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ORIGINAL ARTICLE

The Discovery and Exploration of Tristán de Luna y Arellano's 1559–1561 Settlement on Pensacola Bay

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Abstract Following the fortuitous 2015 discovery of a substantial assemblage of mid-16th-century Spanish ceramics in a residential neighborhood overlooking the Emanuel Point shipwrecks in Pensacola Bay, the University of West Florida Archaeology Institute worked with more than 120 landowners to conduct extensive archaeological testing across a broad area in order to determine the boundaries of and to explore the site. This article compares documentary and archaeological evidence to confirm the identification of the roughly 13–15 ha site as Tristán de Luna y Arellano's 1559–1561 settlement, making it the largest mid-16th-century Spanish colonial site in the Southeast and the earliest multi-year European settlement in the entire United States.

Extracto Después del descubrimiento fortuito en 2015 de un conjunto sustancial de cerámica española de mediados del siglo 16 en un vecindario residencial con vistas a los naufragios de Emanuel Point en la Bahía de Pensacola, el Instituto de Arqueología de la Universidad de West Florida trabajó con más de 120 propietarios para realizar pruebas arqueológicas exhaustivas en un área amplia para determinar los límites y explorar el sitio. Este artículo compara la evidencia documental y arqueológica para confirmar la identificación del sitio de aproximadamente 13–15 ha como el asentamiento de Tristán de Luna y Arellano de 1559–1561, convirtiéndolo en el sitio colonial español más grande de mediados del siglo 16 en el sudeste y el primer asentamiento europeo de varios años en todo el territorio de Estados Unidos.

Résumé À la suite de la découverte fortuite en 2015 d'un assemblage considérable de céramiques espagnoles datant de la moitié du 16ème siècle dans un quartier résidentiel surplombant l'épave du Emanuel Point à Pensacola Bay, l'Institut d'archéologie de l'Université de Floride occidentale a collaboré avec plus de 120 propriétaires terriens afin de conduire de vastes opérations de tests archéologiques à travers une large zone, visant à déterminer les limites du site et à en faire l'exploration. Cet article compare des preuves documentaires et archéologiques afin de confirmer l'identification du site d'environ 13 à 15 hectares comme étant la colonie implantée en 1559 et 1561 désignée sous le nom de Tristán de Luna y Arellano. Ceci en ferait le site colonial espagnol le plus important dans le Sud-Ouest à la moitié du 16ème siècle et la toute première colonie européenne active durant plusieurs années pour tous les États-Unis.

Keywords Tristán de Luna - Spanish Florida - southeastern United States - European colonization - sixteenth century

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Introduction

In August of 1559, Tristán de Luna y Arellano and some 1,500 settlers disembarked and unloaded their equipment and supplies from the ships that brought them from Veracruz to Pensacola Bay. Next they began to erect what they hoped would be the first successful Spanish settlement on the northern Gulf coast of the region then known as Florida (Davila Padilla 1625; Hudson et al. 1989; Galloway 1995:143–160; Priestley 2010; Worth 2018a). The Pensacola settlement was actually Spain's third formal attempt to establish a colony in Florida, following two short-lived attempts under Juan Ponce de León along the southwest Florida coast in 1521 and Lúcas Vázquez de Ayllón along the middle Georgia coast in 1526. There also had been a handful of other failed Spanish exploratory expeditions to southeastern North America, including those of Pánfilo de Narváez in 1528, Hernando de Soto in 1539–1543, and Luis Cancer in 1549 (Lowery 1901:411–427; Davis 1935; Lawson 1946; Hoffman 1980, 1990, 1992, 1994; Lyon 1981; Weddle 1985:38–54,234–246; Peck 1992; Clayton et al. 1993; Hudson 1997; Worth 2014:8–19,23–28,43–86,154–189). The Luna expedition was substantially larger and better-supplied than all previous expeditions. It included 500–550 infantry and cavalry soldiers recruited from around New Spain and paid in advance by the viceroy, some with families and children, many with servants and slaves, 200 Aztec warriors and craftsmen, along with a massive amount of food, equipment, and a range of other supplies. The Spanish Crown paid for mule transport of people and goods from Mexico City and other locations to converge at the port of San Juan de Ulua, and bought, rented, and even constructed new ships for a combined fleet of a dozen vessels to transport the settlers and their equipment to Florida. Beyond the fact that this massive and ambitious undertaking was the first major Spanish colonizing expedition to the North American Southeast that was substantially financed by the Spanish royal treasury, it was also notable for the fact that it was completely staged in New Spain and included a diverse mix of inhabitants from regions that had only been assimilated into the Spanish empire a generation earlier.

The principal intent of Luna's Pensacola settlement, named Santa María de Ochuse (later also known as "Polonza"), was to establish a beachhead from which to penetrate the mainland. The eventual goal was to create an overland route through the native province of Coosa and over the Appalachian Mountains to the Atlantic coast at Santa Elena in modern-day South Carolina in order to head off anticipated French intrusion there. Although Ochuse was intended to be a port from which people and supplies could subsequently be funneled into the new Florida colony, the massive hurricane that struck just five weeks later on 19 September devastated the fleet and wiped out the majority of the colony's food still on board, instantly transforming Luna's settlement into a refuge for the now-stranded colonists (Worth 2009). Even during the five months in 1560 that most of the colonists, in search of stable food supplies, relocated inland to central Alabama to the native town of Nanipacana, the settlement at Ochuse remained a pivotal link to the outside world, where relief fleets could arrive and deliver food and other supplies. Even after most of the remaining settlers were withdrawn by Luna's replacement, Angel de Villafañe, in April of 1561, a detachment of some 50 soldiers was left to guard the port until the effort was officially abandoned. The settlement finally evacuated to Veracruz in August 1561.

In their seminal 1989 article, presenting a new reconstruction of the route of the Luna expedition, Charles Hudson and his colleagues agreed with most previous authors, e.g., Lowery (1901:226,425–426) and Priestley (2010:xxxiv), in the identification of Pensacola Bay as Luna's Ochuse, noting however that "the precise location of Luna's settlement has not yet been discovered" (Hudson et al. 1989:33–34). Three years later, the 1992 discovery in Pensacola Bay of the mid-16th-century shipwreck now known as Emanuel Point I ultimately led to the conclusion that one of the ships from Luna's lost fleet had been found (R. Smith, Spirek et al. 1995; R. Smith, Bratten et al. 1998; R. Smith 2018). The 2006 discovery of a contemporaneous second wreck, Emanuel Point II, just a few hundred meters away, provided even further indication of the colony's likely location somewhere on Pensacola Bay (Cook, Bratten, Worth et al. 2009). Despite these discoveries, however, multiple archaeological projects at Pensacola Bay's three successive, late 17th- to early 18th-century Spanish presidios produced no evidence for Luna's settlement (Bense 1999, 2003; Harris and Eschbach 2006; Benchley 2007; Benchley et al. 2007). Even though the long-known prehistoric archaeological site (8ES1) located on the landform nearest to both Emanuel Point wrecks had been the subject of previous archaeological testing, e.g., Bense (1986), it was not until fall of 2015

that archaeologists from the University of West Florida (UWF) found definitive evidence for the location of the Luna settlement at Emanuel Point. In summer 2016 a third Emanuel Point shipwreck was found by UWF in the shallow waters between the newly discovered terrestrial site and the first two wrecks (St. Myer 2016, 2017). This article details the discovery and results of the initial archaeological testing by UWF at Luna's Santa María de Ochuse.

Documentary Evidence for the Location of the Luna Settlement

Although the Luna settlement was occupied continuously for a full two years between August 1559 and August 1561, only a few documentary references to its location on Pensacola Bay have survived. For this reason, the site of the settlement has long remained a mystery, despite considerable research and many archaeological surveys in recent decades. Nevertheless, the few textual clues that have been available narrow down the list of potential locations considerably and have always included the location at which the site was finally identified in the fall of 2015 (Worth 2016c).

As for the location of Santa María de Ochuse on Pensacola Bay itself (Fig. 1), textual references in the Luna documents make it clear that the bay on which Luna ultimately established his first settlement was some 20 leagues east of Mobile Bay (the actual distance is about 47 modern miles), where scout ships under Guido de Lavezaris had provided a detailed and remarkably accurate description from their visit in 1558, naming it Bahía Filipina, in honor of King Phillip II (de Labazares 1559; Priestley 2010[2]:330–339). Furthermore, the bay known as Ochuse (also Achuse, Ychuse), christened Santa María Filipina in recognition of the feast of the Assumption of Mary (15 August), was described as being one of the best in the Indies, with a deep entrance and spacious interior, and with a red bluff on the eastern side as the bay opened up upon entering (de Velasco 1559; Priestley 2010[2]:268–277[1]). A winding river (the modern Escambia) drained into the bay from the interior to the north, and farther to the north by land was the same river (the modern Alabama River) that drained into Mobile Bay (Bahía Filipina), where, at 40 leagues distance, Luna's men found the native town called Nanipacana. Nanipacana was described as being downriver from the province of Coosa (Coça) in modern northwest Georgia and upriver from Mobile Bay (de Velasco 1560a:5r, 1560b:45v; de la Anunciación et al. 1560:106r; Velázquez 1561:5r; Dávila Padilla 1625:193–194,199,200–201,220; Priestley 2010[1]:92–129,222–233, 2010[2]:300–311). All of these locations are clearly situated along the vast watersheds of the Mobile-Alabama-Coosa-Oostanaula-Coosawattee rivers, stretching from Mobile Bay to the edge of the Appalachian Mountains at Carters Lake in northwest Georgia. The geographic clues, especially when combined with earlier evidence from the 1540 route of the Hernando de Soto expedition through the same region (Hudson et al. 1989), make it abundantly clear that Pensacola Bay is identical to Luna's Ochuse.

Details about precisely where Luna established his port settlement on the bay are much more ambiguous. Luna himself wrote that "it is a point of high land that overlooks the bay where the ships arrive to anchor."[2] In estate papers for a deceased drummer, the place was described as "Santa Maria de Ochuze of the bay upon the point, of these provinces of Florida" (de Luna y Arellano 1559; de Villanueva 1562; Priestley 2010[2]:210–213). Both these descriptions suggest that the settlement was on high ground that formed a point overlooking the bay. Beyond this, the viceroy wrote that "it is a very spacious port, which has three leagues in width in front of where the Spaniards are now," indicating that the settlement had a broad view of the main bay, probably encompassing as much as 7–10 mi. directly in front of the settlement (de Velasco 1559). In addition, based on Luna's initial glowing report, the viceroy noted regarding the bay that "the *naos* [cargo ships] can be anchored in 4 or 5 fathoms at one crossbow-shot from land" (de Velasco 1559). This would indicate that deeper waters (about 6.7–8.3 m, or 22–27 ft.) reached as close as perhaps 250–350 m from land, which seems to be a good approximation of what 16th-century Spaniards believed a crossbow-shot distance to be, based on the lead author's research comparing actual distances and reported distances in the *Relaciones Topográficas* describing Spanish towns in the 1570s, e.g., Ortega Rubio (1918). Unfortunately, the viceroy's letter is not

[1] Faulty transcription in Legajo 280, Mexico, Archivo General de Indias, Seville, Spain.

[2] Luna's personally handwritten letter is erroneously dated and thus must be a transcript he made later for submission to the king; see note 32 in Worth (2018:62).

