Abstract

Illuminating the Lighthouse:

An Historical and Archaeological Examination of the Causes and Consequences of Economic and Social Change at the Currituck Beach Light Station

By

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Director: Dr. Nathan Richards

Department of History, Program in Maritime Studies

The purpose of this project was to gather historical and archaeological data to illuminate potential relationships between economic and social investment in lighthouse complexes, and enhance an understanding of the multitude of factors that drive the establishment and development of lighthouse communities. The community surrounding the Currituck Beach Light Station in Corolla, North Carolina served as a case study for this thesis. Historical and archaeological information was gathered from several sources and was assessed for correlation. Analysis discovered that most change occurring at the lighthouse compound and community was due to investment in technological advancement. Most recent changes resulted from resource preservation and tourism investments.

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Chapter 1: Spark of Interest, an Introduction

Introduction to the Study

Many aspects of lighthouses have been researched through the years. Most studies pertaining to lighthouses are divided into several categories. One category focuses on lighthouse architecture and technology, as well as other supporting structures on site. Topics covered in this category include moving lighthouses, as took place with the Cape Hatteras (North Carolina) lighthouse (Snead 2010), and reconstructing lighthouse privies (Cummings 2007). Another category of study concerns conservation, maintenance, and management of lighthouses. This includes maintenance guidelines (Schweikert 1995), environmental impacts (Amos 2002), and preservation status assessments (Hubbell 1988; Holthof 2008). The third research area concerns the daily life of light station residents. Light stations were often isolated, which created unique living environments for the inhabitants. The children of keepers were often unable to attend school outside of the home. These extreme living conditions created an avenue for research and generated human interest topics, such as an examination of the lifestyles of female light keepers (Clifford and Clifford 1993; Thomas 1997). A final category of study includes the specific roles of lighthouses. This topic covers a variety of research interests, such as the role of a lighthouse as a tourist destination and their interpretation to the public (Thomas 2005), or how lighthouses connected industries on the Great Lakes (Kozma 1987; Gillis 2011).

While much research concerning lighthouses has been conducted already, there are still opportunities for novel forms of analysis. This thesis presents new avenues for studying lighthouses in North Carolina, specifically the Currituck Beach Light Station. This chapter presents the research questions, introduces the case study, and describes how the research is organized. While drawing from the four previously mentioned study categories, this thesis expands lighthouse research by including an often-understudied aspect of lighthouse communities.

Research Questions

A light station is no mere beacon – it is an ever-changing complex of buildings on a footprint that has been altered considerably over time due to fluctuations in its management and the world that surrounds it. As people populated the area around a lighthouse, the dynamics of culture inevitably changed. What were those changes? Did economic growth correlate with other events, such as shipping activity or shipwrecking events? This study expands perceptions of the evolving roles of lighthouses within the landscape and community that surrounds it. It used the Currituck Beach Light Station (CBLS), located in Corolla, North Carolina, as a case study to determine if archaeological and historic evidence demonstrated how local, state, and federal economic investment in tandem with social developments impacted and guided the development and changing role of the light station within its community. This thesis introduces this type of approach to the subject of lighthouse communities.

This study analyzed a series of secondary research questions in consideration of the economic and social conditions that affect and are affected by adjacent light station communities:

- What are the economic factors that guided the development of the Currituck Beach Light Station?
    - What role did federal investment play in this process and what trends influenced this investment?

    - What role did state investment play in this process and what trends influenced this investment?
    - What role did local investment play in this process and what trends influenced this investment?
- What are the social factors that guided the development of the Currituck Beach Light Station?
    - What are the changes in population trends over time in this specific coastal community and how do they correlate with other factors such as shipwrecking events and economic investment?
    - What risk management strategies were implemented, when, by who, and why?
    - How did technological change affect the community?
- What historical and archaeological data indicates a need for a lighthouse structure at the location of the Currituck Beach Light Station during the last half of the 19th century?

Introduction to the Site

Lighthouses along the Atlantic coast did not escape the destructive nature of the Civil War. Many were destroyed or their lenses demolished or removed for maritime tactical advantage. As reconstruction began after the war, several lenses were recovered or rebuilt, and many lighthouses were returned to working order. There were, however, remaining unlit areas along the coast. One of these was near a sparsely inhabited strip of dangerous coast along North Carolina's northern Outer Banks. Because of this, several structures were contracted along the coast to bring light to the region. One of these was the CBLS, which was established in 1873 at Corolla, North Carolina, and began operating on 1 December 1875 (Edwards 1999:9).

Construction of the lighthouse was completed in 1875, but the exterior retains its original red brick color (Holland 1989:181). This daymark distinguishes it from the other tall coastal lighthouses along North Carolina's coast (Khoury 2003:22; Shelton-Roberts and Roberts 2011:121). A daymark is a color combination or pattern visible during the day that distinguishes a lighthouse from others along the coast. The lighthouse tower contains over one million bricks, and there are 6 exterior and 214 interior steps to reach the top. The lighthouse, which has iron and granite window decorations and a copper sheeting roof, employs a first order Fresnel lens. The lens was made by Sautter, Lemonier et Cie., a French optics manufacturer. A nearby lifesaving station was established in 1874 in Jones Hill. The lifesaving station site was most likely chosen to be near the lighthouse. Both were under construction at the same time and provided an environment conducive to cultural and economic growth (Marano 2012:20). In 1876, the two and a half story CBLS keeper’s house was completed. In 1920, a second, smaller keeper's house was added to the complex. The supporting structures for both keepers’ houses included cisterns, privies, and storehouses (United States Department of the Interior, National Park Service [NPS] 1999:7.3-5).

The first keepers of the CBLS arrived soon after its construction. Although they were few, the keeper and his family increased the population percentage substantially. There was little service for most lighthouse workers; supplies and mail were brought to the complex periodically. What many today perceive as isolation, was an accepted lifestyle among keepers of the time. Consequently, many lighthouse locations became a hub of activity in otherwise sparsely populated areas. The few inhabitants around CBLS, Whalehead as locals knew it, were subsistence farmers who raised livestock and harvested feral pigs. The area was originally called Coratank, a term local Native Americans used to refer to wild geese. A few people came to work and live at the light station, but the activity of construction and supply for the structure created a farther-reaching impact on the area (NPS 1999:8.4).

With increased traffic to the area, Whalehead's reputation as a hunting haven for waterfowl soon spread. The Whalehead Club (Corolla Island) was built adjacent to the light station in 1925 (Figure 1.1). It was established by a New Jersey businessman as a hunting club and second home (Davis 2004:48). The 21,000-square foot home was later sold in 1939. The house's Art Nouveau style architecture was a stark contrast to the simple life evident on the island (NPS 1999:7.2).

Figure 1.1. A view of the Whalehead Club from the CBLS (B. Scott Rose 2015).

When the Currituck Beach Lighthouse's signal became automated in 1939 by an electric generator, the light keepers were no longer necessary and their employment was terminated. This contributed to the deterioration of most of the complex. With the exception of a brief period of construction and use by the United States Coast Guard (USCG) during World War II, the site was abandoned until 1980. Eventually, efforts were made to conserve and maintain what was left of the site (NPS 1999:8.8).

The Outer Banks Conservationists (OBC) was formed in 1980 and began reconstruction of the CBLS. John Wilson IV, great-grandson of the last keeper at the Currituck Beach Lighthouse, was one of the founding members of OBC. By 1990, the lighthouse tower was reopened to the public for climbing (Khoury 2003:58). OBC currently owns the tower and maintains controls of the property, which remains open to the public (Shelton-Roberts and Roberts 2011:112).

Today, the lighthouse structure is in its original unpainted form and is now well preserved. Many original structures are still in place, and the lighthouse retains its original first order Fresnel lens (NPS 1999:7.3). Because of the quality of its preservation and its historical significance as an 1873 lighthouse, it has been listed in National Register of Historic Places (NPS 1969; 1999). Regardless, some movement and loss of structure has occurred. The changing footprint of buildings, the evolving property lines, and the myriad economic and social changes occurring around the station made it a perfect candidate for study. This thesis considers how the causes and consequences of social and economic change in northeastern North Carolina may be discerned and interpreted in the historical and archaeological record.

Thesis Organization

This thesis first provides the reader with a basic historic understanding of the period involving the CBLS. It then discusses the theoretical approach used in this research, details the data collection methods, the types of datasets recorded, and interpretation of that data. A discussion of the research questions is presented in the final chapter.

Chapter 2 details the historic information pertaining to the CBLS and surrounding community. The chapter begins with the invention of the Fresnel lens and ends with the reconstruction of site structures and discusses how the site looks today. Primary sources were used when possible to produce the historic narrative. Much of the historic data was collected in North Carolina. The CBLS maintains a digital collection of documents that provided a great amount of those referenced in this work. Several documents were found in online digital collections available through various sources.

Chapter 3 explains the theoretical approach of this thesis, which was provided by Michael B. Schiffer's behavioral archaeological model (Schiffer 1996). Formation processes included both non-cultural transformation and cultural transformation. This study's primary focus was on the cultural transformation processes that shaped the lighthouse complex and its surrounding community.

Chapter 4 reports the data collection methodology used in this study. Historical methods used in this study included consultation of secondary sources obtained through several libraries to track down primary sources. Primary source documents were directly gathered from various archives. Archaeological methodologies included the use of total stations, gradiometers, and metal detectors. These technologies were used in different combinations of terrestrial and underwater surveys. The author utilized Computer-Aided Drafting (CAD) and photogrammetry software to create virtual three-dimensional (3D) models to compare structural elements, investment decisions, population trends, and space utilization techniques. Archaeological information was postprocessed and visualized using *MagMap*, *Xchange 2*, and *ArcGIS* (Geographic Information Systems [GIS]). The information gathered through the methods outlined above are explained in Chapter 5.

Chapter 6 describes ways in which the various datasets were analyzed. The analysis phase of this project was composed of three activities: quantitative analysis of historical records, digital modeling of archaeological data, and the merging of aggregated historical data into virtual modeling for geospatial analysis. After the historical and archaeological data was gathered, statistical analyses were conducted to investigate correlations between economic change and archaeological evidence or between the construction of the CBLS and shipwreck events. The economic and social investments made by local regional and federal entities in the events affecting the lighthouse complex throughout its history were evaluated through qualitative analysis of gathered historic documentation that describe the time, money, and effort expended on the topic. Comparisons were made among population trends, investment data, and shipwreck events. The archaeological data layers in *ArcGIS* were compared. Important correlations were highlighted and discussed. Locations of missing structures were estimated and illustrated.

Chapter 7 presents conclusions based on the data and answers the research questions set forth in the introduction. Future research, including new questions raised during this study, and limitations of this study are also discussed in this chapter. A discussion of how the data confirms, challenges, or adds to the historical record is also presented in this chapter.

Chapter 2: Revolution in Radiance, a Historical Narrative

Introduction

The Currituck Beach Light Station has long been a beacon of hope for seafarers and watermen along the northern stretch of the coast of North Carolina's Outer Banks. To understand the history of the lighthouse compound, one must touch upon the technological, political, economic, and cultural environment in which it was conceived and constructed. Its geographic location, the people who kept the light burning, and its cultural impact are all important topics to be explored in this historical account of the maritime community.

Local, regional, and national events through time impacted the minds and hearts of the people in control of the elements at the lighthouse site. A focused understanding of the cultural ideologies and political mindset of the individuals involved in changes at the location at different points in time is important for understanding the local pressures acting on the site. The construction of the lighthouse and its physical changes over time have been documented quite well. This documentation is significant for recognizing relationships of various public and private agencies on a larger scale.

A chronological approach to the historical narrative is utilized in this chapter to illustrate the events of cultural and physical change in the community that surrounds the CBLS. The *Pre-Construction* section describes the history of the community before the lighthouse was established, as well as preparations for construction of the site. The section labeled *Construction Begins* explains the construction activities on site. *Community at the Complex* illustrates contemporary construction and investments in the community. *Duties and Conflict* describes activities at the CBLS and surrounding community from its founding until the end of the 19th century. In the section labeled *A New Century*, activities that occurred in the community during the first third of the 20th century are explained. *Environmental and Political Issues* follows these issues from their beginning to the site's initial abandonment. The section labeled *After WWII*, details activities in the community from the time of the CBLS's initial abandonment to the early 1980s. The final section, entitled *Conservation Begins*, describes efforts to reconstruct the site and explains the inevitable growth of the community until the recent era.

Pre-Construction

This area along the coast has been known by many names. The Native Americans called the region Coratank or Corotank, both of which are terms used to refer to the abundance of wild geese that propagated the area. The few people who did live on the strip of the island called it Whalehead, which is a name taken from an old story about a man finding an enormous whale on the beach. Per the tale, he drove his horse-drawn carriage into the dead beast's mouth and straight into its head (Davis 2004:16). Representatives of the northern whaling industry often conducted expeditions off the coast between the Old Coratank and Roanoke inlets. Locals took advantage of whales that occasionally washed ashore to supplement their income. Eventually, they went to sea to catch their prey. In 1775, the British Parliament banned whaling and fishing along the coast of North America. After independence was gained, whaling activities resumed. In June of 1789, the New Currituck Inlet filled in forcing the inhabitants of the northern Outer Banks to rely more heavily on the sound instead of the sea (Davis 2004:21). Later, after a thriving community had developed, a new post office was built with the designation of Corolla Post Office. The area has been known as Corolla ever since (NPS 1999:8.4).

