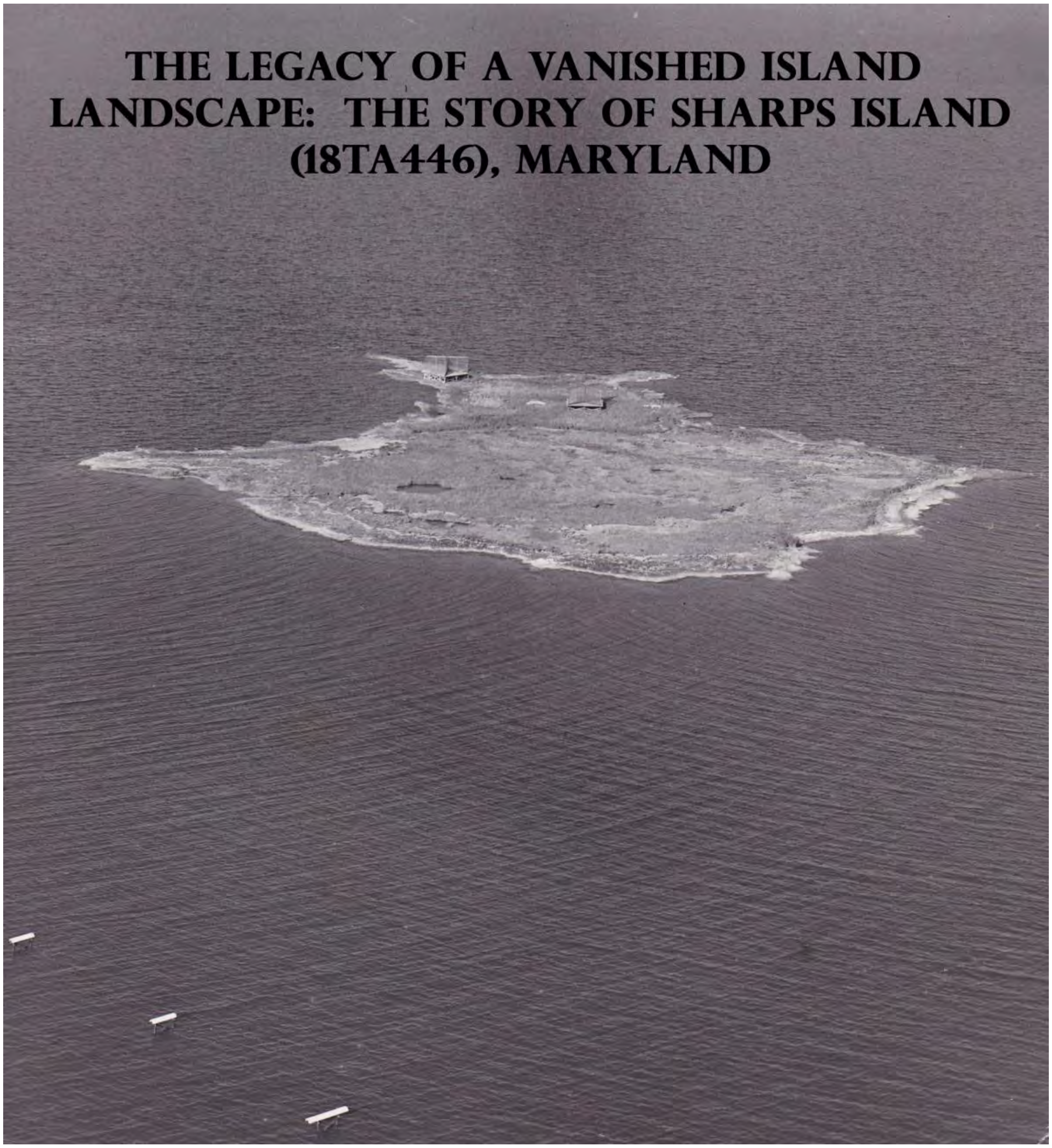

By

Darrin L. Lowery, Ph.D.

Chesapeake Watershed Archaeological Research

Erosion and Archaeological Research Series Monograph #5

The front cover image shows the only detailed aerial photograph of Sharps Island, which was taken on September 22nd, 1946. Original photograph is in the author's collection.

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DEDICATION

I would like to dedicate this short-monograph to my father; Warren E. Lowery. He imparted onto me much of the current knowledge I use with respect to eroding coastal islands. When I was a young child, he shared stories about his excursions to Sharps Island and offered me insights about some of the discoveries he and others had made along its vanished shorelines. During the harsh winter of 1976 and 1977, he arranged for a visit to see the Harrison family collection, which had been amassed from Sharps Island in the early to mid-20th century. Even though I knew nothing about the prehistoric cultural chronology at the time, I was "hooked" after that visit. In many respects, I wish I could go back in time and reassess the Harrison family collection from Sharps Island with the knowledge I now have. Oh well, I guess it wasn't meant to be! Even with the extant collection, we know something about this vanished landscape. I would also like to thank Mr. Freddie Sadler; now deceased, who took me out to Sharps Island in 1978 on his "clam rig" to sieve the bottom for the remains from a bygone era. I would also like to thank Mr. Delmas Haddaway; also, now deceased, who shared his knowledge about Sharps Island and the story of how he escaped drowning after his boat sank during an intense summertime thunderstorm near Sharps Island. He escaped death by floating in the bay for several hours on 14-foot wooden oar. Finally, I would like to thank William Roe. We spent many days on the bay together. Between stories about baseball and him singing, he imparted his knowledge about Sharps Island. I would also like to dedicate this monograph to all of the native Tilghman Islanders. There aren't many left. However, I complied the data for this summary over a period of forty-five years. The goal was to provide future generations with a source of accurate information about a barren region of the bay, which now consists of nothing more than a derelict leaning lighthouse. When driving to the southern end of Tilghman Island, I have tried countless times to envision a several hundred-acre island southeast of the extant lighthouse with "*fields of grain and flocks of grazing sheep, which could be seen from the mainland*". Even with a vivid imagination, I've so far seen nothing but an open-expanse of water.

ABSTRACT

Landscapes, which include islands, adjoining the Chesapeake Bay have come and gone over the past three centuries. Most of these islands once contained a vast archaeological record. Discounting sea level rise, researchers and historians have largely failed to recognize how coastal erosion and land loss in the Chesapeake region have influenced our understanding of the past. The goal of this short treatise is to provide some perspective on islands that have disappeared and offer a detailed record of Sharps Island. Another goal is to provide a summary of how the geomorphology and geology of various islands help us to better understand how erosion has influenced the bay's ecology, biology, and geology. Pure bathymetric-sea level reconstruction models fail to compensate for erosion. As a natural force, coastal erosion is an overriding variable when sea level is stable or rising very slowly. Most importantly, the legacy of Sharps Island has provided us with a better understand of the complexities and interrelated factors associated with coastal erosion. Finally, the synopsis serves to correct some egregious errors made by historians and researchers in the recent past about the historic record and the geologic meaning of what actually occurred at Sharps Island between 1631 and 1954. In sum, the island's legacy offers a perspective associated with comparable vanished coastal landscapes along similar global shoreline settings.

THE LEGACY OF A VANISHED ISLAND LANDSCAPE: THE STORY OF SHARPS ISLAND (18TA446), MARYLAND

By Darrin L. Lowery, Ph.D.

INTRODUCTION:

In the Chesapeake Bay, many islands have disappeared over the past three centuries. Most of these landscapes contained an archaeological record and because of the timing when these islands vanished this archaeological record was never recorded or documented. The existence of many of these vanished landscapes lies only in the memories of local families, in photos, in historic texts, and on archival cartographic maps. The loss of these islands is analogous to someone dying without an "obituary". Many archaeological researchers (see Custer 2018) have failed to acknowledge the magnitude of land loss along the Middle Atlantic's coastline and most of this loss occurred before State Historic Preservation Offices ever existed. These shortcomings have influenced our ability to reconstruct past lifeways, understand ancient subsistence strategies, and evaluate prehistoric human settlement patterns in the coastal plain.

With this brief summary, I will provide an overview outlining a few of the vanished islands (see Figure 1) and offer a brief summary of what archaeological remains have been found at each location. With these "hearsay" summaries, archaeological researchers should be reminded that the tangible remains, which have survived the onslaught of coastal erosion, are largely a coincidence of geologic circumstance.

Two islands once located along the south side of Kent Island (see Figures 1A-B and 2A-B) reportedly contained prehistoric archaeological remains. Local residents found "numerous arrowheads" at both Long Marsh Island (Figure 2A) and Little Island (Figure 2B). Exactly what chronological range of prehistoric artifacts were found at these two islands is largely unknown. Herring Island (see Figure 2C), which was situated in the middle of the Miles River, was a fragment of low tidal marsh in 1848. Several decades ago, a local oystermen exhumed a double-grooved basalt axe and a few flaked stone knives from Herring Island's former footprint. Herring Island ceases to appear on early 20th century maps. In 1850, Nelsons Island (see Figure 2D) encompassed a long peninsula of forested and agricultural land. By 1900, erosion separated the terminal end of this peninsula from the mainland forming an island. Before the island succumbed to erosion in 1982, a few Late Archaic stemmed projectile points were found around the island's marshy remnant. Immediately west of Nelsons Island's former location, a local clam dredger exhumed a fluted Paleoindian-era point from the eight-foot water depth. A neighbor named Royston Island (see Figure 2E) was once positioned due east of Nelsons Island on the opposite side of Broad Creek. In the mid-19th century, it encompassed a farmstead. Prior to 1970, prehistoric stone projectile points were reportedly found on the remnant island by individuals who lived on the adjacent mainland farm. Royston Island vanished sometime after 1970. Further south and adjoining the Chesapeake Bay, a farmstead existed on Long Island (see Figure 2F) in the mid-19th century. U.S. Coastal survey maps indicate that Long Island, which was oriented immediately northwest of Holland's Island, had completely eroded away sometime prior to 1938. Presumably archaeological remains associated with any prehistoric occupation, as well as the 19th century farmstead noted on the 1850 coastal survey are now scattered across the bottom somewhere near island's former location. In recent years, the loss of the last house on nearby Holland's Island gained some media attention. However, archival data would imply that the farmhouse once located on Long Island (see Figure 2F) had suffered a similar fate a century before. Further south, Shanks Island (see Figure 2G), which was dominated by tidal marsh, contained a small upland farmstead in 1850. The island persisted until 1970. Numerous prehistoric and historic artifacts were reportedly discovered along its beaches before Shanks Island succumbed to erosion. Like Shanks, Goose and Queens Reach Islands (see Figure 2H) also had farmsteads surrounded by tidal marsh in the 19th century and both disappeared sometime prior to 1970. Like Holland's, Great Fox Island also achieved some media attention over the past few years. However, most have forgotten about its neighbor; Little Fox Island (see Figure 2I). In the mid-19th century, Little Fox Island contained a small upland farmstead, an orchard, and two small tilled fields surrounded by tidal marsh. Little Fox Island completely washed away sometime prior to 1980. Before Little Fox Island surrendered to erosion, local families in nearby Crisfield, Maryland found numerous prehistoric artifacts at this location. All of these extinct islands once contained a significant prehistoric and historic archaeological record and all vanished before this evidence could be documented. Presently, voids in archaeological databases exist where these landscapes had endured for several centuries. As such, their erosion histories and limited archaeological records should provide a cautionary note about how extant cultural resource databases are heavily biased and how eroded coastal landscapes are grossly underrepresented.

Of the situations outlined above, no island in the Chesapeake Bay has suffered any greater land loss than Sharps Island (see Figure 1). The island was once situated in the middle of the Chesapeake Bay at the mouth of the Choptank River; a strategic prehistoric and historic location. Sharps was inhabited throughout prehistory and during the historic-era until the early 20th century. In 1954, it vanished from the surface of the earth. The disappearance of this immense island sounds like the theme to a fiction novel. Indeed, that is the case! Sharps Island served as the template for James Michener's fictional "Devon Island" as highlighted in his novel entitled *Chesapeake*. The fictional shape and location of "Devon Island" demonstrate Michener's misunderstandings of both coastal geology and coastal geomorphology. However, Michener did recognize that Chesapeake Bay islands, which may contain historically significant resources, can and do vanish rapidly. Notably, the Sharps Island situation has repeated itself many times and at numerous locations along the margins of the Chesapeake Bay. However, a fluke of unique circumstances offers us more information about the tangible archaeological record associated with Sharps.

As a child growing up on Tilghman Island, I had heard the legends of Sharps Island, which was once positioned about four miles south of Tilghman. The legendary status was further amplified after examining some of the prehistoric stone artifacts once found along its vanished shorelines. I was overwhelmed by the sheer number, variety, and volume of the stone projectile points, knives, spearheads, and ground stone tools accumulated from this location during the early to mid-20th century. During this era, a few individuals had combed the island's marshes and beaches before its demise with the intention to accumulate these prehistoric curiosities. One of those individuals happened to be my father. He relayed that the island was literally encapsulated by "*arrowheads!*" The foresight of these few individuals offers future generations a more detailed glimpse into the archaeological record of this vanished island landscape.

The summary outlines the history of Sharps Island. Unlike the other islands briefly discussed above, the story of Sharps Island illustrates the type of information missing from the various academic archaeological syntheses of the Middle Atlantic region. The summary also corrects some of the errors made by other researchers and authors, who have reported on historical aspects about Sharps. The synopsis also implies that many researchers have grossly underestimated the magnitude of late Holocene coastal erosion along the margins of the bay. Finally, it also illustrates how erosion has impacted our current understanding of the bay's ecology, its geology, and the region's archaeology.

HISTORY OF SHARPS ISLAND:

The first cartographic portrayal of Sharps Island was generated by John Smith as a result of his initial 1608 exploratory trip to the upper Chesapeake Bay. When published in 1612 (see Figure 3, left), Sharps is represented as the lower portion of the "*Winstons Isles*". The island at the time was so large that Smith and his crew, who were sailing along the western side of the bay, could not visually denote or document the mouth of the Choptank River. The first Englishmen to set foot on Sharps Island may have contributed to the island's second name. During the late winter/early spring of 1631, William Claiborne and a crew of Virginian fur traders floundered on an island in the middle of the Chesapeake Bay (see Denny 1959: 9). The crew was stranded for several days before being able to traverse the water to the mainland "*in the land of the Choptanks*" (Ibid). Given this notation, Sharps Island would most likely be the location where Claiborne and his men were temporarily marooned. When William Claiborne initially established his Virginia settlement on Kent Island in August 1631, the island was referred to as "*Clayborn's Island*". However, no documentary evidence has survived indicating that William Claiborne or any of his Virginia followers every colonized or used Sharps. We do, however, know that one of Claiborne's followers utilized nearby Poplar Island as a "pig farm". It is possible that Sharps may have had a similar function, which has escaped official historical documentation. In 1659, the Lord Proprietor of the Province of Maryland conveyed ownership of "Clayborn's Island" to John Bateman. The island had not been surveyed since 1631 and was said to encompass approximately ~1400 acres. The acreage reported in 1659 may have been a carry-over from Claiborne's estimates generated ~28 years prior. Three years later in 1662, Bateman sold the island to Peter Sharpe; a "*chirurgeon*" who lived in Calvert County, Maryland. No revised acreage estimates exist as a result of this property transfer and there is also no evidence that Peter Sharpe permanently lived on the island. Upon Peter's death, the island's ownership transferred to his son William in 1672. As part of Peter's estate, the island was accurately surveyed for the first time in 1675 and was said to contain ~900 acres; a net loss of ~500 acres of land since 1631. William Sharp appears to have been the first permanent resident on the island, as indicated by the fact William's entire family moved to the island and lived there for some unknown period of time. Historic documents also indicate that William's son drowned at Sharps Island and was presumably buried somewhere on the island. The Augustine Herrman map of 1673 (see Figure 3, right) is the first cartographic portrayal, which designates the island as "*Sharp's Isle*". The island's third name would persist until its demise 281 years later.

In 1809, Sharps Island was listed for sale and it reportedly "*contained ~700 acres of land, about one-third in wood, principally oak and pine, among which is a considerable quantity for ship timber. The soil is very productive for the cultivation of hemp, tobacco, barley, corn, wheat, and stock may be raised on it to great advantage. The improvements are a comfortable house, three large barns, and other necessary buildings.*" The real estate description of the island in 1809 was based on information garnered from 1798 tax records. Given the island's rapid erosion history, it can be concluded that Sharps Island was smaller in 1809 than the advertised acreage. As a result, Jacob Gibson of Talbot County, Maryland purchased the island for $10,254.00 and maintained an active farm at that location for several decades. During the War of 1812, the British fleet landed at Sharps Island on April 14th 1813 and commandeered food and supplies from Gibson's plantation to support its troops. By 1823, four tenant families were the only permanent residents on the island.

When the first lighthouse was erected on Sharps in 1838, it encompassed 480 acres of land; a net loss of 220 acres of land in 40 years. The first lighthouse was a small 30-foot-high structure and designed so "*the building….can be moved at any time with ease in case of the water washing the earth away*" (see de Gast 1973: 130). Just a decade later in 1848, Sharps Island had lost an additional 42 acres of land and was surveyed to contain 438 acres (see Figure 4). At this time, the original construction location of the lighthouse on the northwest end of the island had eroded and the lighthouse had been moved several times. In 1848, the ownership of the island had transferred to the Valliant family. The property contained one residence, one barn, a hunting blind, an orchard, about 298 acres of tilled fields, approximately 92 acres of forest, 48 acres of tidal marsh, as well as a fringe of sand beaches. The northwestern end of the island was named "*Drum Point*" and the southern end of the island was called "*Beach Point*". The land projecting from the southeastern side of the island was denoted as "Little Island Point"; referring to a small elevated hummock surrounded by tidal marsh.

In 1864, the Lighthouse Board reported to Congress that "*The lighthouse at Sharps Island is in imminent danger of being destroyed by washing away of the bank on which it stands*" (Ibid). A year later, the Board noted that "*the unusual absence of storm-tides, ice, and heavy northwest gales during the past year accounts for the unexpected preservation of the present structure*" (Ibid). They also noted that "*The sea, however, is gradually but surely undermining the bluff and has already reached one corner of the building, leaving no doubt as to the result*" (Ibid). These statements and observations reveal that the Lighthouse Board and their engineers understood that flowing ice, tides, and extreme wind activity resulted in coastal shoreline erosion in areas within the Chesapeake Bay. In 1866, a new screwpile lighthouse was constructed offshore of the island. The location of the 1866 screwpile lighthouse and the pre-existing 1838 movable lighthouse are both denoted on the 1848 U.S. Coastal Survey (see Figure 4). Like its predecessor, the water of Chesapeake would eventually wreak havoc on the new screwpile lighthouse. The bay froze solid in the winter of 1881 and on February 10th, 1881 flowing ice lifted the screwpile lighthouse from its foundation. The moving ice transported the structure and its keepers about two-miles northward until all ran aground on Blackwalnut Point bar; located at the southern end of Tilghman Island.