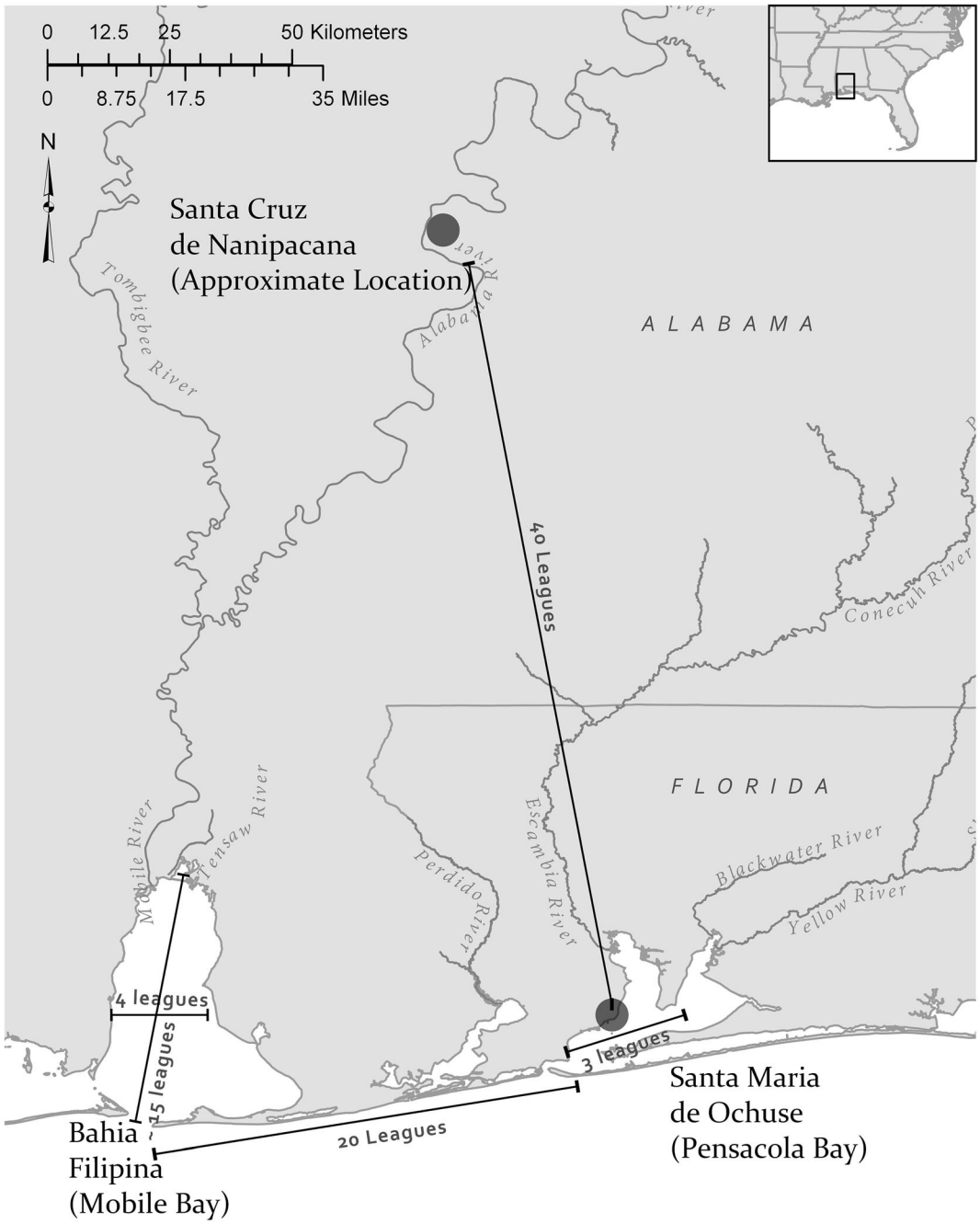

Fig. 1 Map showing relative locations of Ochuse and Pensacola Bay during the Luna expedition, 1559–1561. (Map courtesy of the Archaeology Institute, University of West Florida, 2018.)

clear as to whether Luna was providing simply a general measure of how close large ships could anchor at one or more places in the bay, or if he was specifically stating that this was the exact distance and depth from the settlement itself. Moreover, since Luna's report was designed to emphasize to the Spanish Crown the successes and prospects of the newly arrived expedition, his distances and depths could also have been somewhat exaggerated.

A few other clues come from the narrative of Dominican priest Domingo de la Anunciación, who was almost certainly the source of the firsthand Luna expedition

account in Agustín Dávila Padilla's 1596 publication about the history of the Dominican order in New Spain, reprinted in 1625 (Dávila Padilla 1625). Describing a vessel that had somehow been pushed inland near Luna's port settlement by the September hurricane, he noted that

> they found in a dense grove of trees, which was one arquebus-shot from the port, an intact caravel, without lacking even one thing that was in it, and everyone went to see it as a prodigious thing, and each person recovered whatever had their sign and mark, without lacking even the smallest needle. The grove was surrounded by very dense trees, and even if they failed to detain or break that ship, it should have been in the grove itself, where it seemed that it had been placed by hand, in order to hide it. It is unbelievable that the waves had carried it, because they did not reach the grove, nor would they have left it so well-placed if they had carried it. (Dávila Padilla 1625:194–195)

Presuming that this vessel was actually transported by storm surge over low-lying trees and vegetation, this means that Luna's settlement was located perhaps 450–800 m (based on Spanish perceptions of arquebus-shot distance) from a low area that would accommodate a small ship floating in to land, intact, within a grove of trees. Finally, this same account made reference to surviving colonists collecting "some cargo which had washed up on the shore [*rivera*] after the storm, although most of it had been lost in the water," reinforcing the fact that the port settlement was likely along the shoreline, where debris from the wrecked ships accumulated after the 19–20 September hurricane (Dávila Padilla 1625:199).

Another clue to the location of the settlement is provided by textual accounts that confirm Luna's fleet was at anchor when the storm struck, presumably very near the terrestrial settlement itself. One soldier's testimony after the expedition noted that "there struck a hurricane, which was a very great storm, with which were lost all the ships that were anchored in the aforementioned port, except for two barks and one caravel and a frigate which escaped in the said port" (de Montalbán 1561:1v; Priestley 2010[2]:282–301). The Dávila Padilla narrative also detailed that, "[a]s if the cables were strands of thread, and the anchors were not made of iron, thus they surrendered to the force of the air. The ships came loose, and were broken into small pieces" (Dávila Padilla 1625:194). Luna himself used the verb *barar* (*varar*, to run aground) when he wrote about the hurricane "grounding all the ships that were within this port," indicating that they likely were driven to shallower water and wrecked near the shore close to the deeper anchorage zone (de Luna y Arellano 1559; Priestley 2010[2]:210–213). The settlement's onshore landing area was close enough to the church that the Dominicans later recounted, in the spring of 1561: "It was a thing of devotion to see the two fathers come out singing the litany, accompanied by the greater part of the people. They left from their poor ramada, that served as their church, and reached as far as the cross on the beach, from which they returned" (Dávila Padilla 1625:224).

An additional clue is that Luna's primary goal was to use his Pensacola Bay settlement as a launching point from which to push inland and northward to the fabled native province of Coosa. In fact, Luna sent multiple expeditions inland and upriver along the Escambia River drainage, and finally overland to the central Alabama River along a freshly cut road (de Montalbán 1561:2r–2v; Velázquez 1561:5r; Priestley 2010[2]:282–301,300–311; Worth 2018b). Consequently, his port settlement would most likely *not* have been located on the eastern side of the bay, on the barrier islands at the mouth of the bay, or even on the Gulf Breeze Peninsula, because all those locations would have made it difficult for Luna's cavalry and infantry companies to travel inland toward their primary objective. In addition, Luna's fleet initially offloaded the surviving horses at Mobile Bay before sailing east to enter Pensacola Bay in mid-August of 1559 (de Velasco 1559). It would make little sense to have done so if he intended to settle on a peninsula or barrier island on the eastern side of the mouth of the bay.

Finally, although documentary evidence detailing the configuration of Luna's planned settlement is limited, an initial plan for the pueblo to be constructed at Ochuse was sent by the viceroy to the Spanish Crown a few weeks before the fleet departed from Veracruz (de Velasco 2010:224–225). This plan was described as showing 140 house lots, 40 of which were to be reserved for a plaza, church, warehouse, and other public structures. Some 100 lots were to be laid out for 100 families to remain at the port settlement, and the four gates of the town were to be visible from the plaza on all sides. While this layout was obviously idealized and speculative at the time, since neither the viceroy nor Luna had

laid eyes on Pensacola Bay to choose a suitable location, other similar drawings sent back from the New World during the late 16th century show house lots (*solares*) normally grouped in blocks of four, arranged within a rectangular grid of streets, with a public plaza being located in the center of the town layout; e.g., Jimenez Verdejo et al. (2007).

As to the size of the plaza and lots, the exact sizes intended for the Luna settlement are unknown, but contemporaneous New World town plans drawn up in the last half of the 16th century commonly show square or rectangular lots ranging between 120 and 225 Spanish feet on a side (roughly 33–63 m), with streets measuring 30–35 ft. (12–14 m) (de Castillo 1561; Jufre 1562a, 1562b; Martín Hincapié 1594). Later royal ordinances, dating to 1573, formally defined individual house lots at that time as being 50 × 100 Spanish feet (just under 14 × 28 m) for *peonías*, and 100 × 200 ft. (28 × 56 m) for *caballerías*, sizes distributed to foot soldiers and cavalry, respectively (Philip II 1573). If square, such lots would equate to roughly 20 and 40 m on a side, respectively. The 1573 ordinances additionally specified that, in contrast to settlements in the interior, the principal plaza for port settlements should be at the port's landing and should be rectangular, measuring no less than 200 × 300 Spanish feet (about 56 × 84 m), but no more than 800 ft. in length (222 m).

All these details suggest that the original layout for Luna's first settlement would have consisted of a 5 × 7 rectangular configuration of four-lot blocks, with a central area adjacent to the landing containing a plaza bordered by all major public buildings. Using the ranges above, then, it might be estimated that a hypothetical 5 × 7 block configuration of square lots in Luna's settlement could have measured from as small as 200 × 280 m to as large as 625 × 875 m, covering from 5.6 ha (nearly 14 ac.) to as much as 54.6 ha (135 ac.). In order to narrow down this broad range, archaeological evidence can also be used to establish a comparative baseline for other early Spanish settlements in Florida. To this end, there are two roughly contemporary 16th-century settlements from the Pedro Menéndez era with which to provide some comparison for what might be expected in terms of size for the Luna site: St. Augustine and Santa Elena, both of which have been the subjects of considerable archaeological investigation.

The initial 1565 settlement of St. Augustine was located at the Fountain of Youth Park site (8SJ31) and housed some 600 Spaniards for a short period, though this number dwindled to perhaps just 200 by the end of the year (Deagan 2009:33, 2016:14–16). Archaeological survey has shown that Menéndez's original settlement here was roughly 8,000 m^2 in size (0.8 ha), or about 1.9 ac., measuring about 90 × 60 m (Deagan 2009:325). Following the relocation of St. Augustine to Anastasia Island at an as-yet undetermined place, the settlement was relocated a second time to its current location in downtown St. Augustine in 1572. By the end of the 16th century, St. Augustine had roughly 300–600 residents, and the archaeological site has been documented to cover an area of about 4.0 ha, or 10.55 ac., with dimensions of roughly 260 × 230 m (850 × 750 ft.) (Hoffman 1977; Deagan 1981, 1982:189; DePratter and South 1995:25–26). To the north, the contemporaneous 1566–1587 settlement at Santa Elena on Parris Island, South Carolina, had a total population of roughly 300–400 residents, and its archaeological distribution measured about 6 ha, or 15 ac. (DePratter and South 1995:47–49). The shape was an elongated triangle, running some 367 m (1,200 ft.) long and tapering in width from 213 m (700 ft.) down to 91.5 m (300 ft.).

Based on these three archaeological examples, the size of early Spanish colonial settlements elsewhere in 16th-century Florida ranged between less than 1 ha and up to 6 ha, with no less than about 250 people per hectare at the Fountain of Youth Park (and for a short time more than 600 people) to as few as perhaps 66–150 people per hectare in Santa Elena and downtown St. Augustine during the same era. If even remotely typical, these examples suggest that the 1,500-person Luna settlement might encompass somewhere between 6 and 23 ha. Of course the initial settlement plan would doubtless have been adjusted or modified to fit the shape and topography of the location chosen for the settlement and may only have been strictly adhered to during the first five weeks after the fleet's arrival, before the hurricane that changed everything. Beyond this, the overall size of Luna's settlement would naturally reflect not just the initial occupation area inhabited by the first 1,500 colonists between August 1559 and February 1560, but also a presumably smaller zone within this broader area where a dwindling number of colonists (only 362 at the end of August 1560) remained during the final year of the settlement, including two periods totaling nine months, when detachments of only 50–100 people lived at the site. Given all this, we can reasonably infer that Luna's settlement would have to have been established

on a broad, level landform that could have accommodated a new pueblo with an anticipated 100 permanent resident families spread across a 5 × 7 configuration of four-lot blocks with an intervening grid of streets.