Why was Currituck Beach chosen as a location for a light station? The United States erected new lighthouses at dangerous locations along the Outer Banks. One such area was Whalehead, which was located midway between Cape Henry Light Station in Virginia and the Bodie Island Light Station in North Carolina. Whalehead was an ideal location for the last lighthouse built along the North Carolina coast (USLHB 1872:508, 1873:631; NPS 1999:8.3). This stretch of coast is especially dangerous to southbound traffic that travels close to the coast in attempts to avoid the northbound Gulf Stream Current. Visibility was also generally poor due to frequent fog. Additionally, there had been several wrecks along this stretch of coastline because captains mistook the Currituck Banks for the shoreline at False Cape, located just south of Cape Henry, Virginia (NPS 1999:8.2). To date, there are at least eighteen known shipwrecks just off shore at Currituck Beach (Holland 1989:180). One report indicates 56 wrecks over a 22-year period at Currituck Beach (USLHB 1874:48).

The lenses installed in North Carolina's tall lighthouses were a relatively recent technological advancement in the United States at the time. Invented by Augustin Fresnel, a French engineer in the first quarter of the 19th century, the apparatus was first used at the Cordouan Lighthouse in France in July of 1823 (Adamson 1955:39). After his initial installation proved successful, Fresnel created three successively smaller sized lenses and a classification system for them. First order lenses were the biggest and brightest, with the lenses decreasing in size to the sixth order, which was the smallest (Figure 2.1). Information about each of the Fresnel lenses can be found in *Appendix A: Comparative Table of Lens Orders*. By 1854, the Fresnel lens lit the entire French coastline (Levitt 2013:76).

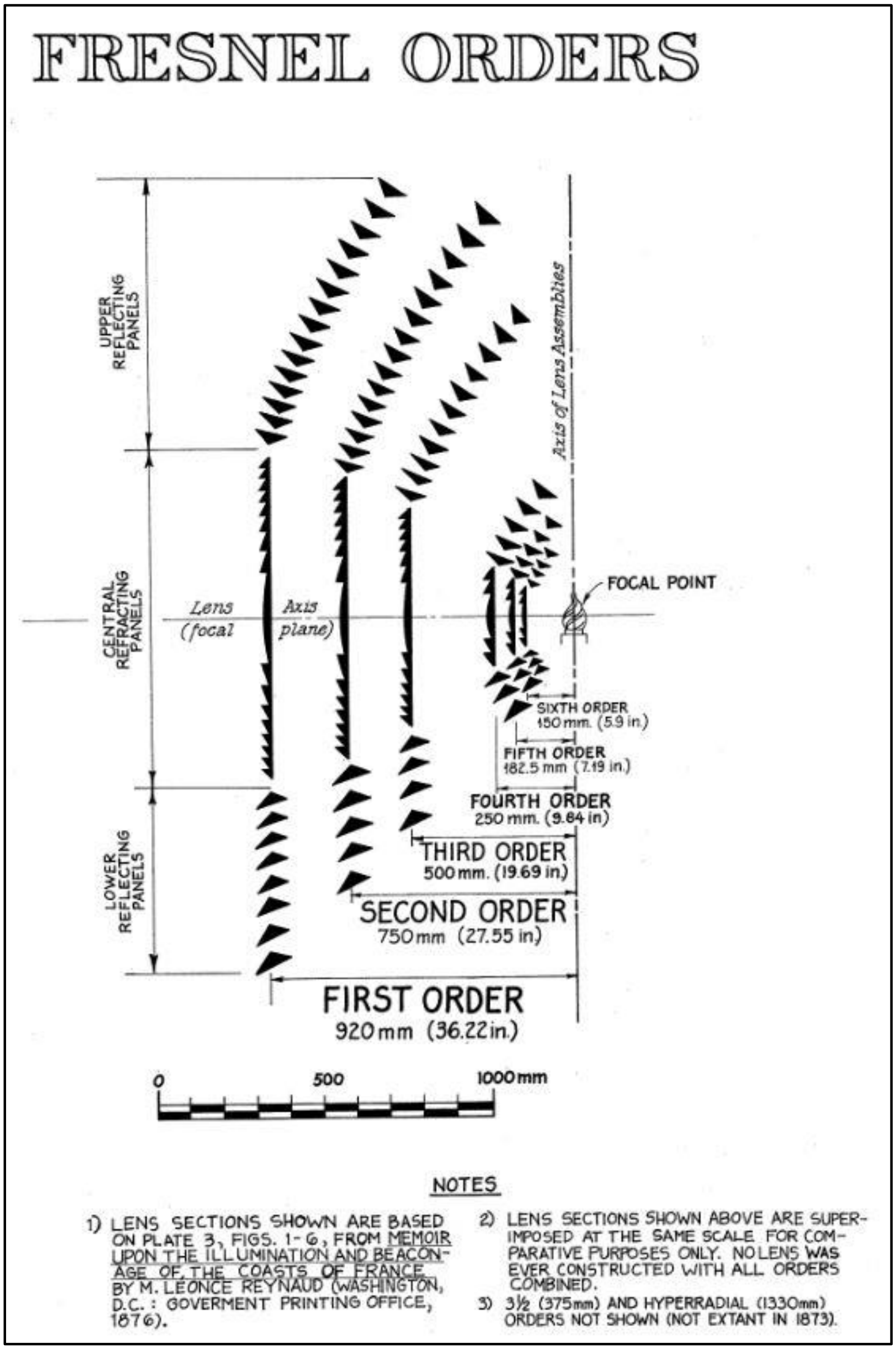

Figure 2.1. Fresnel lens order description (Baiges 1988).

Through a series of mishaps, wars, sabotage, and stubborn bureaucrats, the use of the Fresnel lens in a United States lighthouse was delayed until February of 1850. Part of the reason for the delay in adopting this new technology was due to the reciprocal relationship between lighthouses in the United States and the whale oil trade. The CBLS used kerosene, but most of the United States lighthouse lamps were Lewis lamps. These used whale oil, whereas those of France and England used *colza oil*. The colza oil was extracted from the seeds of a rapeseed plant grown in Europe. Steven Pleasonton, the head of the United States Lighthouse Establishment, thought the use of anything but the less expensive Lewis lamp was preposterous (Levitt 2013:129-152). The Lewis lamp burned half as much oil as any other. Changing to a new lens system was also problematic for Winslow Lewis. Congress had contracted Lewis to supply all lighthouses in the country with his lamps, which incorporated his reflector designs. The new Fresnel lenses would have required modification of the lamp and removal of the mirror mechanism. The expense of these changes helped justify the old technology (Johnson 1889:14; Levitt 2013:129-152).

Another impediment to installing Fresnel lenses in the United States was the Lighthouse Establishment, which existed between 1776 and 1851. This organization was more concerned with lighting dark coastal regions than experimenting with new technologies (Levitt 2013:144). In 1851, Congress ordered the creation of a board to research and report on lighthouse operations. The group completed their research and produced a damning report in short order. However, no immediate action was taken. A few months later, *Baltic*, a steamer with several congressmen on board, found itself in insufficient light and trapped by fog. The inability to navigate in those conditions was the impetus that led Congress to approve the creation of the United States Light-House Board (USLHB). The report identified the need for skilled construction of lighthouses and the use of the Fresnel lens (Dolin 2016:125-133).

In 1855, the United States received the first shipment of Fresnel lenses and mounting hardware for installation as replacements for Lewis lamps. The replacement effort began at Cape Hatteras, where, arguably, the most dangerous strip of coastline on America's shores existed (United States Congress 1885:193.339). Levitt (2013:180) noted, "By 1859, the Lighthouse Board had put a Fresnel lens in virtually every lighthouse in the United States". Between 1850 and 1860, the United States also expanded lighthouse construction. Over five hundred Fresnel lenses were installed by 1860, just prior to a civil catastrophe (Levitt 2013:180).

The United States Civil War took its toll on the land and seascape, as well as on the minds and bodies of those involved. The Outer Banks of North Carolina did not escape the fury of battle, nor the destructive preparations of war. Both combatant forces needed supplies and favored sea routes over other transportation methods. All along the eastern seaboard, lighthouses had their lenses removed in preparation for their protection or to make transportation of goods more difficult for the enemy. Combatants believed that blockade-runners would be hindered by natural hazards if the navigation aids were eliminated (Naish 1985:35).

These lenses were valuable. When removed for tactical purposes, they were packed away with utmost care, with the presumption that they could be replaced after the hostilities had expired and regular economic activity had resumed. In some cases, the buildings were damaged and never used again, or the lenses were lost due to the death of the caretaker. During reconstruction efforts in the south, many prisms were recovered or keepers ordered replacement glass from the original French manufacturer (Levitt 2013:196).

Another technological advancement expanding across the globe was the electric arc light. This technology was fully adopted in Europe by the 1880s. Most of the advancements in seamark technology in the United States during this time were concentrated on audible signal technologies. After the Civil War, the use of electric lighting was a well-established trend in United States lighthouses (Levitt 2013:218-222). It was another fifty years before electric lighting was utilized in the CBLS (NPS 1999:7.4).

Developments in steam power helped advance this type of lighting. Steam engines powered electric generators, which, in turn, powered the lights. This technology required more training for keepers and more money for installation, maintenance, and supplies. Electricity usage resulted in a more powerful light and a more technologically advanced national image. It symbolized national wealth, political power, and modernity (Schiffer 2005:292, 2010:138-140). The United States was in no position to make the tradeoff until well after the turn of the 20th century. The CBLS would finally be electrified in 1933, replacing the outdated oil lamps (Currituck Beach Light Keepers Journal [CBLKJ] 1933:1).

Construction Begins

In 1873, the federal government purchased the site for the Currituck Beach Light Station. Early the next year, construction began on the 162-foot structure located between the Cape Henry Light Station in Virginia and the Bodie Island Light Station in North Carolina (USLHB 1873:631). At Currituck Beach, temporary living quarters for the workmen, a carpenter's shop, a blacksmith's shop, and a cement shed were erected at the site. Construction managers utilized barges to transport the building materials to the lighthouse wharf. A rail system ran from the end of the pier to an area near the future base of the tower (USLHB 1873:631; NPS 1999:8.4).

A local contractor named Dexter Stetson built several lighthouses along the coast including the CBLS (Stetson 1876:1). He was contracted to build the Cape Hatteras and Bodie

Island lighthouses to specifications set forth by the USLHB (Stick 1982:65-68). The CBLS tower is identical in construction that of the Bodie Island structure with two exceptions: the Bodie Island Lighthouse had no piles driven for the foundation, and the tower at Currituck has an extra exterior step (NPS 1999:8.9). The large keeper's house was one of two that were the first built in this style (Victorian Stick) and floorplan.

Initial work at the site included construction of a wharf, rail system, and buildings to be used as construction shops and storage areas for construction materials. The site was remote, and movement of building materials was a concern. The wharf was constructed over 1,500 feet out into the sound to accommodate the draft of supply boats. The wharf had a rail system incorporated within it to transport materials from the dock to the building site (USLHB 1873:631; 1875:45). The carpenter's shop was finished on 6 June 1874 and pile driver derricks were raised on 17 June of the same year. Thirty-five piles were driven during the month (Figure 2.2). Iron from the railroad was gathered for the blacksmith to create necessary hardware for future use in construction (USLHB 1873:631; Haines 1874:1)

Construction of the lighthouse began with piles that were driven 22 to 24 feet into the ground by a steam pile driver. Builders placed a wooden grillage system on top of the pilings. Concrete was used to fill between the pilings and the grillage system (USLHB 1873:631). Masons constructed a multi-component foundation between the grillage system and the double-walled brick conical tower (Figure 2.2). A construction progress report written by Peter Haines, Lighthouse Engineer from the 5th District, to Joseph Henry, Chairman of Lighthouse Board, explains:

> July for month of June
> The carpenter's shop was finished on the 6th of the month. The derricks for the pile-driver were raised at the site of the tower and ready for work on the 17th. New runners, braces, bolts, rollers, etc. have been prepared for the pile driver, it was set up,

> and the engine put in readiness for the operations on the 19th on which day the work, of driving the tower piles was commenced. Before the first pile was driven, however, the engine failed to work on account of the pump being out of order. This defect was repaired and the driving again commenced. Owing to the wearing away of the pile driver runners, work was suspended on the 26th to wait for iron with which to [cover?] the runners. The latter were repaired on the 29th and the pile driving again commenced. Thirty-five (35) piles were driving during the month.
>
> The blacksmith has been engaged in making bolts, staples, etc., for pile driver; bolts for derrick and outer pier; thimbles for guys; cant [?] for moving piles; hinges, staples, etc., for shed and shed doors, and bands, shackles, pins [?] and keys for use in driving piles.
>
> The labours were engaged the first half of the month in removing railroad iron from old stringers, hauling lumber and piles from wharf to site, and stowing the old iron in blacksmith's shop the other part of the month they were at work about the pile-driver, taking bark off piles and preparing them for driving, sawing wood and splitting logs (tops off piles) for fuel for the engine.
>
> The chartered sloop "Virginia" has made one trip to Tull's Creek Mill after lumber and four trips to Church's Island and Coinjock after mule, provisions, blacksmith's coal, etc. (1874:707-709).

