Griffin 2002; Porter 1951; Sears 1994). This speculate-tempered ware was typically formed as open bowls, and the closest thing to decoration on this pottery is a tooled surface that results in what appear to be scratches from dragged sand-grains in the surface. The only temporal changes are in thickness of the rim relative to the body and in the lip treatment (Cordell 2013; Porter 1951; Sears 1994). Lithics are generally rare in the region because the closest chert outcrops are located well outside the boundaries of the KOE (Austin 1997; Butler and Lawres 2014). Knappable stone was transported into the region, primarily from northern Florida, and the majority of Belle Glade sites have small lithic assemblages exhibiting evidence that lithic materials were transported to the sites in nearly finished form (Butler and Lawres 2014). Because of the rarity of local stone, other materials were used for cutting edges and projectiles. Chief among these are shark teeth, which are found in large numbers at many Belle Glade sites (Keller and Thompson 2013; Kozuch 1993). Bone and shell were also fashioned into many varieties of cutting and projectile tools (Willey 1949:37–53).

In general, these characteristics of Belle Glade culture change very little over time. Even so, the region is divided into four chronological periods: Belle Glade I–IV (Table 1). This chronology is based largely on the ceramic and settlement pattern data from Sears's (1994) work at Fort Center, with chronological refinements based on recent work by Thompson and Pluckhahn (2012, 2014). Additionally, Johnson (1991, 1996) has tied shifts in monumental architecture to this chronology. With the exception of Fort Center, none of the Belle Glade monumental architectural sites incorporate all of the forms of architecture. Rather, the forms discussed below appear individually in different temporal periods.

The Belle Glade I period (ca. 1000 BC–AD 200) is associated with a predominance of semi-fiber-tempered pottery, which was gradually replaced by sand-tempered plain pottery (Sears 1994:192–94). This period is associated with the construction of circular ditch architecture (Figure 2a) (Johnson 1991, 1996). The Belle Glade II period (ca. AD 200–1000) is associated with a prevalence of sand-tempered pottery and the appearance of extralocal pottery. There is differentiation between sites as to the origin of foreign pottery. Sites on the west and north sides of Lake Okeechobee contain pottery from North Florida and South Georgia (Austin 1996; Sears 1994); sites on the

Table 1. Belle Glade culture-historical periods

Period	Date Range	Dominant Ceramics	Architecture
Belle Glade I	1000 BC–AD 200	Semi-fiber-tempered	Circular ditches
Belle Glade II	AD 200–1000	Sand-tempered plain	Type A circular-linear earthworks
Belle Glade III	AD 1000–1513	Belle Glade Plain	Type B circular-linear earthworks
Belle Glade IV	AD 1513–1763	Belle Glade Plain	Detached linear embankments

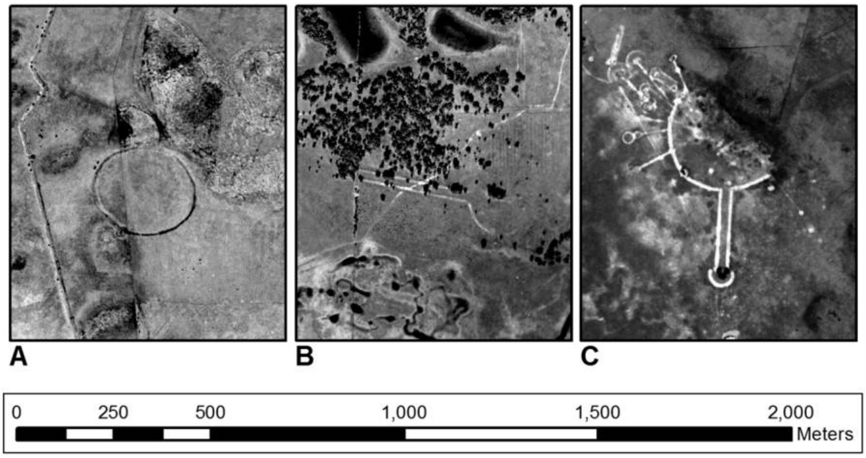

Figure 2. Belle Glade monumental architecture. (A) Circular ditch, Glades Circle, Glades County, Florida, ca. 1948 (Image: USDA 1948a); (B) Type A circular-linear earthwork, Lakeport Earthworks, Glades County, Florida, ca. 1948 (Image: USDA 1948c); (C) Type B circular-linear earthwork, Tony's Mound, Hendry County, Florida, ca. 1957 (Image: USDA 1957c).

eastern and southern sides of the lake contain pottery of the Glades archaeological culture to the south (Griffin 2002; Willey 1949). In addition, Belle Glade Plain ceramics appear during this period. The monumental architecture of this period is known as Type A circular-linear earthworks (Figure 2b), which feature an oblong midden-mound partially surrounded by a semicircular embankment from which extends a pair of parallel linear embankments terminating in a large conical mound (Johnson 1991, 1996). The Belle Glade III period (ca. AD 1000–1513) is associated with a prevalence of Belle Glade Plain pottery with a flat lip treatment and a reduction in sand-tempered plain pottery (Sears 1994: fig. 7.1). The spatial differentiation in imported pottery types seen in the previous period continues (Austin 1996; Griffin 2002; Sears 1994). During this period, the Type A circular-linear earthworks shifted to the Type B form (Figure 2c), in which the semicircles have multiple embankments radiating outward like the spokes of a wheel (Johnson 1991, 1996). The Belle Glade IV period (AD 1513–1763) is associated with a preponderance of Belle Glade Plain with expanding flat lips and comma-shaped lips, along with small amounts of sand-tempered pottery (Sears 1994: fig. 7.1). Extralocal pottery diminishes almost completely, but European materials appear. Monumental architecture of this period takes the form of linear earthen embankments *not* associated with semicircular embankments (Johnson 1991, 1996).

RETHINKING BELLE GLADE MONUMENTALITY

Archaeologists are becoming increasingly concerned with how ontologies can be materialized, and thus become visible in the archaeological record. Some have sought to reveal these materializations through identifying index objects and their signified relations (Zedeño 2008, 2009, 2013), the relationships between depositional patterns and ritualized practices (Brown and Emery 2008; Mills and Ferguson 2008; Murray and Mills 2013; Wallis and Blessing 2015), or the relationships signified in the deposition of other-than-human things in mortuary contexts (Hofmann 2013; Losey et al. 2013; McNiven 2013:111–12). However, with few exceptions, archaeologists have not investigated how ontologies are materialized in monumental form. Those who have investigated this topic have focused on artistic depictions in stone monuments (Borić 2013; Weismantel 2013), the multiple materials and their attendant relations used in construction (Harrison-Buck 2012), bundled deposits within architecture (Pauketat 2013), or celestial alignments in architectural features (Pauketat 2013; Romain 2015a, 2015b, 2015c; Wallis and Blessing 2015). Although these are all pertinent aspects of architecture to address because they are part of the construction process, no one has addressed how the form of monumental architecture itself might be an ontological materialization. This is a salient point to consider because not all monumental architecture consists of stone elements conducive to artistic depictions or contains internal deposits conducive to evaluating index objects and/or bundled relations within the matrices of architectural features.

Such is the case with the Belle Glade monuments. Several researchers have commented on the sterility of the embankments and the very minimal deposits (<10 sherds) in only *some* of the conical mounds associated with the embankments (Carr and Steele 1994:8–10; Carr et al. 1995:9–11; Sears 1994:130–33, 136–37; Willey 1949:74–76). The only mounds at these sites with dense deposits are the midden-mounds located inside the semicircles, and they contain the refuse of daily activity rather than specialized deposits. Even so, I argue that the Belle Glade monuments provide an excellent case study in how an ontology might be materialized in monumental form. In the case of these monuments, I argue that they embody the principles of relatedness, circularity, and place-centeredness and thus are the materialization of these aspects of a Belle Glade ontology. However, in the absence of such deposits we must look to the form of the monuments to evaluate the possibility of an ontology being materialized within them and, more specifically, to evaluate the applicability of the principles of relatedness, circularity, and place-centeredness. Although this region boasts a large array of monumentality, ranging from individual conical mounds to geometric arrays of earthen architecture (Johnson 1991, 1996), for the purposes of the discussion at hand I am focusing on a single monument form: the Type B circular-linear earthworks of the Belle Glade III period (ca. AD 1000–1513).

I argue that we can expect to find certain characteristics that connote certain aspects of the ontology in question within the actual *form* of the monuments themselves (i.e., the end products of construction). The most conspicuous in this respect would be the morphology of the monuments. In terms of the principles outlined above, circles should figure prominently. As a broader geographic example of circularity in monumental form we can look to the Woodland period (ca. 1200 BC–AD 1000) conical mounds of the Southeast, which Fixico (2003) notes are a prominent example of the principle of circularity. Such circularity is also exhibited in the Belle Glade earthworks, which is discussed in further detail below.

