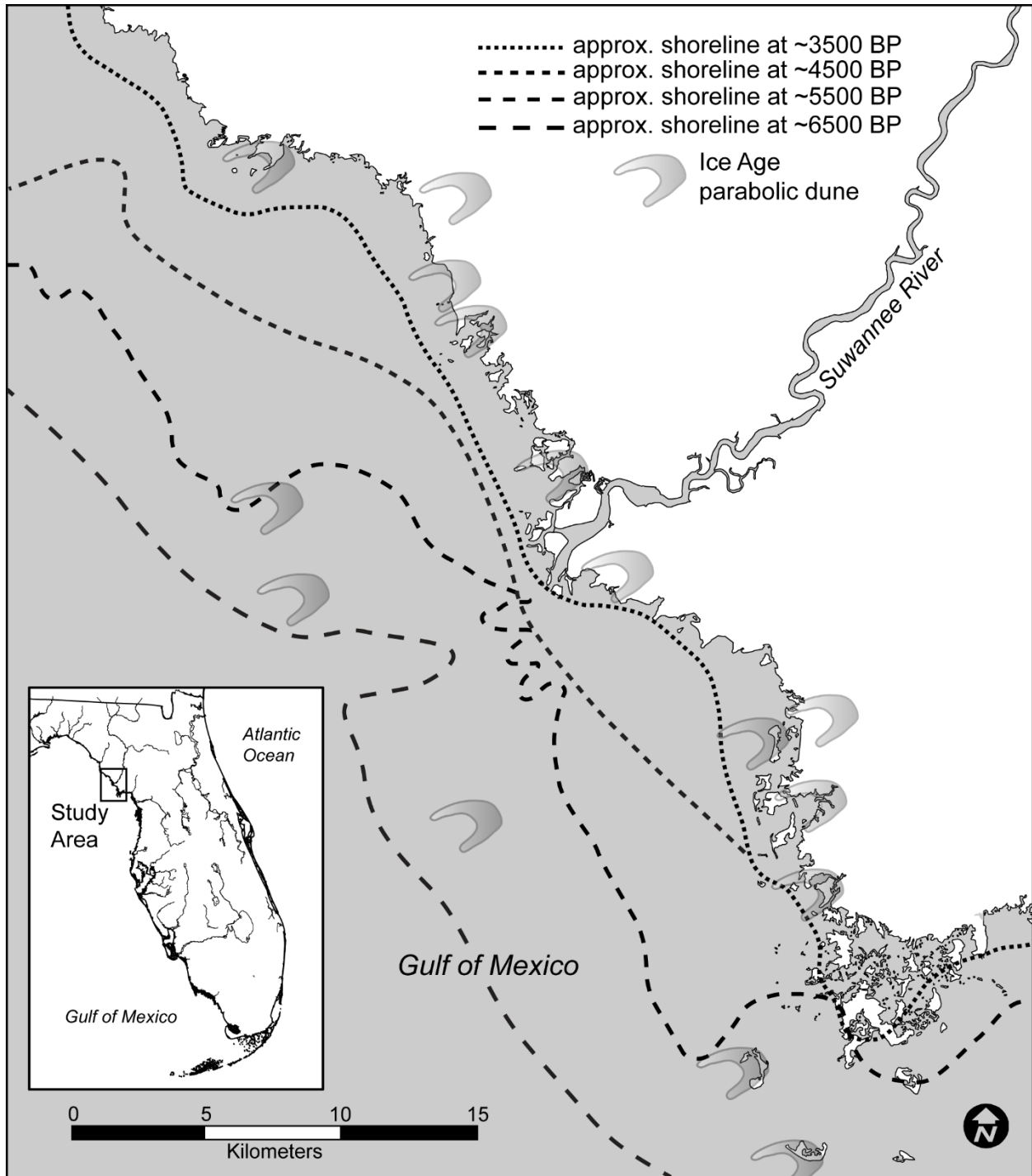


SUPPLEMENTAL TEXT

[Supplemental Text 1](#)
[Supplemental Text 2](#)
[Supplemental Text 3](#)
[Supplemental Text 4](#)
[Supplemental Text 5](#)
[Supplemental Text 6](#)
[References Cited](#)