Currituck Beach Lighthouse itself is visually distinctive because it is the only unpainted lighthouse in North Carolina. Since the Cape Lookout, Cape Hatteras, and Bodie Island lighthouses had already adopted the diamond, candy cane, and horizontal patterns, the USLHB decided to leave the Currituck Beach Lighthouse unpainted. When the sun sets over Currituck Sound, the unpainted red bricks glow with a light that appears to emanate from within, softening the imposing water (Edwards 1999:11). The tower was completed in December of 1875.

Completion of the two and a half story keeper's house occurred in 1876. Two identical storage buildings were added to the site on the north and south perimeters (USLHB 1876:771). These were the primary structures until 1920 when workers brought a second, smaller keeper's house to the compound and reconstructed the wharf (USLHB 1920:754). The supporting structures for both keepers' houses included cisterns, privies, and storehouses (NPS 1999:7.3-5).

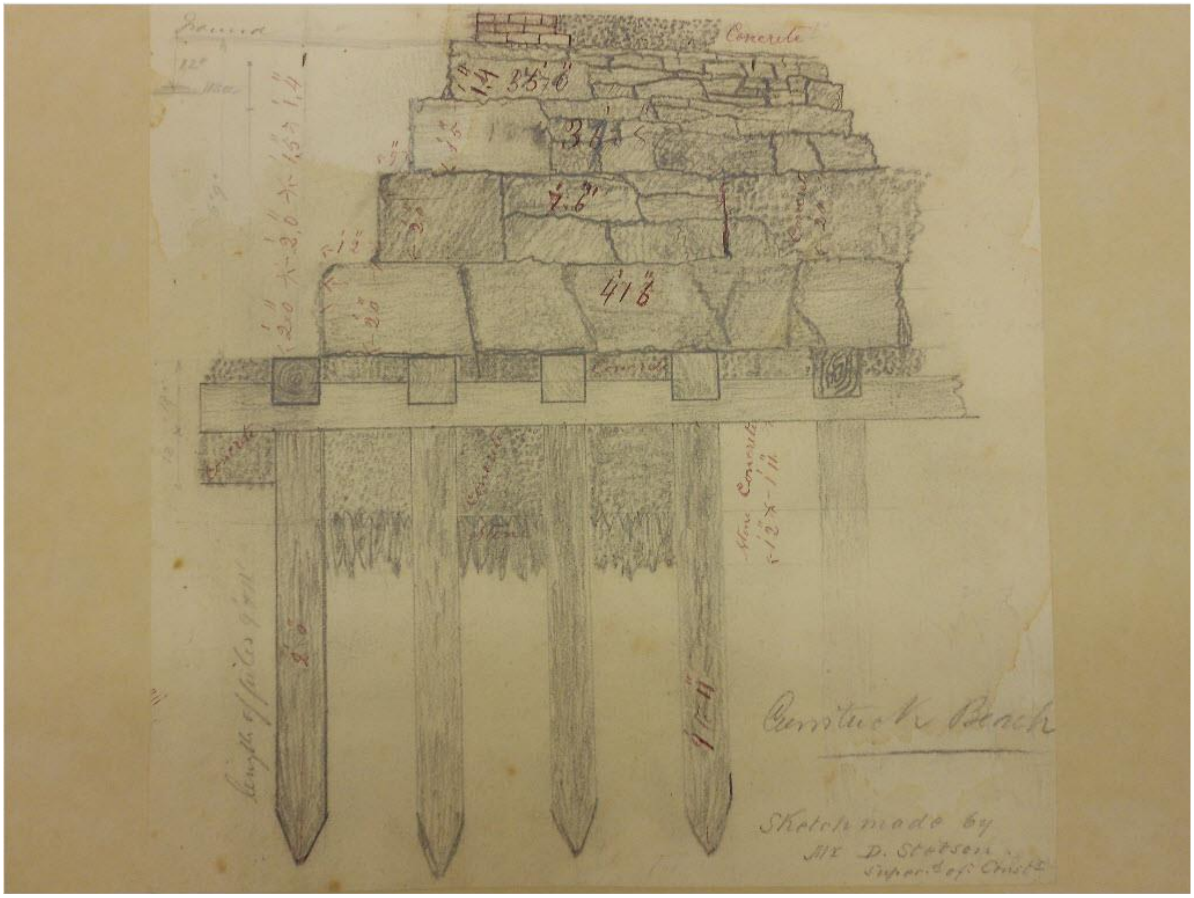

Figure 2.2. Sketch by Dexter Stetson, Superintendent of Construction at Currituck (Stetson 1873).

Community at the Complex

After its construction, the lighthouse had its first keepers. During this early period, there were few social services of any kind for most lighthouse workers. Before establishment of the post office, most supplies and mail were brought to the compound periodically. Early on, the keepers would make the ten-mile round-trip across the sound to Long Point, a lighthouse outpost and supply depot for lighthouse keepers in the area, and other locations for supplies. Perceived isolation was an acceptable lifestyle among keepers of the time (USLHB 1905-1920). The few inhabitants around Whalehead were subsistence farmers who raised livestock, hunted and, domesticated feral pigs (NPS 1999:8.4).

Two contemporary developments occurred in 1874. The Jones Hill Lifesaving Station was one of several that had been placed approximately every four miles along the Outer Banks. Undoubtedly, there were interactions between the staff of these stations and the staff of the lighthouse station due to both the similarity of goals and the necessity of work communications (Mobley 1994:27).

The Lighthouse Club, one of several hunting clubs developed around Currituck in the last quarter of the 19th century, was established. Soon the area became a hunting and leisure area for northeastern businessmen who wanted to take advantage of the bountiful duck and geese around the area. Many enterprising young locals began working at these clubs as guides for hunting trips. Some locals became commercial hunters, supplying their game to the northeast markets. These activities continued well into the 20th century (Davis 2004:34; NPS 1978:8.1).

It did not take long for the population to grow to the extent that it required a post office. In 1896, Emma Parker, the village's first postmaster, requested that the United States Postal Service establish a facility in Whalehead. Eventually, the name *Corolla* was accepted for the new community post office, which was constructed soon after (NPS 1999:8.5).

Duties and Conflict

While there was structural and landscape change at the light station from 1875 until 1933, the responsibilities at the lighthouse were mostly unchanged throughout this period. These duties consisted of ensuring that the light continued burning and that upkeep and maintenance on the mechanical equipment, including on the tower itself and on the first order Fresnel lens, was performed. The keeper also recorded observations and weather conditions and maintained the grounds and other on-site structures. A new lamp was installed in May of 1881. The Funck's Hydraulic Float Lamp lasted for three years when the fuel type changed (Figure 2.3) (CBLKJ 1881:2). The light was originally powered by lard fuel, but on 12 April 1884, the lamp and fixtures had to be reconfigured to accommodate kerosene fuel (CBLKJ 1884:2; USLHB 1884:51). Keepers stored this fuel in the oil-house and storehouse and had to carry it to the various locations where it was needed, including to the tower light. At times, keepers or assistant keepers took a boat to the mainland to retrieve supplies or personnel for new duties in Corolla. The keeper and assistants took time from their regular duties to butcher hogs or harvest crops from the half-acre garden that was located on site (NPS 1999:8.6). In mid-May of 1880, First Assistant Mr. Heath was given permission to move the former temporary home of J. W. Lewis, the Superintendent of Construction, to a location that was more convenient to his quarters, which could be used as a "cook house" (Babcock 1880:1). In the 1880 census, 24 people were reported living in the large keeper's house (United States Bureau of Census [USBC] 1880:49.22).

The pier at the lighthouse was completely rebuilt in 1888 and again in 1902, a major maintenance endeavor. A shed was constructed at the end of the pier, and the call bell system was installed in 1888, as well (USLHB 1888:85). The pier structure required frequent maintenance and upkeep, possibly due to early dock construction techniques or wear and tear of daily use and weathering. In 1892, approximately 3,000 feet of fencing was rebuilt (USLHB 1892:92). The USLHB completed a topographical survey of the lighthouse site in 1894 (USLHB 1894:98). A temporary iron oil-house was built on the site, and 280 feet of board fence and two gates were installed in 1896 (USLHB 1896:87).

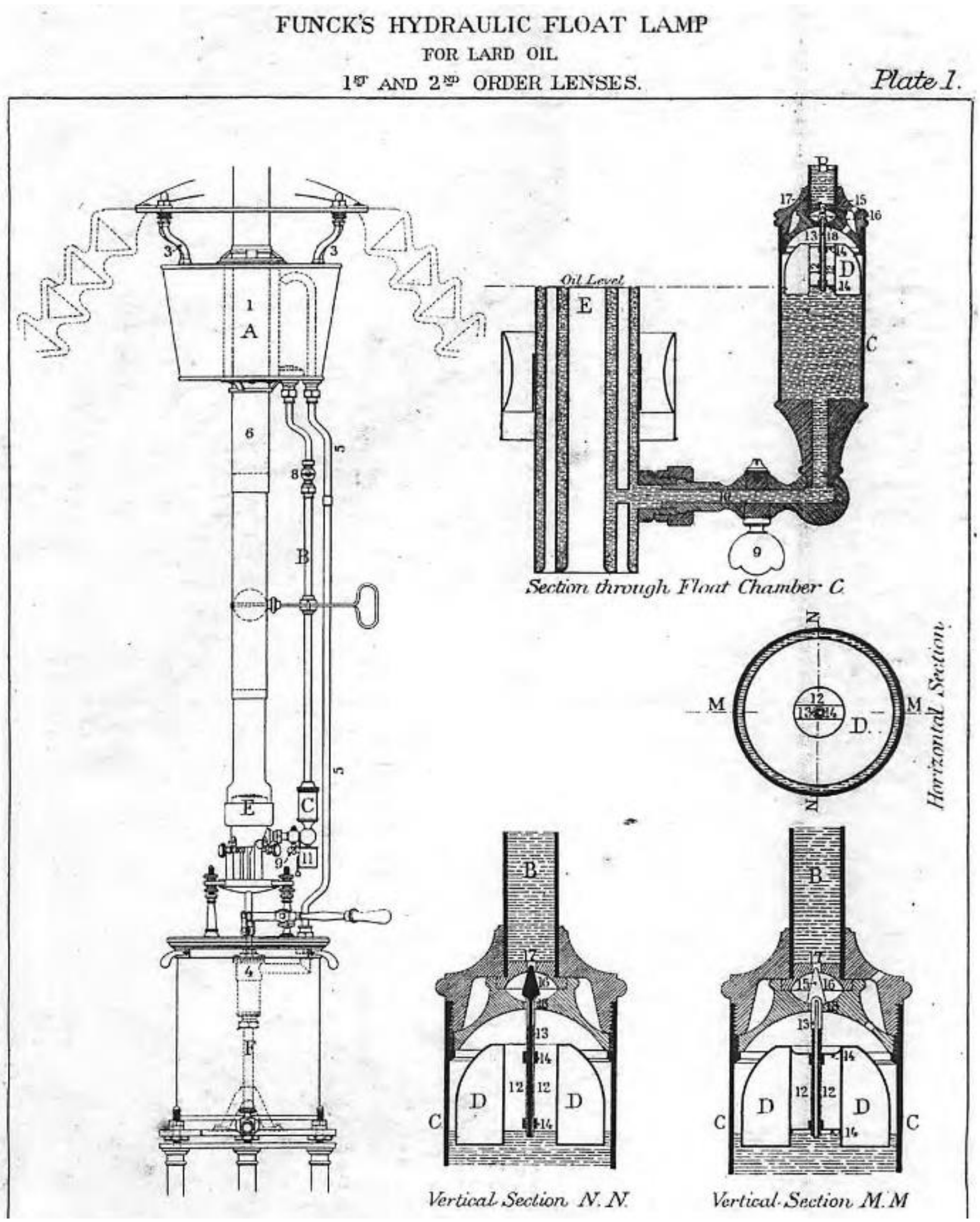

Figure 2.3. Funck's Hydraulic Float Lamp Lantern, employed in the CBLS. (Authority of the Light-House Board 1881:100).