In 1873, Captain Ed Stevens rented the island from the Valliant family and moved his family, as well as a household of German-Polish immigrants to Sharps. The island was said to contain about 300 acres of land; a loss of 138 acres in 25 years. Ed's daughter, Margaret who was 15 years old, reported that the Centennial Storm of 1876, which began on September 17, 1876, greatly impacted the island. Reports show that tides in nearby Dorchester County were almost eight-feet above normal. Mrs. Parsons stated that "*we stood on our porch and watched the waves smash over the pine trees, and the tide got so high, it ran through a ditch and cut the island in two*." The ditch can be seen on 1848 coastal survey and tilled fields are located on either side (see Figure 4). However, the 1900 coastal survey (see Figure 5) shows a broad linear tidal marsh in the same location as the former ditch. The extreme tides and the resultant wave actions of the Centennial Storm must have scoured the surface of the tilled fields adjacent to this ditch. Ultimately, the elevation of the adjoining fields was topographically eroded to sea level, which permitted the formation of tidal marsh. The tidal marsh traversing the island and noted on the 1900 survey (see Figure 5) is a scar from a single storm event. A summary of the island's land loss from 1848 to 1952 (see Figure 6) displays the relationship between the last remnant of the island and the scar generated by the 1876 Centennial Storm.

After the Centennial Storm, the Valliant family must have sold the island. By 1887, an absentee landowner name Frederic Starring of Wyoming Territory owned Sharps Island. In that year, General Starring sold the entire remaining 200-acre island to an absentee French nobleman named John Evans, Marquis d'Oyley of Paris. Over the fourteen-year period since 1873, the island had lost 100 acres of land to erosion. Like many of the island's owners, the French nobleman did not understand the magnitude of annual land loss and coastal erosion at Sharps Island. Contentious legal issues quickly arose as to how much land he actually purchased from General Starring.

Over the period between 1895 and 1898, Miller Creighton of the Baltimore-based shoe and boot manufacturing firm named Young, Creighton, and Diggs (later known as Young, Creighton, and Company) entered into an installment plan to purchase Sharps Island from the French nobleman. In 1895, a construction project was initiated by Creighton and his investors. After constructing a large steamboat wharf off the southeast side of the island, he began building a grand hotel, which would serve as a summer resort for vacationers (see Figure 7). On April 1, 1898, the final transfer of money from Creighton to the Marquis d'Oyley occurred. Evidently, some disagreements arose as a result of erosion. The 1895 bill of sale claimed that Sharps Island contained 200 acres, however, the final deeded survey prepared in lieu of 1898 sale claimed that the island only encompassed 100 acres of land. Obviously, the French noblemen had erroneously assumed that his acquisition of 200 acres of land in 1887 had not been affected by wave activity and flowing ice over the ensuing eleven-years. Because of this acreage discrepancy, the Marquis attempted to sue General Starring over "*sums of money due and owing to me by him on account of a purchase and sale of a tract of land known as Sharps Island*".

Regardless, the Baltimore investors ultimately bought the remaining 100-acre island in 1898. A year prior in 1897, Creighton's personal interests in the Sharps Island venture were transferred to the Avalon Beach Company. An advertisement at the time claimed the new Sharps Island hotel could house 75 to 100 guests. The completed steamboat wharf was 500 yards in length and had nine feet depth at its terminus. Two artesian wells had been drilled to provide dependable fresh water for resort vacationers. However, the business venture ultimately failed before it even got off the ground. Interestingly, erosion may have played a role. No records have survived indicating that visitors ever used the resort. In 1900, a coastal survey indicates that the island contained 91-acres of land; a loss of nine acres over a two-year period.

During the early 20th century, there seems to have been major public concern over the loss of islands in the Chesapeake Bay. Several articles appeared in many of the regional and national newspapers emphasizing the bleak future for most of the bay's islands and the imminent loss of Sharps Island was highlighted (see Figure 8). The last documented use of the island's hotel occurred in August of 1905. A group of businessmen from nearby Easton, Maryland spent a week at the abandoned hotel and fished around the margins of the island. Their visit provides some rare photographic images of the island at the turn of the century (see Figures 7 and 9).

In 1910, J. Fred Hunter of the U.S.G.S. conducted fieldwork to investigate the loss of islands near the mouth of the Choptank River. His stay at Sharps Island provides a written narrative of the island's geology and its current size. He noted that "*The days of the islands prosperity are now but a memory, and the life of the island is a thing of the past. The trees have disappeared save for a meager half dozen; the houses have been washed away except for the large hotel which stands alone in the center of the island, a crumbling monument to the activity of other days; the site of an artesian well has been transgressed by the waves so that it now presents the unique feature of a well in the midst of the waters of the bay. The survivors of the pilings that made up the long pier which formerly invited the voyager only add to the melancholy of the deserted and dreary scene.*" Presumably, the artesian well mentioned in Hunter's account was one of the wells installed by Creighton just 15 years earlier. "*The maximum erosion on Sharps Island has been on the west and north sides, the east and south sides having remained substantially unchanged.*" The underlying geology at Sharps consisted of late Pleistocene aeolian silt, which contributed to its marked erosion by both wave and tidal actions. "*The northern part of the island is made up of material of the Talbot formation (silt and sandy loam) and rises out of the water as much as 7 feet.*" "*The marshland of the southern part of the island is withstanding the force of the waves much more effectively than the rest of the island and will doubtless be the last to disappear.*" J. Fred Hunter surveyed the area and calculated in 1910 the island encompassed 53 acres; a loss of 38 acres of land since 1900. Given the rate of erosion and the variable geology, he prepared a prediction about date of the island's ultimate disappearance without evoking sea level rise, regional subsidence, or man-made actions. Hunter specified that the estimated date the island would vanish as a result of erosion would be "*about 1950 to 1955.*"

By 1938, Sharps Island had been reduced to ~13 acres; a loss of 40 acres over the ensuing twenty-eight-year period. At this time, the island consisted solely of tidal marsh with some drowned upland land surface situated beneath a covering of tidal marsh peat. In the same year, the U.S. Navy leased the island from the owners; Mr. and Ms. Vernon S. Bradley of Cambridge, Maryland. The Navy intended to use the isolated tidal marsh island as a bombing and aerial machine gun target range (see Figure 10). The stratigraphy of the remaining island at the time can be seen in the background of a 1939 photograph showing a group of swimmers at Sharps Island (see Figure 11). The author's father; Warren E. Lowery (front row, far left), was among the group that visited the island on that summer day 82 years ago. It was during the early to mid-20th century that he and another Tilghman Island family amassed an immense quantity of "*arrowheads*" from the island's eroding shoreline.

U.S. Navy aerial assaults continued at Sharps Island throughout World War II. A photo exists showing the island at the onset of WWII (see Figure 12). My father remembered two plywood-covered platforms on the island. These platforms served as bombing and machine gun targets (see Figure 13). My father indicted that his collecting excursions with members of the Harrison family were sometimes interrupted by a Naval plane flying low over the island, waving its wings, and warning the visitors of impending target exercises. Once warned, they immediately vacated the area. The practice aerial assaults employed both AN MK-23 and AN MK-43 practice bombs, which were made of cast-iron and lead-antimony. These bombs weighed between 3 and 4.5 pounds and both used a simple primer impact ignition system detonating a small explosive charge. Witness accounts suggest that larger bombs were also dropped on the island. During the interludes between bombing raids, the island was also a strafing range for both .50 caliber and 20mm airplane-mounted machine guns. Needless to say, the bombing and strafing attacks most likely played a role in the island's never-ending battle with coastal erosion.

On September 22nd, 1946, a detailed photograph was taken of Sharps Island (see Figure 13). The image is the most complete aerial photograph of this withered island (compare Figures 12 and 13). The photo shows several features noted on the coastal surveys and mentioned in the island's oral historical record. Some of the pilings and trusses associated with Miller Creighton's 500-yard-long steamboat wharf can be seen in the foreground. Two elevated wooden bombing platforms are present on the northern-most remnant of the island. Bomb craters, which contain water, can also be seen in the center of the island. A close examination also shows extensive storm-related overwash berm features immediately inland of the shoreline. The overwash features and the small ephemeral beaches fringing the shoreline represent the locations where prehistoric artifacts accumulated and were collected. At the time of the photograph, the island had been reduced to less than half of its 1938 dimensions and encompassed approximately ~6 to ~7 acres of tidal marsh. The last official survey of the island was prepared by the U.S. Navy. The Navy surveyed the island in 1948 (see Figure 14) and the dimensions indicate the remnant had been reduced to ~5 acres.

On her 90th birthday in 1951, Margaret Stevens Parsons revisited the Sharps Island farm she remembered as a child. Like herself, the island had weathered since the Centennial Storm of 1876. She described the vestige she saw on that day as a "*thin strip of nothing*". A blurry aerial photograph exists at the U.S. National Archives (i.e., AHY-5K-171), which shows Sharps Island, Maryland as it appeared on July 2nd, 1952. At that time, the island encompassed ~2 acres of tidal marsh. As J. Fred Hunter predicted forty-four years earlier, the battle between the landmass and the Chesapeake Bay would soon end. Ice, which had formed in the bay during the winter of 1954, inflicted the final blow to the residual marshy island sliver. By the spring of 1954, both Delmas Haddaway and William Roe; who were both Tilghman Island watermen at the time, reported that Sharps Island had finally lost its 323-year battle with the Chesapeake Bay. Flowing ice during the previous winter had scraped the island's remnant marshy surface away. Twenty-three years later, ice again inflicted its influence on a man-made feature located near the former location of Sharps Island (see Figure 15).

The misunderstandings about coastal erosion and land loss, which plagued the Marquis d'Oyley in 1898, seem to have reemerged in 1958. Records assert that the United States Navy purchased Sharps Island. If so, they acquired the island four years after it completely disappeared. The 1958 land transfer (Michael Smolek; personal communication 6-20-2018) declares the Navy acquired 10-acres at Sharps Island. Given the facts, we can conclude the U.S. Navy had purchased 10-acres of nothing. The size of the land area acquired by the Navy is interesting, considering that the 1948 survey implies the island consisted of only ~5-acres. Subsequent maps of the area show only an shallow obstruction at this location (see Figure 16). Where land once existed in 1848 (see Figure 4), the current bathymetry indicates the presence of seven to nine feet of water (see Figure 16).

During the summer of 1978, various aspects about Sharps Island's past resurfaced for a few weeks. Hydraulic soft-shell clam dredgers (see Figure 18) assaulted the island's former footprint, as well as the shallow flats once located east of the island. During this short interval, WWII-era Naval ordnance (see Figure 19), late 19th/early 20th century clay pipes (see Figure 22), historic-period bricks, wooden pilings, and a few prehistoric artifacts (see Figures 20 and 21) were exhumed from the bottom. The array of artifacts document various aspects of the island's past. Interestingly, the stone and metal (.50 caliber and 20 mm) projectile points record both the island's earliest and its latest phase of human utilization.

However, a few of the prehistoric artifacts exhumed by the clam dredgers do provide important data about their contexts. Four of the artifacts have polished surfaces, rounded edges and show tumble damage, which formed as a byproduct of wave and tidal actions. Bio-geochemical weathering on one artifact suggests that it had eroded from the island's tidal marsh and been deposited on the shoreline for some unknown period of time. Nine of the prehistoric artifacts dredged from the bottom suggest that drowned and intact prehistoric archaeological features may exist within the shallow flats located east of the former island. The two historic-era pipes were both found near the end of the former steamboat wharf and may have been accidently lost or dropped overboard during some excursion to the island in the 19th or early 20th century. Ironically, these clay pipes may have been used by some of the vacationers who stayed on the island for a week during the summer of 1905 (see Figure 9).

The archaeological record at Sharps Island was extensive. However, most of the primary archaeological contextual data had been destroyed by decades or centuries of coastal erosion. The archaeological tailings from these disarticulated sites accumulated along the hastily retreating shoreline. The extant prehistoric collection from Sharps Island consists of approximately 700 projectile points, knives, and flaked artifacts, as well as a few ground stone tools. If the additional 16,000 or more projectile points in the Harrison family collection were added to the mix, researchers would have a better idea of how immense the prehistoric human presence was at Sharps Island. If you use the number of diagnostic points in the Warren E. Lowery collection (see Figure 17) and calculate that the Harrison collection was about twenty-three times larger, the number of diagnostic artifacts that may have been associated with this island is staggering. Unfortunately, after Mrs. Ada Ridgeway Harrison died, her husband's collection was scattered among the multitudes of surviving family members. Just like island itself, a portion of the archaeological record has disappeared.

The density of prehistoric artifacts found at Sharps Island in the mid to early 20th century can easily be explained by several interrelated geologic and archaeological factors. First, the island's location at the mouth of the Choptank River was clearly an area preferred for human settlement over a very long period of time. If you superimpose the 1848 layout view of the island over its former location (see Figure 23), you can easily guesstimate where several archaeological sites may have once been located (see Figure 23, red). The predictions are based on the island's former topographic relief and its relic drainage patterns. The anticipated site locations may have once contained dense multi-component prehistoric occupation debris, as well shell midden refuse. In the past, the island could have also contained sacred areas with former prehistoric cemeteries and/or burials. A relic drainage divide, which is clearly evident (see Figure 23, blue line), may have provided the types of ecological settings preferred by both Paleoindian and Early Archaic period colonizers. Of course, the extant archaeological remains (see Figures 17, 20, and 21) do indeed prove many of these assumptions. However, the current situation at Sharps Island (see Figure 16) does not offer any opportunity to test predicted or inferred archaeological site location models. The archaeological sites that may have once existed on this island have essentially been stripped away and dismantled by several centuries of natural wave and tidal actions.

The former 1848 Sharps Island footprint (see Figure 23) now encapsulates an area comprising of bathymetric depths ranging from ~3-feet to ~11-feet of water (see Figure 16). Notably, Sharps Island did not sink as some early 20th century newspaper reporters and scientists had inferred (see Figure 8). The island's late Pleistocene and Holocene upland platform were peeled away and removed by coastal erosion. The observations made by J. Fred Hunter in 1910 clearly indicate that the island's upland was being actively "*worn away by waves and tidal actions*". Given the current bathymetry, Hunter indicated that Sharps Island had banks as much as ~7-feet in elevation. Collectively, these data offer important insights as to the volume of eroded sediment displaced from the island's footprint over the past 173 years. If you estimate an average surface elevation of the former 438-acre island at ~3-feet (see Figures 4 and 6) and a present average bathymetric depth of ~5-feet below sea level (see Figure 16 and 23), approximately ~850,000 cubic yards or about 61,000 commercial dump truck loads of sediment have been eroded from the island's former platform and ultimately redeposited somewhere on the bottom of the existing Chesapeake Bay.

The immense density of archaeological remains found along the eastern tidal marsh remnant of Sharps Island (see Figures 6, 12, and 13) between 1938 and 1946 is simply the byproduct of erosion, the long-term transgression of dislodged archaeological "sediments", and the islands low topographic relief during its final years. Throughout the early 17th century when the island reportedly contained ~1400 acres of land (see Figure 3), the entire landmass may have been fringed by a veneer of more erosion resistant tidal marsh (see Figure 24, top). As such, the forested upland, which may have contained numerous intact archaeological sites, would have been "protected" from erosion. As the western more erosion-resistant veneer of tidal marsh vanished, the upland and all associated archaeological remains rapidly melted into the bay as a result of the never-ending onslaught of wind, wave, and tidal actions (see Figure 24, middle). As the island's western and northern coastal margins transgressed eastward and southward, the increasing fetch parameters further amplified the erosion. The archaeological lithic leftovers from an unknown number of scoured and eroded sites also transgressed with the shoreline and accumulated in the swash and berm zone (see Figure 24, middle). The size-range of the transgressing archaeological "sediments" would have largely been dependent upon the wave and tidal energy regimes affecting both the north and west sides of the island. The high-energy situation associated with the Sharps Island area imply that most of the dislodged artifacts would have transgressed with the retreating shoreline. Only the heaviest ground stone tools would have resisted wave movement and remained offshore. The height of the upland shoreline margin would have also limited the redeposition of archaeological sediments unto the modern surface. Having observed this process over the past three decades, only during extreme high-energy storm events; like the Centennial of 1876, would the displaced artifacts within the normal swash and berm zones be transported and deposited onto the modern forested or tilled upland surface. As the upland landscape completely disappeared (see Figure 6), the collective accumulations of eroded archaeological "sediments" (see Figure 25) were easily transported and deposited by wave and tidal actions onto the topographically-low remnant tidal marsh surface. The long-term history of the island's archaeological remains is recorded on the surface of many artifacts (see Figure 26). The once flaked surfaces of some stone artifacts have been completely eradicated as a result of centuries of prolonged abrasion within the swash and berm zone (see Figure 26A). Other artifacts (see Figure 26B) show less abrasion and have rounded or slightly polished surfaces. Presumably, these examples have been exposed to shorter episodes of swash and berm tumble wear. Some artifacts (see Figure 26C) have sharp edges and maintain their original appearance, which implies they had recently eroded from an intact archaeological site. Finally, a few (see Figure 26D) have been abraded and altered by acid-sulfate bio-geochemical processes unique to tidal marsh settings (see Lowery and Wagner 2012).

SUMMARY AND CONCLUSIONS:

The collective erosion (see Figures 27 and 28) and cultural history (see Figures 17, 19, 20, 21, and 22) noted at Sharps Island provides important insights about many islands that once existed in the Chesapeake Bay region (see Figure 2). The data also offer an understanding into the countless vanished islands formerly located within the coastal regions around the globe. The circumstances at Sharps offer some cautionary insights into reconstructing drowned landscapes based solely on former sea level positions and bathymetric depths. The erosion history (see Figures 27 and 28) provides a better understanding of the complex interplay between the variables; such as geology, linear shoreline surface area, weather, seasonal wind directions, fetch, bathymetry, sub-tidal scouring, and anthropogenic actions, that influence coastal erosion. Some researchers (see Kearney and Stevenson 1991, Kirwan and Megonigal 2013, Kirwan and Temmerman 2009, and Schieder et al. 2018) have equated the loss of upland and tidal marsh in the Chesapeake to both sea level rise and climate change. Interestingly, many of these same authors include the Sharps Island area in their upland/tidal marsh dataset. Arguably, the greatest episode of land loss at Sharps Island (see Figure 27) occurred during the latter phase of what climatologists refer to as the Little Ice Age (see Mann 2002) and not during the episode of recent 20th century warming. The complex interplay between the erosion variables mentioned above and those illustrated in the text (see Figures 6, 27, and 28) imply that coastal erosion is most prevalent when sea level is relatively stable or rising very slowly. Finally, the documented land loss observed at Sharps over the past four centuries demonstrates how erosion has dominated the physiographical, ecological, and environmental conditions of the current Chesapeake Bay.

If we did not know that Sharps Island ever existed and hypothetically, it had disappeared before the English explored the region (see Figure 3), how would our understanding of the remnant shoal be influenced? Local sea level proxy data (see Lowery 2018 and 2020) imply that sea level in the Chesapeake Bay was ~2-meters lower 2000 years ago or circa 0calAD. If we superimpose the circa 0calAD sea level estimation over a current bathymetric template of the area (see Figure 29), the projected island dimensions would encompass ~300 acres of land and the modeled bathymetric island location would largely be positioned east of the known 1848 island footprint (see Figure 23). In other words, the 173-year-old physiographic parameters of the island noted in 1848 (see Figure 4) would not be predicted. In sum, a pure sea level-bathymetry model would predict an island at this erroneous location (see Figure 29) approximately 2000 years ago, which represents both a plotting mistake and chronological error of ~1800 years.