In contrast, characteristics indicative of the principles of relatedness and place-centeredness might not be as conspicuous, but we should expect to see evidence of these principles in terms of how architectural features are related to and reference other features of a site, the surrounding landscape, and other places throughout the landscape, which I expect to be found in the linear embankments that radiate outwards from the semicircles of these monuments. Because the cosmos is part of landscapes, we should expect to see alignments to celestial events. Such alignments have been demonstrated for other areas of the Midwest and Southeast, such as among the Hopewell earthworks (Hively and Horn 1982, 1984, 2006, 2010, 2013; Romain 2000, 2009, 2015a, 2015b) and Mississippian architecture (Benchley 1974, 2000; Pauketat 2013). If such alignments are present, they would demonstrate the relatedness of monuments and the cosmos above as well as the knowledge the builders of the monuments had of the relatedness of the earth and sky (i.e., the relationship between seasonal change and solar patterns), which is also an indication of the principle of circularity in its temporal form.

In terms of the relatedness of places as well as place-centeredness, we may also expect alignments to figure prominently. However, the nature of such alignments is rarely discussed in the archaeological literature. The most prominent discussions of alignments between places are the meridian alignments at Chaco (Lekson 1999) and Poverty Point (Clark 2004; Sassaman 2005, 2010) and the solstitial alignments of the Archaic Gulf Coast (Sassaman 2016). However, because of the variability in the orientation of the embankments, few of which accord with meridians, I expect the embankments to point explicitly toward places that would have been prominent on the landscape. If such alignments are present they would indicate the significance of those places to the builders of the monuments, the relatedness of those places to the place the alignment originated from, and the relatedness of the people dwelling within those places.

This is a much different argument than the few previous interpretations of this architecture. Sears (1994:137) argued the linear embankments of the monuments functioned as raised garden plots and the terminal mounds as habitation areas. However, more recent testing (Johnson 1990, 1991; Thompson et al. 2013) and observations (Hale 1989:146) have called Sears's agricultural interpretations into question. Johnson (1991, 1996) draws on Sears's data to argue that the terminal mounds of the embankments were inhabited and were added to existing Type A forms as populations increased. Thompson and Pluckhahn (2012, 2014) also argue that the terminal mounds were used for habitation, but they argue for a sociopolitical function as well: to separate people and delineate space based on social distinctions. The problem with these interpretations is that they are misreadings of Sears's data. He notes that the terminal mounds were inhabited, but they represent "a single occupation and a single structure for a relatively short period of time in the late sixteenth or early seventeenth century" (Sears 1994:133), which places the occupation of the terminal mounds much later than the construction of the architecture itself. Hale (1984) offers a different interpretation, arguing the monuments were built and oriented to the direction of sheet flow to minimize erosion and redirect water away from the midden-mound. However, Hale drew on outdated hydrological data, and this needs to be tested with new data and hydrological analyses.

I used several methods to test the applicability of the principles outlined above (and their associated expectations) to the Type B circular-linear earthworks. I began with georeferencing aerial photographs that depict these monumental features in ESRI's ArcGIS 10.3 (Figure 3). Johnson (1990, 1991, 1994, 1996) has repeatedly noted that the use of aerial photos in studying the monumental architecture of the region is highly productive because the structures are typically located in ecosystems with minimal canopy vegetation and are constructed of white sands, providing a stark contrast to the darker-colored surrounding environs.

To verify the accuracy of the resulting georeferenced aerials, data from the Florida Division of Emergency Management's 2007 Herbert Hoover Dyke project (FDEM 2014) were used. These data provide a highly accurate image showing the features used as anchor points (e.g., canals, ponds), thus allowing for fine-tuning of the georeferencing. However, most of the monumental architectural sites were destroyed prior to LiDAR survey. In addition, the majority of the architectural features from the few extant monuments were removed from the point clouds during processing because they were viewed as anomalies by FDEM personnel unfamiliar with the archaeology of the region (Pluckhahn and Thompson 2012:295–96). This led to the LiDAR data being used primarily to verify the accuracy of georeferencing and for hydrological analysis.

Once the aerial images were georeferenced, each linear embankment's azimuth was measured using a line projection method, which measures the azimuth of a line from magnetic north as you create a projected line from a specific point.[1] The projected lines follow the central axis of the embankments. Embankment azimuths were compared with the rise/set azimuths of celestial features to test whether the embankments were oriented in respect to the cosmos. Starry Night Pro Plus v.7 software was used to calculate celestial azimuths. This program allows the movement of the cosmos to be projected backwards through time to ensure accuracy of the azimuth measurements for the time in question. Because Johnson (1991, 1996) places the Type B circular-linear earthworks during the AD 1000–1513 range, the azimuths were measured for AD 1000 to align with the initial construction of these features. Degrees of accuracy were established by comparing the embankment azimuths to the azimuths of celestial events.

The projected lines were also extended across the entire landscape to test for alignments to other sites. This involved utilizing data from the Florida Division of Historic Resources' Florida Master Site File (FMSF) to populate base maps with site locations,

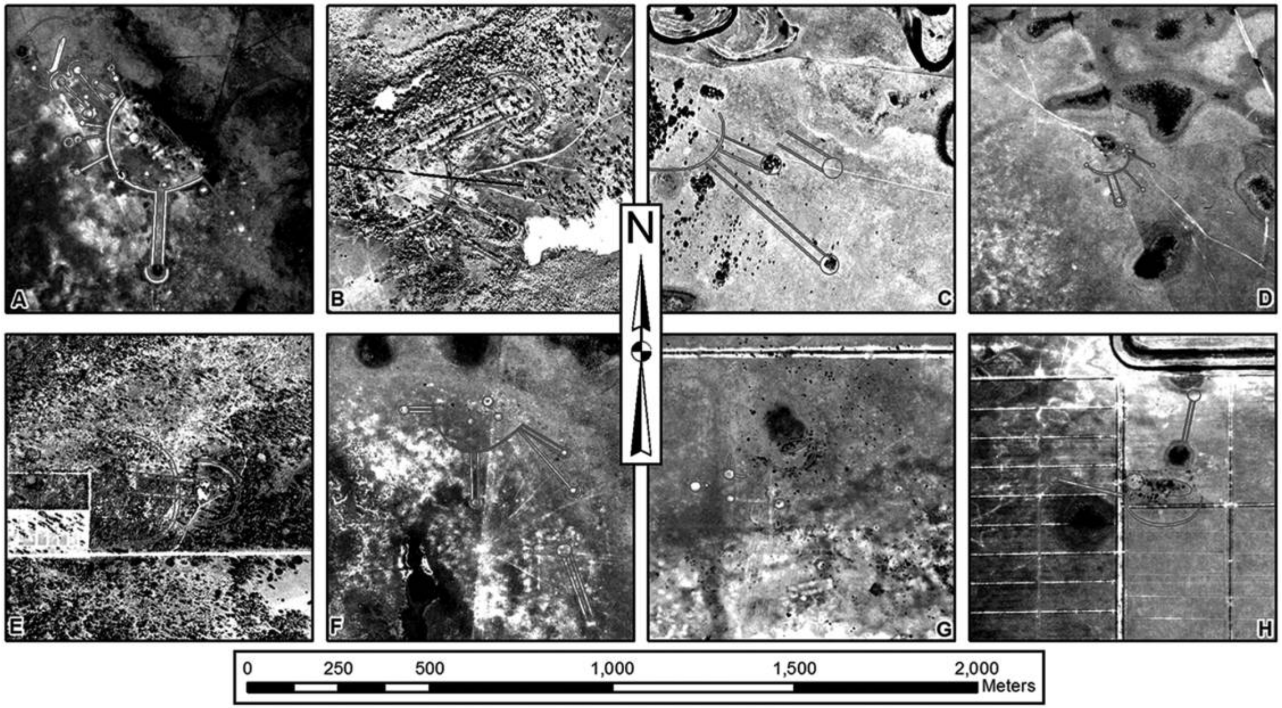

Figure 3. All Type B monuments. (A) Tony's Mound, ca. 1957 (Image: USDA 1957c); (B) Big Mound City, ca. 1949 (Image: USDA 1949a); (C) Fort Center, ca. 1948 (Image: USDA 1948b); (D) Kissimmee Circle Earthworks, ca. 1957 (Image: USDA 1957a); (E) Ortona Earthworks, ca. 1949 (Image: USDA 1949b); (F) Hendry Earthworks, ca. 1957 (Image: USDA 1957b); (G) South Lake Mounds, ca. 1957 (Image: USDA 1957d); (H) Maple Mounds, ca. 1963 (Image: USDA 1963).