The keepers at the CBLS saw many wrecks during their stay at the site. None, however, were as influential as the wrecks of USS *Huron* and *Metropolis*, which took place in the winter of 1877 and 1878. These two wrecks were especially tragic. A course error caused USS *Huron* to run aground off the coast of Nags Head. The iron-hulled gunboat was nearly 200 yards from shore, but the heavy sea and bad weather took the lives of 98 crewmen. It was decided that the United States Lifesaving Service (USLSS) was inadequately funded to handle the disaster. Soon after, *Metropolis* ran hard aground near the CBLS (The Washington Post 1878:1; The New York Times 1878:2). Although various media outlets reported different numbers, it is believed that 102 lives were lost because the USLSS had been ill-prepared for the disaster (Mobley 1994:66-73; Duffus 2007:144-145). Figure 2.4 depicts a victim of the *Metropolis* wreck. The occupants of the CBLS played a significant role in the rescue and recovery effort. The primary lighthouse keeper of the CBLS gave a statement about the event to Walter Walton, the Assistant Inspector and Acting Superintendent of the USLSS. Keeper N. G. Burris described the efforts of those civilians and how the USLSS helped many people return to shore. He also described the recovery efforts of the following days:

> When near the lighthouse I turned and looked back and the mast had fallen, and no sign of the vessel remained. I took one of the survivors home with me, and shortly after my arrival, a great many more of the survivors in an exhausted and destitute condition flocked to the house. I furnished food and shelter for sixty-one persons that night, and for about seventy-six for breakfast and dinner and sheltered them that night and gave them a breakfast the following morning (Saturday). They left at noon for the steamer to Norfolk, Va. This is all I know in relation to the wreck of the steamer Metropolis. N. G. Burris (1878).

These events forced changes in the funding of the USLSS. Public outcry was the major factor in the decision to increase hours and training for those employed by the Service, as well as increase the number of lifesaving facilities along the coast. This increase created more jobs along the Outer Banks and a larger sense of community among the members of the USLSS and others in the area, especially those who lived and worked at the lighthouses (The Washington Post 1878:1; The New York Times 1878:2; Mobley 1994:73-76; Davis 2004:37-39).

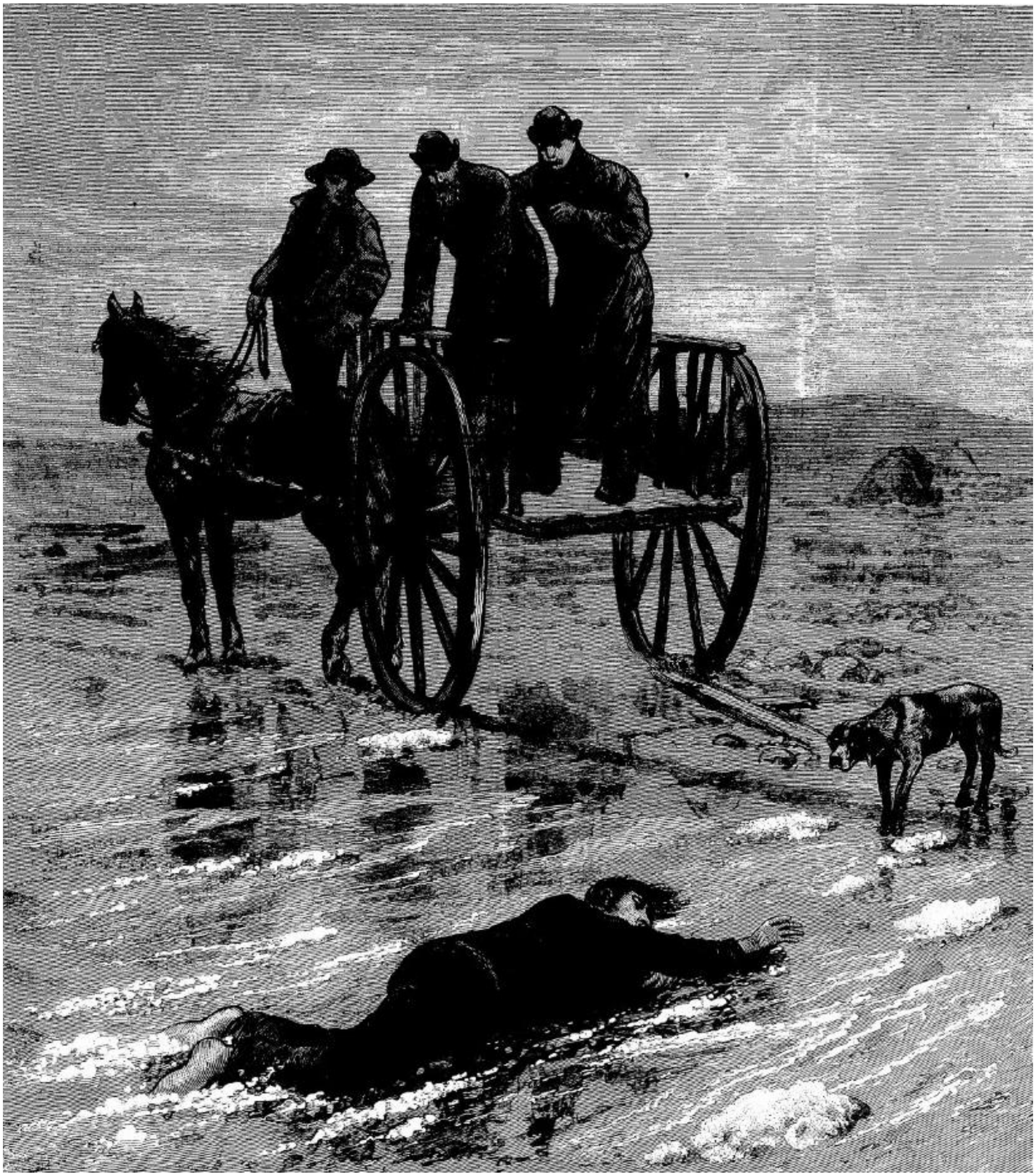

Figure 2.4. A victim of the *Metropolis* wreck (Leslie 1878:169:1).

A New Century

Although cultural change and industrial advancements were occurring throughout the world, most of these changes did not directly affect the northern Outer Banks of North Carolina. There were a few significant changes that took place at the light station in the first quarter of the 20th century. Reconstruction of the Jones Hill Life Saving Service occurred closer to the lighthouse complex in 1903. Workers installed telephones at the compound in 1898, but lines were only connected to the lifesaving service nearby (Jones 1898). These new lines replaced the outdated call bell system of communication. On 30 December 1912, workers installed a new lamp in the tower. This new vaporizer lamp preheated the fuel and resulted in a brighter burning and more efficient light (CBLKJ 1912:5).

An additional matching keeper's house, Figure 2.5 below, was brought to the site in 1920 by barge from the Long Point Light Station. The dwelling house was brought from Long Point and situated at the Club House Landing (CBLKJ 1920:3). The north storage building was moved eastward, parallel to the lighthouse tower. Workers placed the small keeper's house over the north storage building foundation. This structure was originally built in 1881 (USLHB 1881:40). The use of the Long Point Light Station was discontinued by 1915. This structure became the second assistant keeper's dwelling at the CBLS.

The CBLS had many keepers throughout its history, though details of their experiences have been lost over the years. Jenny Edwards (1999) compiled many of their stories as a collection of oral histories of the CBLS in her work entitled *To Illuminate the Dark Space*. Meghan Agresto, Site Manager at the CBLS, gathered and digitally archived many documents about the light station and its keepers, including a list of light keepers (*Appendix B: List of Light Keepers*).

Figure 2.5. Small keeper's house at the CBLS (B. Scott Rose 2016).

Other developments in the community effected the CBLS. With increased traffic to the area, Whalehead's reputation as a hunting haven soon spread. Edward C. Knight, Jr. was a railroad executive with the Pennsylvania Railroad and American Sugar Refinery from New Jersey who established Corolla Island as a hunting retreat and as his second home (Johnson and Coppedge 1991:95; Davis 2004:48-51). Knight built Corolla Island adjacent to the light station in 1925. The old Light House Club building was still on the site close to Knight's proposed building location. Knight used the old building as a temporary residence during the construction of the new house (Davis 2004:54-55).

There is an indication that Knight's wife, Marie Louise LeBel, influenced the construction of the house, visible in the distance in Figure 2.6. LeBel was an excellent shot with a gun, and upon being denied access to an all-male hunting club, she and her husband built the extravagant house and club where women were welcome (NPS 1978:8.1, Edwards 1999:23).

Figure 2.6. The tower at the CBLS; Whalehead Club is visible in the background (John McCord 2015).

At a cost of nearly 400,000 dollars in 1920, Corolla Island was an architectural feat that brought more jobs to the area. The Knights employed several people from the community and made monetary and personal contributions to the community. Despite a contracted economy, the Knights kept their employees and created more jobs for locals (Davis 2004:60). The Corolla Island Club, a 21,000-square foot home, was later sold in 1939 to Ray T. Adams and renamed Whalehead Club (North Carolina Registry of Deeds [NCRD] 1941.72.1; Outer Banks Conservationists 2014).

Environmental and Political Issues

The issue of environmental conservation had been present for years, but drastic measures were needed to counteract current events. For many years, there were discussions regarding protecting the land and its resources. The ratification of the Conservation Act in February 1929 epitomized this protection effort. A dramatic drop in the population of waterfowl occurred in the late 1920s. This decrease in abundancy forced hunters and conservationists together on the issue. It also prompted Congress to action. Monies were earmarked via the Conservation Act by the federal government to purchase wetlands to establish protected habitats for the birds, with funding supplied through permit and stamp sales (Davis 2004:68-69). Edward Knight left Corolla Island in November 1934 due to the lack of waterfowl and did not return. Soon after, both he and his wife died, and the property fell into disrepair. The 150 inhabitants who called Corolla home felt the absence of the Knight family and their contributions to the community (Davis 2004:68-69; Jennings 2012:120).

The Great Depression also affected change at the light station. President Franklin Roosevelt had a similar plan as Knight's to create jobs. Roosevelt established the Civilian Conservation Corps (CCC) and the Public Works Administration (Federal Security Agency

1941:1; Isakoff 1938:9). A handful of projects by these organizations were planned for the Corolla area. The CCC established a temporary camp at the lighthouse complex. While at Corolla, the CCC created a dune barrier system on the beachfront area of the compound. The concrete and metal fencing along the property is believed to have been constructed by the CCC, although some metal fencing was in place before 1920 (United States Bureau of Census 1940; Schoenbaum 1988:89-90; NPS 1999:8.8).

Three events in technology and management in the 1930s could have resulted in the deterioration of most of the compound. The USLHB electrified the tower light in 1933. Automation of the light's motion was completed on 20 September 1937 (Manyon 1937:1). In 1937, the Jones Hill Lifesaving Service was deactivated and decommissioned. The USLHB merged with the USCG to form the United States Bureau of Lighthouses in 1939. The creation of this new entity brought change in management to the light station. One of the light keeper positions was eliminated after the CBLS was powered by an electric generator. After the lighthouse was automated, the rest of the positions were eliminated and the compound was deserted except for weekly maintenance members of the USCG who were living at the Jones Hill Lifesaving Station conducted. Their primary duty involved charging batteries to power the light (Manyon 1937:2).

The subsequently vacated premises stood empty until 1941 when World War II began. The USCG built three barracks near the lighthouse on the beach and repurposed the CCC barracks beside the tower between 1941 and 1945. All structures built at that time have since been removed. Later, the old CCC barracks building was modified, moved, and used as private housing (NPS 1999:8.8). During World War II, the Outer Banks were known as "Torpedo Alley" and "Graveyard of the Atlantic" The Lifesaving Station was reactivated, and Whalehead Club was temporarily turned over to the USCG for the duration of the war for use as a muster point for new Coast Guardsmen (Davis 2004:79). The Mounted Beach Patrol Station was established, and a headquarters building was created from materials salvaged from the Civil Conservation Corps camp located near the lighthouse. The small keeper's house was used to store hay (Schoenbaum 1988:88).

Except for this brief period of construction and use by the USCG during World War II, the site was abandoned until 1980. There were, however, periodic inspections by the USCG during this time (Adamson 1955:30). The Outer Banks Conservationists reported on activities during this time as follows:

> The United States Coast Guard assumed responsibility for the lighthouse. July 1, 1939, under the President's Reorganization Plan No. 11, made effective this date by Public Resolution No. 20, approved June 7, 1939, it was provided "that the Bureau of Lighthouses in the Department of Commerce and its functions be transferred to and consolidated with and administered as a part of the Coast Guard." When the United States Coast Guard took over the Currituck Beach Light Station in 1940, members of the Coast Guard stationed at the Currituck Beach Lifeboat Station maintained the lighthouse. Their duties included maintaining the Fresnel lens, cutting the grass, and painting the interior of the tower. A garage located in the staff parking lot was turned into a stable for the horses used in riding the beaches during WWII. Hay was stored in the Little Keeper's House (OBC 2006:5).

After WWII

After the war ended, commercialization of the Outer Banks began in earnest. The only section of this strand of sand that remained difficult to access was Corolla. Corolla had no road access to the north or south. Ray Adams spearheaded the push to have an access road built through the town. A 65-mile long highway was planned, but was eventually abandoned in 1954 because of funding issues (Davis 2004:83). By 1955, the population of Corolla had dwindled to 50 people (Schoenbaum 1988:90).