In sum, then, the historical record indicates that the location of Luna's settlement should be

(1) On the mainland on the western side of the Pensacola Bay system with easy access to the northern interior;
(2) On a geographic landform that could be described as a point overlooking the bay, from which some 7–10 mi. of waterscape in the bay should be visible;
(3) On a landform broad and level enough to accom modate a 140-lot town plan with streets between 4-lot quadrangles, perhaps ranging between 6 and 23 ha in size;
(4) Reasonably close to a deepwater anchorage area (whether just 200 m or more is unclear) from which six Spanish ships broke loose and were grounded and wrecked during the 1559 hurricane; and
(5) Within about 600 m of a low-lying area that could have allowed a seventh ship to be washed over the trees to settle intact within a grove.

Using all these characteristics and qualifications, there are very few topographic locations along the bay that fit the textual accounts exactly. The most obvious of these, however, is the Emanuel Point peninsula, which, not coincidentally, happens to overlook the three currently known shipwrecks from Luna's fleet.

Identifying and Bounding the Luna Settlement

Although Emanuel Point has long been suspected to be a prime candidate for Luna's settlement, the 2015 discovery of a substantial and areally extensive assemblage of mid-16th-century Spanish residential debris in this area matches all the documentary expectations noted above. Subsequent survey and testing by the UWF Archaeology Institute has provided ample evidence that this is indeed the 1559 settlement of Tristán de Luna. In fact, now that we have the archaeological assemblage to confirm the location, a simple comparison with modern storm surge maps for Pensacola Bay (Fig. 2) makes it clear that Luna chose the only location on the entire bay that (1) was on high ground adjacent to deeper waters of the bay, (2) had easy direct access to the northern interior via land and water, and (3) was still within sight of the mouth of the bay. It was also directly adjacent to a natural sink with a freshwater pond and outflow channel leading downslope to the west, presently infilled, but attested historically by an early 19th-century survey map (Pintado 1807) and by accounts of older residents in the area.

The initial discovery on private land was made by Pensacola resident Thomas Garner (St. Myer 2017), a veteran of UWF archaeological projects directed by Judy Bense during the 1980s, who recognized the potential significance of an early style Spanish olive-jar neck and Columbia plain majolica, along with an assemblage of 50 other sherds of early Spanish ceramics as well as 108 Native American sherds scattered across the recently cleared lot. Comparable items were also observed on the surface at several other locations in the neighborhood, indicating that the discovery was not confined to the original house lot. After Garner brought the discovery to the attention of UWF archaeologists, a team of faculty, staff, and students was organized to conduct close-interval shovel testing on the lot, with the permission of the landowners, before the start of house construction. During five days of fieldwork in early November 2015, 71 shovel tests and one 1 × 1.5 m test unit were excavated. In addition, a large volume of back dirt from new house-construction trenches was sifted, and the construction-trench profiles were documented. Excavations confirmed the presence of subsurface features (F. 1001A, 1001B, 1002) and midden deposits with the same types of Spanish artifacts originally identified on the surface (Figs. 3, 4). In addition to the Spanish types recovered, several red-painted ceramics that were distinctly different from locally made Native American types were found. These ceramics compare favorably with known Aztec types, as discussed below.

The assortment of 16th-century Spanish artifacts recovered from the initial 2015 fieldwork (Table 1) was dominated by ceramics, adding another 327 sherds of both Spanish and Aztec ceramics to the first 52 located by Garner. Another 86 sherds were collected by the end of the 2015 year, making a grand total of 465 sherds of Spanish and Aztec pottery recovered from the site. Not only was this collection remarkable because of the fact that most of it came from excavations in a sample area of just over a tenth of a hectare, it also represented one of the largest assemblages of 16th-century Spanish and Aztec ceramics from any single terrestrial site in the southeastern United States. At the time, the only sites with larger assemblages were the 1539–1540 Hernando de Soto

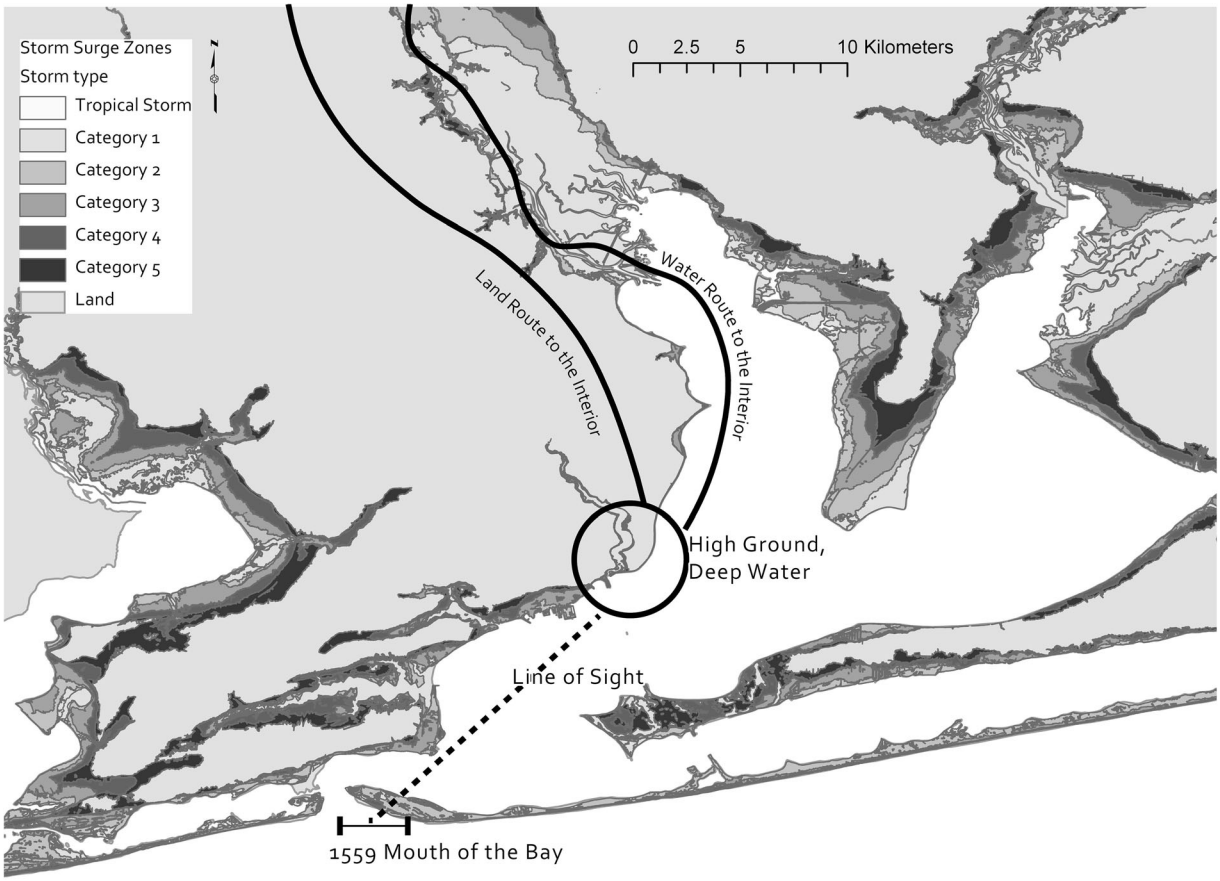

Fig. 2 Landscape features on modern storm-surge map of Pensacola Bay. (Map courtesy of the Archaeology Institute, University of West Florida, 2018.)

winter encampment at the Martin site in Tallahassee and the twin colonial towns of St. Augustine and Santa Elena on the Atlantic coasts of Florida and South Carolina, both postdating the 1565 arrival of Pedro Menéndez de Avilés (South 1979, 1980, 1982; Deagan 1981, 1982, 2009; South et al. 1988; DePratter and South 1995; South and DePratter 1996; Ewen and Hann 1998). In fact, the only comparable assemblages of Spanish and Aztec ceramics anywhere along the Florida Gulf coast were the Emanuel Point shipwrecks just offshore, all of which possess ceramic types essentially identical to the terrestrial finds (R. Smith, Spirek et al. 1995; R. Smith, Bratten et al.1998; Cook, Bratten, Worth et al. 2009; Sorset 2012; Cook, Bratten, and Worth 2016; Bratten and Lloyd 2017; Cook and Mumford 2017).

Many other Spanish artifacts were found during 2015 fieldwork, along with the Spanish and Aztec ceramic assemblage. More than 130 wrought-iron nails, including caret-head nails thought to have been used with early 16th-century horseshoes, were found. Other metal artifacts included a handful of lead shot and improvised fishing-line weights, and several cupriferous items, such as aglets, decorative rosettes, and an engraved hand-bell fragment. Six glass trade beads, including a twisted Nueva Cadiz bead and five seven-layer chevron beads, were collected (Worth 2016b). In addition, more than 900 Native American sherds were recovered, as well as more than 200 fragments of lithic debitage, including flakes, shatter, chunks, and a small number of worked tools. Although some of the Native American materials doubtless relate to prehistoric utilization of the Emanuel Point landform, previously documented in the Florida Master Site File as Site 8ES1, there is also evidence to suggest some of these ceramics were used within the Luna settlement itself, as will be discussed below.

In addition to the sheer quantity of artifacts, the composition of the Spanish assemblage at the site also distinguished it quite clearly from many other sites with

Fig. 3 Features 1001A, 1001B, and 1002. (Photo courtesy of the Archaeology Institute, University of West Florida, 2018.)

16th-century Spanish artifacts from across the Southeast. Most southeastern sites with Spanish artifacts include a limited range and number of gift and trade goods, dominated by glass beads, iron tools, ornamental items, and occasional military gear, that are usually, though not always, found in association with Native American burials (M. Smith 1984, 1987; Little 2008; Blanton 2013). Missing from such assemblages are substantial proportions of the one major category of artifact that seems to have been consistently present where Spaniards lived: Spanish ceramics (Worth 1994, 2015, 2016a). Where Spanish settlers brought food, prepared food, and served food for themselves, they brought ceramics. But such items were of little interest

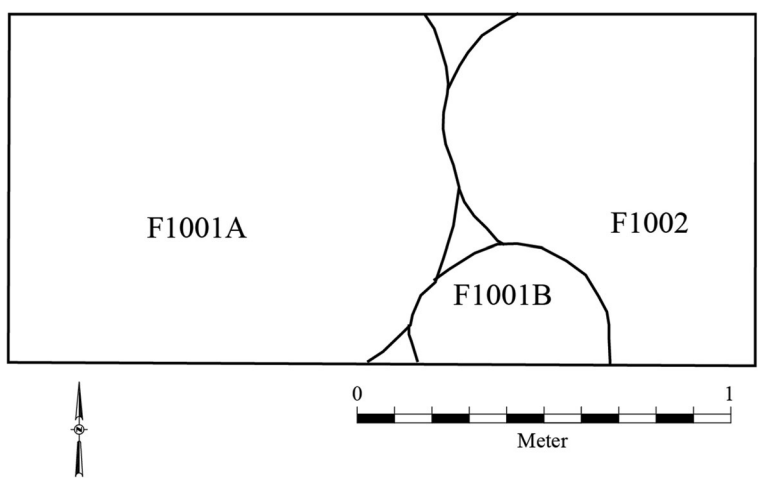

Fig. 4 Plan view of pit features exposed in the 2015 excavations at the Luna-settlement site (8ES1). (Drawing courtesy of the Archaeology Institute, University of West Florida, 2018.)

Table 1 Spanish and Aztec ceramics recovered in 2015 from Site 8ES1 by count

Ceramic Category	Original Surface Collection	November Fieldwork	Later Surface Collections	2015 Totals
Majolica, Columbia plain	2	4	2	8
Majolica, Columbia plain, green variant	—	1	1	2
Majolica, Caparra blue	—	—	1	1
Majolica, indeterminate polychrome	1	—	—	1
Majolica, blue on white, 16th century, thick	—	2	—	—
Majolica, plain, 16th century, thick	—	1	—	—
Majolica, plain, 16th century, thin	—	3	—	—
Olive jar, early, glazed	4	26	13	43
Olive jar, early, unglazed	37	112	27	176
Lead-glazed redware, 16th century	3	21	8	32
Lead-glazed coarse earthenware	—	16	2	18
Green lead-glazed coarse earthenware	—	—	1	1
Unglazed coarse earthenware, plain	5	113	29	147
Unglazed coarse earthenware, incised	—	7	1	8
Unglazed coarse earthenware, red slipped	—	1	—	1
Aztec red earthenware (Aztec IV)	—	19	1	20
Mexican indigenous earthenware	—	1	—	1
TOTAL	52	327	86	465

to the southeastern Native Americans, who maintained their own robust and long-lived ceramic traditions for centuries after European contact. Moreover, broken Spanish ceramics were not generally recycled or scavenged by the Native Americans, and the pieces normally remained in place as a testament to the residential Spanish presence. In fact, apart from the Soto winter encampment and the two colonial towns noted above, only the Berry site in North Carolina, one of Menéndez's small garrisoned outposts, has proportions of Spanish ceramics roughly comparable to the Luna site (Beck, Moore et al. 2006; Beck, Rodning et al. 2016).