along with LiDAR data and aerials depicting the layouts of any sites in question. Sites postdating the construction of the Type B earthworks (e.g., Historic/Belle Glade IV sites) were not considered. All sites were coded as non-monumental, monumental, or Belle Glade monument. Because of the large number of prehistoric sites in South Florida (n=5,796 south of Tampa Bay as of 2015), the issue of intention on the part of the builders comes into play. Identified alignments were deemed intentional when there was a known affiliation between sites (strong indications of interaction or known cultural affiliation) or multiple alignments originating from several sites converging on a single locale. Probabilities were calculated for alignment with (1) a Belle Glade monument, (2) a monumental site in general, and (3) a non-monumental site. Because of the noncontinuous distribution of sites in the region, the shape of the southern Florida peninsula, and the distribution of Type B earthworks, it was necessary to calculate these probabilities on a site-by-site basis. Further, because of the directional nature of the alignment data, probabilities were calculated within 10° azimuth ranges (e.g., 1°–10°, 11°–20°, etc.) from each site (Figure 4). To calculate the probabilities within each of these 10° ranges the total number of sites was tabulated along with the total numbers of monumental, non-monumental, and Belle Glade monument sites. Using these totals, the probabilities for each were calculated using standard probability formulas:

$$P = \frac{n \text{ of non-monumental sites}}{N \text{ of sites}}; P = \frac{n \text{ of monumental sites}}{N \text{ of sites}};$$

$$P = \frac{n \text{ of Belle Glade monuments}}{N \text{ of sites}}$$

The ArcHydro v2.0 framework was used for hydrological analyses. This analysis takes several steps. It begins with the creation of bare earth models, which typically contain depressions known as sinks or pits that can hinder hydrologic analysis because the software renders them as points of water accumulation (Connolly and Lake 2006; Jenson and Domingue 1988; Wang and Liu 2006). These depressions may be the result of imperfections in the bare earth model, naturally occurring topographic features, or anthropic activities and thus need to be evaluated manually (Wang and Liu 2006). These depressions can be especially significant in a flat, homogenous topographic landscape such as South Florida. Further, in this region the numerous canals constructed over the past century have significantly altered the hydrology of the region. ArcHydro provides a suite of tools for evaluating and removing these features for hydrologic analysis. The modified bare earth models are then used for drainage analysis to detect the flow of water across a landscape, which is a function of topography, elevation, and slope (Macrae and Iannone 2016; Olivera et al. 2002). This involves identifying the flow direction (FDR) of each cell in the bare earth model, which calculates the direction water will flow from cell to cell based on the elevation of each cell (Connolly and Lake 2006; Jenson and Domingue 1988; O'Callaghan and Mark 1984), and flow accumu-

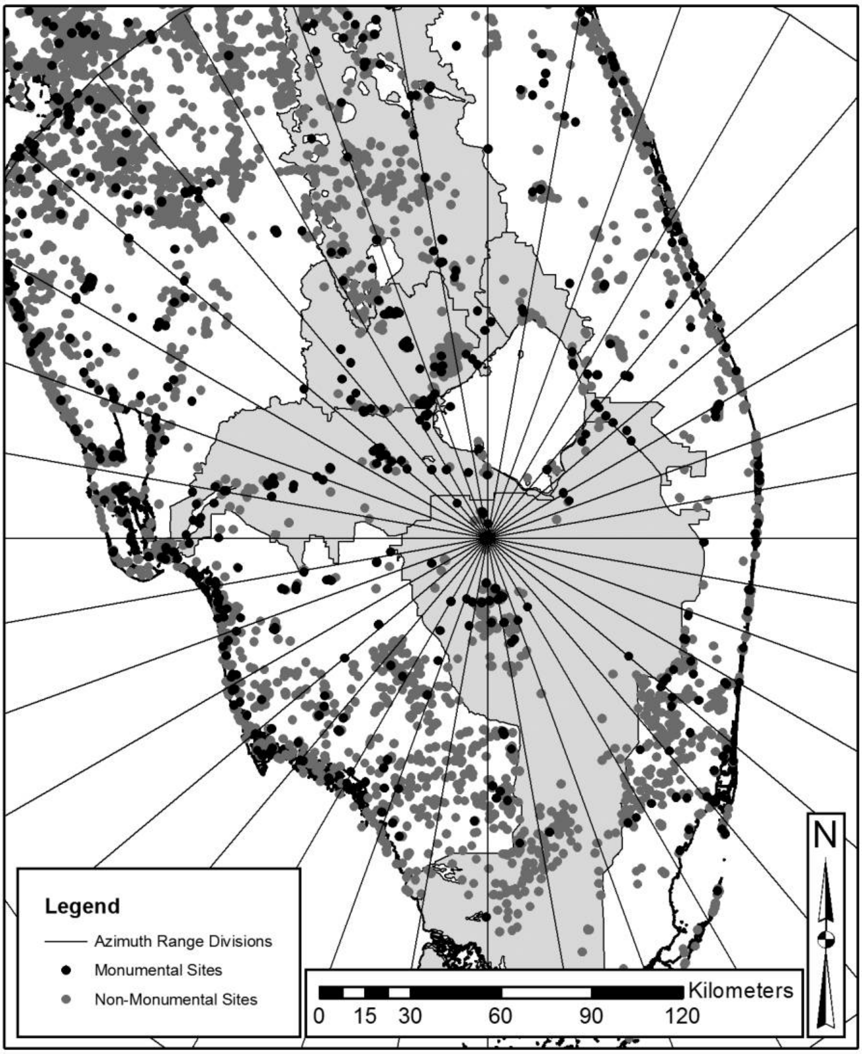

Figure 4. Compass rose diagram depicting 10° azimuth range divisions and the associated site distributions used for probability calculations. This compass rose is centered on the midden-mound of Tony's Mound, but the same diagram was centered on each Type B circular-linear earthwork's midden-mound to calculate probabilities on a site-by-site basis. (Watershed boundaries: NRCS 2015).

lation (FAC) analysis, which assigns a code to each cell based on how many surrounding cells are sources of water flowing into it (Connolly and Lake 2006; Jensen and Domingue 1988; O'Callaghan and Mark 1984). The FAC analysis results in the identification of areas where water flows in the greatest amounts (Macrae and Iannone 2016). Given the paleohydrological data (McVoy et al. 2011) demonstrating the large amount of water that flows across the KOE landscape for a large portion of the year, and the low slope gradient of the southern Florida peninsula, the ArcHydro framework provides a powerful tool for showing the minute details of how the water flowed across the landscape in the past.

MATERIALIZING ONTOLOGY IN MONUMENTAL FORM

Returning now to the monuments in question, these earthen constructions are geographically restricted to the Okeechobee Basin (see Figures 1d and 3). More significantly, they are always built in areas of flowing water, providing a stark contrast to Belle Glade settlement sites. The intentional emplacement within flowing water is an important aspect of these monuments because it is an enduring performance of the principle of relatedness. In other words, it forms and maintains enduring relations between the monuments and water. Hale (1984) was the first to note a relationship between these monuments and water. As mentioned above, he argued they were built and oriented in a manner suitable to redirect water away from the living area. However, reconstructing the local hydrology using LiDAR data, the ArcHydro v2.0 framework, and the paleohydrological evidence of McVoy et al. (2011) suggests that Hale was only partially correct. Contrary to Hale's argument, the monuments redirect water *into* the confines of the semicircular embankment. This would cause water to flow around a portion of the midden-mound, drawing the flow *toward* the living space rather than away from it (Figure 5).[2]

Given the hydrological characteristics of the KOE watershed, it would be necessary to form and maintain enduring positive relations with water. It was the primary characteristic of the landscape, and the Belle Glade peoples lived their lives in accordance with the rising and falling water levels of their world. They fished from it, drank it, traveled through it, and their settlements were surrounded by it. Thus their lives were tied to the shifting depths of water, and as such, water took on a spiritual significance as well. Not only did it provide sustenance, hydration, and a mode of travel, it was a repository for the dead. Among other Southeastern groups, water was a portal to other worlds (Hudson 1976:130) and a barrier against vengeful spirits (Hall 1976), and it may have had similar roles for the Belle Glade peoples.

The water itself would have also taken on ontological significance because of the watershed's specific hydrological and environmental characteristics. As water levels continually increased throughout the spring and summer, the emergent properties of the landscape would have been highly visible to the Belle Glade peoples, which in turn would have played a significant role in how they understood their world. During the spring, as the landscape began to rehydrate, they would see the florescence of vegetation, the propagation of many mammalian species, and the egress of migratory birds. During the summer, the height of water levels, they would perceive deer behavior shift toward rutting (Richter and Labisky 1985) and the spread of fish species across the entirety of the watershed. During the fall and winter, as the landscape was drying out, they would witness the withering and browning of vegetation, the congregation of fish

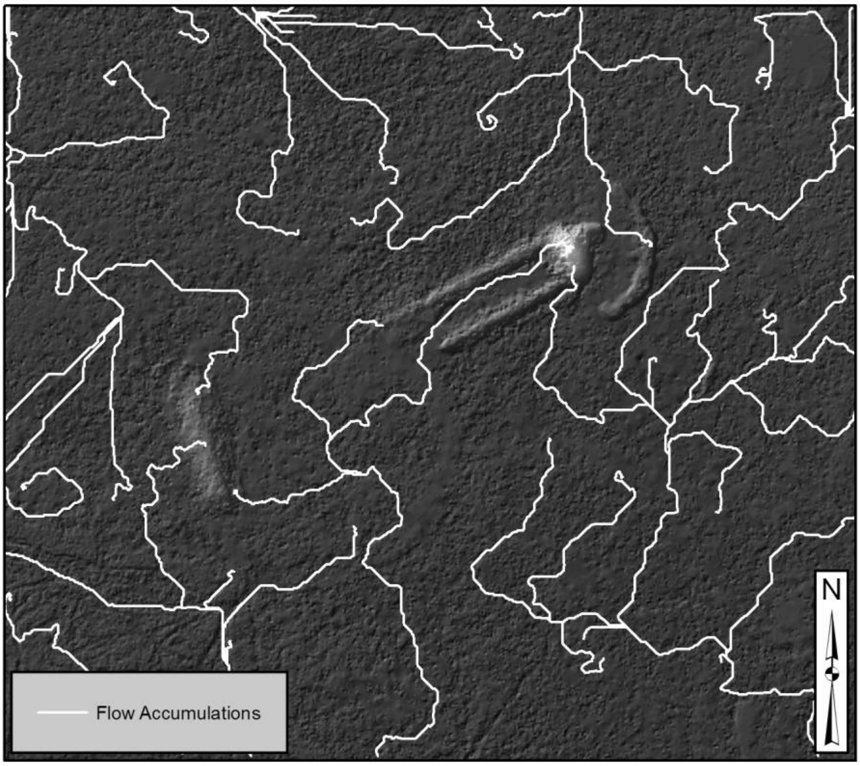

Figure 5. Hydrological modeling of Big Mound City. The white lines in the image represent the *primary* flow accumulations, or areas where water flows in the greatest amounts, generated by the ArcHydro analysis. These accumulations are a function of topography, elevation, and slope. Note that the analysis shows one of these accumulations reaching the primary embankment of Big Mound City and then being rerouted towards the interior of the semicircle (LiDAR data: Florida Division of Emergency Management 2014).