The USCG converted the light in the tower to the electric grid in 1950 (Naish 1985.154). Soon after, nearby residents re-appropriated some of the smaller buildings. The small storage building that originally occupied the area where the small keeper's house currently exists vanished from its new location north of the lighthouse sometime in the 1960s. The southern storehouse was removed from the site. It was later recovered and rehabilitated. A small barn located north of the compound also disappeared during this time (NPS 1999:8.8).

The years of 1954 and 1955 held a few stormy surprises for the small village. During this time, four powerful storms struck the strip of land, decimating much of its resources and infrastructure. The North Carolina Wildlife Resources Commission had taken over the surrounding property at CBLS in 1952, though the lighthouse tower remained under control of the USCG. The Wildlife Commission was intent on assessing the damage the storms caused to the area (Davis 2004:84). The State of North Carolina was eventually able to secure the use of the lighthouse property by convincing Congress of its usefulness "for muskrat experimentation, research, recreation, or other public purposes" (NCRD 1951:82.7, 1979:77.1; NPS 1999:8.8). It was used in this capacity until 1979.

Life continued at Corolla village even though the lighthouse compound sat empty and abandoned. Many projects were designed to aid the Corolla community. In 1956, efforts by the resurrected CCC began to stabilize the sandy strip of coastline (Davis 2004:85). Ray Adams spent millions of dollars to convert the area into a beautiful country club community. It paid off, to some extent. The limited access was still the biggest obstacle to overcome to support the community. Ray Adams died before his dreams could become a reality. By this time, forests began to emerge in spots along the strip of sand (Davis 2004:95-96).

The Whalehead Club property changed hands many times and saw varied uses throughout the years. The property was sold in 1958 and became the Corolla Academy. This endeavor lasted only three short years. The property was sold again in 1961 to the Atlantic Research Corporation, who used the property as a rocket testing facility until 1969 (Davis 2004:96-106). The main house accommodated scientists and technicians who worked nearby in the several warehouses and huts flung about the area. This research was an economic boon to the area both through jobs and, more importantly, it brought customers (Davis 2004:106-117). The property sold again in 1971 to Gerald Friedman, James Kabler, Samuel Rigs, Isadore Schwartz, Harry Sandler, and Samuel Sandler (NCRD 1971:116.7). The latest owners had a similar vision as Ray Adams and hoped to profit from sale of sections of land. They intended to subdivide the land and create individual homes on the Whalehead Club property. The partners sold their shares of the land one at a time, though the house and its surrounding forty acres were kept together (Davis 2004:127).

The Beginning of Conservation

Eventually, efforts were made to conserve and maintain what remained on the CBLS site. In 1980, OBC, Inc. formed (Holland 1989:181). An increase in the perceived importance of history was evident during this time. John Wilson IV, great-grandson of the last keeper at the CBLS, was one of the founding members of OBC. Wilson, an architect, visited the lighthouse complex and was shocked at the state of disrepair of the structures (Figure 2.7). The group signed a lease with the state of North Carolina for the property and began restoration of the structures. By 1990, the lighthouse tower, visible in Figure 2.8, was reopened to the public for climbing (Shelton-Roberts and Roberts 2011:112). OBC currently leases the tower and maintains control of the property (NPS 1999:8.9). The tower and grounds are currently open to the public. John Wilson oversaw the reconstruction work on the Whalehead Club in 1987 (Coastland Tides 1987:3). The community hoped that the reopened Whalehead Club building and the newly constructed wildlife museum would bring income to the local economy.

Figure 2.7. The big keeper's house in 1980. (Khoury 2003:58).

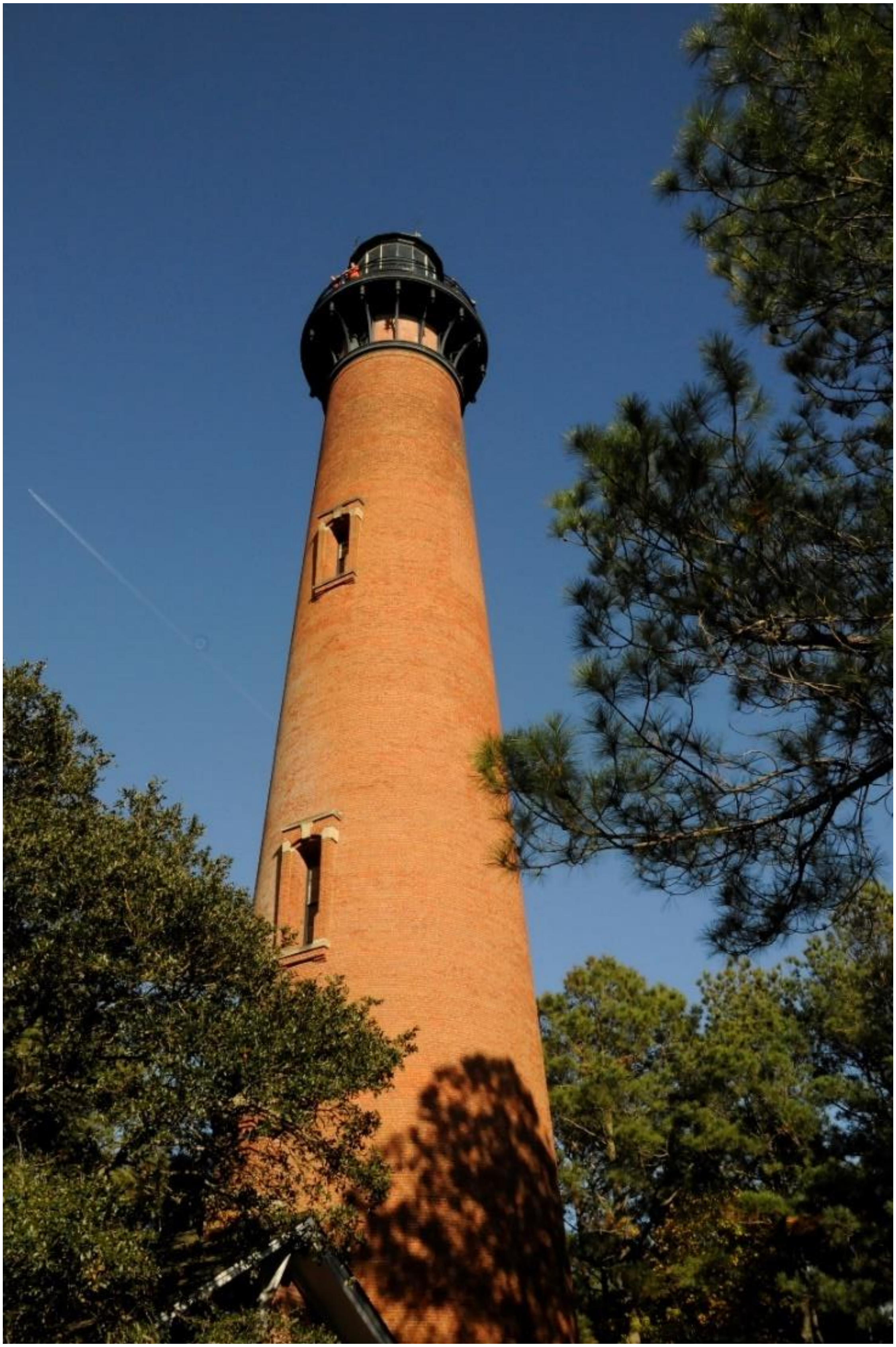

Figure 2.8. The CBLS tower (B. Scott Rose 2015).

While cultural factors have had a major influence on the CBLS, natural factors have also caused changes to the site over time. Tree cover increased, as was evident during field work for this thesis. Change in the natural vegetation cover may be a result of the Ash Wednesday Nor'easter that struck in February of 1962 (NPS 1999:7.2). The storm washed sea dunes inland and led to the germination of dormant seeds around the complex. Persimmon, sweet gum, and red cedar flourished on site. After dune creation, cattle were not allowed to range free on the land. The dunes also stopped salt and sand spray from traveling inland. These factors allowed larger vegetation, such as pine and live oak, to thrive in the area. Tree cover has created a feeling of seclusion around the lighthouse complex and keeps it hidden from the modern tourist-powered beachfront economic atmosphere (NPS 1999:7.2).

Conclusion

The entire use-life of the CBLS must be considered to understand its historical connectivity to the surrounding community. Once more modern technologies, such as electricity, were accepted, changes in culture surrounding the CBLS became evident. The abandonment and conservation of the site was tied to cultural, economic, political, and natural processes acting on the environment. As this chapter demonstrated, the "Light Station" was not merely a beacon; it was a complex of evolving buildings that changed considerably over time because of its management and the community that surrounded it. Once people populated the Corolla area more heavily for hunting, fishing, leisure activity, and employment, the dynamics of culture around the light station changed substantially.

Chapter 3: The Theoretical Lens, a Theoretical Approach

Introduction

Theory is the basic framework used by archaeologists to understand past lifeways through the study of material cultural remains. Schiffer's behavioral archaeology is a framework for examining formation processes acting upon a site (O'Brien et al. 2005:253). Because this thesis focuses on the cultural transformations of the area in relation to the construction and use of a light station through time, Schiffer's (1976:4, 2010:186) behavioral archaeology is an ideal and applicable theoretical model. This research utilizes Schiffer's approach to understanding the relevance of place throughout time to multiple populations, specifically the CBLS community. Schiffer states that:

> Behavioral approaches bring to landscape studies an explicit framework for (1) investigating formation processes at the landscape level, and (2) understanding how people interact with places, spaces and landscapes over time in their explorations, alterations, use and maintenance of these elements (Schiffer 2010:186).

The CBLS is an appropriate example of space existing as more than merely a place. In other words, it is a geographic location with useable resources that has become meaningful to its inhabitants because of the interplay of cultural and natural events witnessed and managed by previous generations of inhabitants. These events were dissected and evaluated by archaeologists through the inspection of the archaeological record to assess their cultural impact on the area. Inferences are made to connect the artifacts in archaeological context back to their systemic context (Schiffer 1976:12; Tschauner 1996:7). These changes are called *Site*

Formation processes which are divided into C-transforms and N-transforms, which stand for cultural transforms and non-cultural transforms, respectively.

Site Formation

An understanding of the terminology associated with the behavioral archaeology framework is necessary to evaluate the research questions of this study. Scholars assert that it is the duty of the archaeologist to recognize any distortions found in the archaeological record and to account for them when possible (Reid 1985:11-13). When an artifact is found in an archaeological context, it has undergone a distortion as it has been transformed. This transformation implies that "behavior… cannot be discerned directly from the patterns discovered in the archeological record. However, the formation processes themselves show patterning, and so they can be recognized and discounted, and the underlying behavioral patterns in the record discovered" (Giles 2008:91). Formation processes include both non-cultural transformation processes (n-transforms) and cultural transformation processes (c-transforms) (Schiffer and Rathje 1973:169-179; Tschauner 1996:7).

After these transforms have been identified, researchers must assess behavior using the remnants of material culture. These transforms are the link between material culture and environmental forces in the archaeological record and the sociocultural organizations in practice during the site's occupancy (Seeb 2007:14). Schiffer explains that "through the use of correlates, on materials determined by c-transforms and n-transforms to be within appropriate units of analysis, the mute evidence of the past is brought to life" (Schiffer 1975:838). A basic explanation of correlates and each type of transform is provided in this chapter along with other terminology helpful in disseminating the information that follows. Although there will be some evaluation of n-transforms, this study's primary focus will be on the cultural transformation processes that shaped the lighthouse complex and its surrounding community.

A cultural landscape is a web of interaction. Schiffer provides five distinct dimensions to consider when examining what attracted people to a site and the sequence of activities that occurred there. These five dimensions are the *formal dimension, spatial dimension, frequency dimension, relational dimension,* and *historical dimension*. The *formal dimension* includes analyzing the formal land attributes to gain an understanding of why people used or avoided sections of a landscape. The formal dimension includes attributes associated with landmarks such as size, location, and color (Schiffer 1996:15-17, 2010:20). Characteristics at the lighthouse site are the size and color of the tower and the location of the site near useful waterways. This dimension can also include the history of use. *Spatial dimension* refers to an artifact's location compared to other elements at the site (Schiffer 1996:17-18, 2010:20). Undoubtedly, any artifacts scattered around the base of the tower reflect the proclivity of patrons to drop items from the tower balcony. *Frequency dimension* refers to the number of artifacts in each area (Schiffer 1996:18-19, 2010:20). For example, a high frequency in the presence of nails or glass could indicate a structure was previously located nearby. *Relational dimension* consists of researching how the movement of people connected various land elements. The relational dimension refers to interactive elements that connect landmarks to one another for social, economic, or ritualistic movements of people (Schiffer 1996:19-21, 2010:20). These attributes are represented as roads and waterways that connect to other communities, such as lighthouses, lifesaving service offices, or resource gathering locations, like Long Point Station. Finally, the *historical dimension* uses the life history model to explore the formation, maintenance, and transformation of the landscape (Schiffer 2010:192). The historical dimension concerns the successive use of places through sequential links. Several keepers and their families reflect this dimension in the successive use of the lighthouse compound. By utilizing these basic approaches to cultural formation processes and in considering the human decision-making processes involved, a new understanding of the CBLS through time is reached

C-Transforms

Cultural formation processes (c-transforms) are categorized by Schiffer into four subcategories: *reuse, deposition process, reclamation,* and *disturbance* (Schiffer 1975:839-840, 2010:31-41). Each of these processes will be examined within the context of the CBLS. While artifacts themselves can showcase evidence of c-transforms, this study focused primarily on c-transforms acting on the CBLS complex.