The 2015 discovery location was only a small portion of a much larger archaeological site (8ES1, East Pensacola Heights). This site was originally identified as having two sand mounds on a map of Pensacola Bay published by S. J. Walker (Walker 1883:885). Walker further noted that all the sand mounds on his map were "generally quite small and were nearly all erected for domiciliary purposes" (Walker 1883:884). Gordon Willey (1998:200) visited the site in 1940 and found no evidence of mounds, which he, nonetheless, described as "burial mounds" based on Walker's article, despite the lack of such a specification in Walker's original map or article. Willey did, however, note a "black midden stain" and a handful of prehistoric sherds at the site. The prehistoric site was more extensively tested and bounded during a 1986 UWF archaeological field school under Judy Bense (1986). Reexamination of curated collections from the 1986 survey has confirmed that some 16th-century Spanish olive-jar sherds were indeed present, but had been originally identified as sand-tempered plain ceramics.

Our next step was to conduct a broader shovel-test survey across the entire Emanuel Point landform in order to determine the spatial extent of 16th-century Spanish artifacts and explore the integrity of subsurface deposits and any associated pit features. Since the site is in the midst of a developed urban neighborhood with more than a hundred different landowners, UWF archaeologists organized a neighborhood meeting with landowners and tenants to provide first notification about the find and start the process of soliciting permission for shovel testing and voluntary monitoring of construction projects across the neighborhood. As part of this broader public notification process and in order to continue UWF's longstanding tradition of public outreach, on the next morning, 17 December 2015, a formal press conference was held at

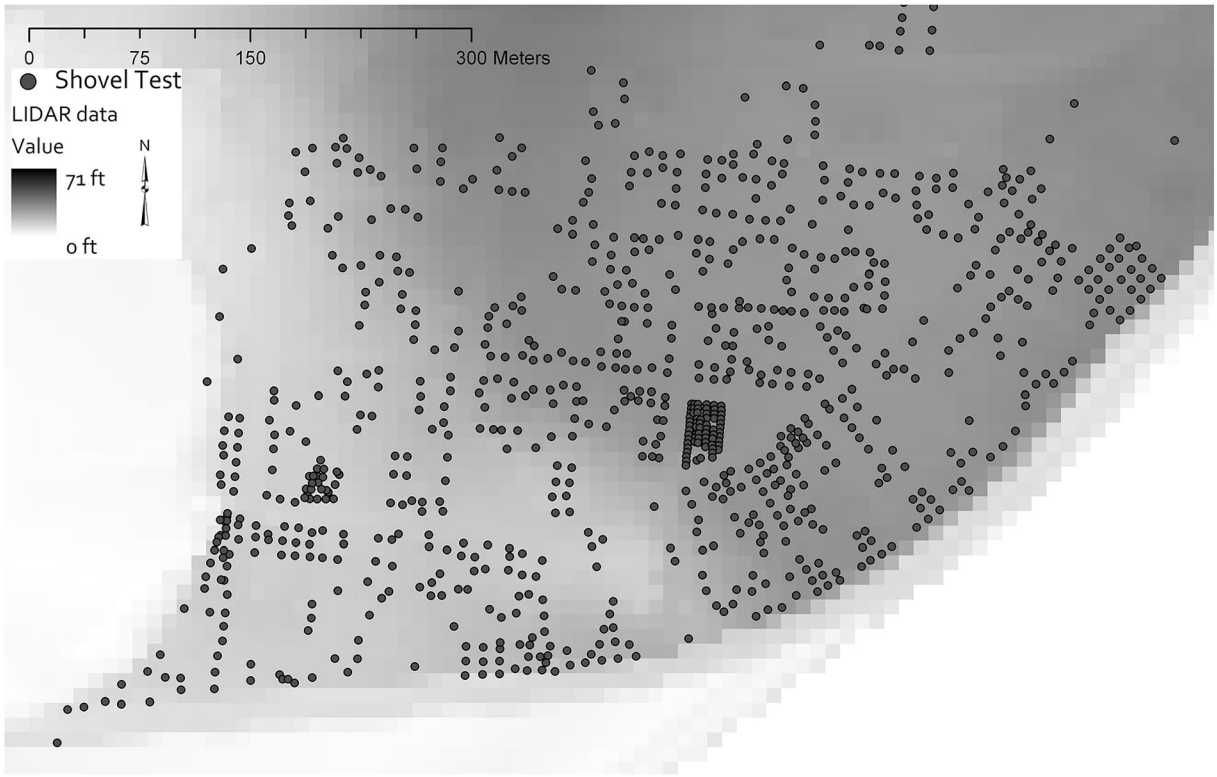

Fig. 5 Map showing shovel-test locations at the Luna-settlement site (8ES1). (Map courtesy of the Archaeology Institute, University of West Florida, 2018.)

the T. T. Wentworth Museum announcing the discovery of the first multiyear European settlement in the continental United States (St. Myer 2017).

Shovel testing sponsored by the UWF Archaeology Institute began in January of 2016 and continued throughout most of the year, ultimately encompassing more than 900 shovel tests at roughly 10 m intervals across an area spanning some 34 ha, or nearly 85 ac. (Benchley and Worth 2017; Worth et al. 2017). Even though the survey has many gaps due to the presence of houses, paved roads, and other disturbances within the survey area (Fig. 5), the distribution of 16th-century Spanish materials provides a solid basis for establishing the boundaries of the Luna settlement site. Artifact-distribution maps were then created for the site using a hexagon grid to display the data (Fig. 6). The use of a hexagon grid allowed researchers to even out shovel-test data that were collected on an uneven basis across the site due to its urban nature and the many residential lots aligned to the natural landscape. In the 40 m hexagon grid, some hexagons present the weighted (weight divided by area excavated) data of just one or two shovel tests, while others account for six or more shovel tests. Additionally, presenting the data in hexagons smoothed the data over property boundaries and other landscape features that would have made it easy for unauthorized visitors to identify specific locations.

Details of the assemblage will be explored below, but, from a distributional standpoint, the most abundant diagnostic artifact type is the early Spanish olive jar (Fig. 6*a*), which is found in undisturbed subsurface contexts across an area of roughly 12.7 ha, or 31 ac., including 8.9 ha on the level upper summit of the terrace overlooking Pensacola Bay, and another 3.8 ha extending along the lower slope close to the shore and surrounding a freshwater pond draining to the west (Fig. 7). Several other diagnostic markers overlap this distribution, including caret-head nails, 16th-century majolica, and Aztec ceramics (Fig. 6*b*, *c*, *d*).

If Luna followed the viceroy's original instruction to lay out the rectangular 140-lot town described above, overlaying such a rectangle to encompass all the 16th-century material on the level terrace paralleling the bay

bluff, at roughly 50° west of north, results in a rectangle roughly 375 × 290 m, with a projected site area of roughly 11 ha, or just over 27 ac., not counting the area below the upper terrace. The schematic in Figure 7 shows a hypothetical layout of such a configuration on the landscape of Emanuel Point. The schematic also incorporates a projected boat-landing site where a 1940 aerial photo and several 19th- and early 20th-century bathymetric maps show a deeper channel extending northward toward the lower slope (U.S. Coast and Geodetic Survey 1859, 1882, 1892, 1946; U.S. Department of Agriculture 1940). Since the original town of Santa María de Ochuse was devastated just five weeks after Luna's arrival, and its stranded population fluctuated and gradually dwindled from 1,500 to roughly 160 by the spring of 1561, the artifactual trace of an original rectangular layout may be ephemeral at best, but may eventually be clarified by additional excavations.

The results of the UWF shovel-test survey indicate that the Luna settlement encompassed somewhere between about 12.7 ha and potentially as much as 14.8 ha, falling squarely within the anticipated size range noted above and making it unquestionably the largest 16th-century Spanish site in the Southeast, certainly larger than both St. Augustine and Santa Elena. Since the Luna settlement originally housed 1,500 settlers, more than double the number of settlers living in 16th-century St. Augustine and Santa Elena,

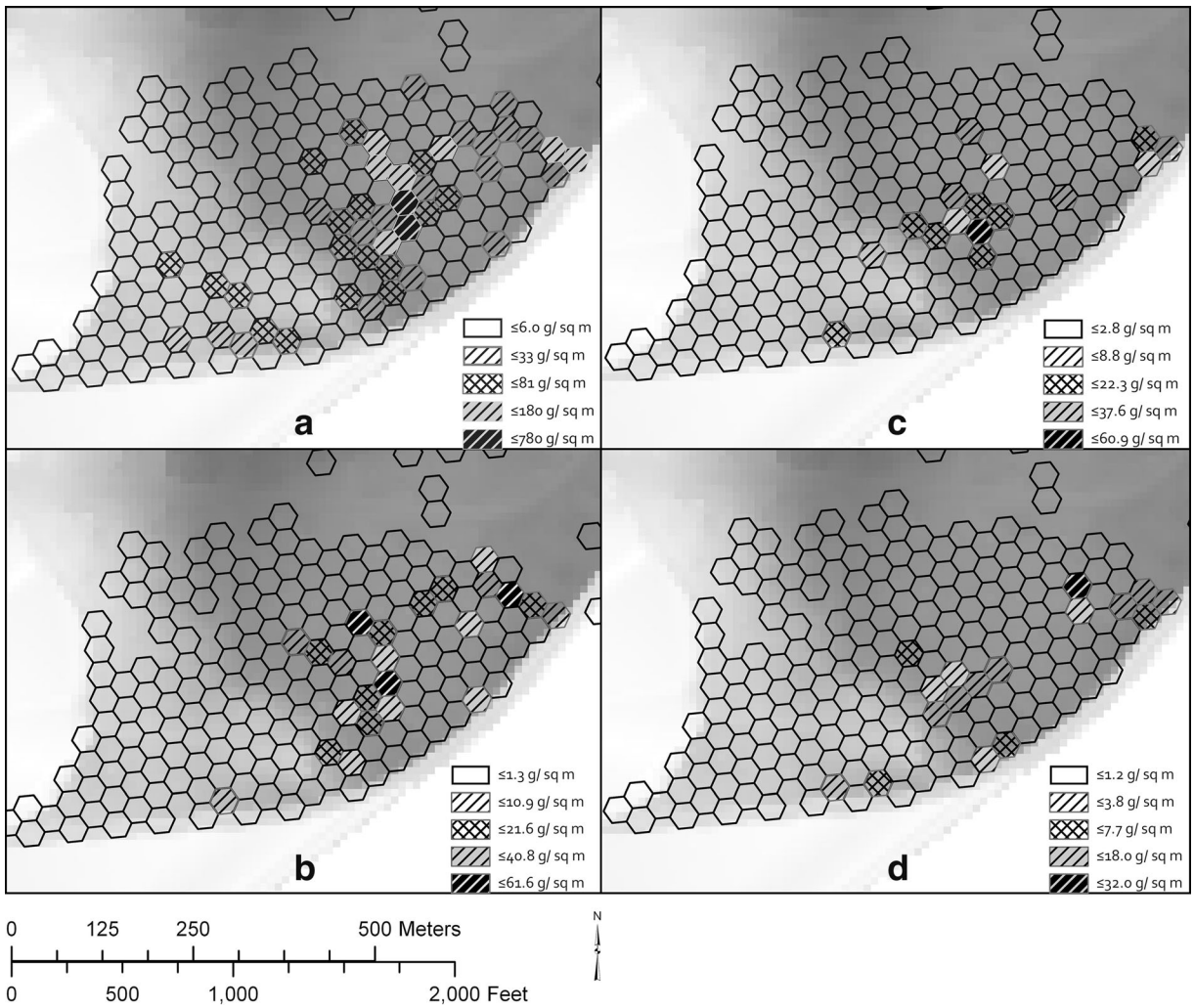

Fig. 6 Maps showing the distribution of diagnostic artifacts across the Luna-settlement site (8ES1): (*a*) Early olive jar, (*b*) caret-head nails, (*c*) 16th-century majolica, and (*d*) Aztec ceramics. (Map courtesy of the Archaeology Institute, University of West Florida, 2018.)