populations in deeper catchments, and the ingress of migratory birds. These emergent properties provided a highly visible portrayal of the principle of relatedness, and, because of the seasonal cyclicality, the principle of circularity. Thus, water takes on an extremely important significance because it is tied to the principles of relatedness and circularity, and building the monuments in flowing water was an enduring performance of both principles.

The form of the monuments themselves is also an enduring performance of the principles of relatedness and circularity. To reiterate, these monuments are composed of an oblong midden-mound surrounded by a semicircular embankment with multiple linear embankments radiating outward from it and terminating in conical earthen mounds surrounded by additional semicircular embankments. The principle of circularity is embodied in the form of the monuments: it is exhibited in the semicircular embankments, the conical mounds, and, to a lesser extent, the oblong midden-mounds. If the terminal mounds are connected with a line they give a rough outline of yet other semicircles, ultimately forming a set of nested circles (Figure 6) that resembles how Pueblo peoples conceptualize their cosmos (Fowles 2009, 2013; Snead 2008). The fact that this principle is manifest as semicircles, rather than full circles, is suggestive of water's link between the principles of relatedness and circularity. The opening in the circle allows enduring relations between the inhabitants of the midden-mounds, water, and aqueous entities moving into the confines of the circle. If the circles were closed, there would be no openness to these relations. Thus, the incomplete circle suggests a connection between these two principles in the Belle Glade ontology.

The principles of relatedness and circularity are also embodied in the radiating embankments of the monuments. At seven of the eight Type B monuments, one or more of the embankments are aligned with celestial events within ±2° error (Figure 7). Carr et al. (1995:258) briefly reflected on this characteristic in regard to the Ortona site, but it was never pursued. The events being signified are solstices, equinoxes, and

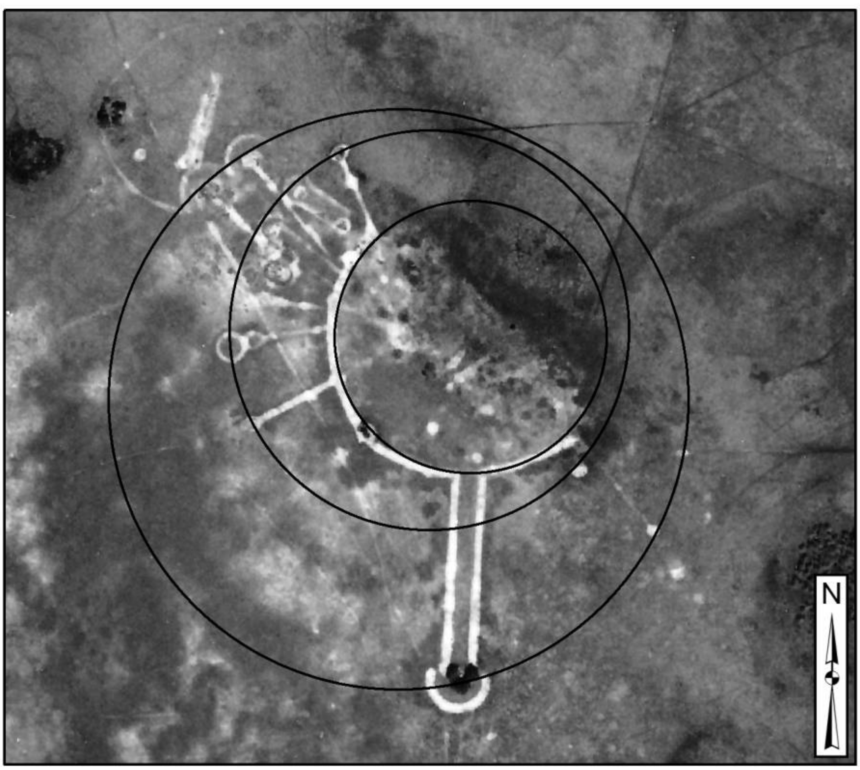

Figure 6. Circularity in Type B monuments with Tony's Mound as an example (Image: USDA 1957c).

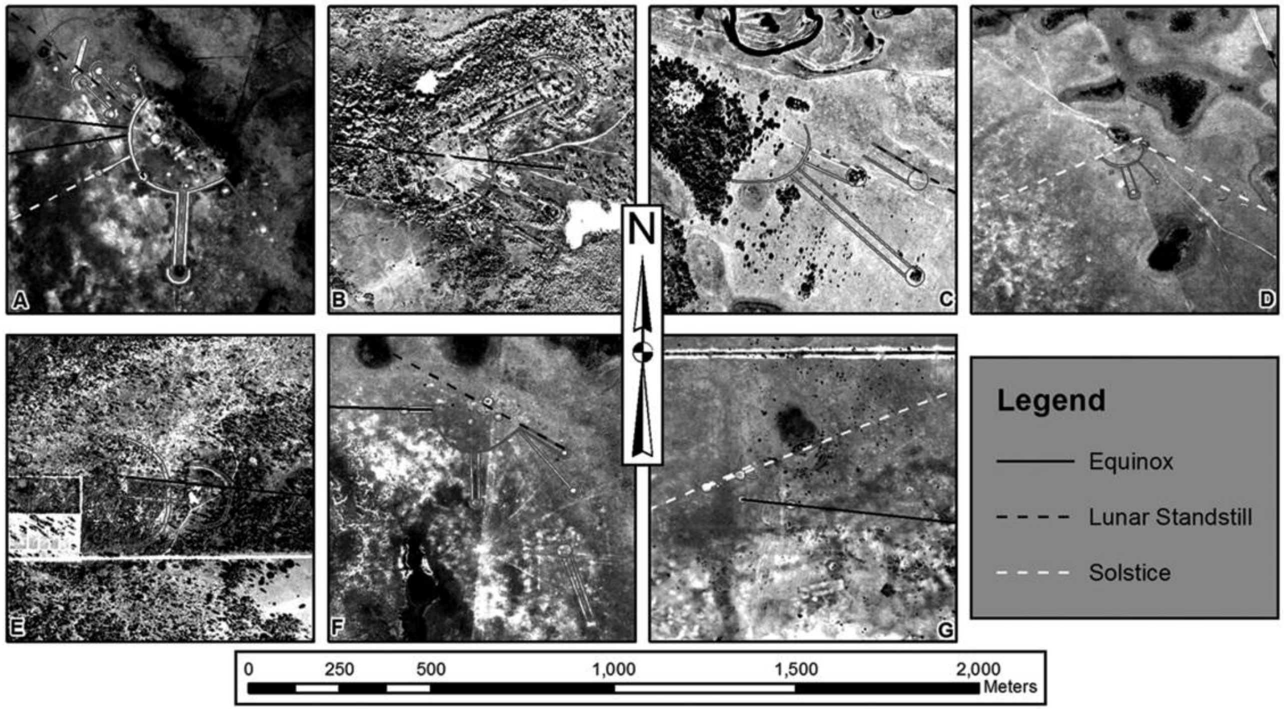

Figure 7. Celestial alignments in Type B monuments. (A) Tony's Mound (Image: USDA 1957c); (B) Big Mound City (Image: USDA 1949a); (C) Fort Center (Image: USDA 1948b); (D) Kissimmee Circle Earthworks (Image: USDA 1957a); (E) Ortona Earthworks (Image: USDA 1949b); (F) Hendry Earthworks (Image: USDA 1957b); (G) South Lake Mounds (Image: USDA 1957d).

lunar maxima, suggesting an intricate knowledge of time and celestial movement. The alignments with solstitial and equinoctial events suggest the importance of the relatedness between the cosmos and seasonality to the Belle Glade ontology. This is significant in the context of the KOE watershed, where water levels are a highly visible characteristic of the landscape. Understanding this cycle is important because water levels play a large role in predicting animal behaviors (Dalrymple et al. 1991; Frederick and Ogden 2001), distributions (Bancroft et al. 2002; Chick et al. 2004; Johnson et al. 2007; Kushlan 1976, 1980), and breeding seasons (Humphrey and Zinn 1982; Johnson et al. 2007; Richter and Labisky 1985) in the region, which often differ from other areas of Florida because of the unique environmental characteristics. In turn, the water levels are tied to precipitation patterns, which are tied to solar events: the vernal equinox signals the onset of the rainy season, the estival solstice marks the peak of heavy rains, the autumnal equinox signals the end of the heaviest precipitation, and the hibernal solstice is associated with landscape drying.