<u>Reuse</u>

There are several types of artifact reuse strategies identified on archaeological sites. These include lateral cycling, recycling, secondary use, and conservatory processes. These strategies, when identified, aid in the interpretation of the behavior of individuals or groups who inhabited a given area. An illustration of artifact life history is seen in Figure 3.1 below.

Lateral cycling occurs when an artifact is used the same way over time, but by different users. If the form and use of an artifact are not altered, it may pass from one person to another or through several people (Schiffer 1996:29). Many societies practice this type of reuse. When the individual rights of property ownership are not present, as in hunter-gatherer societies, this type of reuse pattern is prevalent. Furthermore, slave masters often laterally cycled their tools or utensils to their slaves in the American South (Cressey et al. 1982:170). *Lateral cycling* was evident at the CBLS complex because buildings served as living quarters or storage buildings for more than one light keeper's family.

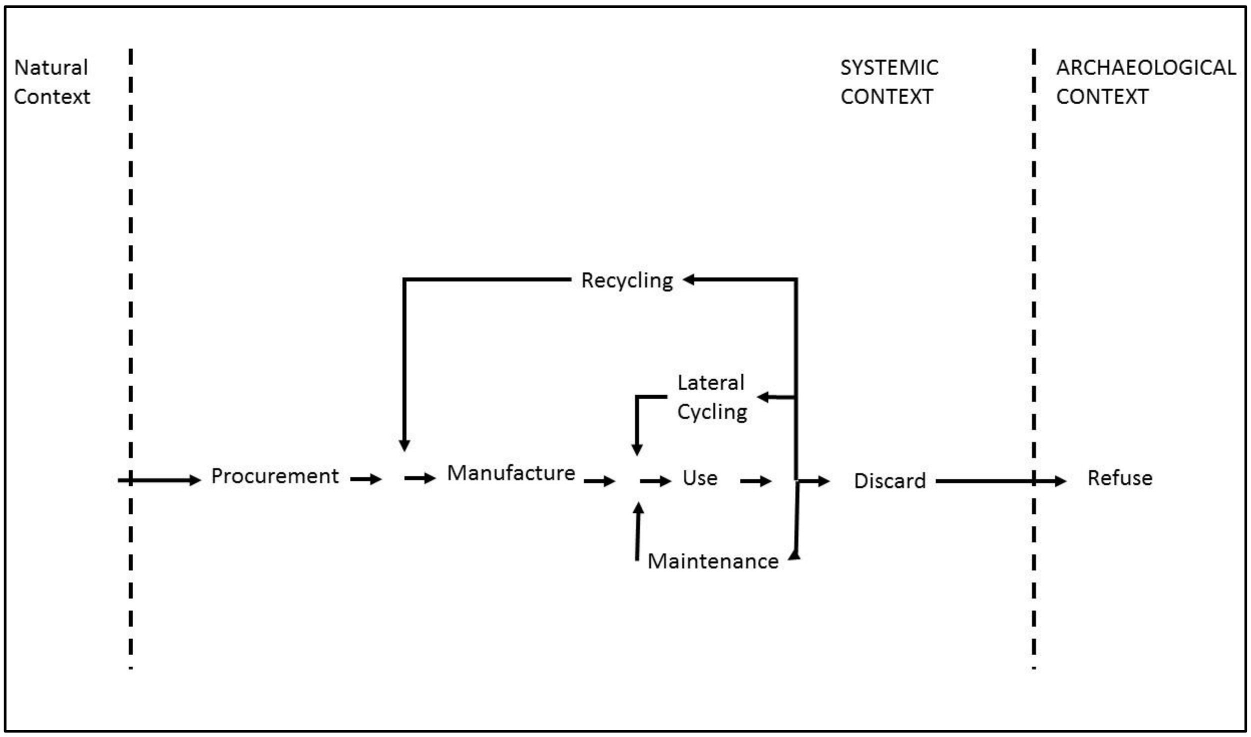

Figure 3.1. The Basic Flow Model of Artifact Life History (Schiffer 2010:22).

Recycling occurs when an artifact ceases to be used for its original purpose, is re-designated as a raw material, and is remanufactured as a different artifact with a different use. During this process, its original identity is lost. For example, on a colonial site in New York, 17th century pipe stems were reworked into crude whistles (Huey 1974:105). Material that is produced during the manufacture of an artifact can also be recycled. Changes to an artifact can occur through maintenance, and these changes are distinguishable from those created through recycling. In many cases, an artifact is recycled into one with a symbolic function (Schiffer 1996:29-30). In the case of CBLS, buildings were recycled for different uses.

Secondary use of an artifact occurs when the artifact is no longer used for its primary purpose but can be utilized in a different manner without significant modification. An artifact's physical structure is changed through use-wear, maintenance, and breakage. These changes make the item unusable in one way, but the artifact can remain suitable for another purpose. Secondary use is often attributed to architectural structures (Schiffer 1987:32). In most cases, this is a unidirectional transformation. As the deterioration of the structure occurs, its use is relegated to a lower standard. In the American southwest, evidence suggests that habitation rooms were converted to storage areas over time (Hill 1970:52-53). Sometimes a building's use is abandoned (Schiffer 1996:30-32). Buildings at the CBLS exhibited this type of cycling activity over time, as they were reused for storage and then abandoned at times.

Conservatory processes change the artifact's use, but not usually its form. However, the conservatory process can render an artifact unusable in its original function (Schiffer 2010:33). For example, collections of items held by individuals or institutions represent social standing and often communicate wealth. In these situations, unusual pieces are typically over-represented (Fowler and Fowler 1981:185). *Conservatory processes* closely relate to lateral cycling in cases involving fine art or a written language (Schiffer 1996:32-35). The entire CBLS compound exhibits this type of cycling because its primary purpose was shifted from a tool used for protection, defense, and commerce to one that focused on tourism, historical attractions, and economy.

Deposition Processes

Cultural deposition is the transformation of an object as used in a systemic context to an artifact in an archaeological context. Schiffer divides cultural deposition into two sub-categories: normal and abandonment processes. Normal processes occur during a site's use. Abandonment processes occur at either the end of the useful life of a site or at a time when normal activity ceases due to natural or cultural pressures (Cameron 1993:3; Schiffer 2010:34-36).

Schiffer further divided normal depositional process into five categories: *discard, loss, child's play, refuse, ritual cache deposits, and burial cache deposits*. Patterns of these processes are sometimes evident through survey. While not all of these processes are represented at the CBLS site, some of them are discussed below.

Discarding broken or useless objects best represents normal deposition processes of artifacts. Discarded items can be described in two significant ways: primary refuse and secondary refuse. *Primary refuse* refers to that which is disposed of at the location of use, such as metal slag created during the manufacture of iron tools. *Secondary refuse* is refuse taken away from the use area for deposition, such as in a garbage dump or burning area. *Provisional refuse* is refuse that is temporarily stored for eventual disposal, such as at CBLS when refuse items were temporarily stored before being burned (Joyce and Johannessen 1993:138; Schiffer 1996:56).

Loss of an artifact is another normal depositional process and is further divided into two stages. The first is initial inadvertent disassociation of an artifact from its user, or *disassociation probability*. The other is rediscovery of the item by its user, or *retrieval probability*. These probabilities depend on factors such as object size, mobility, replacement cost, and type of substrate (Schiffer 2010:36). At CBLS, many items have been lost and continue to be lost as people traverse the grounds. Further, a banking cache that served as a temporary storage place for valuables at the lighthouse provides an example of a more complicated form of the process of loss deposition as opposed to a *ritual cache* (Bradley 1982:119; White and Modjeska 1978:31).

These *ritual caches* usually contain unused, complete, and useable artifacts. They are found in a concentration not associated with a refuse deposit. It is sometimes difficult to differentiate between a ritual cache deposit and a *banking cache* deposit (hiding items for later use). These can be like burial caches but are not associated with a burial (Schiffer 1996:79). This type of depositional behavior was not likely to be discovered at CBLS.

Child's play refuse is another form of normal depositional processes (Hammond and Hammond 1981:634-636). Children form a large part of a cultural population, and their effect on the archaeological record is significant. In most cases, children serve to scramble disposal remnants. Children also contribute to the record by leaving behind artifacts associated with childhood, like toys. The co-occurrence of toys in a scattered disposal area is a good indicator that the artifacts were scattered due to child's play (Schiffer 1996:75-76). This type of deposition likely exists at the lighthouse compound because several of the keepers had children on the premises during their tenure at the site (USBC 1880:49.22; CBLKJ 1925, 1927).

Disposal of the dead is the last process of normal cultural deposition. This process is most diverse considering varying burial treatments known throughout the world. This type of deposition includes items like that of ritual caches as well as human remains. There are no known burial areas on the lighthouse site, but animal burials could be present.

The abandonment deposition model is more relevant to this study. When an area, structure, or entire settlement is transformed to the archaeological context, it is considered abandoned. Abandoned sites often contain many other types of deposition within them. This study area includes several structures that are now in a systemic context. Some have been modified and utilized in a different manner.

When occupants vacate a site, they sometimes leave items of value behind. Artifacts are left in place if they are not valuable or are not mobile enough for the voyage. These artifacts are considered *de facto refuse*. The path itself may hold lost items or buried caches. A curated set refers to things that are taken on this voyage. Artifacts from a curated set, those from the abandoned site, and those along the path complete the assemblage. Replacements of artifacts left at the abandoned site are also expected at the new location. These artifacts may be present at the lighthouse compound, especially at transport entrance or exit locations such as at the wharf extent.

Stevenson (1982:260) divides abandonment processes into comparable pairs of cultural strategies. These are *gradual* and *planned* versus *sudden* and *unplanned*. It is evident that sudden and unplanned abandonment sites produce more *de facto refuse*, whereas there are fewer artifacts present in gradual and planned abandonment sites. In most cases, the abandonment process at the lighthouse site should reflect gradual and planned abandonment processes. As technology replaced the keepers, they had ample time to plan their departure.

Catastrophic site abandonments can have either cultural or non-cultural causes. Natural disasters can force the abandonment of a structure or an entire settlement. Wars and other cultural conflicts can also force abandonment activities through relocation or the death of occupants (Schiffer 1996:92). Catastrophic site abandonment has not been recorded at the lighthouse site; therefore, no de facto refuse was expected from this type of deposition.

When abandonment is planned, either artifacts are curated for travel or they are deposited if the site will be reused in the future. Lateral cycling of artifacts tends to happen in planned abandonment processes. This form of reuse includes giving items away or selling them to others on site or nearby. In using this strategy, the need to cache or curate artifacts for travel is eliminated. Richards (2008:57) states "…curate behaviors are forces working against the creation of de facto refuse. At the end of this activity, curate behaviors may see humans completely strip sites of useable materials for recycling and eventual reintegration into systemic contexts".

Stevenson (1985:75) also notes that standards of cleanliness diminished when an immediate abandonment event has been perceived. Areas that were never used as a dump suddenly are. Child's play processes are no longer as strict. Schiffer (1996:98) categorizes this type of refuse as *abandonment stage refuse*.

Reclamation

Reclamation is a closely related process to abandonment. Many artifacts do not remain in their original archaeological context. Salvage and scavenging activities take advantage of older artifacts that were previously discarded or abandoned (Schiffer 1996:99, 2010:38). In this case, they serve as natural resources for other groups to use. These activities are observed on site as disturbance and other depositional effects.

A culture group can reclaim an entire site, though this re-occupation is not always so drastic. In many cases, a small area or building can be reclaimed and reused. Any amount of occupation exceeding one year is considered a habitation. This occupation includes brief (less than a decade), extended (10 to 100 years), or supra-extended (multigenerational) habitation. A single instance of occupation is considered *unique occupation*. If a site is occupied several times and is used in the same manner, it is known as *recurrent occupation*. If a site is occupied several times and is used in a different manner, it is *mixed occupation* (Schiffer 1996:103).

A recurrent visitation occurs when a site is reclaimed by the same group for the same purpose. This type of re-occupation usually results in the reclamation of artifacts that were in the archaeological record. Structures are often reclaimed and reused. The CBLS owes its recurrent visitation status to the almost transient nature of the lighthouse keepers and their families. The exception to this statement occurred when all but the tower itself was abandoned after automation was put in place. Mixed reoccupation also occurred at the CBLS because it was reclaimed for various reasons, such as historic preservation.