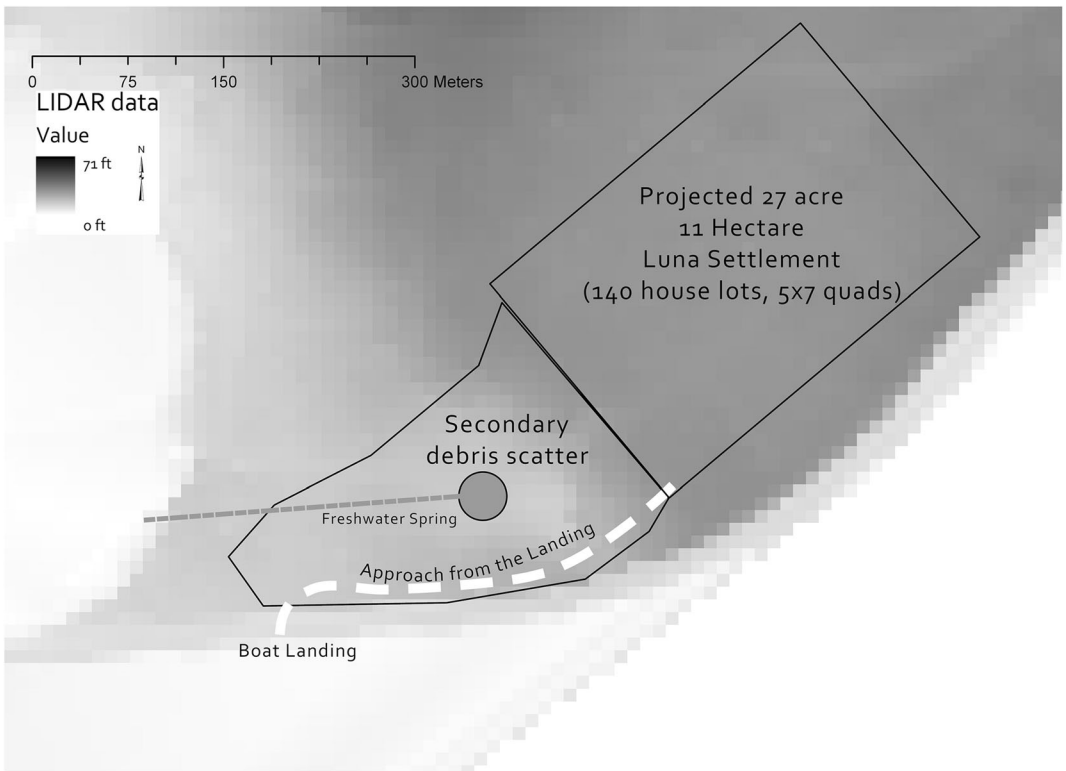

Fig. 7 Schematic diagram showing the hypothetical layout of the Luna settlement (8ES1). (Figure courtesy of the Archaeology Institute, University of West Florida, 2018.)

the huge size of the archaeological site of Santa María de Ochuse is entirely consistent with what we would expect.

Exploring the Luna Settlement: Artifacts and Features

While fieldwork and lab work are both still actively underway in 2018, a brief overview of the initial results of the first two years of excavations is warranted here, particularly since the presence of subsurface features and the nature of the associated artifact assemblage provides confirmation of the site's identification. In both 2016 and 2017, UWF conducted terrestrial archaeological field schools at the Luna settlement site, opening excavation units in several areas of the site to search for subsurface evidence of structures, pit features, or other types of activity areas, and to increase the sample size of associated artifacts. In addition, during both years, small-scale fieldwork was also conducted by UWF Archaeology Institute staff in advance of construction projects on privately owned lots. These investigations included test excavations, mechanical stripping, and utility-trench excavation. Although analysis is still underway for these projects, two things are already abundantly clear: the basic Spanish residential-artifact assemblage associated with the Luna settlement is remarkably consistent across the site, and this assemblage is directly associated with undisturbed subsurface features that reflect a range of Spanish residential activities at the site.

The following artifact overview is based primarily on completed artifact analyses in the UWF database for Site 8ES1 as of March 2018, derived from more than 190 m^2 of positive shovel tests, 112 m^2 of excavation units, materials recovered from screening construction-trench back dirt totaling roughly 137 m^2, as well as from surface collections. Only the completed results of the 2016 and 2017 field schools, along with other mitigation and monitoring units analyzed by that date, are included in the following analysis, though additional field discoveries from as late as the spring of 2018 are also noted separately below.

In addition, for database queries, proveniences were subdivided into two areas, the "inland terrace" (including all materials from 2015 fieldwork and inland portions of

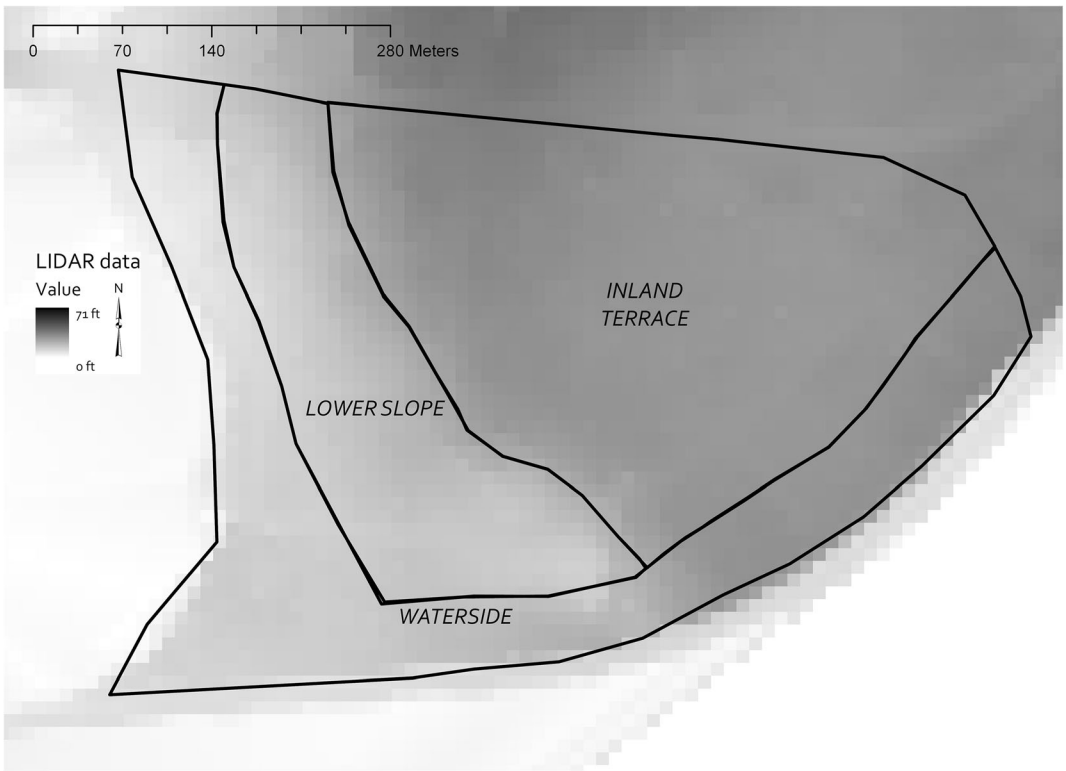

Fig. 8 Map showing site areas within the Luna-settlement site (8ES1) designated in the text. (Map courtesy of the Archaeology Institute, University of West Florida, 2018.)

the 2016 and 2017 materials) and the waterside and lower slope (the remainder of the 2016 and 2017 collections), not counting proveniences without specific grid coordinates (Fig. 8). The subdivisions were developed because field observations as well as subsequent laboratory analysis indicate that prehistoric Native American occupation at 8ES1 was largely confined to the waterside margins of the upper terrace overlooking Pensacola Bay, as well as the lower slope of the Emanuel Point peninsula descending toward Bayou Texar to the west (Gougeon and Boren 2017) (Fig. 8). Moreover, the waterside and lower-slope area also contains somewhat more localized occupations from the late First Spanish, British, and Second Spanish periods associated with successive cattle-ranching operations based there starting in the late 1750s. For this reason, the inland terrace appears to have a lower risk of contamination with pre-Luna Native American or post-Luna colonial artifacts in general nonfeature contexts and can thus be used as a potential check for artifact categories or types that are difficult to discriminate chronologically.

Even though additional artifacts may ultimately be added to this more restrictive list as objects are recognized through further analysis and identification, including x-ray imaging and conservation of presently unidentifiable iron concretions, it is clear that the Spanish and Aztec portion of the Luna-settlement artifact assemblage is characterized by substantially more ceramics than any other category of artifact (Fig. 9). As can be seen in Table 2, nonlocal 16th-century ceramics (n=2,744) are dominated by olive jar (37%) and a variety of other coarse earthenwares, both glazed and unglazed (51%), but also include several types of majolica (7%), as well as a consistent minority of Aztec/Mexican indigenous wares (4%). The sherds of olive jars (Spanish: *botijas*) found at the site are predominantly unglazed (82%), though a minority (18%) show interior lead glazing that ranges from extremely ephemeral to thick and glossy. Two chronologically sensitive characteristics, rim form and vessel-wall thickness, place the Luna assemblage squarely in the mid-16th-century. Rims are flared and thickened toward the lip (Fig. 10), neatly straddling the line between John Goggin's early and middle styles, postdating the unthickened early style rims, but predating the even more notably thickened "donut-shaped" ring well below the lip in middle-style rims (Goggin 1960; Deagan 1987:30–35; Marken 1994:41–138). This transitional rim form has also been documented

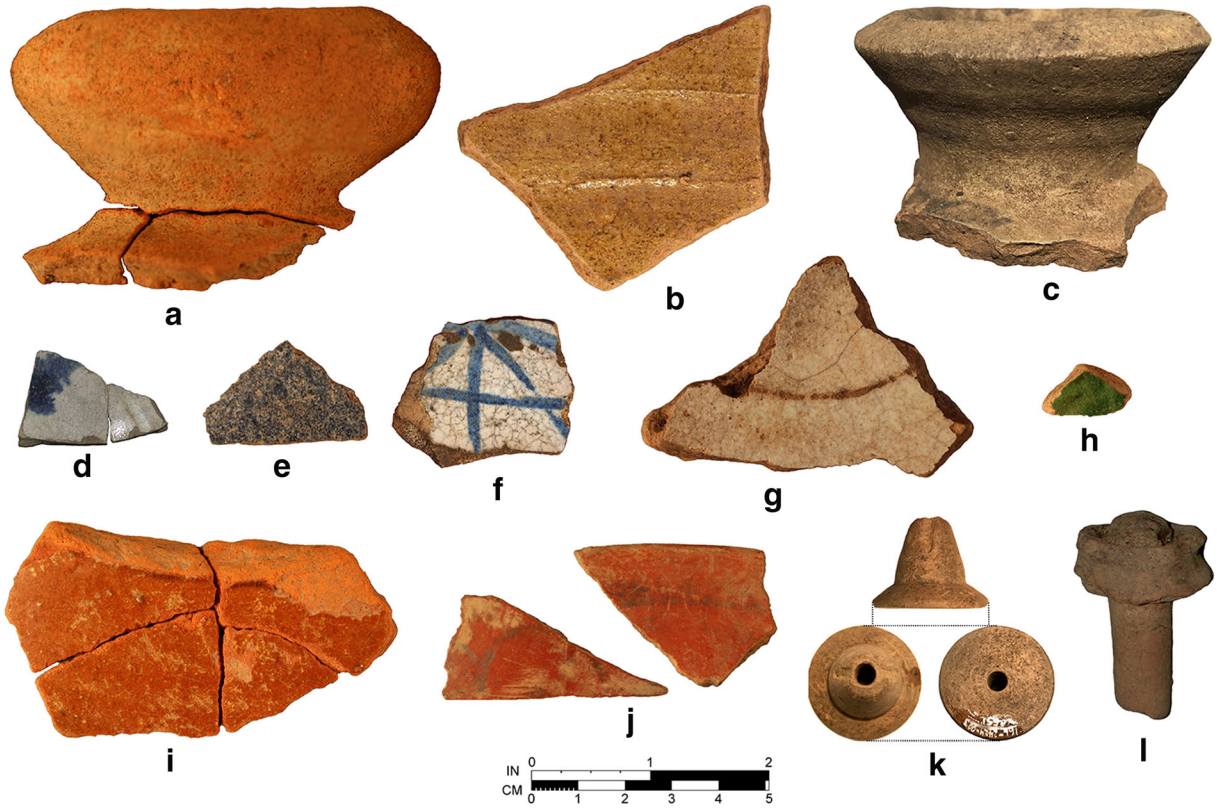

Fig. 9 Selected Spanish and Aztec ceramics from the Luna-settlement site (8ES1): (*a*) Olive-jar neck, (*b*) glazed olive jar, (*d*) Santa Elena mottled, (*e*) Caparra blue, (*f*) blue-on-white majolica, (g) Columbia plain, (*h*) Columbia plain, green variant, (*i*) lead-glazed 16th-century redware, (*j*) Aztec graphite black on red, (*k*) a spindle whorl, and (*l*) a brazier leg. (Photo by the authors, 2018.)

in the 1564 Santa Clara shipwreck in the Bahamas (also known as the St. Johns Bahamas wreck) (Malcolm 2017:235–247). In addition, the vessel walls of the Luna-settlement olive-jar assemblage are completely consistent with Goggin's early style, displaying an average body-sherd thickness of 7.2 mm, both on the terrestrial site and in the Emanuel Point wrecks (Fig. 11). These thinner walls differ significantly from later middle-style olive jars, which average roughly 10–12 mm in thickness (Goggin 1960:9–10,12; Deagan 1987:33,34).