Early 17th century land records indicate that Sharps Island once encompassed ~1400 acres. It's immense land area ~400 years ago completely impeded early cartographic views of the Choptank River (see Figure 3, right). To reconstruct a 1400-acre land mass (see Figure 30), you would have to lower sea level approximately 3-meters, which would be expressive of a relative sea level position circa 2,500 to 3,000 years ago (see Lowery 2018 and 2020). If we superimpose the circa 1000calBC sea level position over a current bathymetric template of the region (see Figure 30), the projected dimensions would closely approximate the island's land area reported only 400 years ago.

The Sharps Island situation clearly demonstrates that inundated landscape reconstruction models based solely on former sea level positions and bathymetric depths do not provide accurate reconstructions of former upland settings. If we accept the minimal ~40-centimeters of sea level rise (see Lowery 2020: Figure 4.11) reported for the local area over the past four centuries, erosion along the west side of the Delmarva Peninsula has played a key role in shaping our geographical, archaeological, and ecological understanding of the modern Chesapeake Bay (see Figure 1). By incorporating the same conservative surface elevation and bathymetric parameters noted above, Sharps Island alone may have contributed three-million cubic yards of eroded and reworked sediment to the bottom of the Chesapeake Bay over the past four centuries.

Other locations around the bay suggest a similar story. Darmody and Foss (1978) indicate that low-wave energy coastal environments are required for tidal salt march formation over former upland surfaces. The presence of drowned or in-situ tree stumps (see Figures 31, 32, and 33) imply that Darmody and Foss's contentions (ibid) are indeed correct. These stumps survived overtime by the slow gradual accumulation of anaerobic organic debris. Had these in-situ tree stumps been subjected to a high-energy, aerobic, and abrasive wave environmental setting, they would not have been preserved. Most importantly, the preserved in-situ tree stumps have only recently been exposed as a result of erosion; not as a result of sea level rise. During periods when sea level rise or transgression decreases, Lowery (2019 and 2020) has remarked that high-energy fetch-related wave actions become a dominant factor eroding, sculpting, and reshaping shorelines simply because wave energy is regularly focused along the same vertical face or section of a shoreline (see Figures 31, 32, and 33). In sum, tidal marsh (see Figure 34) accumulates onto a former upland surface as a result of sea level rise in a low energy or passive environmental setting. As sea levels stabilize, wave and tidal actions erode and scour-away shorelines. As implied by the erosion history noted at Sharps Island, the local fetch and bathymetric parameters can exponentially transform over a very short period of time; thus, further intensifying the erosion of the island and any nearby landmass.

Many islands in the Chesapeake Bay represent a geologic enigma. In 1849, Smith Island (see Figure 35), like today, encompassed a vast area of tidal marsh with only a minor amount of exposed upland. Greater than ninety percent of the island's landmass consists of tidal marsh. Given the sizeable fetch-parameters and the high-energy wave environment, it would be virtually impossible to create the massive tidal marshes presently situated around Smith Island. Like Sharps Island, the extensive tidal marsh at Smith Island (see Figure 35) provides a clue that the current bay dimensions were radically different in the recent past. Though not conducive to its formation, tidal marsh is, however, more resistant to erosion (see Hunter 1910) once exposed to the highly abrasive actions of wave energy and tidal scouring.

The vast area of tidal marsh currently associated with Smith Island could not accrete or develop given the dynamic nature of the area's current coastal environment. The immense fetch parameters along the margins surrounding the island, the concentrated overwash sediments deposited immediately inland of the shoreline, and the limited contribution of upland detritus would not permit the continuation of tidal marsh if sea levels were rising at a marked rate. Like the previously illustrated examples (see Figures 31, 32, and 33), many drowned forested upland surfaces are presently situated beneath the tidal marshes associated with Smith Island. Also, like Sharps Island, a massive archaeological record occurs along the bay side of Smith Island, which has been eroded, scoured, reworked, redeposited, and re-eroded many times (see Figure 37). Even though the bay side of Smith Island is actively eroding (see Figure 36), the maintenance of the tidal marsh surface immediately inland of the active shoreface is being upheld by sequential high-tide and storm-related overwash events. In the case of Smith Island, there are large distances between the modern shoreline and the island's limited interior upland hummocks. The situation offers an opportunity to evaluate sea level rise models and to better understand how the vast tidal marsh at Smith Island initially formed.

Some tide-based sea level rise models (see Figure 38) suggest that the region has experienced about 1.25 feet of rise over the past century. If sea level was rising at this reported rate (see Figure 38), continued maintenance of the tidal marsh in the interior of Smith Island would cease, the tidal marsh surface would collapse, open-water conditions would ensue, and the amount of marginal upland would decrease.

Aside from anthropogenic alterations; such as ditching, 19th century tilling, as well as drainage redirection, channelization and deepening, the tidal marsh far from the shoreline at Smith Island remains largely intact (see Figure 39). Even the 1849 dimensions of the hummock are still largely preserved (see Figure 39). Given the low topographic relief of this interior hummock, the modeled 1.25 feet of sea level rise reported in the area over the past century should have largely eliminated many if not all of the upland features documented at this location 164-years ago. However, the mid-19th century features noted on this low topographic landscape have persisted, which imply the tide-modeled rate of sea level rise (see Figure 38) for the past century may be grossly miscalculated.

If sea level had risen 1.25 feet over the past century, the vast tidal marsh currently associated with interior of Smith Island could not maintain itself (see Darmody and Foss 1978) given the region's precarious dynamic coastal environment. There are some local sea level proxies for the area, which offer some insights when the tidal marsh began to form at Smith Island. At nearby Deal Island, Kearney (1996) reported a basal peat date of 1134 calAD +/_ 88 years for the initial appearance of saltmarsh located 90-centimeters below the modern marsh surface. The dated peat was situated over a drowned former upland surface containing in-situ tree stumps. Recent research conducted in nearby Fishing Bay (see Lowery 2020) has documented a ~10-centimeter per century rate of sea level rise, which is consistent with the Deal Island sea level data.

Given the ~1-meter thickness of tidal marsh throughout most of Smith Island, we can conclude that the initial presence of tidal marsh within the footprint of modern island began to accumulate ~1000 years ago or approximately 1000 calAD. With the lessons learned at Sharps Island (see Figure 23), we can also infer that erosion over the past several centuries has played a major role in widening the Chesapeake Bay and deepening the nearshore areas adjacent to Smith Island. However, the sediment displaced by erosion over the past millennium has infilled many of the deep channels within the bay.

For tidal marsh to initially develop and be maintained around Smith Island, the wave energy regime, which directly corresponds with fetch, had to be fairly benign. The current northwest fetch distance at Smith Island is ~25 miles (see Figure 40A). If we were to drop sea level by ~ one-meter and assume tidal scouring has deepened the eroded areas, the western boundary of Smith Island could easily be extended 4 miles or more (see Figure 40B) circa 1000 calAD. At the time, a narrower bay would significantly reduce the fetch-related wave energy and be more conducive to the formation and maintenance of tidal marsh; especially if the currently eroded or missing portion of Smith Island contained more upland ridges (see Figure 36) along its now vanished western periphery. Dropping sea level by one-meter would also increase the amount upland area within the extant island footprint, which would have fostered greater upland detritus contributions to the slowly accreting tidal marshes.

Given the data and the collective observations, we can conclude that the long-term tidal marsh-dominated geology of Smith Island directly implies the region has been subjected to slow rates of sea level rise over the past millennia (see Nikitina et al. 2000 and Lowery 2020: 120-133). If a marked uptick in sea level rise were to occur; as indicated by some tide-based sea level models (see Figure 38), the rapid inundation would severely impact the continuity and maintenance of tidal marshes along many of the topographically-low bay islands; like Smith Island. Comparable to Sharps Island, the recent geologic history of Smith Island has been governed by coastal erosion. Ultimately, erosion has greatly transformed our understanding of the ecology, geology, and archaeology of the Chesapeake Bay.

Many of the vanished islands in the region (see Figures 2 and 23) have former footprints, which have been deepened by the daily onslaught of both ebb and flood tidal scouring. Pure bathymetry-based sea level models would not predict many of these islands every existed just a century ago. The bathymetry models would advocate that these sub-tidal shoals were dry landscapes approximately 1000 years ago. However, mid-19th century cartographers acknowledge the presence of islands at these locations 170 years ago. These observations imply that many researchers; myself included, may have grossly underestimated how coastal erosion has influenced our understanding of former shoreline locations within and around the Chesapeake Bay. I can only conclude that many islands must have existed centuries before Europeans arrived in the Chesapeake. Like both Sharps and Smith Islands, these extinct landscapes must have contained an extensive archaeological record. As the shorelines of these vanished islands eroded, some percentage of the displaced archaeological remains transgressed with the ever-retreating shorelines. Once these islands dissolved away, the collective archaeological debris previously amassed against the receding shorelines were scattered across the bottom as subaqueous sediments.

In 2019, the former location of Sharps Island was issued an official archaeological site number (i.e., 18TA446). Unlike its brethren (see Figure 2), enough of the island's history and archaeological legacy had survived the onslaught of coastal erosion. Some of the island's history had been recorded in maps, archival texts, and in human memories. Over time, some of the archival data (see Meintzer 1905) has been misinterpreted (see Kenney and Brainard 2021). Some authors have even suggested Sharps disappeared in 1940 (see de Gast 1973: 131), whereas others have claimed it vanished in 1960. Most importantly, the historical erosion of Sharps and its ultimate demise have been misrepresented (see Kearney and Stevenson 1991, Kirwan and Megonigal 2013, Kirwan and Temmerman 2009, and Schieder et al. 2018) as evidence of sea level change.

Coastal erosion does not require a change in sea level. As a natural force, it actually works more efficiently if sea level is stable. Coastal erosion and tidal scouring will continue to attack the bay's islands, alter its bathymetry, change its ecology, and eradicate the bay's archaeological past. In summation, the shape, depth, salinity, tidal range, and estuarine environments so familiar to us today must have been radically different not that long ago. The people and cultures that observed these marked differences did however leave a legacy of their presence (see Figures 17, 19, 20,21, 22, and 25) on this vanished island landscape. With the information noted above, the "obituary" of Sharps Island has now been written.

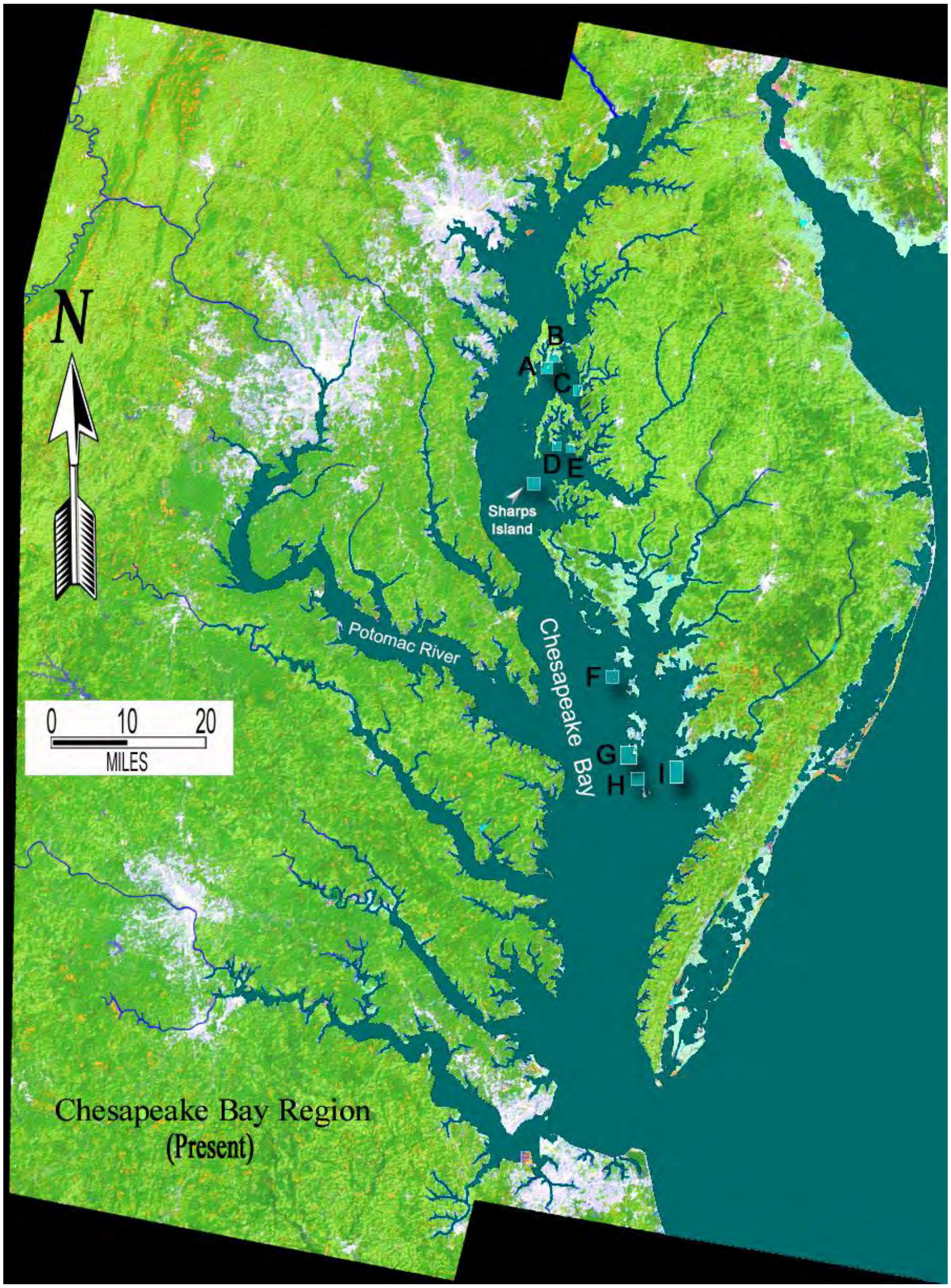


Figure 1. The map shows the location of various islands that have disappeared as a result of coastal erosion.

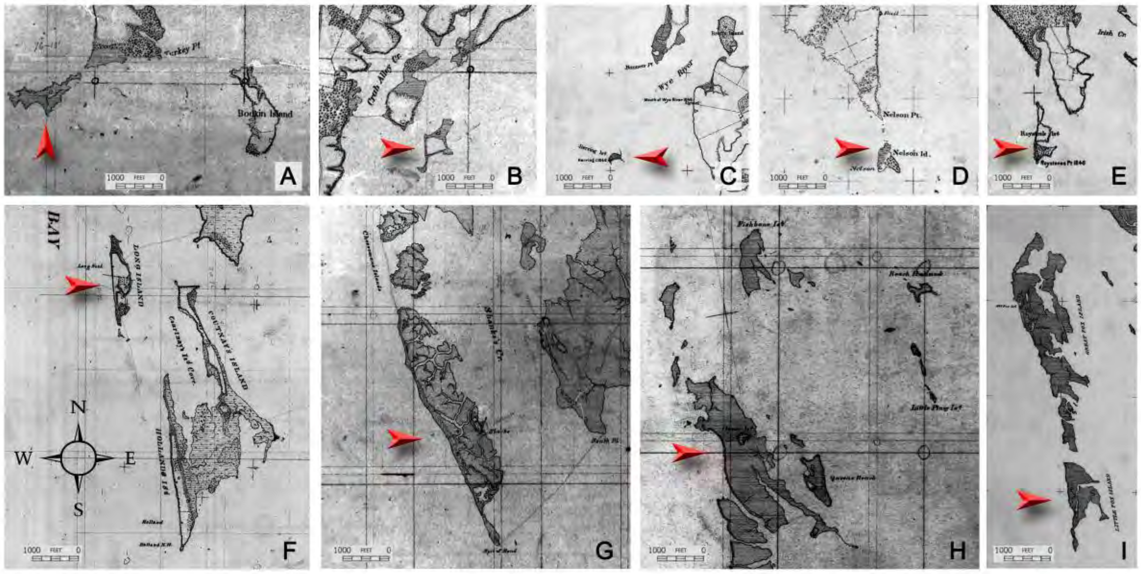


Figure 2. The maps show historic islands that once existed in the Chesapeake Bay, which contained an archaeological record of various time depths. All of these islands had eroded away decades before any archaeological assessments or evaluations could be conducted. Long Marsh Island (A and Figure 1A) existed along the south end of Kent Island and ceased to appear on cartographic maps after 1970. Little Island (B and Figure 1B), which was also situated along the southern end of Kent Island, completely eroded away sometime prior to 1972. Herring Island (C and Figure 1C), which was positioned in the middle of the Miles River, vanished before 1938. Nelsons Island (D and Figure 1D), which was located on the north side of the Choptank River, eroded away before 1982. Royston Island (E and Figure 1E), which was also located on the north side of the Choptank River, disappeared before 1970. Long Island (F and Figure 1F), which once contained a tilled field, a residence, and an orchard vanished as a result of coastal erosion sometime before 1938. Shanks Island (G and Figure 1G), which encompassed a broad tidal marsh and a small upland farmstead completely disappeared prior to 1970. Like Shanks Island, both Goose Island (H and Figure 1H) and the adjacent Queens Reach Island were once inhabited and both vanished prior to 1970. Finally, Little Fox Island (I and Figure 1I), which also contained a small upland farmstead in the mid-19th century, eroded away prior to 1980.