Most mixed reoccupations show evidence of occupation by various groups. Each occupation may display a different use of place. These sites are usually located near a trade route or valuable resource supply area, as was the case of the CBLS (House and Wogman 1978:100). The station was located strategically on a major shipping lane. However, it was not directly linked to the shipping lane through traditional means, such as ports of trade. Local watercraft used the lighthouse as an aid for navigation, but the lighthouse did not directly benefit from the watercraft trade system.

Salvaging activity often occurs at abandoned sites, whether mixed occupation or recurrent visitation were present. Closely related to salvage is the notion of recycling artifacts (Schiffer 1996:106-114, 2010:38). The act of salvage is often illegal or unsanctioned (Gibbs 2006:14; Richards 2008:58). The removal of buildings completely or in part at the CBLS site represents salvage activity. Items of greater value or those considered to have a longer use-life tend to be the first artifacts scavenged. The availability and demand of materials or actual artifacts are important factors to consider when evaluating an artifact's likelihood of recovery (Seeb 2007:29).

Disturbance

Cultural activity on a site disturbs *in situ* artifact deposits. These disturbances come in many forms. Earthmoving and surface disturbance are the major disturbance activities that archaeologists encounter. Earthmoving activities occur most frequently during construction periods on the site. Construction planning, actual construction, and operational stages of the building's use all have an impact on the site formation (Schiffer 1996:122-125,133-140, 2010:38-40). Upward migration of artifacts occurs during earthmoving activities (Rathje and Schiffer 1982:123). There were several construction events at the CBLS site that may have incorporated earthmoving actions including: initial construction of temporary structures, initial permanent construction, each instance of building movement, reconstruction of the wharf, and reincorporation of old buildings back to the site (CBLKJ 1875, 1876; NPS 1999:7.1,6-9).

Trampling and plowing activity are usually associated with the operational stage of a site. Trampling is evident along the edges of walk paths between buildings and along animal trails and housing areas. Areas of trampling activity exhibit lateral distribution of artifacts based on artifact size and soil permeability. In sandy soils, larger artifacts are found closer to the surface, whereas smaller objects are deeper in the sediment column (Stockton 1973:116-117). Edges of trample zones tend to accumulate more artifacts (Wilk and Schiffer 1979:533). Plowing activity scrambles surface features and displaces and disperses artifacts in the plow zone (Schiffer 1996:126-133). Larger artifacts indicate greater motion during plowing activities (Lewarch and

O'Brien 1981:45; Rothschild et al 1993:136). This type of activity is exemplified on the lighthouse compound in underground utility service. These services include electric supply and water supply and drainage.

N-Transforms

Most submerged sites are affected by n-transforms rather than c-transforms, due to the difficulty of accessing the sites. In other words, humans repeatedly interact with terrestrial sites in a more drastic manner than with submerged sites; evidence of these activities accumulates over time. This study focused primarily on the terrestrial elements of the CBLS; therefore, c-transforms more dramatically impact it. As Laurcuente (2008:12) states, "Space is more than a neutral container." Researchers must consider the n-transforms that affected the lighthouse complex throughout the years. These transforms are considered on three levels: region, site, and artifact (Schiffer 1975:841, 1996:141-261, 2010:42-52).

Entire regions can be affected by agents stemming from geologic and climatic forces that serve to disturb and distribute artifacts in various ways. Examples of these types of natural processes that are present along the Outer Banks include eolian processes, hydrological processes, coastal processes, vegetation, and fauna (Schiffer 1996:236, 2010:42-52).

Site-specific n-transforms influence locations of artifacts on sites like the CBLS. Movement of artifacts on a site like that of the light station or *pedoturbation* can be attributed to several factors such as faunalturbation, floralturbation, and cryoturbation (Schiffer 1996:201). This means the movement of artifacts due to animal activity, plant growth, or repetitive freezing and thawing actions, respectively.

Conclusion

New questions, or rather, asking old questions about new topics, is the legacy of archaeologists. Schiffer discusses the importance of asking new questions:

> Progress can now result from posing behavioral questions which are clearly beyond the applicability of traditional interpretive concepts. New questions which archaeologists must devise from system theory, or any other productive conceptual framework, will favor the development of lawful relationships between variables of behavioral and spacio-material dimensions of cultural systems. Tested and testable relationships between variables of these dimensions can form the only secure foundation for inferences about past cultural behavior (Schiffer 1972:149).

The theoretical framework chosen for this study discussed how the various structures at the CBLS complex have changed over time and how their purposes have altered according to local inhabitants' needs. More importantly, it helped tie those structures to behaviors of the many successive inhabitants of the site using n-transforms, c-transforms, and correlates. Behavioral archaeology served as an appropriate theoretical model for this thesis research.

Chapter 4: Searching for Enlightenment, Methodologies

Introduction

The research methodology for this project consisted of three phases: *Historical Research, Terrestrial Archaeological Methodology, and Underwater Archaeological Methodology*. The historical research concentrated on three major areas: census data, shipwreck data, and investment data. This historical data was necessary to establish a historical narrative (and reassess the traditional narrative). It was also useful for comparison with other datasets to discover trends and correlations between datasets. The archaeological data gathered during this study was important to understand events on the site, especially since documented historical evidence can be inaccurate or misrepresentational. The archaeological methodologies serve to validate, improve, or challenge the historical account.

The archaeological stage consisted of multiple data collection phases. These activities included terrestrial survey and underwater survey, each of which led to creation of three-dimensional (3D) models. The terrestrial survey included collection of data points from a metal detector, survey with gradiometric hardware, total station data collection, and Global Positioning System (GPS) information gathering. The underwater portion included a metal detector survey and collection of data points with a total station. 3D models were created using original construction drawings and current photographic evidence. Combined, these technologies served to support and expand the current knowledge of the CBLS.

Historical Research

The historical research included collection of multiple datasets, USBC data, shipwreck data, and both public and private investment data. This study gathered USBC data from the years 1870, 1880, 1900, 1910, 1920, 1930, and 1940. This data helped researchers understand population trends near the light station. Shipwreck data was acquired from several sources that covered the area within seven miles of the lighthouse beacon's reach. Shipwreck data provided information about potential dangers off the coast and patterns of wrecking events. Investment data concerning the CBLS and surrounding community since its founding also proved useful. When examined together, these datasets provide insights into broader trends.

Census Research

This study used record data from USBC for Corolla, North Carolina every ten years beginning in 1870 until 1940; data after this date is not available because of the "72-year rule". The 72-year rule protects respondents' privacy for 72 years after enumeration, which is the process used by the USBC to count a population (USBC 2016a). The data collected for Corolla was interpreted and converted to a usable format in a Microsoft *Excel* document. The information was divided from most of the census records into enumeration districts. The information for the district including the area surrounding the CBLS between the Penney's Hill Lifesaving Station and Poyner's Hill Lifesaving Station was the primary focus.

When the enumeration district could not be determined by other means, district section was determined by searching the district for the name of the contemporary, primary lighthouse keeper. The document that listed the lighthouse keeper was recorded, along with other relevant documents. This method as used for the 1870 and 1880 census data (USBC 1870, 1880). There were no enumeration records available for the 1890 census; a fire in the US Census archive destroyed those records. Earlier census records are not as precise concerning location; only one enumeration district exists in early census years. For example, in the 1900 census, there was a location listed as "Whalehead" which only contained two pages of catalog data (USBC 1900). The data from 1900 are the most accurate due to this subdivision of geographic location. This study handled the information from the 1910 census in much the same way as the 1870 and 1880 censuses (USBC 1910).

The 1920 and 1930 census records were chosen based on the road name on which the enumerated person lived (USBC 1920, 1930). The 1940 census district was noted as "Corolla" on the entries selected (USBC 1940). As the census years progressed, the report included more information in the catalogue. This information was recorded, but was not used during this study. Only the population numbers and gender statistics were utilized in this study. *Appendix C: Census Data* lists the data recorded from all associated census records that were used in this study.

Unfortunately, the records collected from the United States Census were sporadic and not standardized during this era. The geographic delineation of the area of investigation (Corolla) changed through time to the extent that the information becomes inaccurate due to inconsistencies in enumeration districting. Many of the inhabitants listed in each census record could reside on the mainland or further away from Corolla and were not relevant to the lighthouse area. Despite these issues, this data was utilized in the results of this study.

Shipwreck Research

Several sources were consulted to gain information about shipwrecks along the coastlines that surround the CBLS. NOAA's *Automated Wrecks and Obstructions Information System* (AWOIS) was consulted to determine dates of shipwrecks near the lighthouse. This tool allowed for visualization of locations of wrecks relative to the light station, but it produced little information about each wreck (United States Department of Commerce [USDC] 2015). Several publications of the *Annual Report of the United States Coast Guard* (USCG), 1915-1932, and the *Annual Report of the Operations of the United States Life-Saving Service* (USLSS), 1876-1914, were also consulted.

After 1906, the *Annual List of Merchant Vessels of the United States with Official Numbers and Signal Letters and Lists of Vessels Belonging to the United States Government with Distinguishing Signals* (USTD), 1906-1965, contains a section that details vessel losses during the previous year. The reports from 1917, 1940, and 1953 were unavailable. For this research, information from the report was compiled and organized by year. Though the CBLS beacon reaches an 18-mile radius, the area was extended to a 25-mile radius to account for drift or other unforeseen factors (Figure 4.1) (NPS 1999:7.3).

The information concerning each wreck was gathered from several sources and placed within Microsoft *Excel* to create a database. Wrecks from conflicts, such as WWII, were not included in this study since they were the result of intentional sinking and not due to weather or navigational error. Further, this study did not include wrecks in narrow inland waterways, since visual contact with the lighthouse would be limited due to elevation and foliage cover between the wreck and the lighthouse.

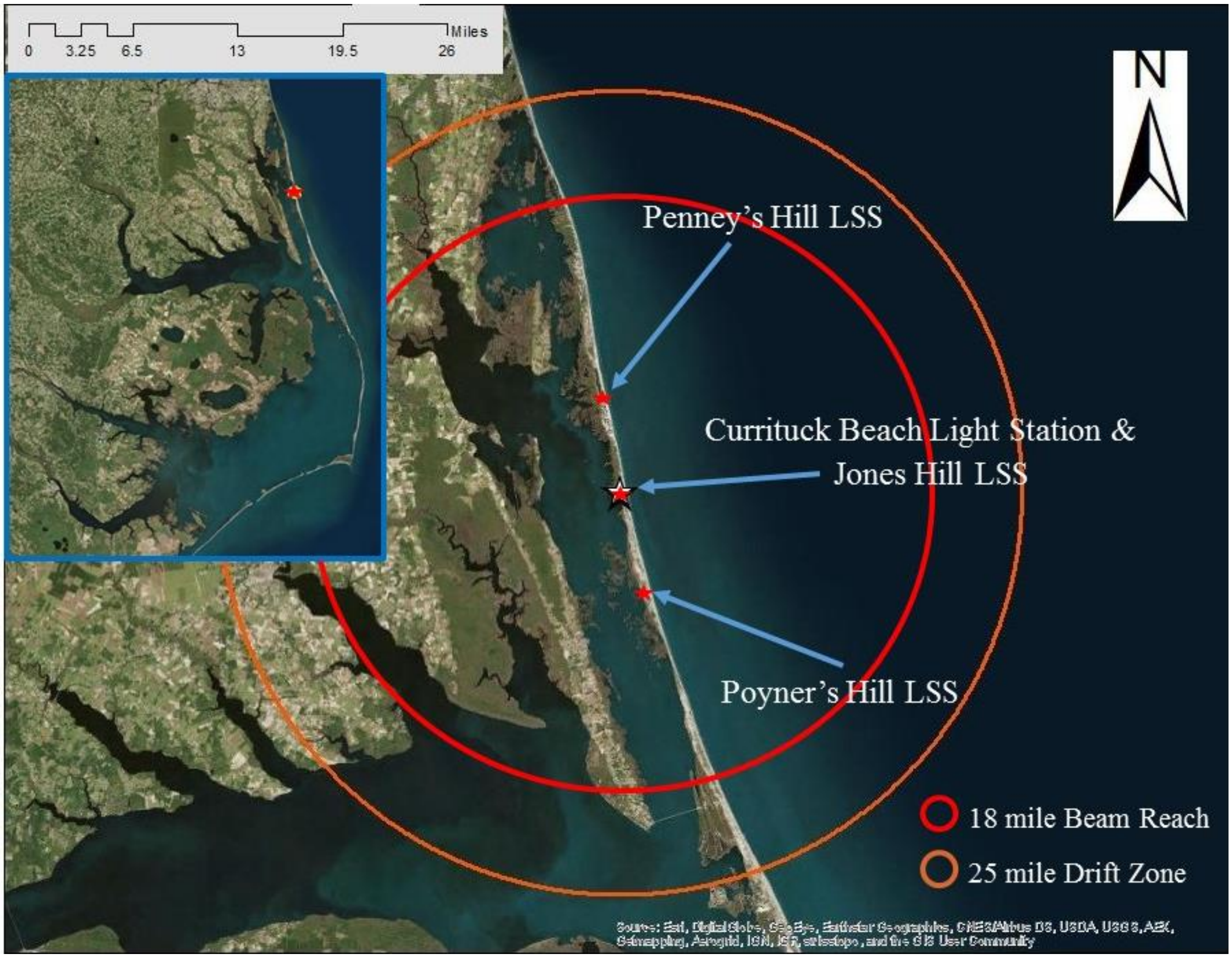

Figure 4.1. *ArcGIS* overlay map of CBLS beacon range and location of CBLS, Jones Hill, Penney's Hill, and Poyner's Hill Lifesaving Station over NOAA World Imagery (B. Scott Rose 2017).