Tin-enameled majolica at the Luna settlement is characterized by standard 16th-century tableware vessel forms, including *platos*, *escudillas*, and *lebrillos*, and includes the types Columbia plain, Yayal blue on white, Isabela polychrome, Santa Elena mottled, and Caparra blue. The assemblage is dominated by undecorated white sherds (78% by count), followed by blue-on-white decorations (18%), and extreme minorities of polychrome- (3%) and blue-decorated (1%) sherds. In addition to olive jar and majolica, other Spanish-tradition coarse earthenwares include a diverse range of lead-glazed (24%) and unglazed ceramics (76%). Apart from otherwise-indeterminate clear lead-glazed and unglazed coarse earthenwares (79%), identifiable types are dominated by 16th-century redware (predominantly with a coarse gritty temper, but also including a few specimens with finer paste). Also present are smaller numbers of *melado*, green *bacín*, green lead-glazed, and incised, painted, and red-slipped varieties, and orange micaceous ware. In general, these coarse earthenwares are dominated by more utilitarian food-preparation and -serving vessel forms, including *cazuelas*, *jarras*, *ollas*, and large *lebrillos*, although this broader category of ceramics is poorly described and defined in the literature and will need further study.

The most unusual category of nonlocal 16th-century ceramics at the Luna settlement is Aztec-tradition redwares, noted above. While more detailed evaluation will require comparisons with Mexican examples, including compositional and petrographic analysis for sourcing, the Pensacola specimens are characterized by paste and decorations that are distinct from locally made Native American ceramics, including black temper; red filming

Table 2 Spanish and Aztec ceramics from 8ES1 as of March 2018

Type	Count	Weight
Majolica, Caparra blue	4	5.6
Majolica, Columbia plain	79	399.9
Majolica, Columbia plain, green variant	18	65.4
Majolica, Isabela polychrome	3	4.3
Majolica, Santa Elena mottled	1	2.8
Majolica, Yayal blue on white	2	15.9
Majolica, blue on white, 16th century, thick	23	90.8
Majolica, blue on white, indeterminate	23	13.9
Majolica, polychrome, indeterminate	2	3.6
Majolica, plain, 16th century, thick	23	49.9
Majolica, plain, 16th century, thin	8	9.4
Majolica, indeterminate	7	0.8
Olive jar, early, glazed	187	1529.8
Olive jar, early, unglazed	831	8089.6
Lead-glazed redware, 16th century	234	1111.1
Lead-glazed coarse earthenware	104	516.8
Green lead-glazed coarse earthenware	2	22.7
Melado	7	39.9
Green bacin	1	5.6
Redware, glazed	6	17.9
Redware, unglazed	3	3.6
Coarse earthenware, incised	36	133.5
Coarse earthenware, painted	4	82.3
Red-slipped coarse earthenware	16	48.7
Orange micaceous	4	5.1
Indeterminate coarse earthenware	995	2675.9
Tile, impressed and painted	2	2.7
Clay shot (*bodoque*)	4	15.1
Aztec red earthenware (Aztec IV)	95	192.4
Mexican indigenous earthenware	20	114.1
TOTAL CERAMICS	2,744	15,269.1

on one or both sides, sometimes overlapping the vessel rim; and with several possessing traces of shiny graphite-black painted-line decorations. Several types of early colonial-period Aztec wares illustrated in the scholarly literature appear similar, including the type "Cuauhtitlán negro grafito sobre rojo" (Charlton et al. 1995:147). The Aztec-style ceramics found at the Luna settlement are consistent with the documented origin of Luna's contingent of indigenous Mexicans, who were specifically noted to have originated both from Mexico City itself, as well as from Santiago Tlatelolco immediately to the north (Priestley 2010[1]:142–143, 2010[2]:150–151).[3] However, since such ceramics may well have been incorporated into the ceramic assemblage of first- and second-generation Spanish colonists in Mexico City by the 1550s, there is as yet no way to determine whether these ceramics were used specifically by Luna's Aztec contingent or were more generally distributed among all the settlers. One definite and one possible ceramic spindle whorl found on site are also likely attributable to Aztec manufacture, as is another ceramic object that could be a brazier leg.

We should also note here that there is good evidence that the Luna settlers also incorporated local Native American ceramics into their own ceramic inventory during their stay at the site. In fact, this is specifically documented for Luna settlers while living inland at Nanipacana; one recently discovered documentary account includes testimony by a cavalry officer on the Luna expedition explicitly stating that, while Luna's soldiers scavenged for supplies hidden by the Native Americans along the lower Alabama River in 1560, "they found corn and beans and jars [*ollas*] and other things from which they provided the camp" (de Vega 1566:423r–v). Similar practices can be inferred based on documentary accounts of other early exploratory expeditions; in 1541, for example, members of the Coronado expedition (some of whom later went on the Luna expedition, including Tristán de Luna himself) traveling through Texas lamented the local absence of native replacements for the Spanish ceramics that were smashed in a hailstorm during their march eastward (de Castañeda 1596:82r–83r). This suggests the appropriation of native ceramics was normal practice even on fast-moving 16th-century *entradas.*

Spanish contact-era native ceramics do appear within Spanish features and midden deposits at the Luna settlement and not just as isolated sherds. For example, mendable sherds from a large portion of a shattered Pensacola-incised, variety Pensacola, carinated bowl were found in the midst of a Spanish trash-pit feature (discussed below) and produced an optically stimulated luminescence (OSL) date of 1591 ± 49 (Boren 2017). Moreover, the spatial distribution of Native American ceramics across the inland portion of the site overlaps directly with the Spanish-artifact distribution, and at present this does not appear to be simply the result of Luna's settlers reoccupying an abandoned Native

[3] Priestley (2010[1]:142–145) mistranscribed "Tatebula" instead of "Tatelulco," a variant of Tlatelolco; see Indios Principales (1560:75r).

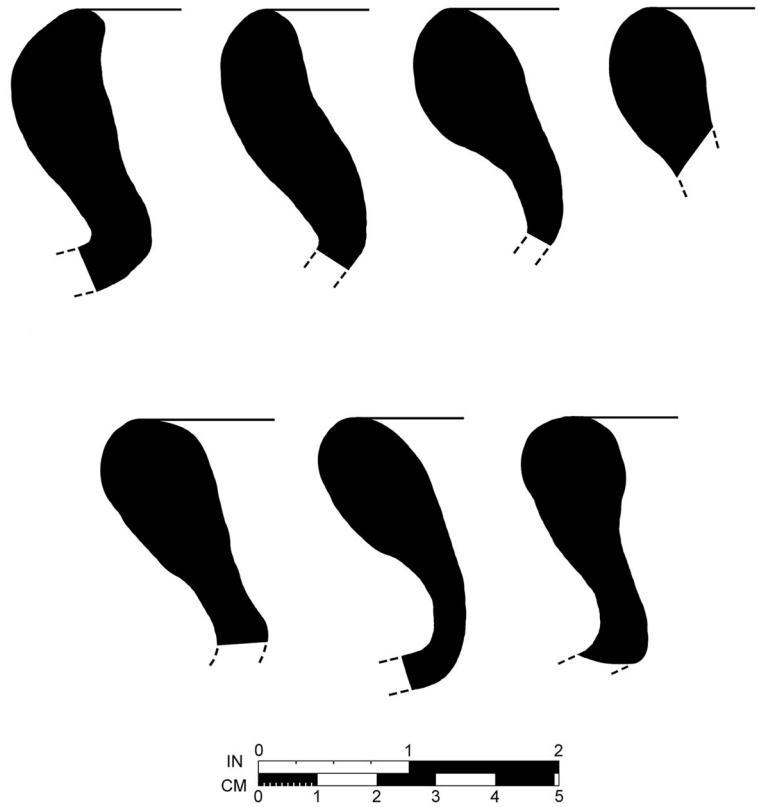

Fig. 10 Typical olive-jar rim profiles from the Luna-settlement site (8ES1). (Drawing by John E. Worth, 2018.)

American village (or vice versa), since as yet no purely Native American features have been found on the inland terrace, which is instead characterized by features associated with the Spanish occupation (along with 20th-century disturbances).

Situated some 9 m above modern sea level, Emanuel Point is the erosional remnant of an ancient marine terrace (Marsh 1966). The eastern side of this level terrace forms a steep bluff overlooking Pensacola Bay, and windblown sand has formed low dune deposits along its waterside margin. The western side of the terrace, however, is characterized by a much more gradual erosional slope that descends to the edge of Bayou Texar, which drains the Carpenter Creek watershed to the north and empties into Pensacola Bay just west of Emanuel Point. As noted above, there is clear archaeological evidence for routine prehistoric habitation along the waterside margins of both Pensacola Bay and Bayou Texar, extending into the lower western slope of Emanuel Point (Fig. 8). This seems to have resulted principally from the cumulative effect of repeated small-scale visitations by Native Americans for at least several thousand years, likely similar to the seasonal fishing camps described during the 1693 Spanish reconnaissance of Pensacola Bay (de Sigüenza y Góngora 1693:287r). In contrast, however, the archaeological trace of mid-16th-century Spanish occupation extends well inland from these waterside locations. Large portions of the Luna settlement do not appear to overlap prior prehistoric occupation, permitting us to explore which types and proportions of Native American ceramics may have been used by Luna's colonists during their brief stay between 1559 and 1561.