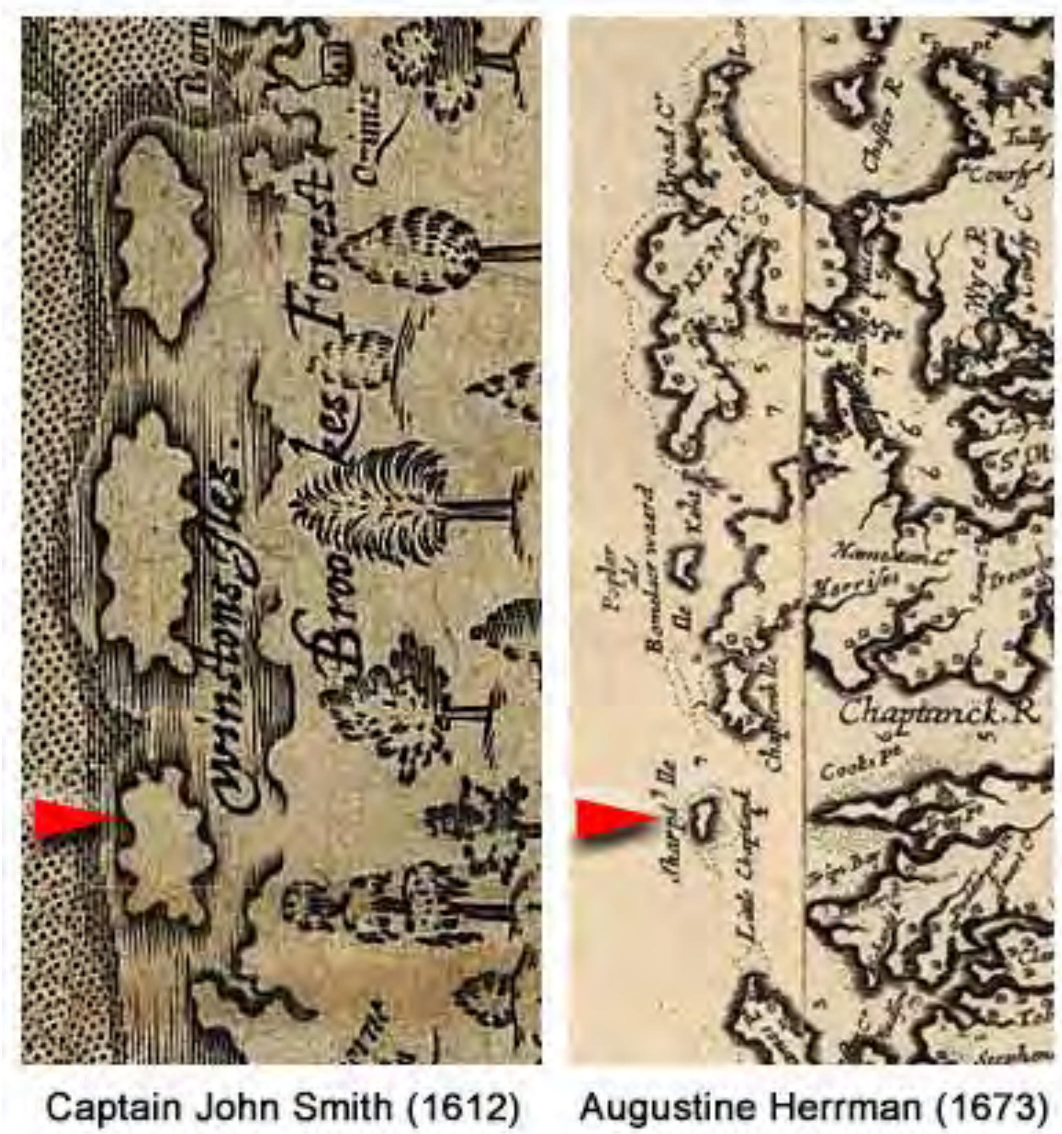


Figure 3. The two 17th century maps denote Sharps Island as recorded by Captain John Smith on the left and Augustine Herrman on the right. In 1612, Sharps Island would have encompassed more than 1400 acres of land. By 1673, the island had been reduced to ~900 acres.

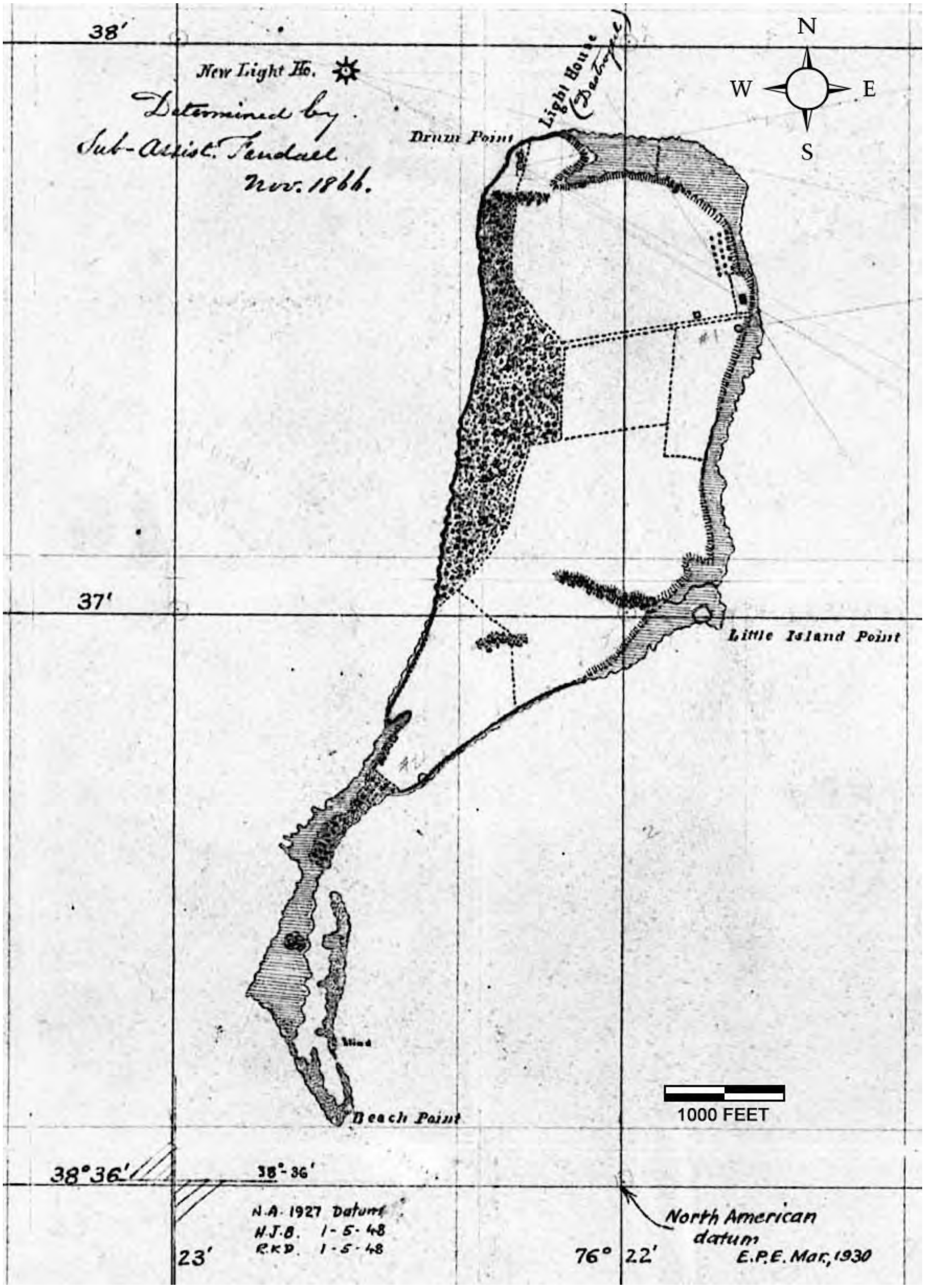


Figure 4. The map shows a portion of the U.S. Coastal T-251 field map, which was generated during a survey conducted between May 20th and May 22nd in 1848.

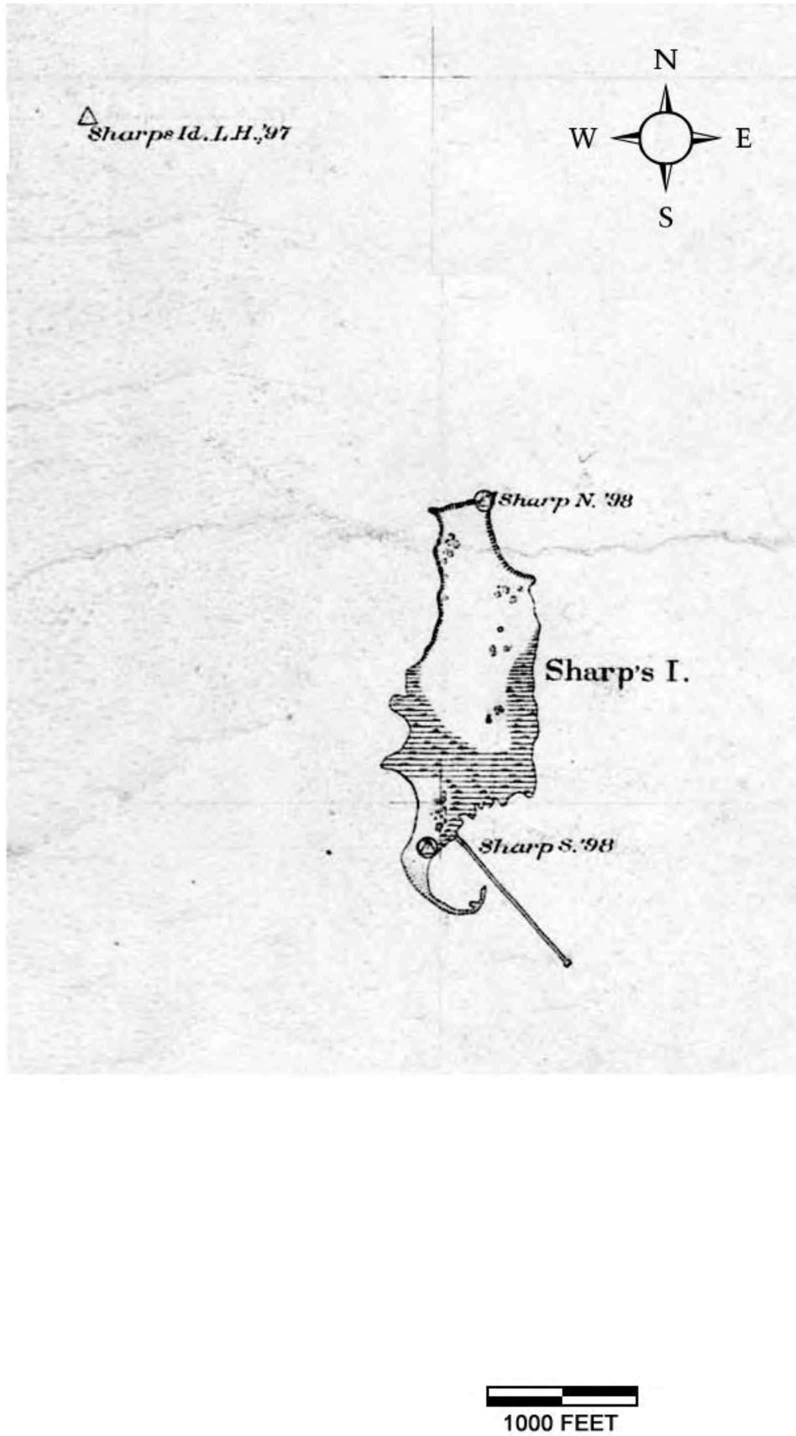


Figure 5. The map shows a portion of the U.S. Coastal Survey T-2494 field map, which was published in 1900. However, the survey was prepared in 1898. Along the lower end of the island, the map shows a tidal marsh extending from the west side of the island to the east. In 1848, the area consisted of a ditch (see Figure 4). The marsh may represent the scar associated with the Centennial Storm of 1876 during which Mrs. Margaret Parsons noted "*the tide got so high, it ran through a ditch and cut the island in two*".

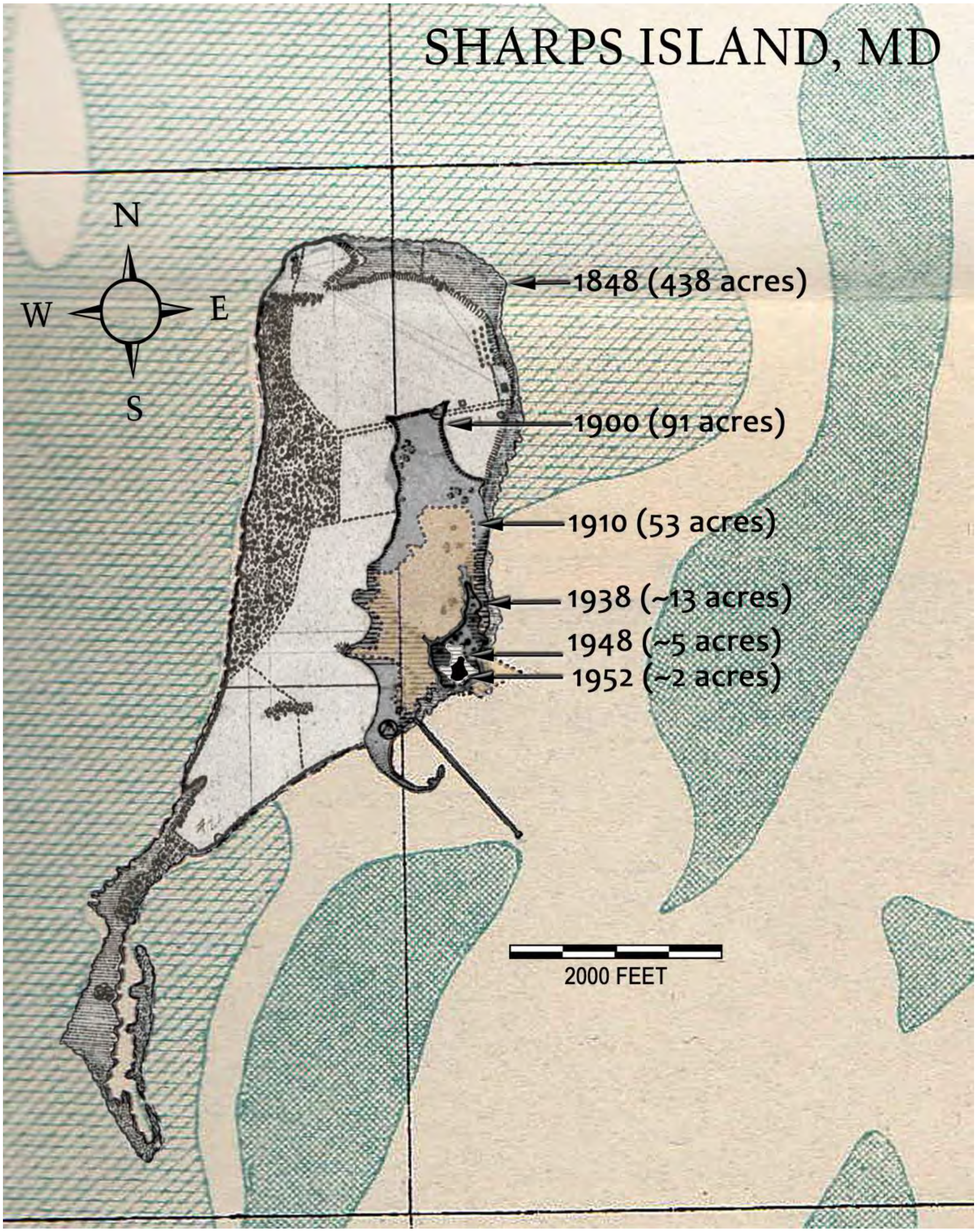


Figure 6. The overlays show the acreage changes to Sharps Island between 1848 and 1952; two years before the island eroded away. In 1848, the island encompassed 438 acres of tilled upland, forests, tidal marsh, and beaches. A century later, the island encompassed ~5 acres of tidal marsh. Note that the 1948 tidal marsh island remnant correlates with the tidal marsh area located along the southeast side of the island in 1848 (see Figure 4).

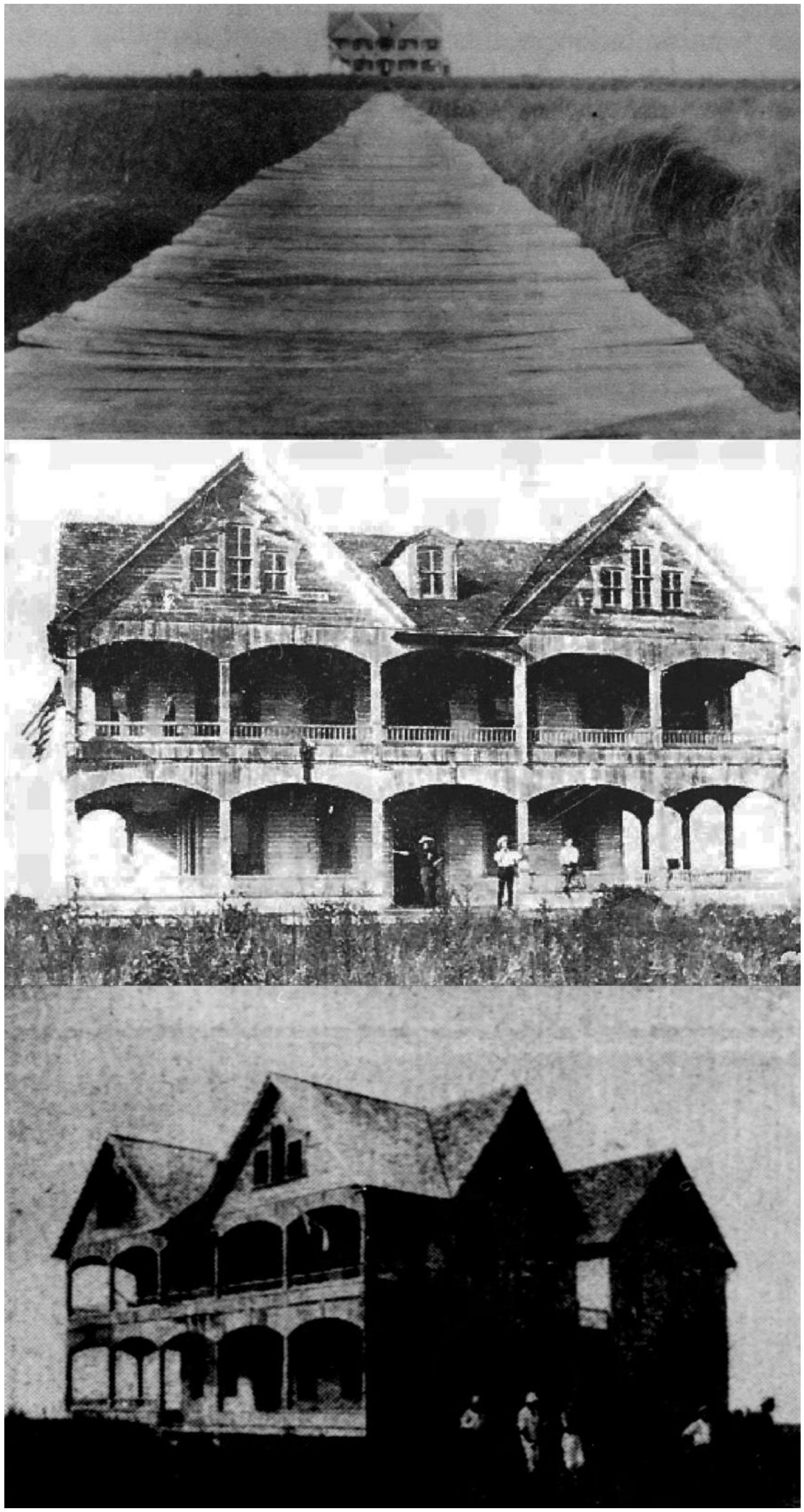
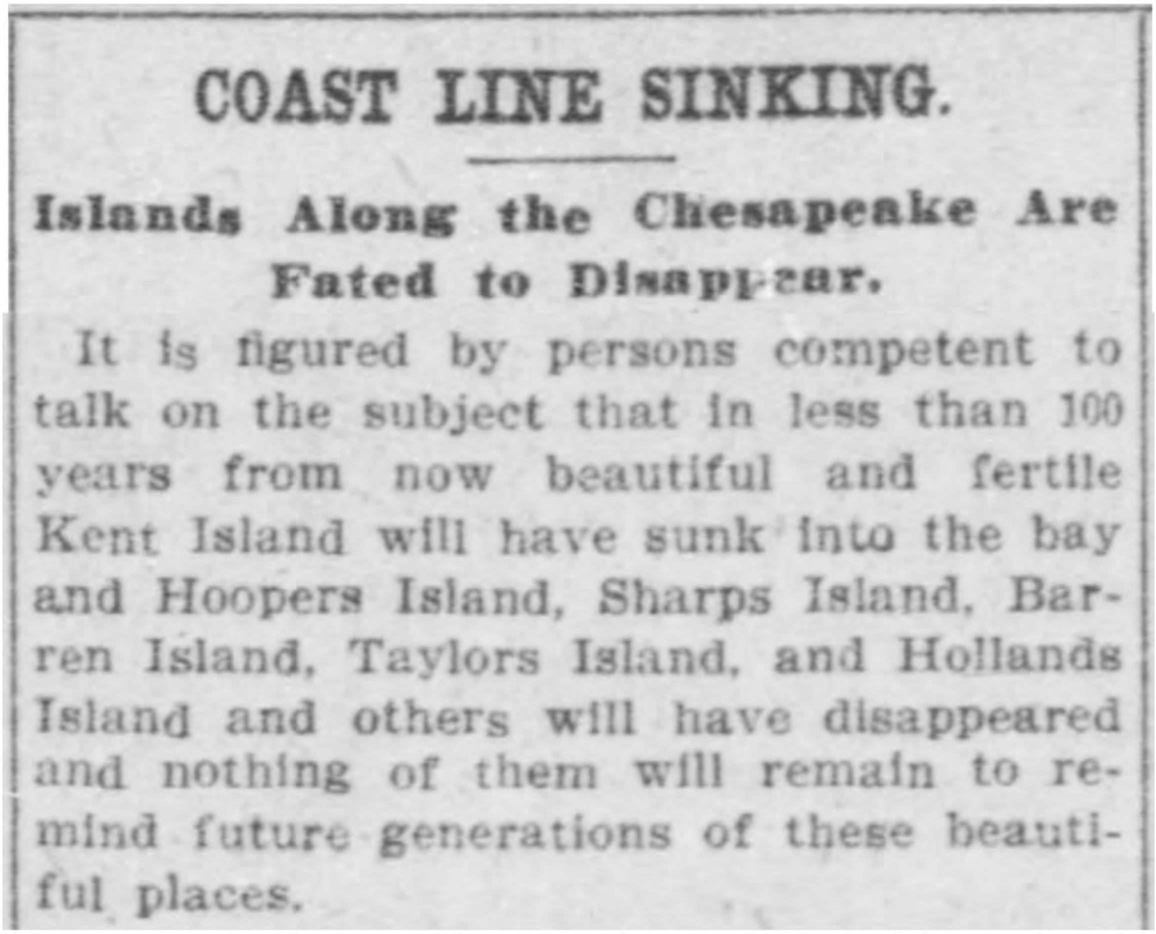