The alignments with these events provide evidence that the Belle Glade peoples held knowledge of the relatedness of the cosmos to water levels because the monuments were built in relation to water and because subsistence relied on knowledge of the seasonal distributions and behaviors of the local fauna. This latter point is especially salient. Each year when the landscape dries, fish populations migrate into deeper catchment basins that continue to retain water (Ewel 1990; Gaff et al. 2000, 2004; Kushlan 1974, 1976, 1980, 1990). Thus, the alignments may also have aided in predicting when to adjust land-use patterns to target the congregated fish populations. There is also likely a sacred aspect to these celestial events and their citation in the monuments. This may have been reflected in the timing of ceremonial activity, or the assembly of people at these monuments during these celestial events. Further, the seasonal cosmic events referenced in the alignments are important because the relationship between them and the emergence of landscape features would be highly visible. Thus, the relatedness between earth and sky would be cognized as an emergent property of the world, with the cyclical movement of the cosmos bringing different aspects of the landscape into emergence.

The radiating embankments also embody the principle of relatedness in a second form, a form that is tied to the principle of place-centeredness. When the linear embankments are extended across the landscape, they align with monumental architecture located at other sites. Several mound-to-mound sitings exhibit this as well. In total, 32 site alignments originate from seven of the Type B monuments (Table 2), all of which are within a 0.01° margin of error.[3] Figures 8–10 provide examples of the alignments originating from Tony's Mound (Figures 8 and 9) and Hendry Earthworks (Figure 10). In these figures the base map shows the entire group of alignment lines, and the insets detail where the lines intersect. A comparison of the number of observed alignments (n=32) with the number of possible alignments (n=38)[4] suggests that these alignments do not occur by chance, as 84.2% of the embankments and mound-to-mound sitings are aligned with other sites. The majority of these alignments involve

Table 2. Circular-linear earthworks, embankment azimuths, site intersections, and cultural affiliations of intersected sites

Embankment Type	Azimuth	Site Intersect	Cultural Affiliation	Architecture Type
Tony's Mound				
Double Embankment 1	183.7	*(none identified)*		
Double Embankment 2	309.5	Ortona Earthworks	Belle Glade	Type B Earthwork
Double Embankment 3	306.3	*(none identified)*		
Embankment 1	139.6	Miami Circle Ditch	Possible Belle Glade	Circular Ditch
Embankment 2	241.9	Naples Canal	Calusa	Calusa Canal
Embankment 3	261.2	Mound Key – canal	Calusa	Calusa Canal
Embankment 3	275.9	Pineland	Calusa	Calusa Mound Complex
Embankment 4	315.0	*(none identified)*		
Embankment 5	319.6	*(none identified)*		
Embankment 6	334.1	Fort Center	Belle Glade	Type B Earthwork
Mound to Mound Ramps	51.4	Joseph Reed Shell Ring	Late Archaic	Archaic Shell Ring
Mound to Mound	52.4	Big Mound City	Belle Glade	Type B Earthwork
Fort Center				
Double Embankment 1	122.3	Belle Glade Mound	Belle Glade	Conical Burial Mound
Double Embankment 2	115.7	Kreamer Island	Belle Glade	Subaqueous Ossuary
Double Embankment 3	132.5	New River Earthworks	Possible Belle Glade	Unknown†
Great Circle Line of Sight 1	79.6	Joseph Reed Shell Ring	Late Archaic	Archaic Shell Ring
Great Circle Line of Sight 2	143.8	Miami Circle Ditch	Possible Belle Glade	Circular Ditch

Kissimmee Circle Earthworks				
Double Embankment	163.7	Ritta Island	Belle Glade	Subaqueous Ossuary
Embankment 1	119.7	*(none identified)*		
Embankment 2	138.9	*(none identified)*		
Mound to Mound	244.8	Pineland	Calusa	Calusa Mound Complex
Hendry Earthworks				
Double Embankment 1	121.7/301.7	Ortona Earhworks	Belle Glade	Type B Earthwork
Double Embankment 2	179.3	*(none identified)*		
Double Embankment 3	271.8	Pineland	Calusa	Calusa Mound Complex
Double Embankment 4	164.3	Tony's Mound	Belle Glade	Type B Earthwork
Embankment 1	141.5/321.5	Miami Circle Ditch/South Lake Mounds	Possible Belle Glade/Belle Glade	Circular Ditch/Type B Earthwork
Ortona				
Double Embankment	96.5	Kreamer Island	Belle Glade	Subaqueous Ossuary
Big Mound City				
Double Embankment 1	60.4/240.4	Hendry EW	Belle Glade	Type B Earthwork
Double Embankment 2	118.5/298.5	Whitebelt Circle	Belle Glade	Circular Ditch
Double Embankment 3	117.6/297.6	Blueberry	Belle Glade	Conical Mound
Triple Embankment	277.0/97.0	Fort Center	Belle Glade	Type B Earthwork
Embankment 1	125.1/305.1	Kissimmee Circle Earthworks	Belle Glade	Type B Earthwork
Embankment 2	145.9/325.9	Barley Barber I	Belle Glade	Type A Earthwork
Embankment 3	245.7/65.7	Maple Mound	Belle Glade	Type B Earthwork

continued on next page

Table 2. (*Continued*)

Embankment Type	Azimuth	Site Intersect	Cultural Affiliation	Architecture Type
South Lake Mounds‡				
Mound to Mound 1 (N)	244.8	Mound Key	Calusa	Calusa Mound Complex
Mound to Mound 2 (S)	96.3	Ritta Island	Belle Glade	Subaqueous Ossuary
Crescent to Crescent	149.5	Tony's Mound	Belle Glade	Type B Earthwork
Mound to Crescent Mound	66.3	Joseph Reed Shell Ring	Late Archaic	Archaic Shell Ring

Note: Measurements are listed in clockwise order and divided into single, double, and triple embankments.

†This site has been destroyed, but the single historical description notes the presence of linear ridges or embankments terminating in conical mounds, so it is likely a Type A or Type B circular-linear earthwork (see Harrington in Boas et al. 1909:139).

‡See Carr and Steele (1992: fig. 5) for a reconstruction of this earthwork. Much of their reconstruction was not visible on historic aerial photographs so the full reconstruction was not used in this research.

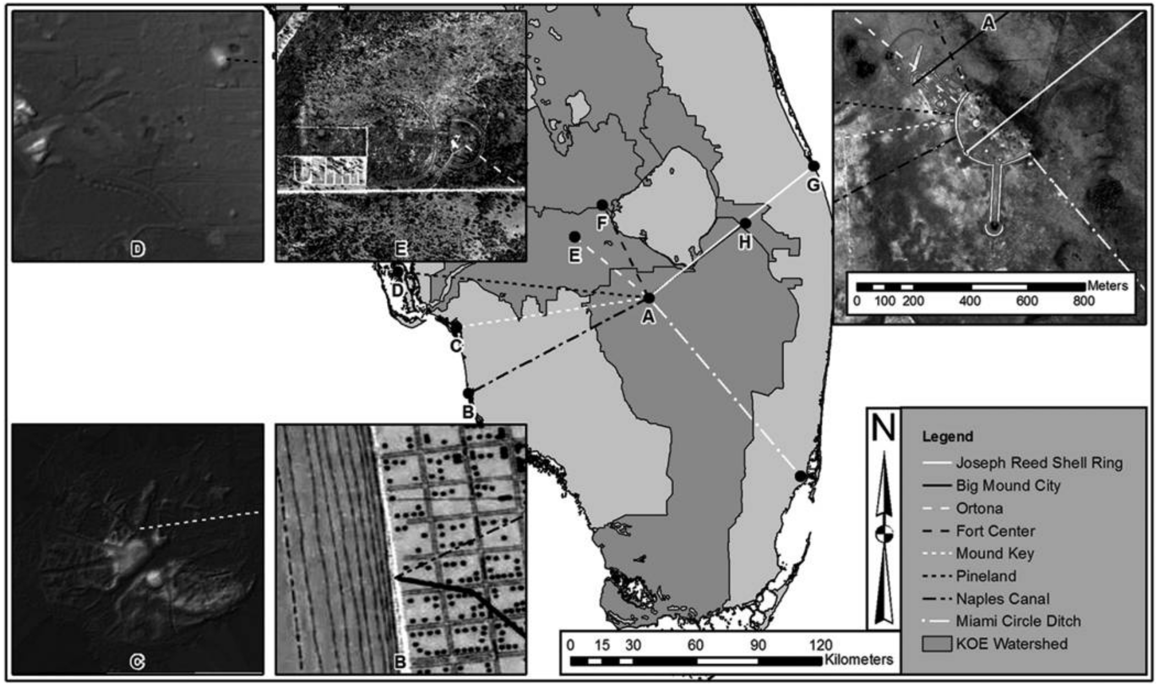

Figure 8. Alignments exhibited by Tony's Mound. (A) Tony's Mound (Image: USDA 1957c); (B) Naples Canal (Image: USGS 1991); (C) Mound Key (Image: FDEM 2014); (D) Pineland (Image: FDEM 2014); (E) Ortona Earthworks (Image: USDA 1949b). In this figure the alignments originate from Tony's Mound (pictured in inset A) and intersect the western edge of the Naples Canal (inset B), Mound 2 and a prehistoric canal at Mound Key (inset C), Brown's Mound at the Pineland Complex (inset D), and the terminal mound of Ortona's Type B monument (inset E). Note that all insets use the same scale in inset A, while the background base map is associated with the scale at the bottom of the figure. (Watershed boundaries: NRCS 2015).