While the proportion of Spanish and Aztec ceramics in the waterside and lower-slope area is just 11%, with an overwhelming majority (89%) of Native American ceramics, the inland terrace is characterized by a more balanced ratio, with Spanish and Aztec ceramics comprising 39% of the assemblage, compared to only 61% identifiable as Native American. In addition, the inland terrace native-ceramic assemblage (n=1,415) is almost exclusively characterized by types that could date to the Mississippian Period, dominated by plain (74%) and incised (21%) surface treatments on vessels tempered with shell (53%), sand/grit (36%), and shell and grog (8%), and thus could be contemporaneous with the Luna

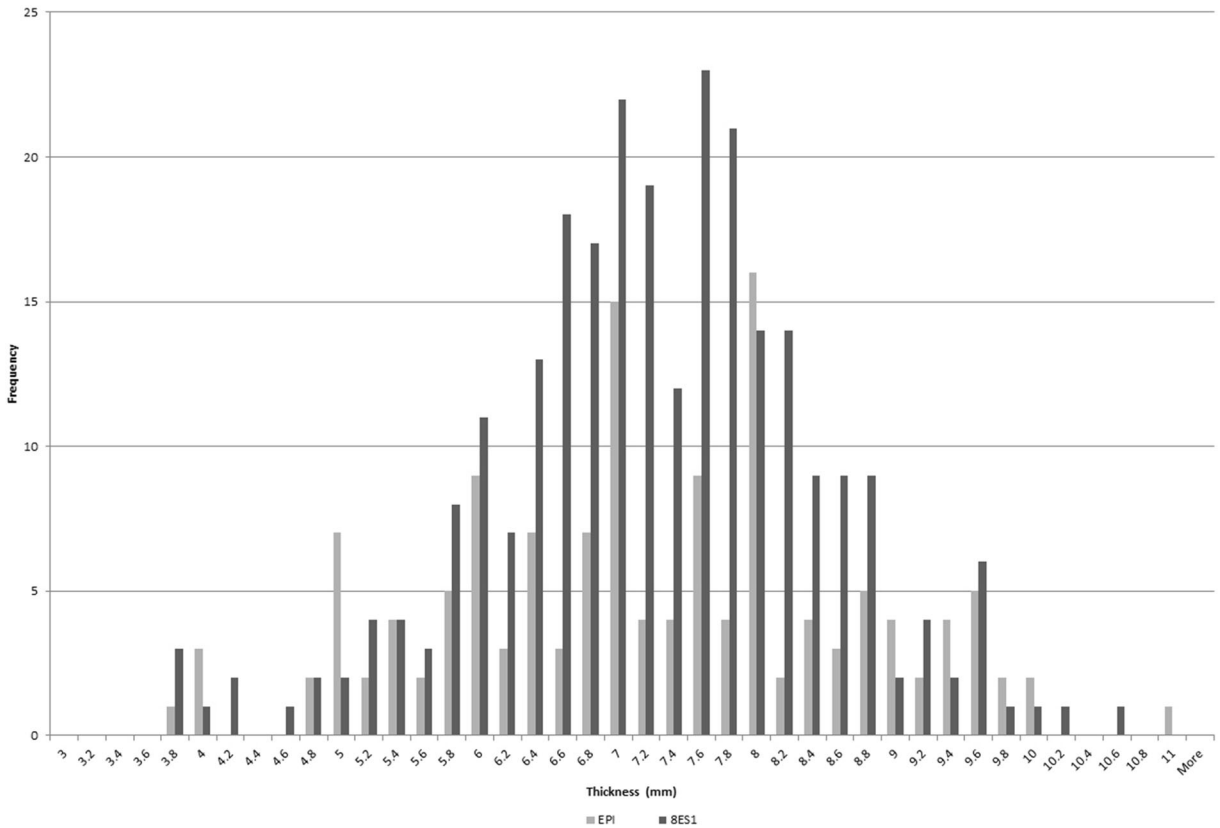

Fig. 11 Chart comparing olive-jar thicknesses for the Luna-settlement site (8ES1) and Emanuel Point I shipwreck. (Figure by John E. Worth, 2018.)

expedition. In fact, nearly all prehistoric ceramic types that definitely predate the Luna era (i.e., named types from the Woodland and Archaic periods, including all unassigned sherds with stamped decoration) are found outside this inland-terrace area (193 of 203 sherds in this category). While definitive conclusions must await more detailed analysis and further fieldwork, there is actually substantial precedent for this interpretation; all other Spanish colonial settlements in 16th- to 18th-century Florida cited above (including Pensacola's three successive presidios between 1698 and 1763) are similarly characterized by a substantial presence of native ceramics, confirming a longstanding Spanish practice of collecting and using local ceramics.

As noted above, the roster of non-ceramic artifacts in the database presently attributable to the Luna expedition is only a subset of what is most likely a larger number of artifacts from general midden or surface contexts that may eventually be added as a result of continued analysis and conservation activities following initial sorting and classification in the lab (Figs. 12, 13). This is particularly the case with metal artifacts, including a substantial number of severely rusted and concreted iron objects that are still being x-rayed and conserved, as well as a range of cupriferous artifacts of undetermined age, some of which may ultimately be attributable to the 16th century using more intensive compositional or comparative morphological analysis paired with further documentary research. Nevertheless, the very conservative list of artifacts presented in Table 3 represents a substantial and diverse range of non-ceramic objects directly associated with the Luna settlement, many of which have direct correlates within the Emanuel Point shipwrecks.

Non-ceramic Spanish artifacts at the Luna settlement include a large number of wrought-iron nails and spikes, along with tacks and other types of fasteners. While heavy spikes as large as 18 cm long have been found across the site along with a range of mid- and small-sized nails, one of the most distinctive fastener types is the caret-head nail, which has been found at mid-16th-century archaeological sites associated with both the

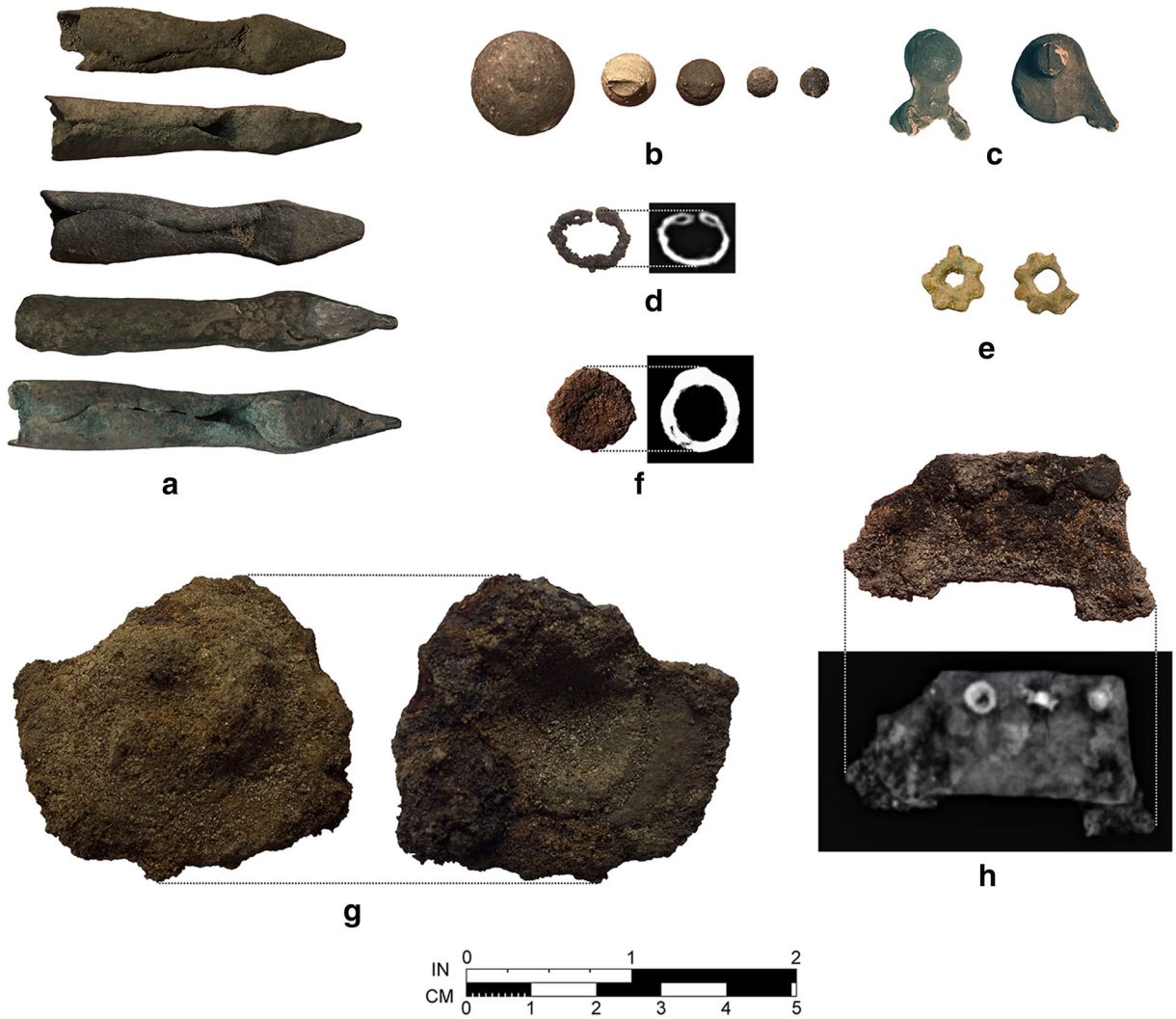

Fig. 12 Selected Spanish arms-and-armor artifacts from the Luna-settlement site (8ES1): (*a*) Crossbow-bolt tips, (*b*) lead shot, (*c*) lead shot and sprue, (*d*) a riveted mail link, (*e*) armor-rivet rosettes, (*f*) a wedge-riveted mail link, (*g*) a jack-plate armor fragment, and (*h*) a riveted brigandine-armor fragment. (Photos by the authors, 2018.)

Coronado and Soto expedition sites in the American Southwest and Southeast, respectively. Caret-head nails are thought to have been used to fasten horseshoes (Ewen and Hann 1998:83–84; Mathers et al. 2010; Mathers and Haecker 2011), though they doubtless could have had other functions as well. The Luna site may actually be the most recent appearance of caret-head nails in the United States, since they are not found in post-1565 St. Augustine and Santa Elena contexts. At the Luna settlement, caret-head nails comprise some 20% by count of the entire assemblage of wrought-iron nails and spikes in the inner-terrace area (n=206). Possibly due to the additional presence of occupations from the terminal First Spanish, British, and Second Spanish periods along the bay margin, caret-head nails only comprise 9% by count of the wrought-nail and spike assemblage (n=699) in the waterside and lower-slope sample.

Less numerous types of non-ceramic Spanish artifacts include arms and armor, tools, metal parts from perishable containers such as barrels, and clothing and ornament. Arms and armor found at the site include hammered copper crossbow-bolt tips (four in the database and one more found subsequently during 2017), lead shot and sprue, fragments of brass-riveted iron brigandine and iron jack-plate armor, links of mail armor, and rosettes from plate-armor rivets. A number of

Fig. 13 Selected non-ceramic Spanish artifacts from the Luna-settlement site (8ES1): (*a–c*) Wrought-iron nails, (*d*) a caret-head nail, (*e*) glass trade beads, (*f*) a thimble, (*g*) brass straight pins, (*h*) brass aglets, (*i*) a bale of brass wire, (*j*) a button, (*k*) a hook fastener, (*l*) a belt hook, (*m*) a decorative mount, (*n*) a cotter pin-like fastener, (*o*) a wire-wrapped ring, (*p*) a pewter whistle, (*q*) a brass enema-pump nozzle, (*r*) a balance-scale weight, (*s*) a lead line weight, and (*t*) a brass bell fragment. (Photos by the authors, 2018.)

basalt mano-and-metate fragments have been found that correspond well to documentary records of several thousand pounds of grinding stones sent from Mexico with the expedition. Other Spanish artifacts include an engraved brass bell fragment, brass wire, rolled lead fishing weights, a pewter whistle mouthpiece, and a 45.1 g brass balance-scale weight stamped with a castle and an *X*, indicating a weight equaling 10 *castellanos*, or 1/5 of a mark (de Arphe y Villafañe 1572:21r–23r). Clothing- and ornament-related items include sheet-brass aglets, brass straight pins, brass thimbles, hook-and-eye fasteners, at least one brass button, a brass belt hook, a brass ornamental mount, and a hand-crafted brass wire-wound finger ring.