Figure 7. The photographs shown above were taken in late August or early September of 1905 and show various views of the grand hotel erected by the Baltimore-investment company at Sharps Island in 1895.



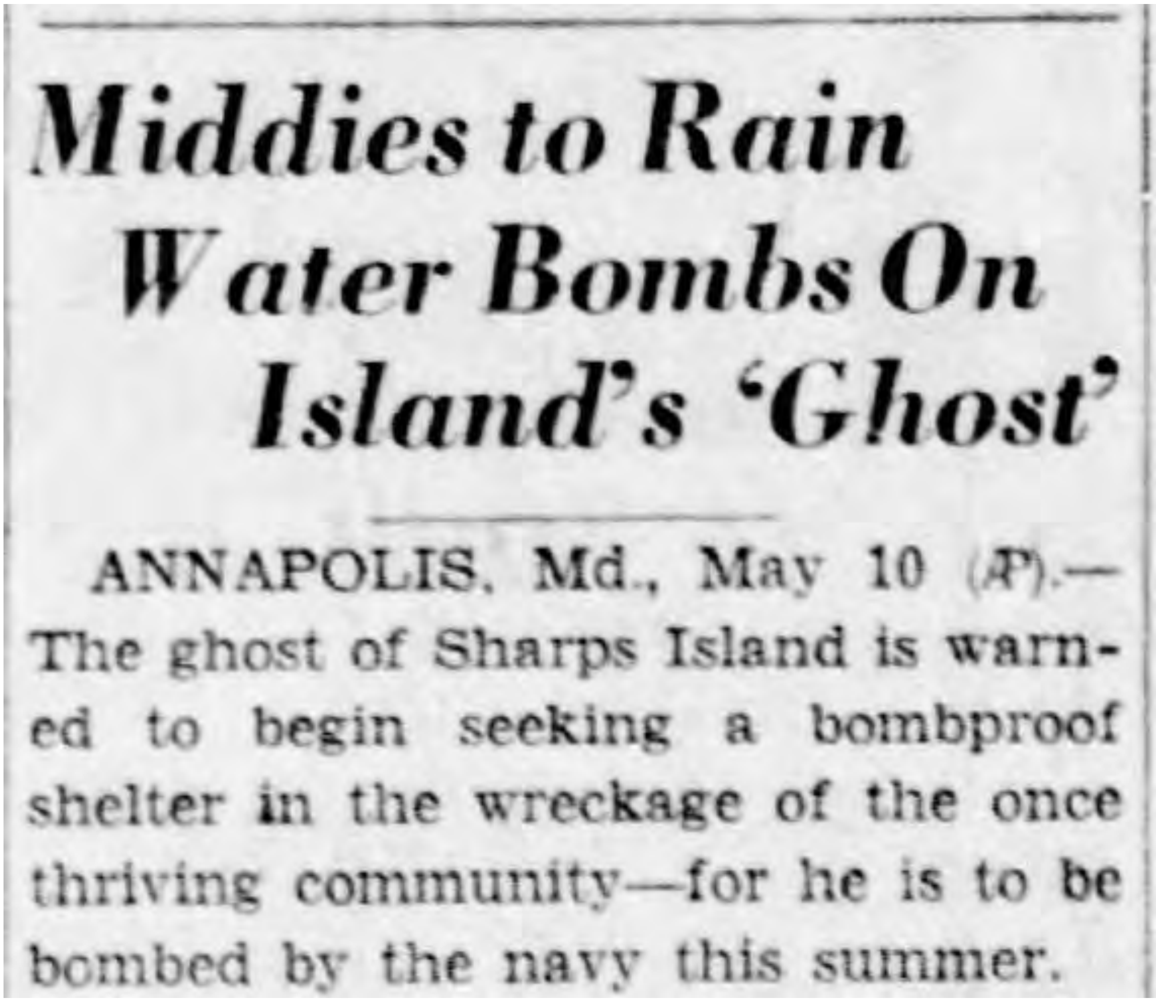
COAST LINE SINKING.

Islands Along the Chesapeake Are Fated to Disappear.

It is figured by persons competent to talk on the subject that in less than 100 years from now beautiful and fertile Kent Island will have sunk into the bay and Hoopers Island, Sharps Island, Barren Island, Taylors Island, and Hollands Island and others will have disappeared and nothing of them will remain to remind future generations of these beautiful places.

Figure 8. The article appeared in the Sunday, February 3rd, 1907 issue of *The Washington Herald*, which predicted that six islands in the bay would disappear by 2007. Of the islands mentioned in the article, only one (i.e., Sharps Island) actually disappeared over the predicted time frame.

Figure 9. The photographs shown above were taken in late August or early September of 1905 during a fishing vacation taken to Sharps Island by a group of local Talbot County businessmen. Interestingly, an online publication entitled *Chesapeake Quarterly: A Magazine from Maryland Sea Grant* (see Kenney and Brainard 2021) falsely professes that the bottom photograph was taken in 1950. However, the same photograph appears in a publication by Meintzer (1905), which proves it was taken in late August or early September of 1905.



Middies to Rain Water Bombs On Island's 'Ghost'

ANNAPOLIS, Md., May 10 (AP).—The ghost of Sharps Island is warned to begin seeking a bombproof shelter in the wreckage of the once thriving community—for he is to be bombed by the navy this summer.

Figure 10. The article appeared in the Tuesday, May 10th 1938 issue of *The News Journal* published in Wilmington, Delaware, which announced that Sharps Island, Maryland will be bombed by the U.S. Navy.

Figure 11. The photograph, which was taken in 1939, shows a group of youth and adult swimmers who were visiting Sharps Island.

Figure 12. The aerial photo, which presents the east side of the island in the foreground looking west, shows the marshy silhouette of Sharps Island, Maryland as it appeared at the onset of WWII.

Figure 13. The aerial photo, which presents the south side of the island in the foreground looking north, shows Sharps Island, Maryland on September 22nd, 1946. The two U.S. Navy bombing and aerial machine gun target platforms can be seen in the photo. The pilings once associated with the former late 19th steamboat wharf, which was constructed by the Baltimore-based investment company, can be seen in the foreground.

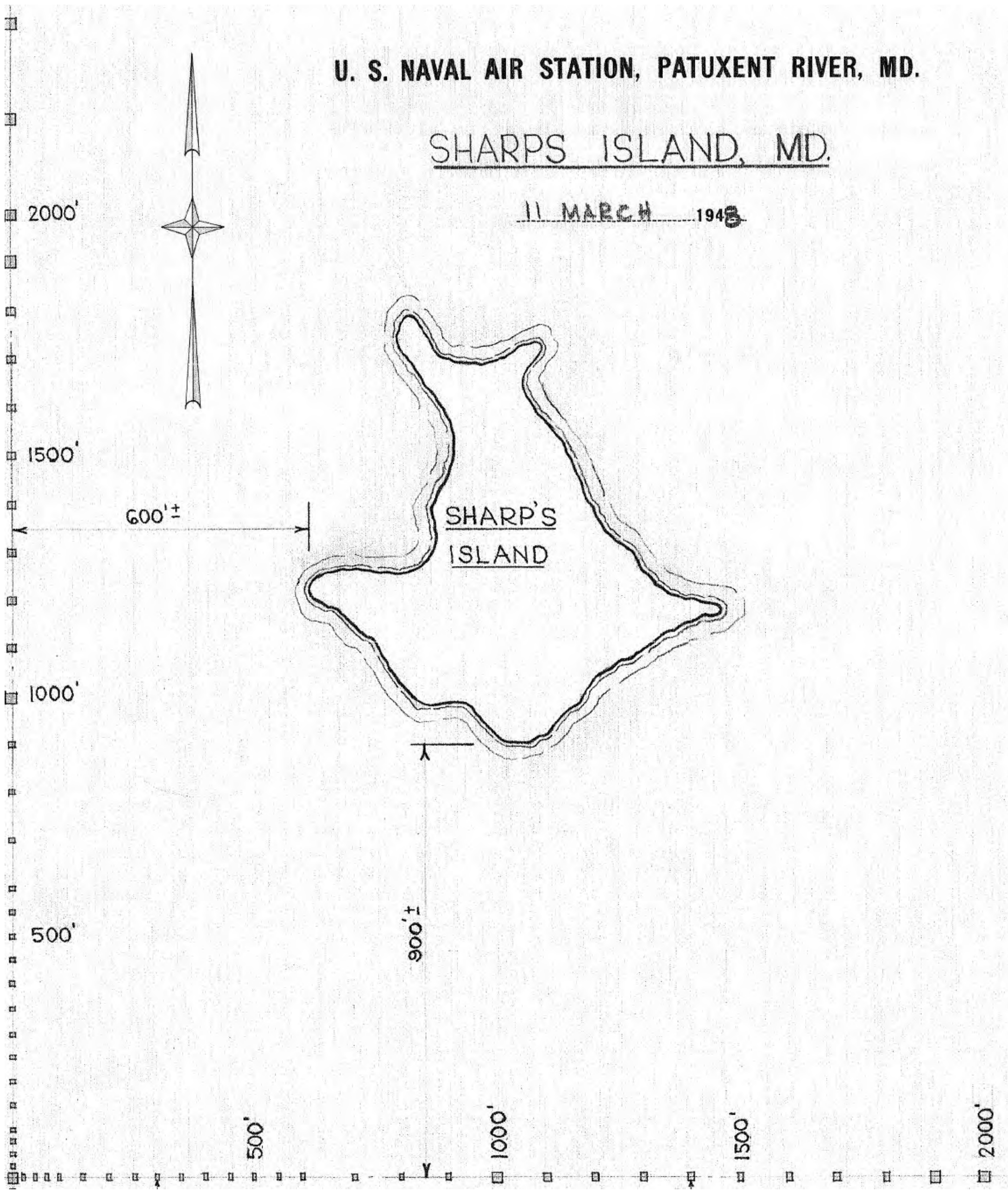


Figure 14. The last official survey of Sharps Island, Maryland was prepared by the U.S. Navy on March 11th, 1948. The island was ~900 feet long (North to South) and ~600 feet wide (West to East). If the island were a perfect 900-by-600-foot rectangle, it would have encompassed ~12 acres. However, at least half of the island's land area is missing. In 1948, the island would have encompassed ~5 acres of tidal marsh.

Figure 15. The power of the flowing Chesapeake ice can be seen in this 1977 photo showing ice piling up around the Sharps Island lighthouse. Prior to the winter of 1977, the lighthouse was vertical. After the winter of 1977, the lighthouse's caisson structure, which sits in ten feet of water, was sharply tilted.

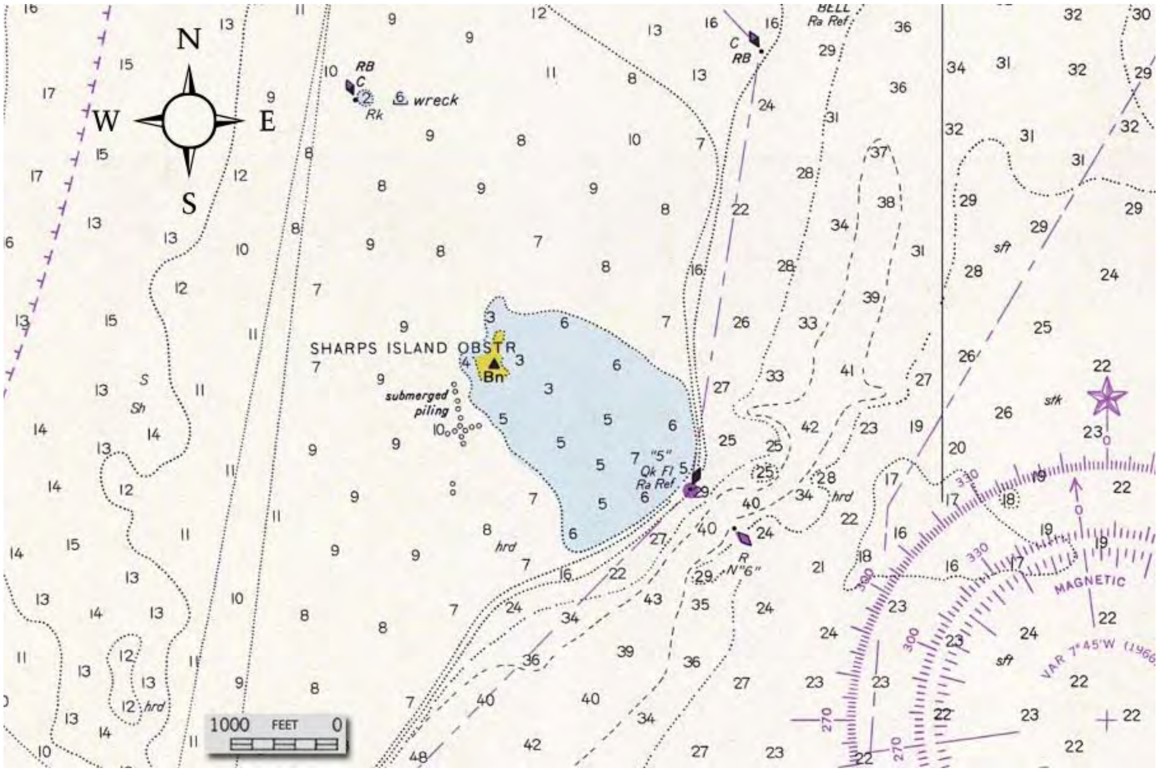


Figure 16. The 1970 navigation-bathymetry chart shows Sharps Island as nothing more than a shallow obstruction. Note that the series of submerged pilings represent the approximate location of the late 19th century steamboat wharf.

Figure 17. The image shows a random selection of diagnostic prehistoric projectile points and knives found at Sharps Island by Warren E. Lowery between 1938 and 1946. These artifacts indicate that humans had used Sharps Island for at least 13,000 years.

Figure 18. The photograph shows three soft-shell clam dredgers excavating the bottom off of Parsons Island, Maryland in the Chesapeake Bay. The dredge excavates and sieves the sub-bottom sediments and a conveyor belt lifts any large items, which includes artifacts, to the surface (see inset).

Figure 19. The photos show some of the Navy ordnance exhumed from the former footprint of Sharps Island during the summer of 1978. The shell casings exhumed from the bottom included spent .50 caliber (A) and 20mm (B) brass rounds. Copper jacketed .50 caliber bullets and corroded steel 20mm cannon projectiles with copper rifling rings. Note that the .50 caliber case is stamped DM 43, which indicates that the round was manufactured at the Des Moines Ordnance Plant located in Ankeny, Iowa in 1943. The 20mm case in marked 20MM M21A1 and M.S. 1945, which indicates that the round manufactured by the Metal Specialties Manufacturing Company located in Chicago, Illinois. The bombs include corroded cast-iron AN MK-23 and lead-antimony AN MK-43 practice bombs.