Supplemental Text 1. It is beyond the scope of this paper to examine in detail how the landscape of the study area indexed movements of the sun, but several points warrant mention. First, when we assert that the landscape of the study area was predisposed to solstice gatherings we mean that geomorphic alignments on the earth's surface coincided with the azimuths of solar standstills, the solstices. Prevailing winds during the Pleistocene, when the study area was over 200 km from the coastline, blew from the southwest, forming over time parabolic dunes of variable size, but consistently oriented along a southwest-northeast axis (Supplemental Figure 1). There were scores of dunes in the study area before rising sea transmuted them (Wright et al. 2005). Few exist today in nearshore terrestrial settings but those that do—such as the dune arm on which Shell Mound was sited—preserve solstitial alignments. From a position at the head of any dune at winter solstice (December 21), the sun would have slipped below the horizon at a point equidistant between the parallel arms of the dune, ~240 degrees east of north. From a position between the arms of the dune on June 21 the sun would have risen directly over the head of the dune, its highest point, ~60 degrees east of north. We emphasize that there is nothing intrinsic about this earth-sun connection; its value awaited recognition and signification by observers on the ground. All such value or meaning is contextual and contingent, but inarguably movements of the sun have held significance for people worldwide and throughout history (Aveni 2001; Pauketat 2013:61-69; Williamson 1984). Due to the tilt of the earth relative to its orbit around the sun, the rising and setting sun migrates along a meridian, halting and reversing its northerly route at the summer solstice, and halting and reversing its southerly route at the winter solstice. Any observer of these cycles may notice landmarks on the horizon that reference the standstills; it is in this sense that such features awaited “discovery” and were then mobilized for ritual or political purposes (e.g., Ashmore 1991; Pauketat 2013). The “built” environment of temples, plazas, henges, and other architecture materializes all variety of celestial bodies and their movements, but here we are concerned with the larger scale of citation enabled by landscapes of solar alignment. For example, the buildings of Chaco Canyon are oriented with respect to both solar and lunar standstills (Sofaer 2008), but were they built in this particular canyon because of its solstitial orientation and position along a meridian (Lekson 1999)? Similarly, the moundscape of Poverty Point expresses a variety of solar alignments (Romain and Davis 2013), but is its location a matter of relational solar geography spanning much of the Southeast and two millennia of dwelling (Sassaman and Randall 2020)? At this larger scale of orientation, the precision of modern astronomy may not apply, which is to say that naked-eye astronomy need not attend to subdegree measurement or modest shifts in declination. Since the time parabolic dunes formed in the study area, they have materialized solstice alignments within a couple of degrees of deviation.

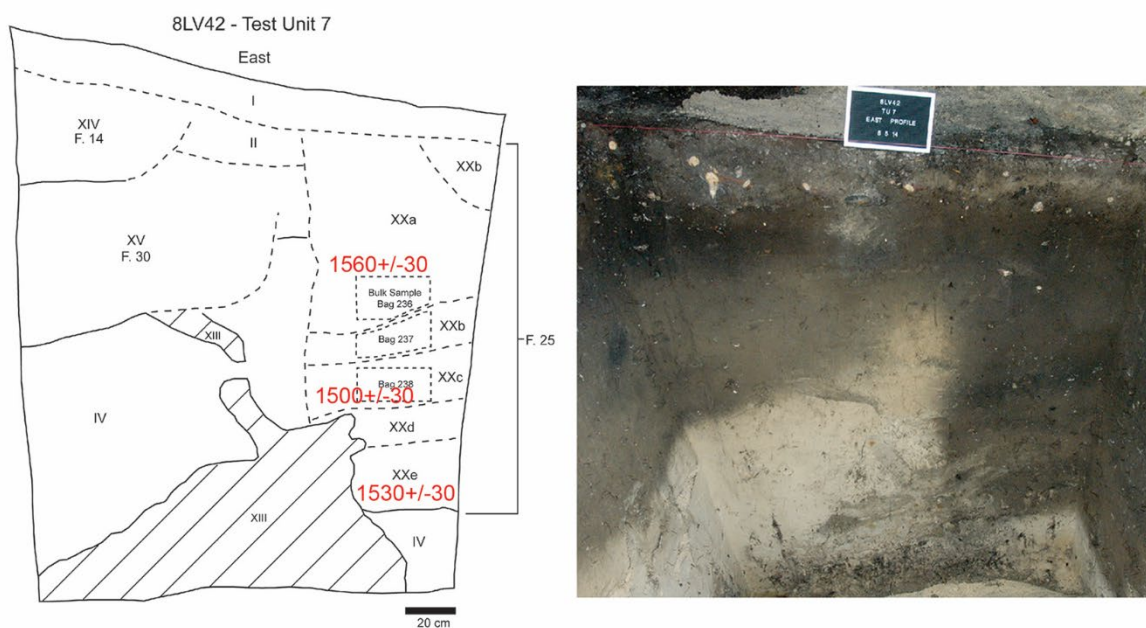


Supplemental Figure 1. Schematic map of the Lower Suwannee study area showing the locations of parabolic dunes both extant and extinct against projected backdrop of retreating shorelines over past ~6,500 years (following Wright et al. 2005).