An important addition to this assemblage is a small number of glass beads, all of which are consistent with Indian trade goods (*rescates*), crates of which are documented to have been brought on the expedition. The beads include six faceted seven-layer chevron beads, all of the same type (Type IVC2d) (K. Kidd and M. Kidd 1970; M. Smith and Good 1982), one twisted Nueva Cadiz bead (IIIA2a), three plain Nueva Cadiz beads

Table 3 Selected non-ceramic Spanish artifacts from Site 8ES1 as of March 2018

Type	Count	Weight
Nail, caret head, wrought iron, fragment	99	498.7
Nail, caret head, wrought iron, whole	8	53.9
Nail, wrought iron, fragment	709	2741
Nail, wrought iron, whole	54	754.7
Spike, wrought iron, fragment	17	855.2
Spike, wrought iron, whole	18	1792
Armor fragment, iron	20	64.2
Crossbow-quarrel point, copper	4	49.1
Ball, lead	9	11.5
Shot, lead	152	241.4
Sprue, lead	8	22.1
Rosette, armor, cupriferous	2	0.5
Barrel band, iron	16	1123.9
Mano, basalt	14	1855.7
Mirror fragment, bronze	1	0.7
Weight, balance scale, brass	1	45.1
Weight, lead	27	382.9
Whistle, pewter	1	1.7
Aglet, brass	12	4.3
Bead, glass, Nueva Cadiz twisted (IIIA2a)	1	0.8
Bead, glass, Nueva Cadiz (IIA1e)	3	0.3
Bead, glass, chevron (IVC2d)	6	3.4
Bead, glass, green seed	1	0.1
Bead, glass, red seed	1	0.1
Jewelry ring, wire wrapped, brass	1	1.4
Straight pin, brass	13	3.5
TOTAL	1,198	10,508.2

(IIA1e), and two untyped, wire-wound, donut-shaped seed beads, one opaque green and the other opaque red. In addition to these beads already incorporated into the database from four different localities within the site, two additional beads have since been found in 2018 at yet another distinct location on the site: another faceted chevron and a Nueva Cadiz bead, both consistent with types previously found (Types IVC2d and IIA1e).

Both Nueva Cadiz beads and faceted seven-layer chevron beads are widely known to be associated with pre-1550 Spanish contexts in the Southeast, but terminal dates for both bead types are generally acknowledged to extend as late as at least 1560 or 1570 (M. Smith and Good 1982:10–11; Deagan 1987:162–167,172; M. Smith 1987:31–33,45; Mitchem 1991:102; Little 2008:15–28, 2010; Waselkov 2009:99–100), and their appearance at the Luna settlement is thus consistent with their appearance at several later sites in Spanish Florida unquestionably dating to the 1560s (Deagan 2009:283–290; Whitley et al. 2013). Moreover, since the royal trade goods transported from Mexico City likely came from the royal warehouse there, they might well have included stockpiled beads from slightly earlier dates. However, the dominance of Nueva Cadiz (5 of 14) and faceted seven-layer chevron beads (7 of 14) at the Luna-settlement site clearly establishes that both were unquestionably available to be distributed to southeastern Indians during the period 1559–1561.

Far from simply being a huge surface scatter of Spanish debris adjacent to the Luna shipwrecks or objects accumulated and then for some reason discarded without modification by resident Native Americans, Site 8ES1 also possesses intact subsurface features and midden deposits that provide direct evidence of Spanish structures, trash pits, hearths, and other deposits, including evidence for activities that can only be attributed to Spaniards residing onsite. Though comprehensive details must await a more complete report, a brief sampling will suffice to provide some sense of the range of residential evidence still being uncovered and analyzed. Even though the total area excavated through the spring of 2017 between shovel tests and

Fig. 14 Profile of the Feature 3008 posthole (*inset* shows olive-jar sherds in situ). (Photo courtesy of the Archaeology Institute, University of West Florida, 2018.)

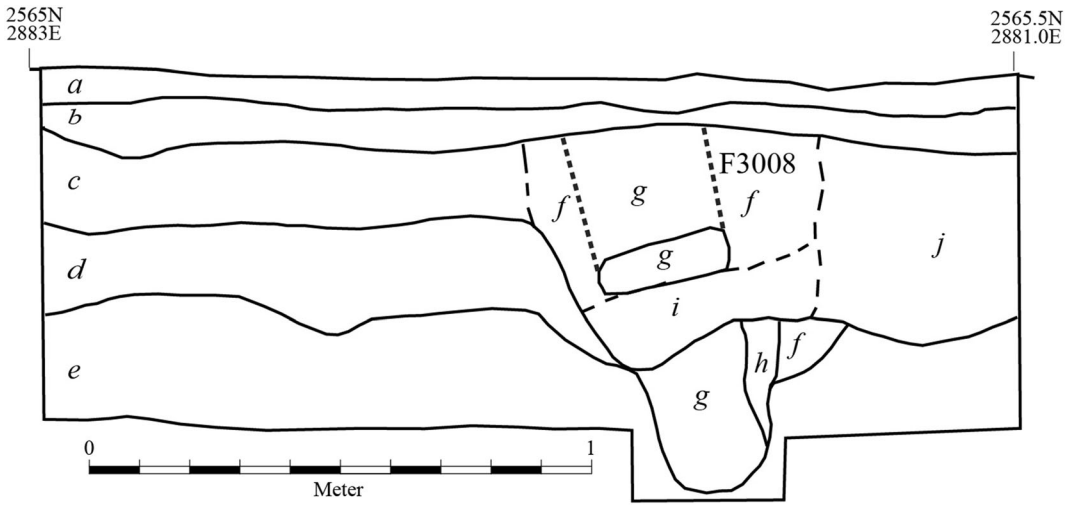

Fig. 15 Profile map of the Feature 3008 posthole: (*a*) Humic layer, (*b*) modern fill, (*c*) midden, (*d*) mixed subsoil and midden, (*e*) subsoil, (*f*) F. 3008 posthole, (*g*) F. 3008 post mold, (*h*) F. 3008 heavily burned area, (*i*) bioturbation, and (*j*) Feature 3007. (Drawing courtesy of the Archaeology Institute, University of West Florida, 2018.)

larger excavation units represents only a fraction of 1% of the entire site area (just over 172 m^2 for the area represented in the database query used above), a range of intact features associated with the Spanish occupation have been discovered and excavated.

One small feature (F. 3008) is a deep, burned post found in 2016 with olive-jar sherds in the posthole fill and a charred post remnant with a wrought-iron nail still in place (Figs. 14, 15). Three 2 × 2 m excavation units opened around this post in 2016 and 2017 contained a dense ceramic deposit of 329 Spanish olive-jar sherds (many of which mend to one another) and 145 other Spanish and Aztec sherds, along with 432 Native American sherds, as well as a range of other Spanish artifacts including the balance-scale weight described above, several brass straight pins, an aglet, a hook-and-eye fastener, a basalt mano fragment, a wire-wound finger ring, a copper crossbow-bolt tip, two Nueva Cadiz beads, several sizes of lead shot, fired clay balls potentially identifiable as specialized crossbow shot (*bodoques*) used for hunting birds, and many other items still under analysis. In another unit some 30 m away, a straight line of three probable Luna-era postholes of equal depth (F. 56, 57, 58) within a single 2 × 2 m excavation unit was found

Fig. 16 Profile photograph of the Feature 3006 trash pit. (Photo courtesy of the Archaeology Institute, University of West Florida, 2018.)

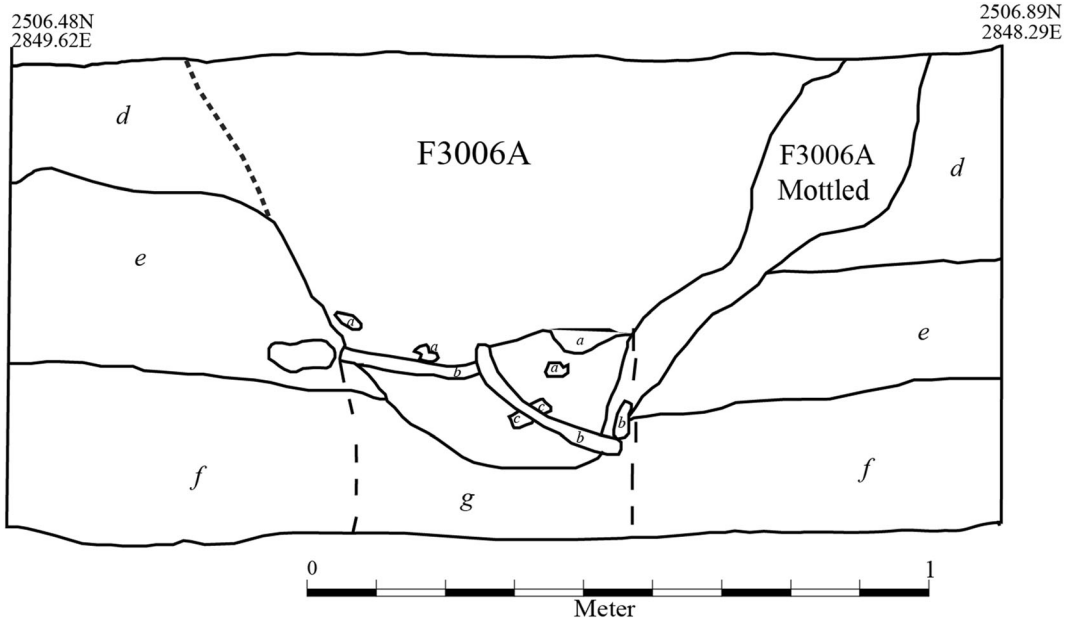

Fig. 17 Profile map of the Feature 3006 trash pit: (*a*) Olive jar, (*b*) an iron strap/band, (*c*) an indeterminate ceramic, (*d*) midden, (*e*) mixed subsoil and midden, (*f*) subsoil, and (*g*) leaching from F. 3006A. (Drawing courtesy of the Archaeology Institute, University of West Florida, 2018.)

Fig. 18 Plan view of the Feature 2002 fire pit (*inset* shows a profile view). (Photo courtesy of the Archaeology Institute, University of West Florida, 2018.)

during 2017 excavations, one of which contained several bones of an egg-laying hen (*Gallus gallus domesticus*). Another Nueva Cadiz bead and a green seed bead were among the many Spanish materials encountered here. In 2016 UWF conducted excavations nearby in a large trash-filled pit (F. 3006) packed with 16th-century materials, such as broken iron barrel bands, Spanish pottery sherds, wrought-iron nails and spikes, a bale of brass wire, a fragment of a polished-bronze mirror, a link of mail armor, a large portion of a Native American bowl broken in-place, a few shells, and a complete deer antler at the base (Figs. 16, 17).

Near the north end of the site, more than 200 m distant from all the units noted above, mechanical stripping of topsoil in advance of house construction in 2016 exposed a small fire-pit deposit (F. 2002) containing Spanish olive-jar sherds, Native American sherds, a wrought-iron nail fragment and other metal fragments, and two fragments of ground-basalt manos, all amid oyster shells, burned animal bones, and wood charcoal (Fig. 18). Not far away at this same end of the site, a cluster of Luna-era posts and other features, including apparent footer trenches, were discovered by UWF archaeologists late in the summer of 2017 prior to new construction, and these features were still being explored in 2018. A robust Spanish-artifact assemblage was present in this area, including the fourth and fifth copper crossbow-bolt tips found at the site, as well as a heavy brass artifact that has been tentatively identified as a 16th-century enema-pump nozzle.

In addition to these features and artifact concentrations indicating Spanish residential presence at the site, an additional clue that Spaniards and not Native Americans were using these objects onsite is the fact that several of the areas have produced direct evidence of the onsite casting of lead arquebus shot in several size categories (including 4 mm, 7–8 mm, and 12–13 mm), a number of which are unfired lead balls detached with scissors (and sometimes still attached), along with numerous splattered lead sprue and droplets (Fig. 12). Even beyond the fact that none of the Spanish debris at the site seems to have been modified or reutilized after discard (which should certainly have been likely had 16th-century Native Americans scavenged or otherwise obtained these exotic materials), the onsite casting of lead shot is an activity only attributable to resident Spaniards during this era.

Conclusion

In sum, after a year and a half of focused archaeological research, the conclusion seems inescapable that the 1559–1561 site of Tristán de Luna's settlement of Santa María de Ochuse has indeed been identified at Site 8ES1 on Emanuel Point, supported by the following facts:

(1) The site fits all documentary accounts regarding the location of Luna's settlement.
(2) The site is the largest 16th-century Spanish ter restrial site by area in the entire Southeast.
(3) The artifact assemblage is fully consistent with a mid-16th-century Spanish residential occupation that originated in Mexico and included Spanish cavalry and Aztecs.
(4) The site contains subsurface architectural traces and other pit features, and evidence of specific activities that are all consistent with Luna's two-year occupation.
(5) The site is adjacent to an unprecedented cluster of three 16th-century shipwrecks already attributed to the Luna expedition that contain artifact assemblages which precisely match the terrestrial assemblage.

In light of these facts, we are confident that continuing archaeological and historical research by the University of West Florida will permit new and deeper insights into the settlement and fleet of Tristán de Luna, shedding light on a still little-known chapter in the early colonial history of North America.

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Compliance with ethical standards

Conflict of interest statement On behalf of all the authors, the corresponding author states that there is no conflict of interest.

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