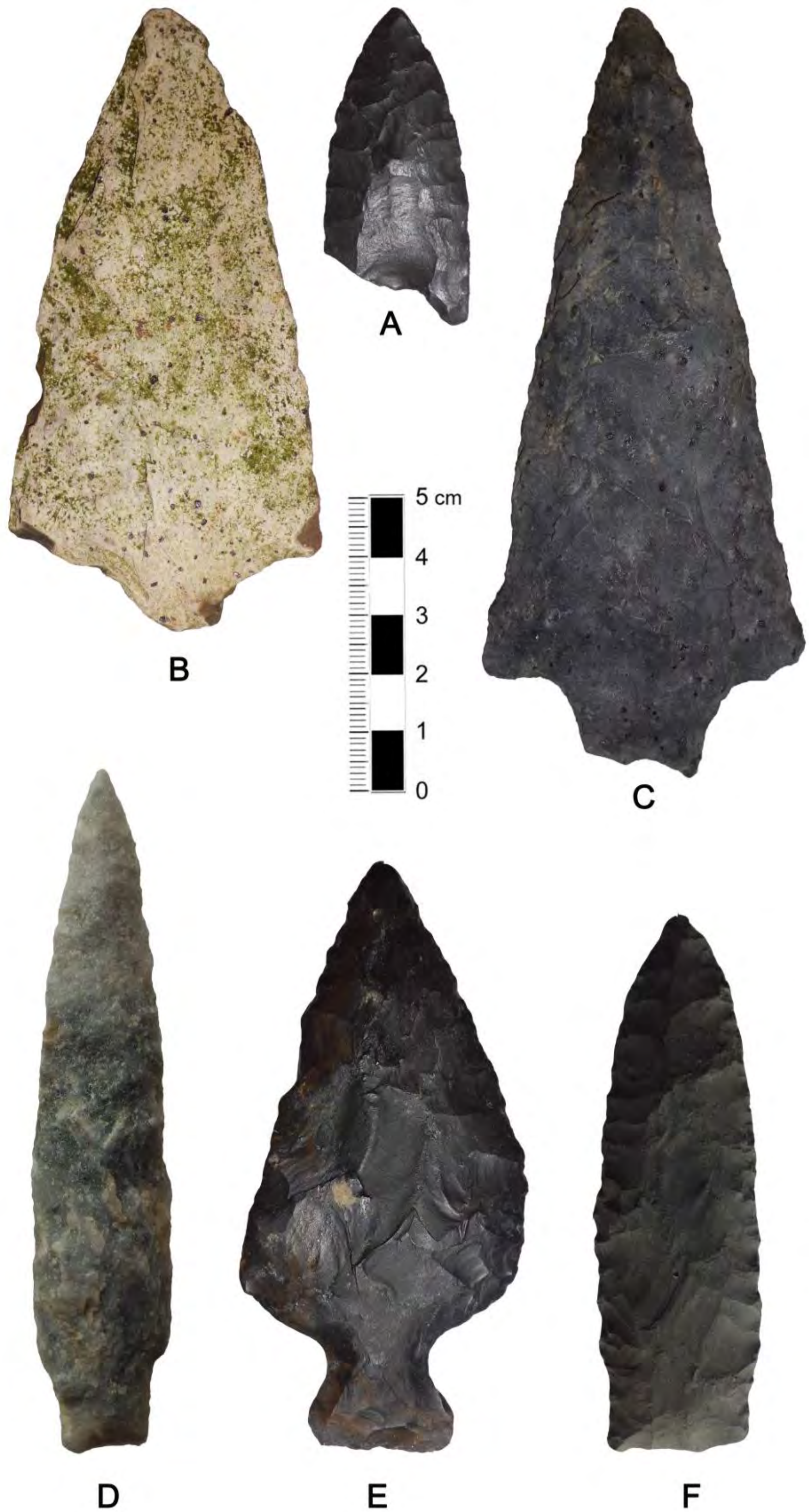


Figure 20. The images show some of the flaked prehistoric lithic artifacts exhumed by soft-shell clam dredgers from the former Sharps Island area in 1978.

Figure 21. The images show some prehistoric ground stone tools exhumed by soft-shell clam dredgers from the former Sharps Island area in 1978.

Figure 22. The images show some of the late 19th century historic pipes exhumed by soft-shell clam dredgers from the former location of Sharps Island in 1978.

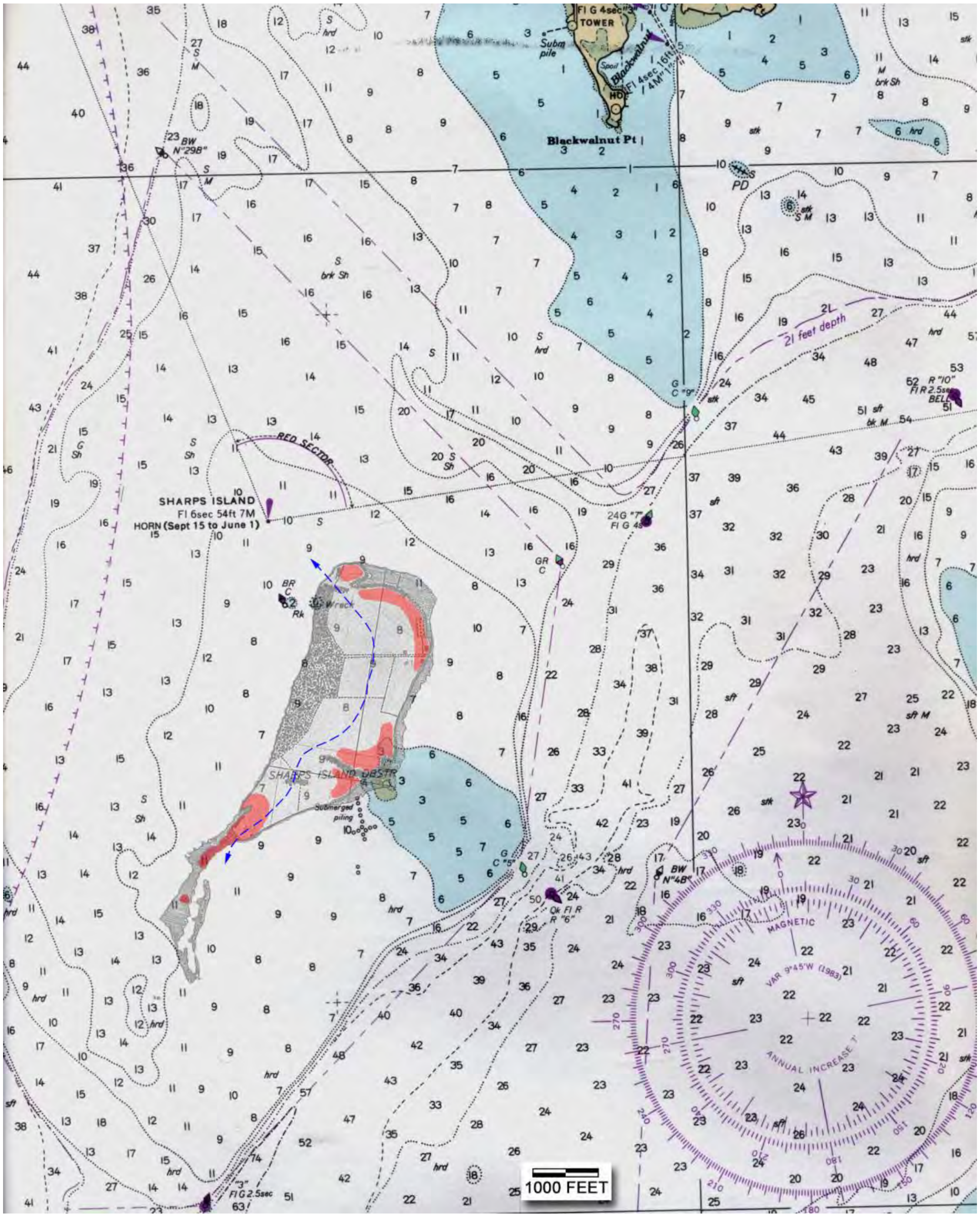


Figure 23. The map portrays a "ghostly" overlay of Sharps Island's dimensions as recorded during the 1848 U.S. Coastal Survey. The former mid-19th century island has been georeferenced and positioned over a current navigation chart. Where tilled fields, forests, and marshes once existed in 1848, the current bathymetric depths range between 3 and 11 feet of water. As implied by the island's former drainages, the interfluve or drainage divide has also been plotted (blue line). The red areas denote several possible archaeological site locations.

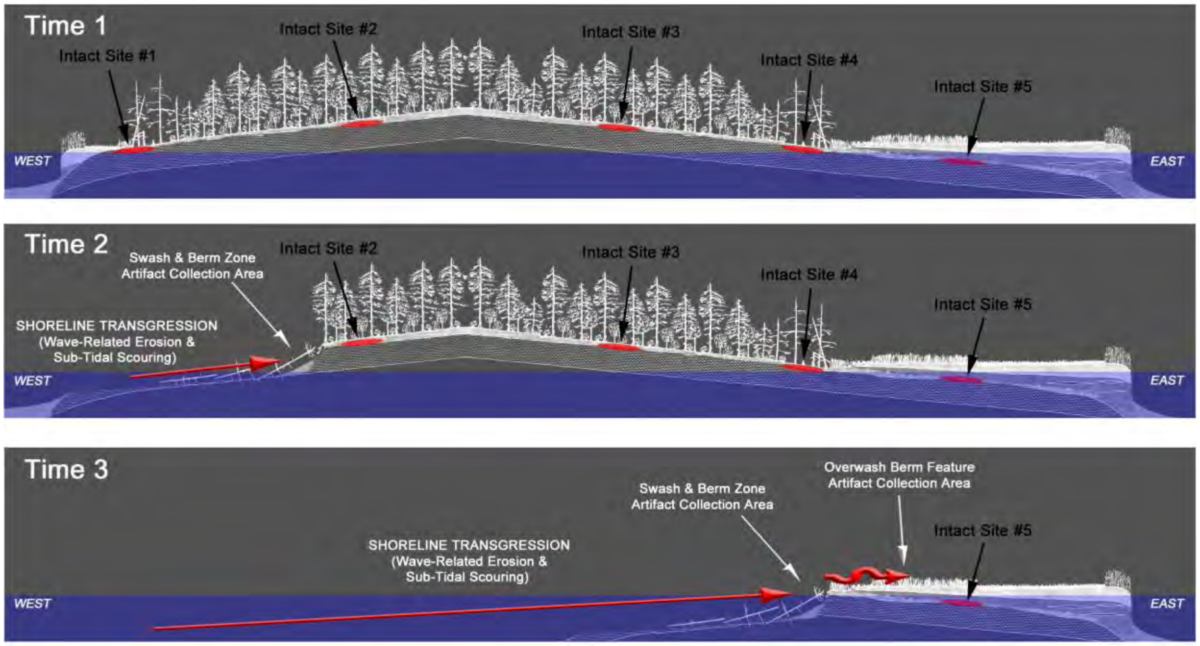


Figure 24. The illustrations shown above portray an idealized view displaying the collective erosion history of Sharps Island's former archaeological resources. Presumably, several archaeological sites were once located on the island (see Time 1). As erosion removed the protective veneer of tidal marsh along the island's west side, wave-related erosion rapidly transgressed eastward and started to dismantle the island's archaeological sites (see Time 2). As the shoreline retreated, the lighter prehistoric stone artifacts, which had been collectively dislodged from the eroded archaeological sites, became concentrated within the island's swash and berm zone. As erosion continued to erode, dismantle, and destroy the island's archaeological resources; more and more prehistoric artifacts accumulated within the nearshore swash and berm zone. When the island's upland landscape disappeared (see Time 3), the accumulated prehistoric artifacts were easily deposited on the island's low-lying tidal marsh surface during storm and wave-related overwash events. As a low-lying isolated landscape, the tidal marsh along the eastern margins of Sharps Island became a massive archaeological sediment trap during its final years.

Figure 25. The image shows one of the twenty-eight boxes containing ~700 complete prehistoric stone projectile points and knives found at Sharps Island, Maryland between 1938 and 1946.

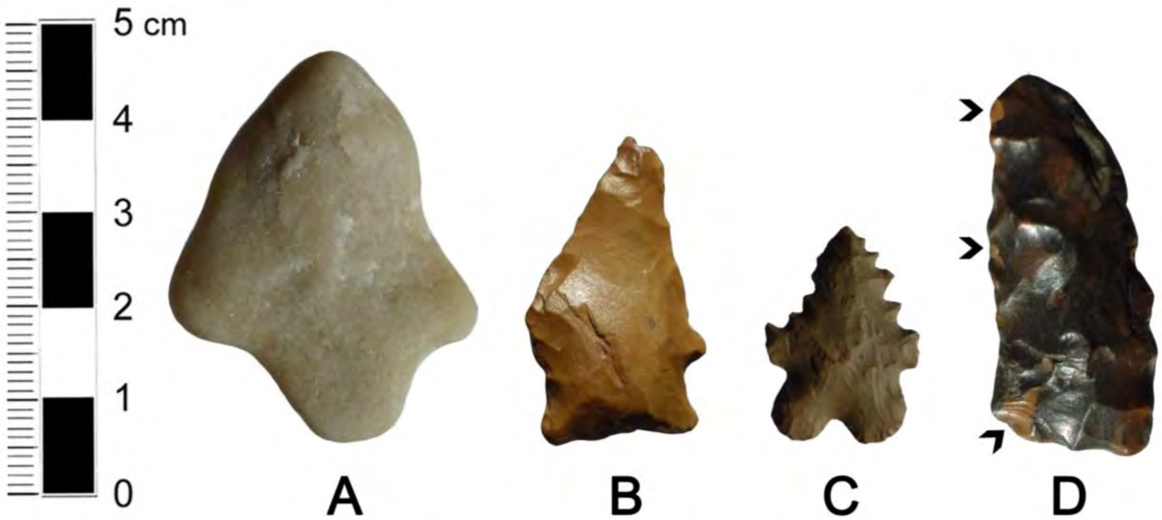


Figure 26. The images show the exterior conditions of several projectile points found at Sharps Island between 1938 and 1946. A quartzite Middle Archaic-era stemmed point (A) has become so rounded and abraded that the flake scars have been obliterated. Its surface condition is largely a byproduct of decades or even centuries of tumbling in the surf and being smoothed by sand particles. A Terminal Archaic period jasper projectile point (B) retains its flake scars; however, all of its edge margins have been smoothed as a result of years of tumbling in the swash and berm zone. In contrast, an Archaic bifurcated projectile point (C) has maintained its sharp cutting edges. Finally, an iron-rich jasper biface (D) had been buried beneath anaerobic tidal marsh along the margins of the island. The iron-oxides in the rock had been converted to iron-sulfide when it was exposed to the bio-geochemical effects of sulfidization. Ultimately, the biface (D) had eroded out context and been abraded within the island's swash and berm zone. Wave damage to the edges of the biface (see arrows) has exposed the original iron-oxide jasper interior.

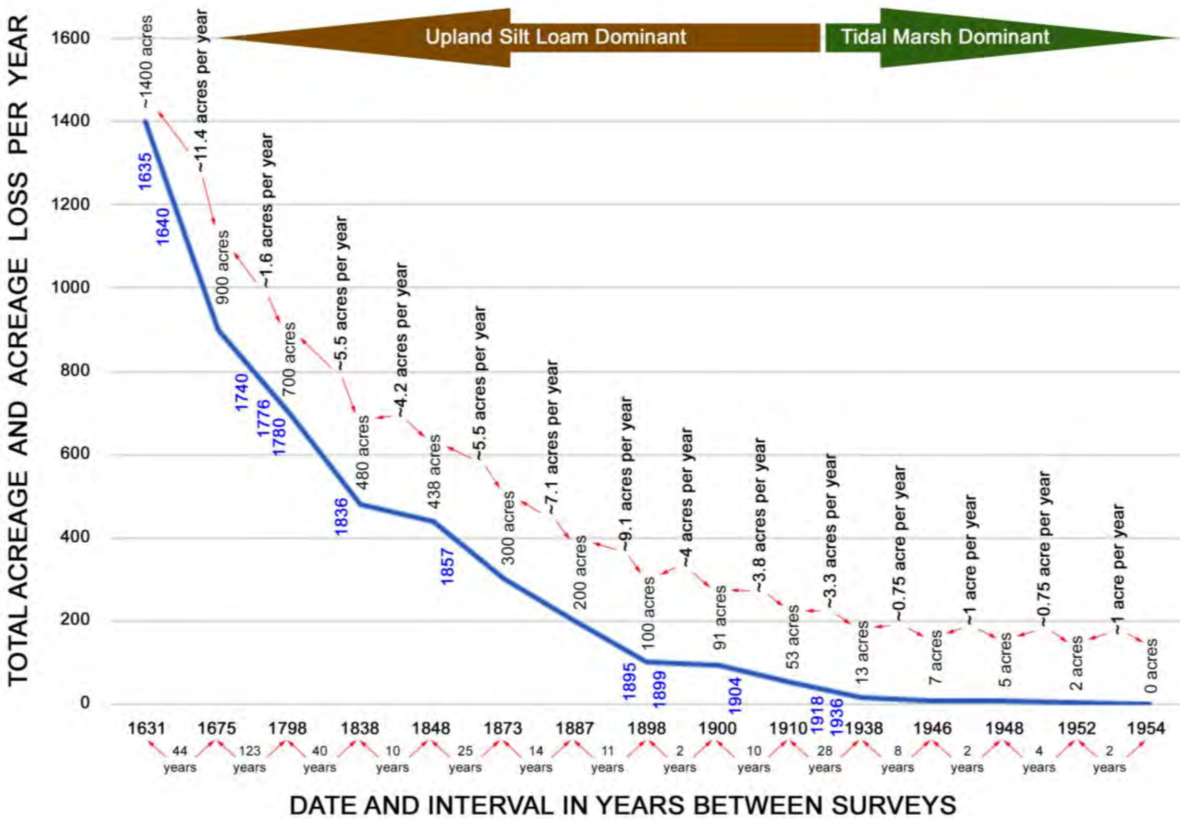


Figure 27. The graph illustrates the historic acreage land loss, which is based on surveys and mapping, for Sharps Island, Maryland between 1631 and 1954. The reduction in acreage over time is the byproduct of wave and tidal actions. The various intervals between these survey and mapping events provide an opportunity to better understand how the annual coastal erosion loss varied over this 323-year period. During this interval, the rate of annual land loss fluctuated between ~11.4 acres per year (1631 to 1675) to as low as 0.75 acres per year (1948 to 1952). The dominant geology of the island also changed over this period of time. Prior to ~1915, Sharps Island principally consisted of upland Pleistocene-age silt loam. As the island diminished, the surviving remnant after ~1915 comprised largely of tidal marsh, which is topographically low and more resistant to the effects of wave-related erosion. The graph also denotes the years in blue when intensely cold winters resulted in major accumulations of ice in the Chesapeake Bay region (see Ludlum 1966 and 1968). Notably, other periods of ice accumulation most likely occurred; but were not documented in the pre-1870 historical record.