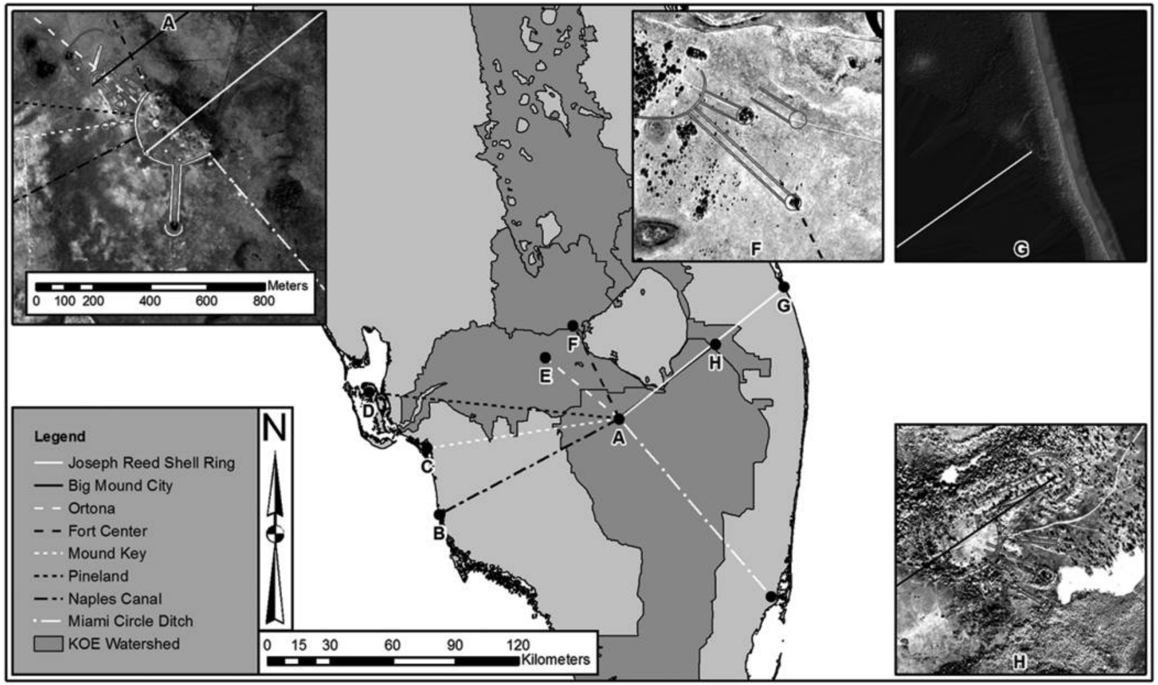

Figure 9. Alignments exhibited by Tony's Mound. In this figure the alignments originate from Tony's Mound (pictured in inset A) and intersect a terminal mound in Fort Center's Type B monument (inset F), Joseph Reed Shell Ring (inset G), and the terminal mound of Big Mound City's primary embankment (inset G). Note that all insets use the same scale in inset A, while the background base map is associated with the scale at the bottom of the figure. (A) Tony's Mound (Image: USDA 1957c); (F) Fort Center (Image: USDA 1948b); (G) Joseph Reed Shell Ring (Image: FDEM 2014); (H) Big Mound City (Image: USDA 1949a). (Watershed boundaries: NRCS 2015).

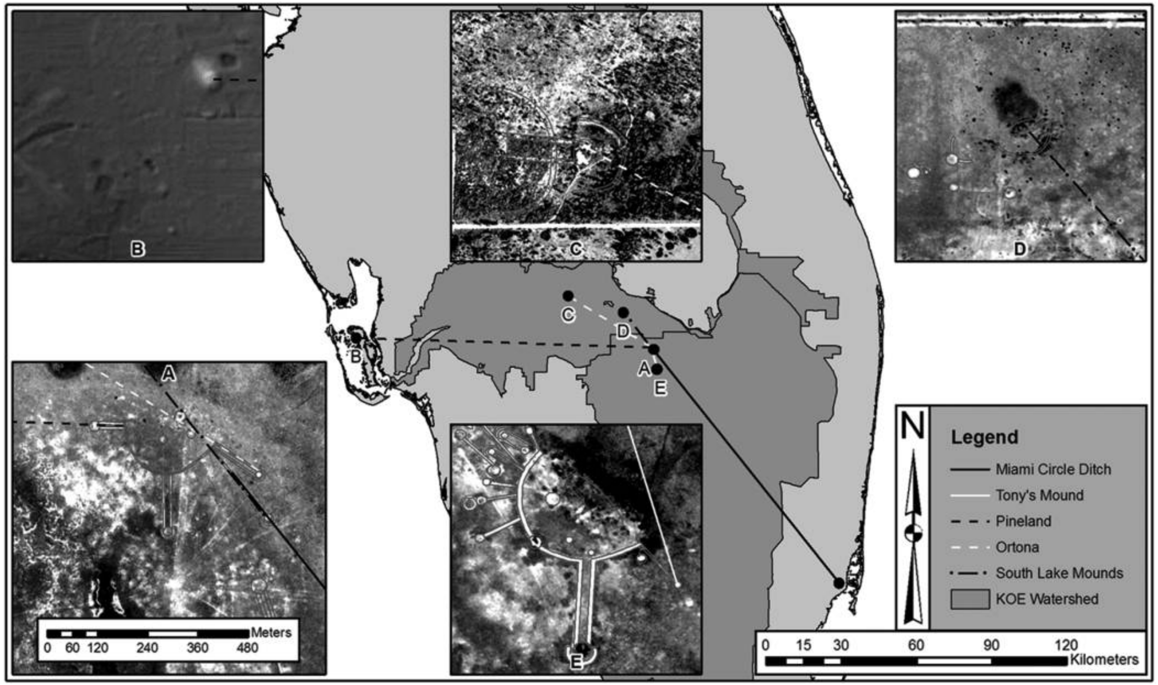

Figure 10. Alignments exhibited by Hendry Earthworks. (A) Hendry Earthworks (Image: USDA 1957b); (B) South Lake Mounds (Image: USDA 1957d); (C) Ortona Earthworks (Image: USDA 1949b); (D) Pineland (Image: FDEM 2014); (E) Tony's Mound (Image: USDA 1957c). (Watershed boundaries: NRCS 2015).

monumental sites in the Okeechobee Basin and sites with known subaqueous mortuary components. Twenty-three (71.9%) of the observed alignments involve sites affiliated with the Belle Glade archaeological culture (Table 2), with eleven (47.8%) being Type B earthworks. Three of these monuments have two alignments from separate sites converging on them. Converging alignments also occur with two subaqueous ossuaries, a circular ditch, two Calusa sites, and an Archaic shell ring site.

Moreover, the probabilities associated with these alignments suggest that the Belle Glade peoples had a strong geographic knowledge of their landscape, allowing them to construct features with highly accurate, long-distance alignments. The probability for aligning with monumental sites ranges from 0.02 to 0.35; the probability for aligning with non-monumental sites is much greater, ranging from 0.65 to 0.95. The probability ranges of aligning with one of the observed alignment sites (see Table 2) is much smaller than the probability for aligning with any monumental site within the pertinent azimuth ranges: 0.002–0.054. The combination of the known affiliations between these sites, documented archaeologically among the Belle Glade sites and historically between the Mayaimi (Belle Glade) and Calusa peoples, and the very low probability of incidental alignments provides further support for the intentionality of constructing these monuments purposefully for aligning with other places. For site-specific probabilities see Tables 3–9, which display the probabilities of aligning with a monumental site, a non-monumental site, or a Belle Glade monument for each of the 10° azimuth ranges associated with an embankment or mound-to-mound siting azimuth. These tables also provide the raw data used for calculating the probabilities within each azimuth range.

The alignments suggest these were meaningful places that did not exist in isolation, but rather were part of an integrated landscape with people moving within and between them with enough regularity that sufficiently strong relations were formed and maintained to warrant their citations being monumentalized. This pattern of alignments is roughly similar to the sighting stones used in Micronesia and Polynesia (Lewis 1974, 1994) and the zeq'e system of the Inka Empire (Bryan 2014; Christie 2008, 2012). However, rather than using these alignments to integrate people and places into an imperial hierarchy, as the Inka did, the Belle Glade people used them in a different fashion. They are enduring performances of the principles of relatedness and place-centeredness, and much like the Micronesian and Polynesian sighting stones, they would have aided the travel of people between these places to perform practices reifying these principles while maintaining kin relations and meeting potential mates.