Supplemental Text 2. Our use of the term “world renewal” follows from Knight’s (1986) interpretation of ethnohistoric accounts of Mississippian mound construction and mound-related rituals, particularly his sense that incarnations of platform mound rituality going back to Middle Woodland times “may be seen as a conservative, long-term complex of world-renewal ritual” (Knight 2001:312). These were routinized and repetitive rituals, such as the annual Green Corn ceremonies of Mississippian communities (Hudson 1976:365-375; Witthoft 1949), which were communal rites of purification and replenishment at the turning point of an annual cycle. Our use of the concept of world renewal goes beyond connotations related to revitalization or millennial movements as conceptualized by Wallace (1956) in the context of European colonialism. Looking beyond those historical particulars, we find it worthwhile to consider that climate events that disrupted coastal living could have been ameliorated by ceremonialism that carried the weight of social memory about intermittent disruptions by routinely gathering together regional communities for collective intervention. This perspective comports with recent theorizing over Native American religion that privileges practice over belief (e.g., Fowles 2013; Pauketat 2013)

Supplemental Text 3. In the dynamic relationship between coastal shorelines and the sea, overstepping is the process by which water breaches a barrier (shoreline proper, barrier islands, even oyster reefs) during a climate event (e.g., hurricane) and alters shoreline morphology through mass erosion and deposition. In the study area, salt marsh has aggraded with rising sea over the past few millennia, but occasional overstep events resulted in rapid shoreline retreat (Goodbred et al. 1998; Wright et al. 2005). A critical variable in this history is the health of the Great Suwannee oyster reef, which acts as a barrier to shoreline erosion. As with the marsh, oyster reefs have the potential to keep pace with rising sea; however, when reefs are diminished under changing conditions or overexploitation, storm surges have greater potential for overstepping shorelines. The recent downturn in the health of the Great Suwannee reef is owed to increased salinity, which traces to freshwater extraction far upriver (Seavey et al. 2011), an example of local-scale outcomes attending regional-scale processes.

Supplemental Text 4. The fill Feature 25 was stratified and thus possibly indicative of sequential, prolonged back-filling or possibly reuse (Supplemental Figure 2). However, AMS age estimates of 1530 ± 30 B.P. (lower), 1500 ± 30 B.P. (middle), and 1560 ± 30 B.P. (upper) are statistically coeval suggesting that the fill of Feature 25 was emplaced quickly after the hole was dug and thus represents a more-or-less single depositional event. The vertical walls of Feature 25 and other steep-walled pits could not have stood for long without collapsing. We observed no evidence of collapse in the profiles of any of the features (Sassaman et al. 2019). We did however observe dune sands deposited on the surface from which pits were dug, suggesting that not all excavated fill was returned to pits, which is not surprising given the volume of organic matter deposited in pits. All this goes to the likelihood that the back-filling of pits was part of the ritual activity of summer solstice feasts.



Supplemental Figure 2. Stratigraphic drawing (left) and photograph (right) of the east profile of Test Unit 7, showing Feature 25 and three AMS assays on charcoal from successive strata.

Supplemental Text 5. The “everyday” at Shell Mound has yet to be investigated for lack of discrete contexts, such as the features of domestic structures. We acknowledge that accretional middens offer opportunities for developing data on quotidian life, perhaps best sampled with finer fractions of vertebrate fauna than those we analyzed for this paper. We are aware that our emphasis on the ¼-inch fraction biases against the recovery of small fish. But fine-fraction recovery has its own biases, generally those associated with the reality that as screen size shrinks from ¼-inch to ⅛-inch to 1/16-inch or finer, the volume of fill that can be analyzed shrinks too, given the usual constraints of time and funding. Our emphasis on the ¼-inch fraction enabled us to examine large samples of pit and midden fill, but it is certainly reasonable to ask what we missed. As might be expected from prior studies of coastal sites in the Southeast (e.g., Colannino 2011; Reitz 2004; Reitz et al. 2009), fine-fraction samples of accretional midden from Shell Mound reveal a preponderance of small fish (e.g., pinfish and killifish) (Palmiotto 2015). Fine-fraction recovery rightfully reflects the use of near-shore, intertidal resources, and yet the larger samples of ¼-inch fill from Shell Mound—whether from pits or midden—shows that procurement involved boat travel to patches 12 km or more distant. They also reflect the use of infrastructure to intensify the capture of schooling fish. We agree that fine-fraction samples are needed to characterize the use of local, near-shore resources, but samples constrained by the volumetric limits of fine-fraction analyses would not have begun to characterize the economic intensification of solstice events. Similarly, after decades of research on the subsistence economies of the Calusa of southwest Florida, Marquardt (2014) commented on the limited number of mullet remains, a species that in historic times was fished intensively in the Charlotte Harbor region (Edic 1996:111–112). He attributes the lack of mullet bone to an analytical emphasis on fine-fraction samples as opposed to coarser-fraction but more widely sampled excavated fill. The point is not that mullet remains are never recovered in finer fractions, because they are, but that the events that reproduced the social and cosmological significance of Shell Mound, and perhaps the sacred sites of the Calusa, have archaeological distributions that are unlikely to be revealed with an emphasis on column samples in accretional midden.