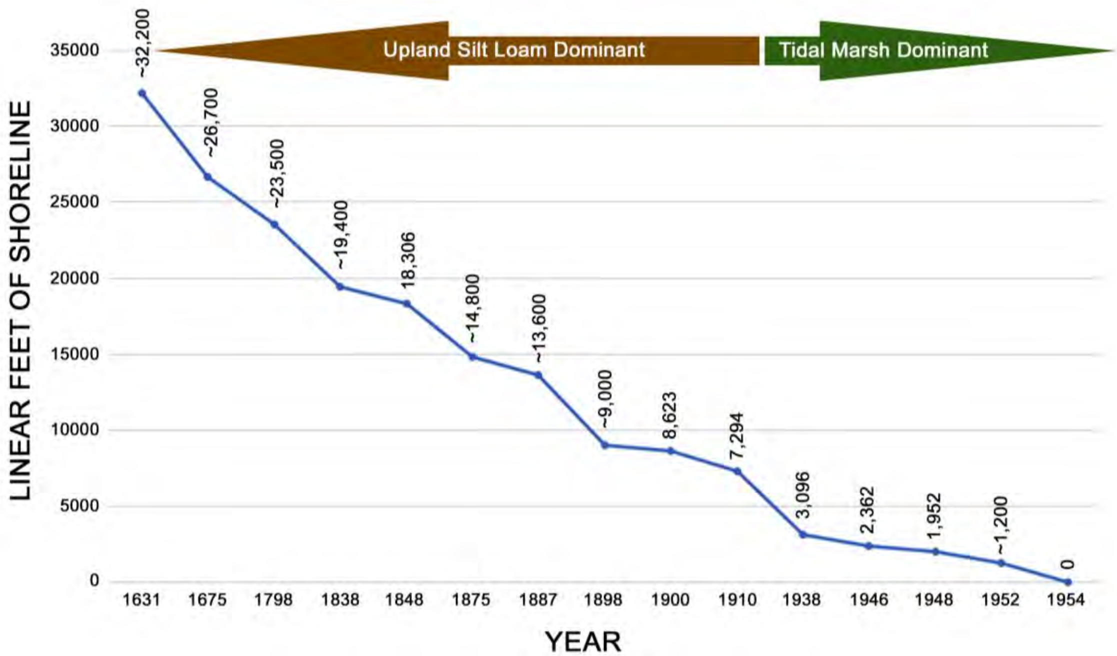


Figure 28. The graph illustrates the reduction in linear-feet of shoreline at Sharps Island between 1631 and 1954. Many of the linear-feet estimates noted in this graph are based solely on georeferenced acreage-defined square-polygon boundaries. Because shoreline margins in real-life have marked sinuousness, these projected measurements (~) represent low-end linear-feet shoreline approximations. More accurate estimates of the shoreline linear-feet surface area were generated from various maps (1848, 1900, 1910, 1938, and 1948) and aerial photographs (1946) of the island. In comparing the data above with the erosion land-loss shown in Figure 27, the island's shoreline surface area (linear-footage) is a major variable with respect to coastal erosion. Since the last portion of the island consisted of more erosion-resistant tidal marsh, both shoreline surface area and geology are factors with respect to erosion. The combined data indicate that between 1900, when the island had 8,623 linear-feet of shoreline, and 1910, when the island had 7,294 linear-feet of shoreline, 38-acres of predominantly upland sediments were lost to erosion. The loss in shoreline surface area over this period was 1,329 linear-feet. During a more recent ten-year interval between 1938 and 1948, Sharps Island lost only 8-acres of predominantly tidal marsh and the shoreline surface area was reduced by 1,144 linear-feet; differing by only 185 linear-feet compared to the 1900 to 1910 values. Without knowing the bathymetric depths around the island and the variability in weather during these two ten-year periods, the comparative results would imply that the parent geology (i.e., upland silt loam and low tidal marsh) is a major factor overriding shoreline surface area. When the parent geologic variable is relatively equal, the amount of shoreline surface area in linear-feet becomes a major facet impacting the degree of coastal erosion. For example, Sharps Island lost ~500-acres of upland during a 44-year period between 1631 and 1675 when the island's shoreline surface area encompassed >26,700 linear-feet. Over a similar 40-year period between 1798 and 1838; the island lost ~220-acres of upland with far less shoreline surface area.

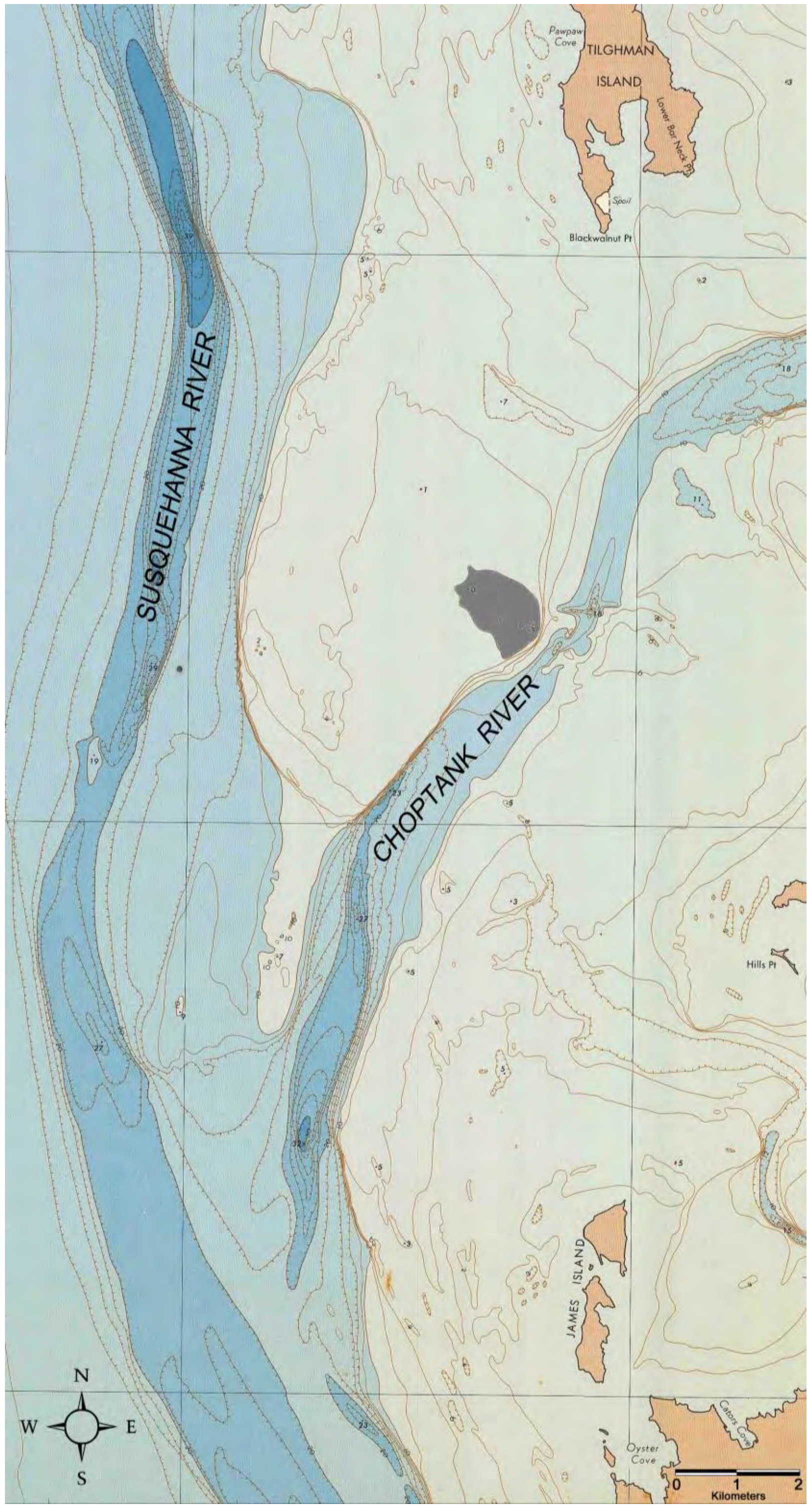


Figure 29. If Sharps Island had eroded away sometime prior to the colonial-era, a pure bathymetric-sea level rise model would imply that the former island encompassed the gray area presented above ~2000 years ago or circa 0calAD. Notably, the bathymetric-sea level rise model does not accurately reconstruct the island's known shape or outline as recorded in 1848 or 173 years ago.

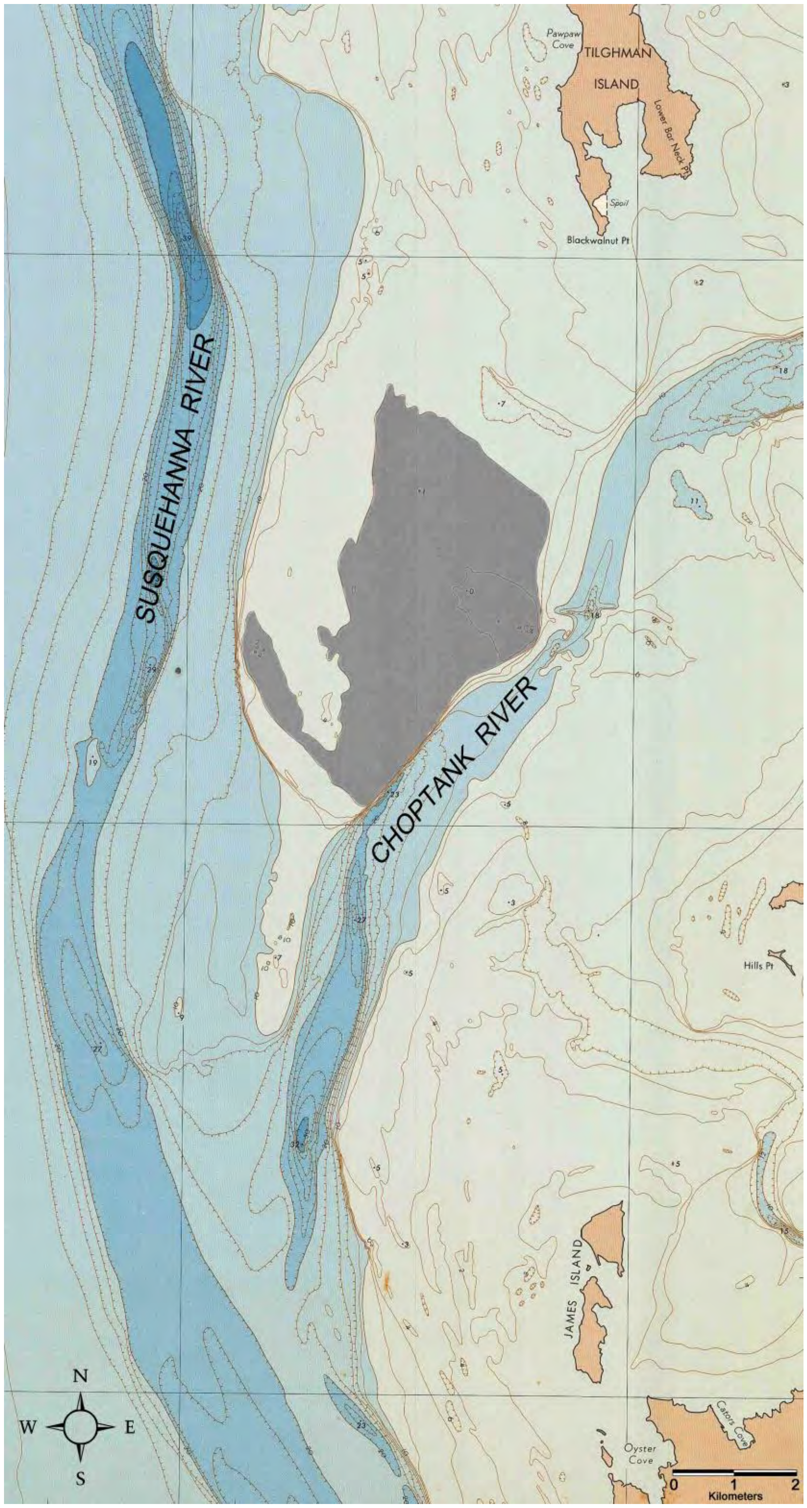


Figure 30. A pure bathymetric-sea level rise model would imply that Sharps Island encompassed the gray area shown above circa 1000 calBC or 3000 years ago. Notably, the acreage defined by the gray area is only slightly larger than the historic 1400-acre island landmass chronicled by the early 17th century land grants.

Figure 31. The image shows an in-situ tree stump beneath a ~20-centimeter covering of tidal marsh peat at Horsehead Wetland Center near Kent Narrows, Maryland.

Figure 32. The image shows an in-situ tree stump beneath a ~80-centimeter covering of tidal marsh peat at Horsehead Wetland Center near Kent Narrows, Maryland.

Figure 33. The image shows a completely inundated and in-situ tree stump along the northeast side of Parsons Island near Kent Narrows, Maryland.

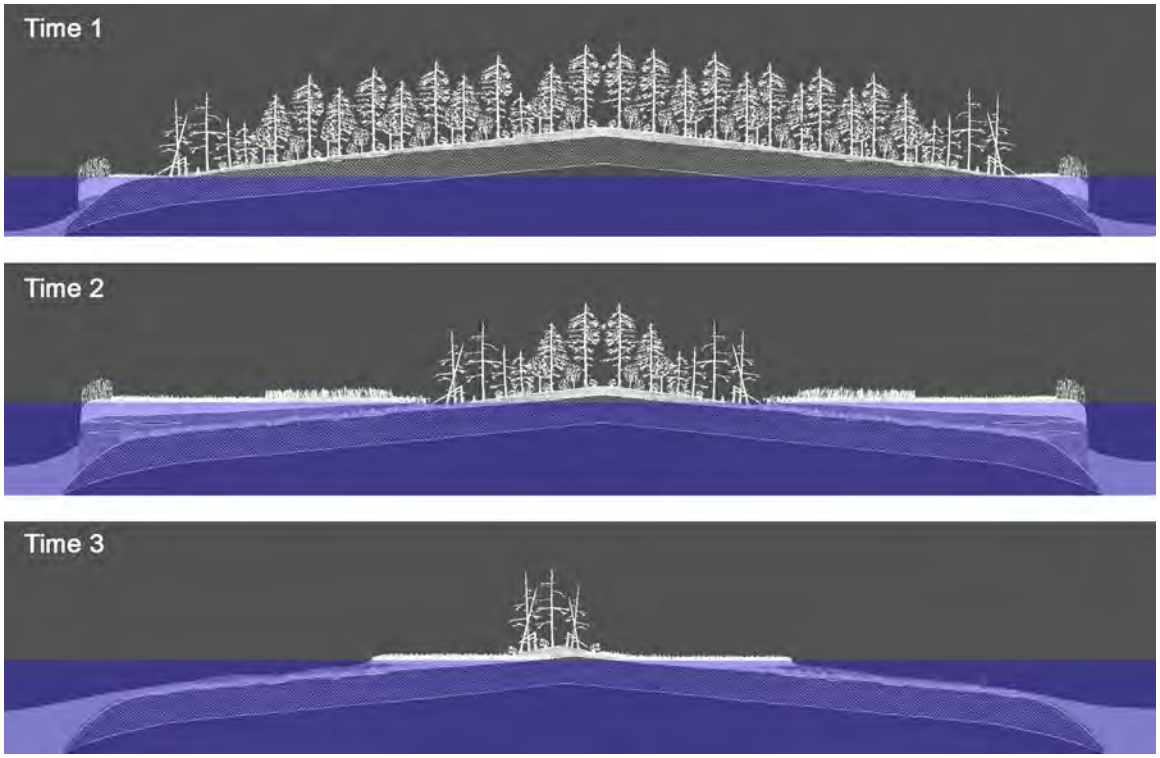


Figure 34. The idealized stratigraphic profiles illustrate how tidal marsh forms as a result of sea level rise (Time 1 to Time 2) in an otherwise low-energy or passive coastal setting. The gradual vertical accretion of tidal marsh represents a byproduct of organic detritus inputs from the adjacent upland and sediment accumulation from episodic extreme high-tide overwash events (see Darmody and Foss 1978). During periods of marked sea level rise, the slow vertical accretion of tidal marsh becomes largely outpaced by rapid transgressive inundation. During protracted periods of relatively stable sea level, wave actions and tidal scouring, which are focused along the same vertical shoreline face, result in marked shoreline erosion and retreat (Time 3). Erosion can subject topographically-low and environmentally stressed forested hummocks to more saline water, which can result in evapotranspiration hyper-salinization; especially during hot and dry periods. In sum, already stressed forested landscapes will succumb to the marked increase in salinity and implode.

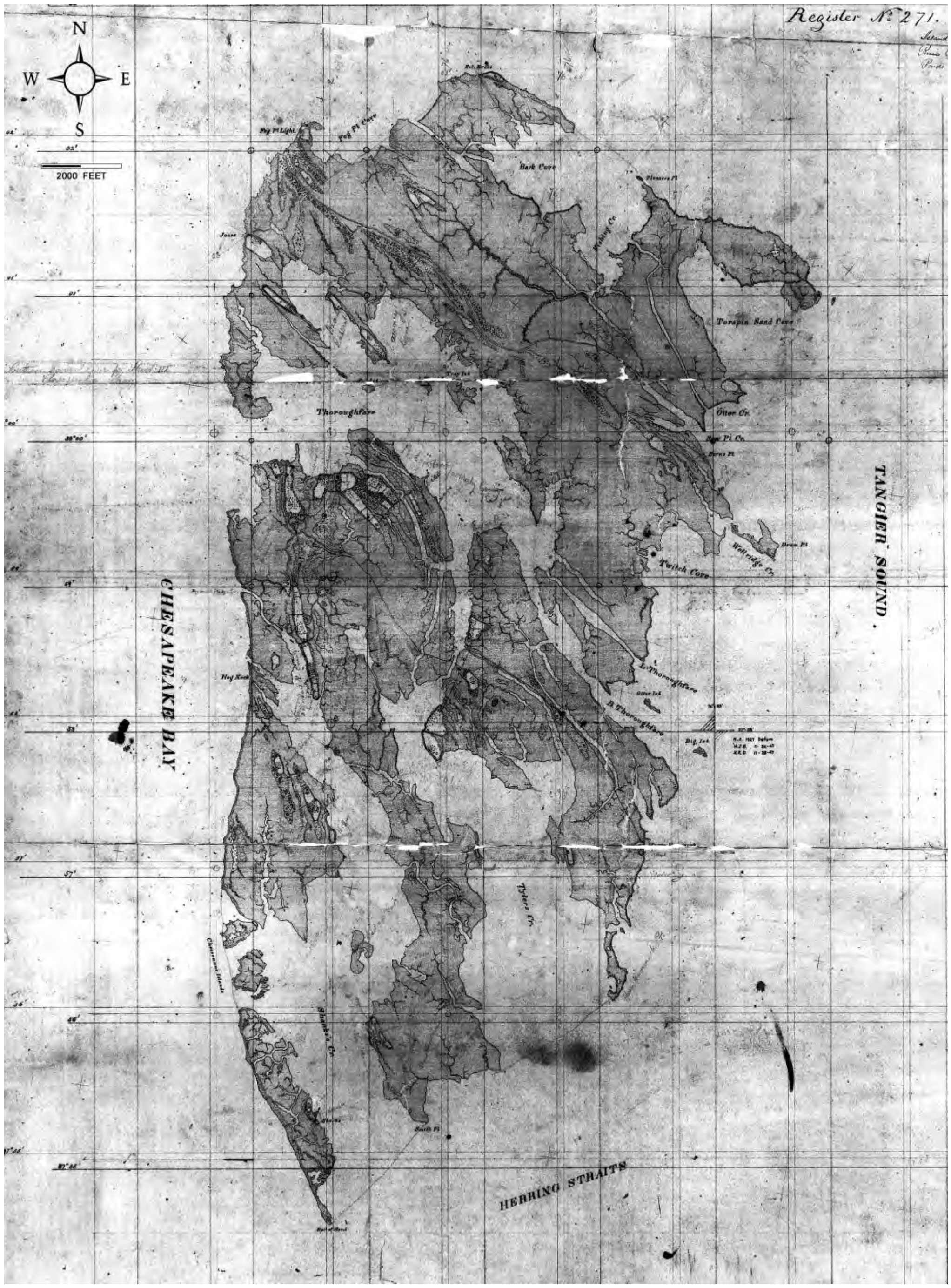


Figure 35. The U.S. Coastal Survey chart entitled T-271 shows Smith Island, Maryland as it appeared in 1849. Like today, the island encompassed large areas of tidal marsh 172 years ago, which was intersected by tilled, forested, and settled topographically-higher ridges.