Furthermore, the alignments with sites containing subaqueous ossuaries suggest the importance of these places and the ancestors contained within them. This is further suggested by the presence of multiple alignments to them originating from multiple monuments. It is also of significance that these mortuary practices are not known anywhere outside of the KOE watershed during this time (ca. AD 180–340 to ca. AD 540–650; Thompson and Pluckhahn 2012:59). Much like the other alignments, those to the subaqueous ossuaries of the region suggest the importance of the principles of

Table 3. Alignment probabilities and site distributions by azimuth range from Tony's Mound

Tony's Mound	Azimuth Range (Decimal Degrees) Associated with Possible Alignments								
Azimuth range	51–60	131–140	181–190	241–250	261–270	271–280	301–310	311–320	331–340
P (monument)	0.17	0.1	0.07	0.16	0.35	0.34	0.18	0.1	0.11
P (non-monument)	0.83	0.9	0.93	0.84	0.65	0.66	0.82	0.9	0.89
P (Belle Glade monument)	0.073	0.006	0	0.015	0.013	0.012	0.003	0	0.005
No. of non-monumental sites	34	144	122	56	51	54	249	453	473
No. of monumental sites	7	16	9	11	28	28	54	49	56
Total sites (*N*)	41	160	131	67	79	82	303	502	529
Possible alignment azimuths	51.4, 52.4	139.6	183.7	241.9	261.2	275.9	306.3, 309.5	315, 319.6	334.1
No. of Belle Glade monuments in range	3	1	0	1	1	1	1	0	3

Table 4. Alignment probabilities and site distributions by azimuth range from Big Mound City

Big Mound City	Azimuth Range (Decimal Degrees) Associated with Possible Alignments					
Azimuth range	231–240	241–250	271–280	291–300	301–310	321–330
P (monument)	0.14	0.25	0.21	0.09	0.05	0.08
P (non-monument)	0.86	0.75	0.79	0.91	0.95	0.92
P (Belle Glade monument)	0.03	0.026	0.003	0.003	0.003	0.002
No. of non-monumental sites	114	113	221	493	278	408
No. of monumental sites	18	37	58	51	15	36
Total sites (*N*)	132	150	279	544	293	444
Possible alignment azimuths	240.4	245.7	277	297.6, 298.5	305.1	325.9
No. of Belle Glade monuments in range	4	4	1	2	1	1

Table 5. Alignment probabilities and site distributions by azimuth range from Fort Center

Fort Center	Azimuth Range (Decimal Degrees) Associated with Possible Alignments				
Azimuth range	71–80	111–120	121–130	131–140	141–150
P (monument)	0.2	0.31	0.24	0.14	0.14
P (non-monument)	0.8	0.69	0.76	0.86	0.86
P (Belle Glade monument)	0.028	0.038	0.054	0.006	0.004
No. of non-monumental sites	55	18	28	124	173
No. of monumental sites	14	8	9	21	28
Total sites (*N*)	69	26	37	145	201
Possible alignment azimuths	79.6	115.7	122.3	132.5	143.8
No. of Belle Glade monuments in range	2	1	2	1	1

relatedness and place-centeredness, but in this case the relatedness is between the living and the dead, with the dead being recurrently interred in the same place over the course of generations. Although no ethnohistoric documents exist that discuss the importance of ancestors to the Belle Glade peoples, the neighboring Calusa and Tequesta were documented to have placed great importance on them, to the point of making recurrent visitations to mortuary facilities to converse with ancestral spirits (Hann 2003: 191, 197; Worth 2014:217). The Belle Glade peoples likely followed similar practices given their relationships with the Calusa and Tequesta (see below).

A significant number of alignments to sites outside the basin also exist. Three of them are to the Miami Circle Ditch (Figure 11a). Although it is located outside the watershed, the morphology of this circular monument suggests a strong connection with the people living in the Okeechobee Basin, where circular ditches are an early form of monumental architecture (Carr 1985; Johnson 1991, 1996).[5] There are also three alignments originating from multiple monuments that converge on the Joseph Reed Shell Ring (Figure 11b). Significantly, this site predates the Type B earthworks by millennia (Russo 2006; Russo and Heide 2000, 2002). The alignments may represent a citation to a place considered to be of ancestral significance, especially when considered alongside the alignments to subaqueous ossuaries. This further suggests the importance of ancestral relations to the Belle Glade ontology.

The alignments to Pineland, Mound Key, and the Naples Canal on the Gulf Coast (Figure 12) are just as significant because of their association with the Calusa, who held political control over the Okeechobee Basin in the sixteenth century (Marquardt 2014; Marquardt and Walker 2012, 2013; Worth 2014). There are a significant number of alignments to Calusa sites (n=6; 18.75%), and two of the sites (the two largest sites associated with the Calusa) have multiple alignments converging on them. Mound Key, historically known as Calos, was the Calusa capital during the sixteenth through eighteenth centuries, and Pineland was the second-largest Calusa village (Marquardt

Table 6. Alignment probabilities and site distributions by azimuth range from Hendry Earthworks

Hendry Earthworks	Azimuth Range (Decimal Degrees) Associated with Possible Alignments					
Azimuth range	141–150	161–170	171–180	271–280	301–310	321–330
P (monument)	0.12	0.12	0.09	0.29	0.17	0.06
P (non-monument)	0.88	0.88	0.91	0.71	0.83	0.94
P (Belle Glade monument)	0.007	0.007	0	0.007	0.002	0.002
No. of non-monumental sites	124	118	204	98	323	378
No. of monumental sites	17	16	20	41	65	24
Total sites (*N*)	141	134	224	139	388	402
Possible alignment azimuths	141.5	164.3	179.3	271.8	301.7	321.5
No. of Belle Glade monuments in range	1	1	0	1	1	1

Table 7. Alignment probabilities and site distributions by azimuth range from Kissimmee Circle Earthworks

Kissimmee Circle Earthworks	Azimuth Range (Decimal Degrees) Associated with Possible Alignments			
Azimuth range	111–120	131–140	161–170	241–250
P (monument)	0.28	0.17	0.05	0.18
P (non-monument)	0.72	0.83	0.95	0.82
P (Belle Glade monument)	0.031	0	0.015	0.007
No. of non-monumental sites	23	30	63	106
No. of monumental sites	9	6	3	24
Total sites (*N*)	32	36	66	130
Possible alignment azimuths	119.7	138.9	163.7	244.8
No. of Belle Glade monuments in range	1	0	1	1

1992a, 2014; Marquardt and Walker 2012; Worth 2013). Significantly, relations with the Calusa are documented archaeologically as early as AD 500 in the form of Belle Glade Plain pottery recovered from Calusa sites (Cordell 2013; Marquardt 2014; Marquardt and Walker 2013); thus these alignments signify not only important relations with political connotations, but also long-standing relations that shifted over time.

As noted above, the Mayaimi were subject to Calusa political control in the sixteenth century, but this was not always the case. Rather, heterarchical political relations (Crumley 1995:3) were in place among the Calusa and the groups of interior South Florida (Marquardt 2014; Marquardt and Walker 2013). Specifically, reciprocal relations among the Calusa and interior groups emerged between ca. AD 500 and 800,

Table 8. Alignment probabilities and site distributions by azimuth range from South Lake Mounds

South Lake Mounds	Azimuth Range (Decimal Degrees) Associated with Possible Alignments			
Azimuth range	61–70	91–100	141–150	241–250
P (monument)	0.29	0.24	0.13	0.3
P (non-monument)	0.71	0.76	0.87	0.7
P (Belle Glade monument)	0.032	0.04	0.019	0.023
No. of non-monumental sites	22	19	135	30
No. of monumental sites	9	6	20	13
Total sites (*N*)	31	25	155	43
Possible alignment azimuths	66.3	96.3	149.5	244.8
No. of Belle Glade monuments in range	1	1	3	1

Table 9. Alignment probabilities and site distributions by azimuth range from Ortona Earthworks

Ortona	Azimuth Range (Decimal Degrees) Associated with Possible Alignments
Azimuth range	91–100
P (monument)	0.23
P (non-monument)	0.77
P (Belle Glade monument)	0.033
No. of non-monumental sites	23
No. of monumental sites	7
Total sites (*N*)	30
Possible alignment azimuths	96.5
No. of Belle Glade monuments in range	1

which is evidenced by the ever-increasing amount of trade that began between the two areas during a time of lowered water tables (Marquardt 2014:13–16). Thus, this relationship with the Calusa was initially based on the need to rely on each other during an unpredictable time. After ca. AD 800, this relationship shifted to a patronage/clientage system, and by AD 1513 the Calusa and their subject groups were ruled by "a powerful despot who was feared throughout southern Florida" (Marquardt 2014:15–16). The alignments to Calusa sites signify the importance of the patronage/clientage system to the Belle Glade peoples. The small regional population, numbering 1,500–2,500

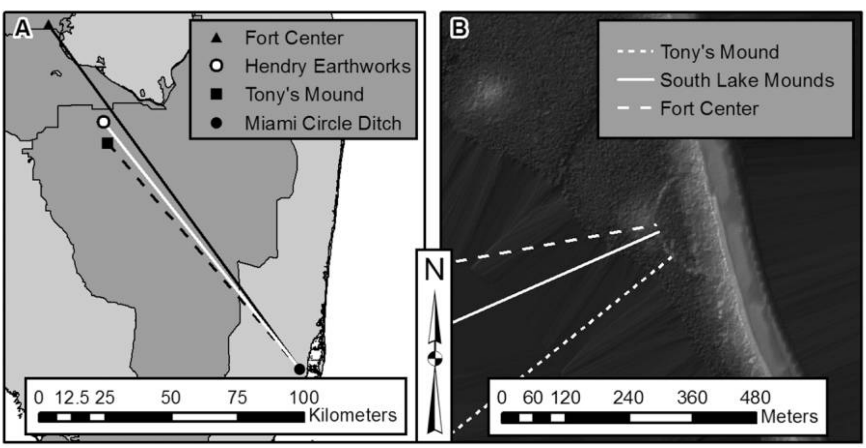

Figure 11. Convergent alignments to the Atlantic Coast. Sites of origin for the alignments are listed in the legend. (A) Alignments to the Miami Circle Ditch site; (B) Alignments to the Joseph Reed Shell Ring (Image: FDEM 2014). (Watershed boundaries: NRCS 2015).