Supplemental Text 6. That Shell Mound would be considered anomalous in the landscape of Middle Woodland civic-ceremonial centers goes more to the site-centric and typological proclivities of modern practitioners than to the intrinsic qualities of the site. The lack of a platform mound at Shell Mound obviously did not preclude the hosting of ritual events, suggesting that it was the *practice*, not the infrastructure, of ritual that reproduced Middle Woodland society over the centuries. Granted, inasmuch as platform-mound building was itself connected to world-renewal ceremonialism, as Knight (2001) argues, the absence of a platform mound at Shell Mound begs explanation. The elevated dune arm on which Shell Mound was built may have been a surrogate for a platform mound although given the precedence of the dunes over the mounds, the reverse may be true.

REFERENCES CITED

- Ashmore, Wendy
1991 Site Planning Principles and Concepts of Directionality among the Ancient Maya. *Latin American Antiquity* 2:199–226.
- Aveni, Anthony
2001 *Skywatchers* (revised edition). University of Texas Press, Austin.
- Colannino, Carol E.
2011 Examining Ichthyofaunal Remains for Evidence of Fishing Technologies Employed in Georgia Estuaries during the Late Archaic Period. *Southeastern Archaeology* 30:337–350.
- Edic, Robert F.
1996 *Fisherfolk of Charlotte Harbor*. Institute for Archaeology and Paleoenvironmental Studies, University of Florida, Gainesville.
- Fowles, Serevin
2013 *An Archaeology of Doings: Secularism and the Study of Pueblo Religion*. School for Advanced Research Press, Santa Fe.
- Knight, Vernon James
1986 The Institutional Organization of Mississippian Religion. *American Antiquity* 51:675–687.
- Lekson, Stephen H.
1999 *The Chaco Meridian: Centers of Political Power in the Ancient Southwest*. AltaMira, Walnut Creek, California.
- Marquardt, William H.
2014 Tracking the Calusa: A Retrospective. *Southeastern Archaeology* 33:1–24.
- Palmiotto, Andrea
2015 *Effective Seasons and Mobility Practices in the Lower Suwannee Region, Florida: A Zooarchaeological Study*. Ph.D. dissertation, Department of Anthropology, University of Florida, Gainesville.
- Pauketat, Timothy R.
2013 *An Archaeology of the Cosmos: Rethinking Agency and Religion in Ancient America*. Routledge, London.
- Reitz, Elizabeth J.
2014 Continuity and Resilience in the Central Georgia Bight (USA) Fishery between 2760 BC and AD 1580. *Journal of Archaeological Science* 41:716–731.

- Reitz, Elizabeth J., Irvy R. Quitmyer, and Rochelle A. Marrinan
2009 What Are We Measuring in the Zooarchaeological Record of Prehispanic Fishing Strategies in the Georgia Bight, USA? *Journal of Island and Coastal Archaeology* 4:2–36.
- Romain, William F., and Norm L. Davis
2013 Astronomy and Geometry at Poverty Point. Website article, Louisiana Archaeological Society. <http://www.laarchaeology.org/articles.html>, accessed October 21, 2013.
- Sassaman, Kenneth E., and Asa R. Randall
2020 Cosmic Abandonment: How Detaching from Place was Requisite to World Renewal in the Ancient American Southeast. In *Detachment from Place: Beyond an Archaeology of Settlement Abandonment*, edited by Maxime Lamoureau St-Hilaire and Scott MacRae. University of Colorado Press, Boulder (in press).
- Sofaer, Anna
2008 Chacoan Architecture: A Solar-Lunar Geometry. In *Chaco Astronomy: An Ancient American Cosmology*, edited by Anna Sofaer, pp. 115-126. Ocean Tree Books, Santa Fee, New Mexico.
- Wallace, Anthony F. C.
1956 Revitalization Movements. *American Anthropologist* 58:264–281.
- Williamson, Ray A.
1987 *Living the Sky: The Cosmos of the American Indian*. University of Oklahoma Press, Norman.
- Wright, Eric E., Albert C. Hine, Steven L. Goodbred Jr, and Stanley D. Locker
2005 The Effect of Sea-level and Climate Change on the Development of a Mixed Siliciclastic-carbonate, Deltaic Coastline: Suwannee River, Florida, U.S.A. *Journal of Sedimentary Research* 75:621–635.