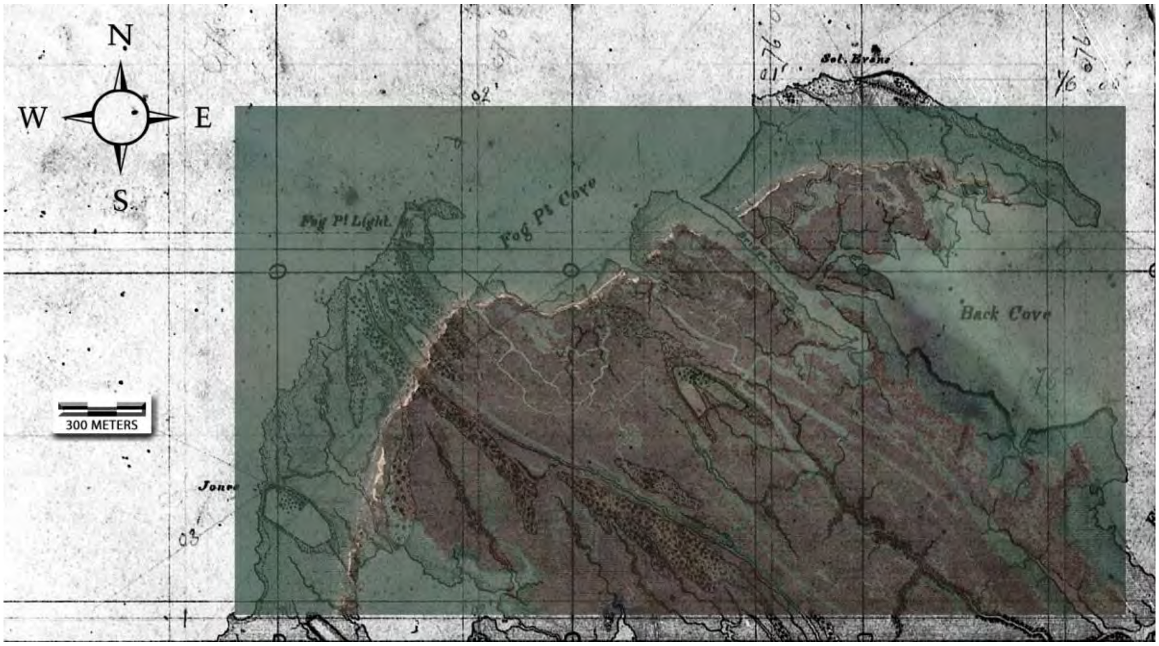


Figure 36. The overlay shows the 1849 shoreline along the northwest highly-erosive end of Smith Island, Maryland. The overlay compares the mid-19th century shoreline with the georeferenced 2013 satellite shoreline. In high wave-energy areas, the shoreline has receded well over 400 meters. In more protected regions, the shoreline has eroded <100 meters.

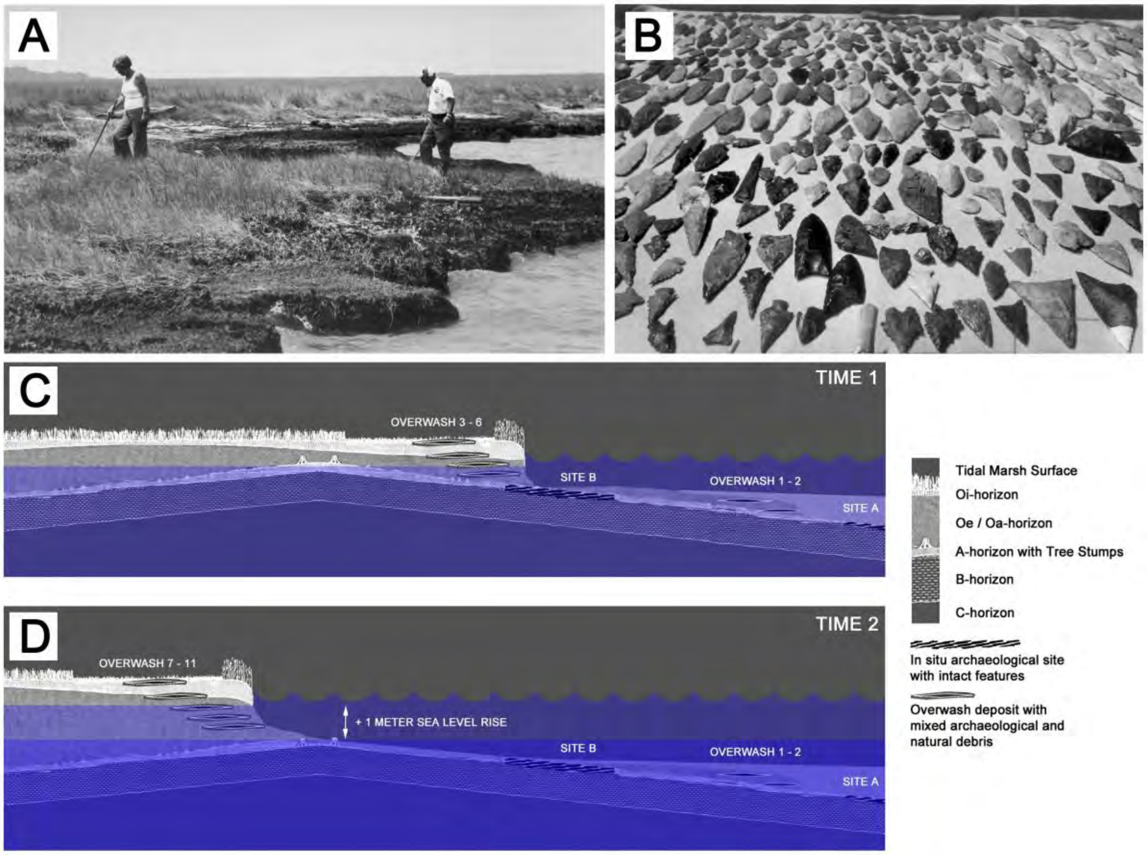


Figure 37. Along the northwest end of Smith Island, the high-tide overwash berm accumulation features (A) immediately inland of the active shoreline margin have revealed an immense quantity of wave-transported and transgression displaced prehistoric artifacts (B). Like Sharps Island, the archaeological assemblages represent nothing more than secondary inter-tidal archaeological "sediments", which have accumulated as a result of both archaeological site erosion loss (C) over several centuries, as well as Late Holocene marine transgression (D). Many of the artifacts have been episodically exposed to wave and tidal actions as sequentially eroded, deposited, re-eroded, and re-deposited overwash lenses encapsulated within tidal marsh strata.

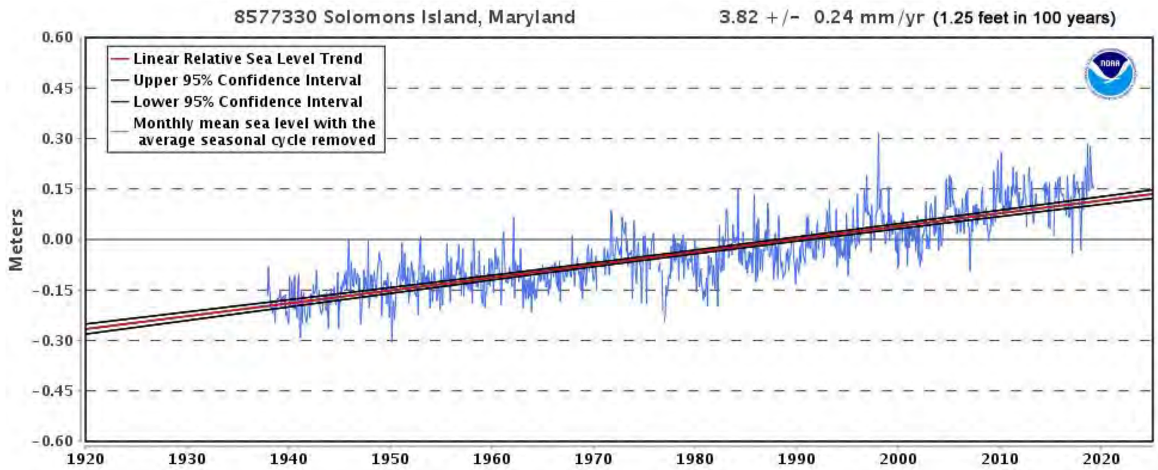


Figure 38. NOAA's Solomon's Island, Maryland Tide-Based Sea Level Model suggests that the area has been subjected to ~1.25 feet (~38-centimeters) of sea level rise over the past century.

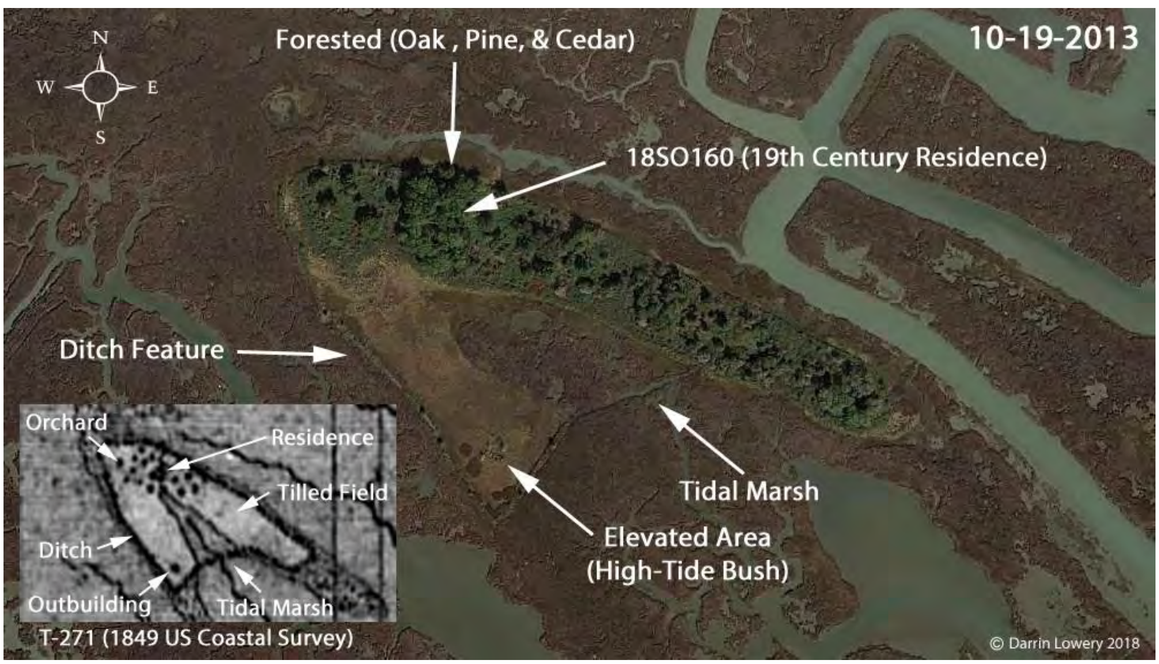


Figure 39. A detailed comparison showing an elevated landform in the interior of Smith Island, Maryland located southeast of Fog Point Cove as shown in Figure 31 suggests very little change over a 164-year period. Notable alterations to the surrounding marsh since 1849 include the redirection, channelization and artificial deepening of nearby tidal drainages. Even with these major anthropogenic modifications, the formerly tilled 19th century upland landform has retained its same configuration.

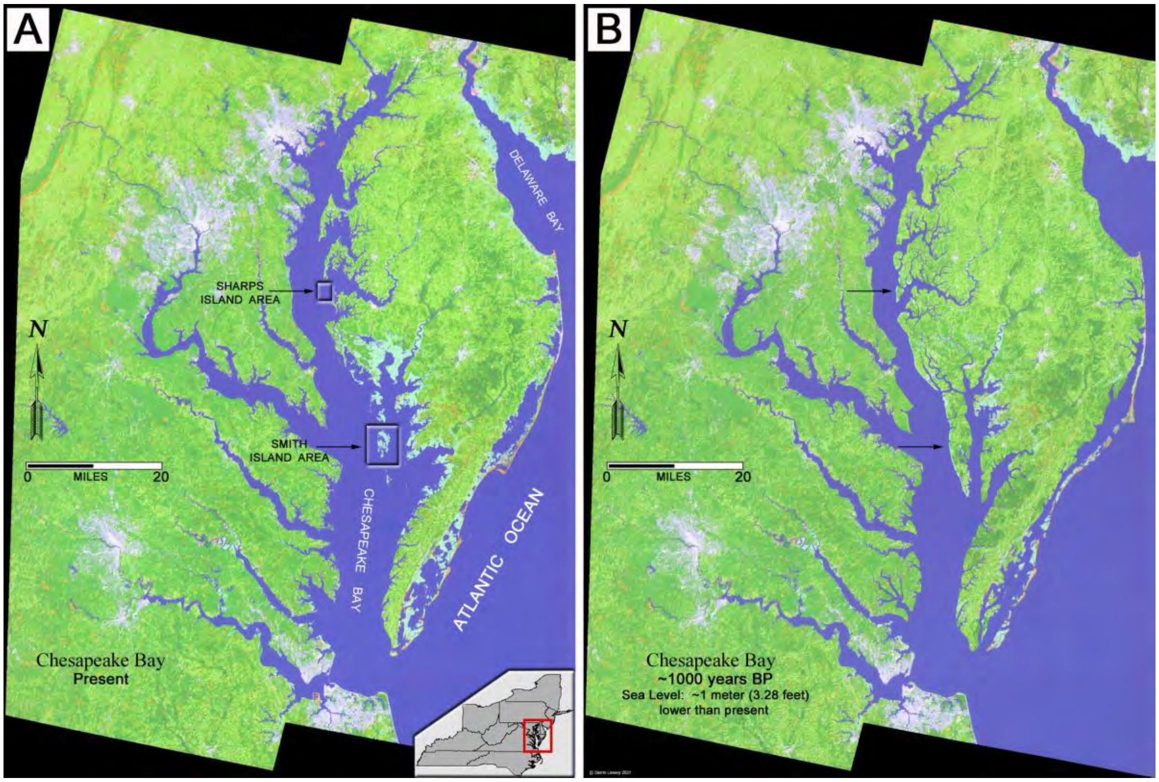


Figure 40. The maps show the present Chesapeake Bay (A) and a hypothetical reconstruction of the bay ~1000 years ago (B). The reconstruction tries to estimate the surface land-loss as a result of erosion, as well as bathymetric sub-tidal scouring. Under these parameters, the wave-related energy in sections like Smith Island is greatly reduced, which would permit the formation of vast areas of tidal marsh.

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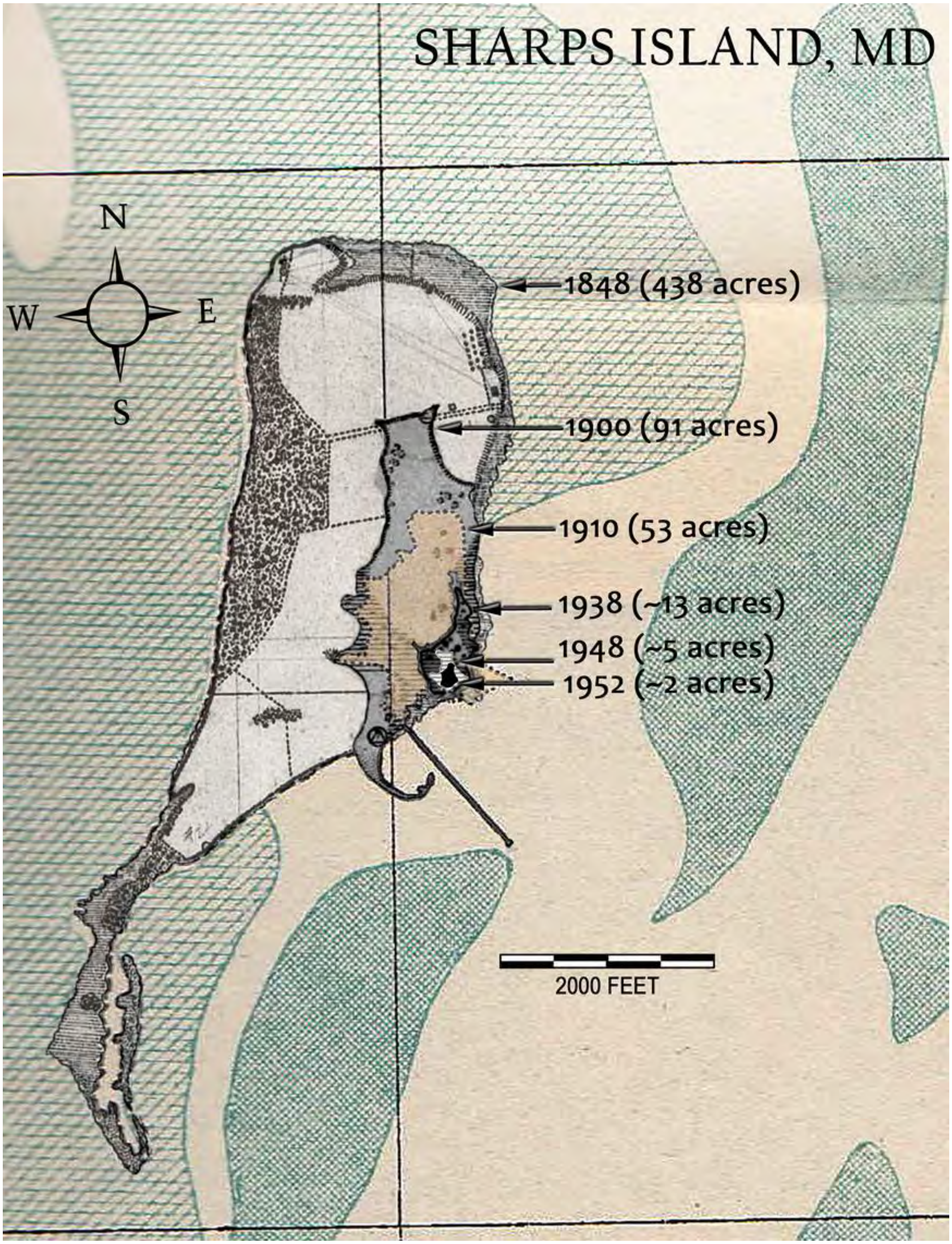
The back cover image shows the georeferenced compilation of the surveys and aerial photographs of Sharps Island between 1848 and 1952.


SHARPS ISLAND, MD
N
W
E
S
1848 (438 acres)
1900 (91 acres)
1910 (53 acres)
1938 (~13 acres)
1948 (~5 acres)
1952 (~2 acres)
2000 FEET