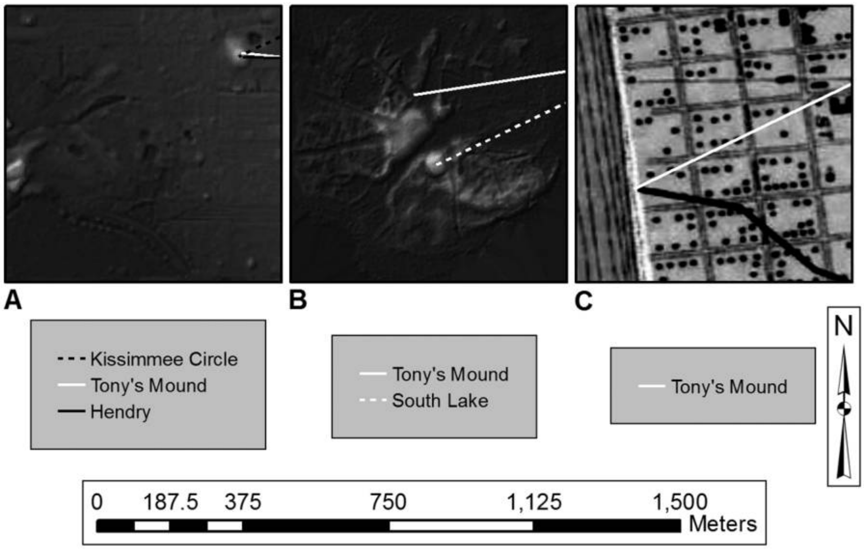

Figure 12. Alignments to Calusa sites along the Gulf Coast. Sites of origin for the alignments are listed in the legend. (A) Pineland (LiDAR data: FDEM 2014); (B) Mound Key (LiDAR data: FDEM 2014); (C) Naples Canal (Image: USGS 1991).

(Hale 1984; Widmer 1988, 2002), would have made Calusa military strength essential for protection from the expansion of the northern chiefdoms. As well, the Belle Glade people relied on the Calusa for many of the marine materials they used to make tools, adding further importance to this relationship.

All of the sites on the Gulf Coast connected by alignments to Belle Glade sites in the KOE contain water-control features in the form of canals, which the Calusa built throughout their domain (Luer 1989, 1998; Luer and Wheeler 1997; Marquardt 2014; Marquardt and Walker 2012, 2013; Wheeler 1995). The Belle Glade people held this in common with the Calusa as they built at least two canals in the KOE (Carr et al. 1995, 2002; Wheeler 1995). Further, it has been argued that these canals played an integral role in establishing and maintaining the relations between the Calusa and Mayaimi because they would have allowed unimpeded travel to and from the interior and were also large enough for the passage of multiple canoes and/or lashed canoes (i.e., catamarans) laden with goods (Marquardt 2014). The fact that the alignments were directly to canals in some cases, and to features adjacent to canals in others, may point to the significance of these features and the movement of water and people through them in maintaining the balance of the Belle Glade world and for the performance of relations.

The principle of place-centeredness is also exhibited in a second form. As discussed above, previous archaeological investigations have demonstrated that the majority of the architectural features of these monuments are largely sterile in terms of material culture. This sterility is associated with the semicircular embankments, radiating embankments, and the terminal conical mounds of those embankments. Although minute amounts of cultural materials have been recovered from *some* of the terminal conical mounds, it is likely these materials were incidental inclusions resulting from the "mining" of cultural sediments to be used in construction of the monuments. In contrast, the midden-mounds provide evidence for long-term use and occupation. This is most clearly exhibited at Big Mound City, where recent work has demonstrated the presence of numerous stratified anthropogenic strata spanning approximately 1,000 years (Lawres and Colvin 2017). These deposits suggest long-term, recurrent use of the same locations and thus provide evidence for the presence of the principle of place-centeredness in the Belle Glade ontology.

The ontological principles identified in the Belle Glade monuments would have been socially significant in several ways. As organizing principles for how the Belle Glade peoples would have understood their world as existing and operating at a fundamental level, they would have been held in common by the majority of the regional population and would have provided common ground between community members. They also would have played a role in cultural transmission as community members were taught about their world and how it works. The monuments themselves may have played a role in this transmission because they are enduring features of a landscape visible to multiple generations. This is a salient point regarding the principle of relatedness. The manifestation of this principle in the monuments demonstrates the importance of knowledge of the relatedness between earth and sky, which has implications for daily life and habitation in the KOE watershed. It also points to the importance of relationships between people at the regional scale. Knowing which communities had long-standing relationships with your community can be important socially, politically, and culturally, and these relationships would be exceptionally important in times of duress.

A full exploration of the materialization of ontological principles in Belle Glade culture is beyond the scope of this essay. Nevertheless, the principles outlined above would have affected multiple aspects of the Belle Glade archaeological record. The monuments are no exception; they would have been built in a much different manner if the principle of circularity was absent. Further, if time and space were conceptualized linearly, the monuments may have taken the form of the detached linear embankments known for the historical period. If the principles of relatedness and place-centeredness were absent, the form of the monuments would not have included radiating embankments explicitly pointing to other places across the landscape, they would not have been intentionally built in flowing water, and they would not have aligned with the celestial events that signify a cyclical view of time. If place-centeredness were absent, we might not even expect to find monumental architecture because the act of monumentalization in itself signifies the importance of place. Further, places become sacred to Native peoples for a number of reasons, and once that sacredness is identified there is a moral obligation to commemorate them and participate in practices that maintain relations with them. The monumentalization of these places reflects that obligation.

CONCLUDING REMARKS

By approaching monumentality from an ontological perspective it is possible to show that ontological understandings of a world can be materialized in monumental form. In evaluating the Belle Glade monuments, I have shown that the Belle Glade ontology was composed of at least three principles: relatedness, circularity, and place-centeredness. The adherence to these principles affected the historical practice of monument-building in a unique way, resulting in unique monumental forms. If these principles were absent, the monumental architecture of the region would have been constructed in an entirely different manner. However, these are not the only principles in the Belle Glade ontology; they represent only a fragment of the whole.

Even so, the ontological approach used in this study is fruitful in reevaluating monumental architecture in cases where more traditional archaeological interpretations have not stood up to additional testing. It is useful for evaluating such architecture in more meaningful terms not only from an analytical sense, but also in the sense that it brings us closer to how the people who built the architecture would view it. I argue that this approach would be useful in reevaluating monumental architecture in other areas of the world because the practices involved in the production of such architecture are always translations of the underlying structures that inform them, and those structures are ontological in nature. However, the mechanisms of citation and the components of the lived world being cited might not be as clear-cut as the case study presented here because the citations in the Belle Glade monuments are explicit due to their specific form. In other areas, combining aspects of the approach presented here with those of other researchers involved in the ontological turn might prove useful.

Future research should continue to investigate the ways ontologies are materialized in monumental form. The global variability in monumentality could lead to a number of new lines of thought on the materiality of ontologies as well as on monumentality. However, such research should heed the critiques of the ontological turn and take care not to attribute overly generalized ontologies to the archaeological record. Instead, it should attempt to characterize the ontologies of individual groups in more nuanced ways because the current proliferation of such vague concepts as relational, animistic, and totemistic ontologies masks the presence of significant variability and hides the fact that we do not, nor will we ever, grasp the entirety of the ontologies in question.

NOTES

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1. To read the azimuth from North it is necessary to adjust the layer settings, which in their default form measure 0° as East.

2. It should be noted that the results of the hydrological modeling would not hold true for the Ortona Earthworks site because of this site's location in an upland environment not subject to the annual inundation exhibited at all of the other Type B monuments.

3. This margin of error was manually tested by projecting new lines at 0.001° intervals to see how many hundredths of a degree of change is necessary for the projected line to no longer be in alignment with the sites in question. While it varies from site to site, I found that changes between 0.003° and 0.006° would take the projected lines out of alignment with specific architectural features at a site, but it is not until 0.007°–0.01° that entire sites are taken out of alignment.

4. The number of possible alignments includes the total number of embankments and mound-to-mound sitings present at all of the Type B earthworks.

5. This connection can be considered problematic because this site is only known through an 1845 government survey and is currently beneath the pavement of Miami (Carr 1985:298). However, given the patterns arising from these data, the amount of precision indicated in these patterns, and the convergence of multiple alignments, it is probable that there was something of cultural significance located there.

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