Public Investment Research

The goal of the public investment research was to locate data indicating investments from public sources into the community surrounding the CBLS. These public source investments helped establish the community both directly and indirectly through employment, supply, and maintenance of facilities in the area.

This study gathered public investment information from several sources, especially reports from the USLHB (1872-1905, 1920). These reports provided yearly investment data concerning every lighthouse in the United States. Unfortunately, some investments reported were not quantified. These records were accessed through the Harvard Library Digital Collection. Other documents consulted included Annual Reports of the USCG (1915-1932) and Annual Reports of the USLSS (1876-1914). Both resources were available through the digital archives of the USCG.

Private Investment Research

Information about private investment was less straightforward in acquisition. Much of this information came from the transfer of property and the documents accompanying these transfers. The NCRD supplied several deeds of property transfer (1941, 1951, 1971, 1979). Several books gave detailed accounts of improvement to properties in the area (Johnson and Coppedge 1991; Davis 2004; Edwards 1999). Several documents detailing restoration to properties in the area including the CBLS were provided by the OBC through the NPS (1969; 1978; 1999).

Terrestrial Archaeological Methodology

It is important to determine the original or interval location of the CBLS structures. Bowens states:

> Archaeologists are generally studying complicated elements that may have been used together. They, therefore, need to know where they were (their position) and what they were with (their associations). It would be extremely difficult to make sense of complex structures without an accurate plan and a description of the position and association of the various elements.
>
> In looking for clues about the past, the archaeologist has to make do with where things ended up; where they slid, fell, were carried or washed. It is vital, however, to record the position and associations for each clue so that archaeologists can attempt to

> determine where they originated and how they ended up in their final location (Bowens 2009:22).

This statement emphasizes the importance of debris scatter in places where no structures currently exist. This debris scatter can indicate a position of an entrance or exit to a building. Gradiometric and metal detector survey provided data that could suggest the temporary location of the north storage building between 1920 and the mid-1940s when it disappeared from the historical record. The gradiometric and metal detector survey data aided in locating the barracks building evident in photographic evidence (NPS 1999:8.8). This building was divided into sections and moved away; one section is now located northeast of the compound. It was modified and is now used as a private residence. The location of the rest of the structure is unknown, though possible foundation construction, historic fencing, and other features were located during site survey.

The first phase of archaeological survey consisted of terrestrial survey work conducted to determine previous physical structure locations and evidence of changes to those structures. A total station and data-logger were utilized to gather spatial data points representing important structural, archaeological, cultural, and natural elements. A gradiometric survey was completed in areas of interest to locate underground features. Metal detector survey was conducted in areas of interest to locate smaller items in the substrate. Photographs were recorded of the existing structures to develop 3D models illustrating the physical condition and dimensions of structures at the compound. Virtual models were also created based on the original construction drawings of structures on the site to be compared to the photogrammetric models. These datasets serve as a base line for evaluating the structural change through time at the lighthouse complex.

A gradiometer and metal detector were used to collect data on two separate occasions. Total station data points from previous fieldwork in 2013 were also collected and used for future analysis in this work. Remote sensing techniques were used to locate buried objects, structures, and features located in the lighthouse complex. The property was systematically divided into workable areas and then surveyed. This work was completed in the context of the present-day property boundaries of the lighthouse complex. This study completed some work on adjoining properties after acquiring permission from owners. East Carolina University students aided in these endeavors on a volunteer basis. East Carolina University and the University of North Carolina Coastal Studies Institute (UNC-CSI) provided all necessary equipment for the duration of the project, which took place during July and December 2015.

Total Station Survey

Building upon a survey conducted by the UNC-CSI and East Carolina University's Program in Maritime Studies during their 2013 fall field school, this phase was comprised of non-disturbance techniques, which included a ground survey and total station mapping of structures and other exposed features, such as concrete slabs and fencing (Figure 4.2). Total station mapping allowed for precise 3D location of points that were mapped into a 3D modeling program (McPherron 2005:6,7; Smith and Levy 2014:166). These points were added to a GIS map to aid in understanding the layout of the original site and changes to the site over time. This study utilized a reflector-dependent total station (GTS-220 series, Topcon) and data-logger for accurate 3D mapping of cultural features and topography.

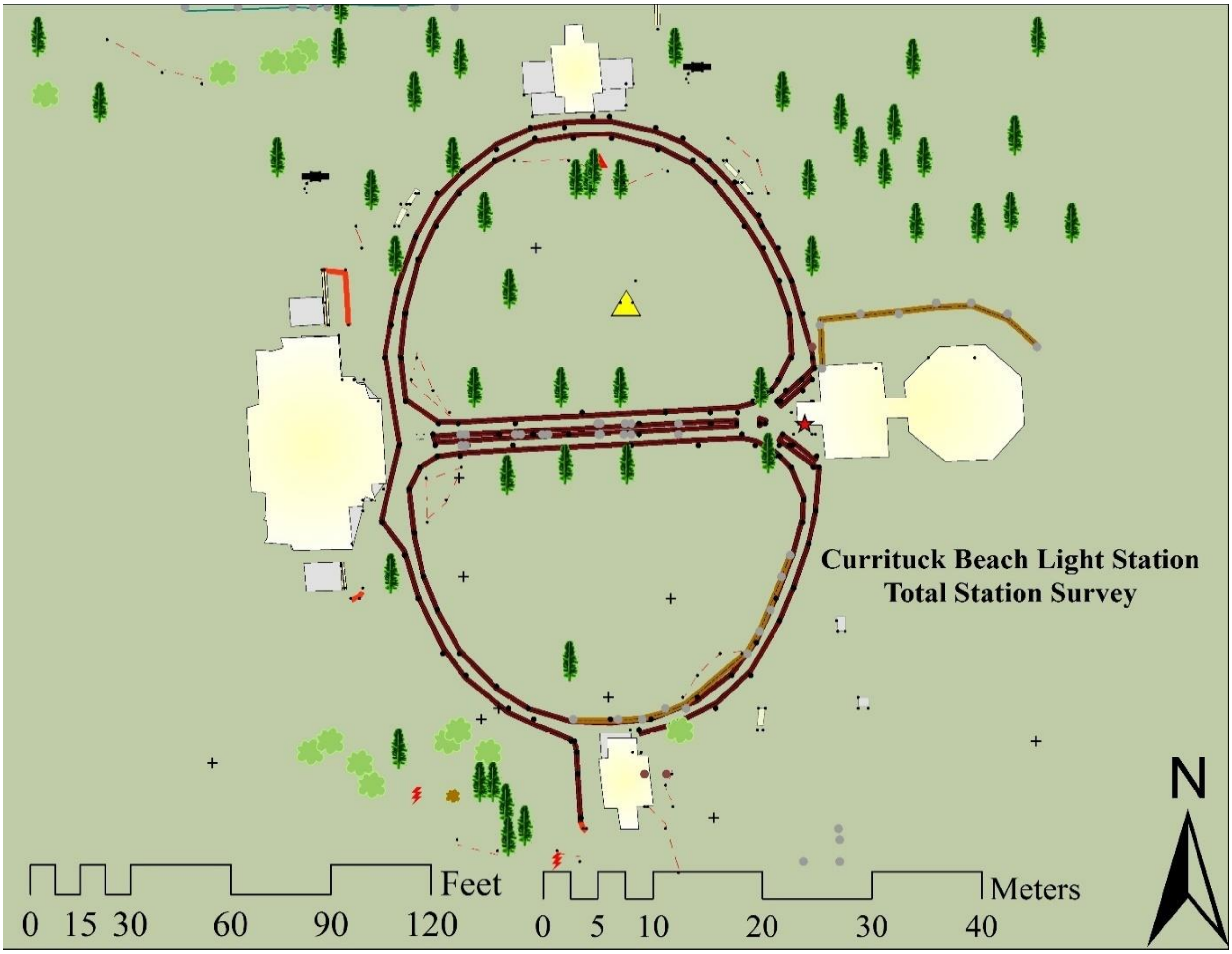

Figure 4.2. Total station data points recorded in 2013 survey at the CBLS. (B. Scott Rose 2017).

The total station was back-sighted to a geodetic marker (N 36° 22.600 W 075° 49.839 [NAD 83] Altitude: 144) located on the front step structure of the lighthouse (National Geodetic Survey 2016). Back-sighting is a technique surveyors use to establish an accurate geographic location for their survey instrument in relation to a well-established and well-known point. The total station was then used to gather information about current building and other feature locations around the sight. The researcher also recorded points that would later be used as corner markers for gradiometric and metal detector surveys, and locations of trees and small architectural elements, such as concrete fence posts and existing concrete slabs. Buildings on the site were also recorded along with modern fences, benches, and other important features (McCoy 2009:276).

Gradiometric Survey

A gradiometric survey device is essentially two magnetometers arranged in a way that allows it to cancel out the earth's magnetic field, allowing for diurnal variation to be excluded. This also allows for smaller anomalies to be discerned. Magnetometers have been used successfully in several archaeological surveys. Bruce Bevan describes the magnetometric nomenclature as follows:

> Each of these magnetometers measures the amplitude (also called the magnitude) of the Earth's magnetic field; this is complementary to a magnetic compass, which measures direction, but not amplitude. The technical name for this amplitude is flux density; in physics and engineering books, this name is designated with the letter B. The typical unit for this quantity is the nanotesla. The "nano" means billionth (US), while "tesla" honors an engineer with that name… A gradiometer allows greater spatial resolution of buried features and it accentuates nearby or shallow features (Bevan 2006:2,6).

Anthropogenic features that can have distinct magnetic signatures include middens with organic content, trash pits, intrusive structures such as foundations that contrast with the surrounding soil, walls, ditches back filled with mixed soil, fire hearths, burned house structures, and bricks. Burnt structures exhibit an even stronger magnetic signature due to the magnetizing effect of heat. Items such as brick that are moved after heating may not exhibit a strong signature (Weymouth 1986:343; Clark 1990:64; Gaffney and Gater 2003:110-111).

Previous experimental archaeology has been conducted during other projects to test the accuracy of gradiometric techniques employed in this survey (Black and Johnston 1962; Isaacson et al. 1999). In 2005, one study by John Isaacson, R. Eric Hollinger, Darrell Gundrum, and Joyce Baird in Champaign, Illinois, intentionally created sites that were staged and scanned in different ways to discover the most accurate and best way to perform the survey. These test sites were called Controlled Archaeological Test Sites, or CATS. At that location, the researchers created features and buried them. After interment was complete, the team conducted gradiometric surveys in several ways and noted the processes that best illustrated the features below (Isaacson et al. 1999).

At the CBLS, gradiometric data was gathered from around the site near the lighthouse to the north and south. Technical problems relating to the integrated GPS system complicated all attempts at survey. Extensive tree coverage on the site made the GPS inaccurate for recording the path of the survey. However, the information that was gathered was useful for estimating a general concentration of active elements in the areas surveyed.

A Geometrics MagMapper G-858 Gradiometer was utilized for these surveys. Magnetometry and gradiometry are passive techniques that reveal magnetic anomalies in the subsurface. Passive techniques measure magnetic fields as they exist without any active injection of energy into the ground. Anomalies indicate areas of activity: areas where animals were held, trash disposal areas, and metal working areas. These areas may be of interest to future researchers and could be investigated and compared to historical information. This comparison would make it possible to find locations of historic buildings at the CBLS and add to our understanding of the sequential occupation of the site and its occupants. Gradiometers are most useful for locating large anomalies like foundations (Bevan 2005:6; Johnson 2006:110). Besides the previously collected data, three other areas were identified to be surveyed (Figure 4.3).

An area 10 meters (m) by 12 m was identified north of the lighthouse itself, and then divided into ten transects running from north to south and surveyed. This area was chosen based on speculation that the small storage building on the north side was moved farther to the east when the small keeper's house was brought on site and placed in its current location (Figure 4.4) (NPS 1999:7.1). Areas were sampled based on historical photographs. The research team searched these areas for patterns of anomalies that would indicate the possible new location of the north storage building based on ingress/egress refuse deposits and foundation signatures. Evidence for temporary structures such as a blacksmith's shop, carpenter's shop, and cement shed may be evident in the analysis of resulting data.

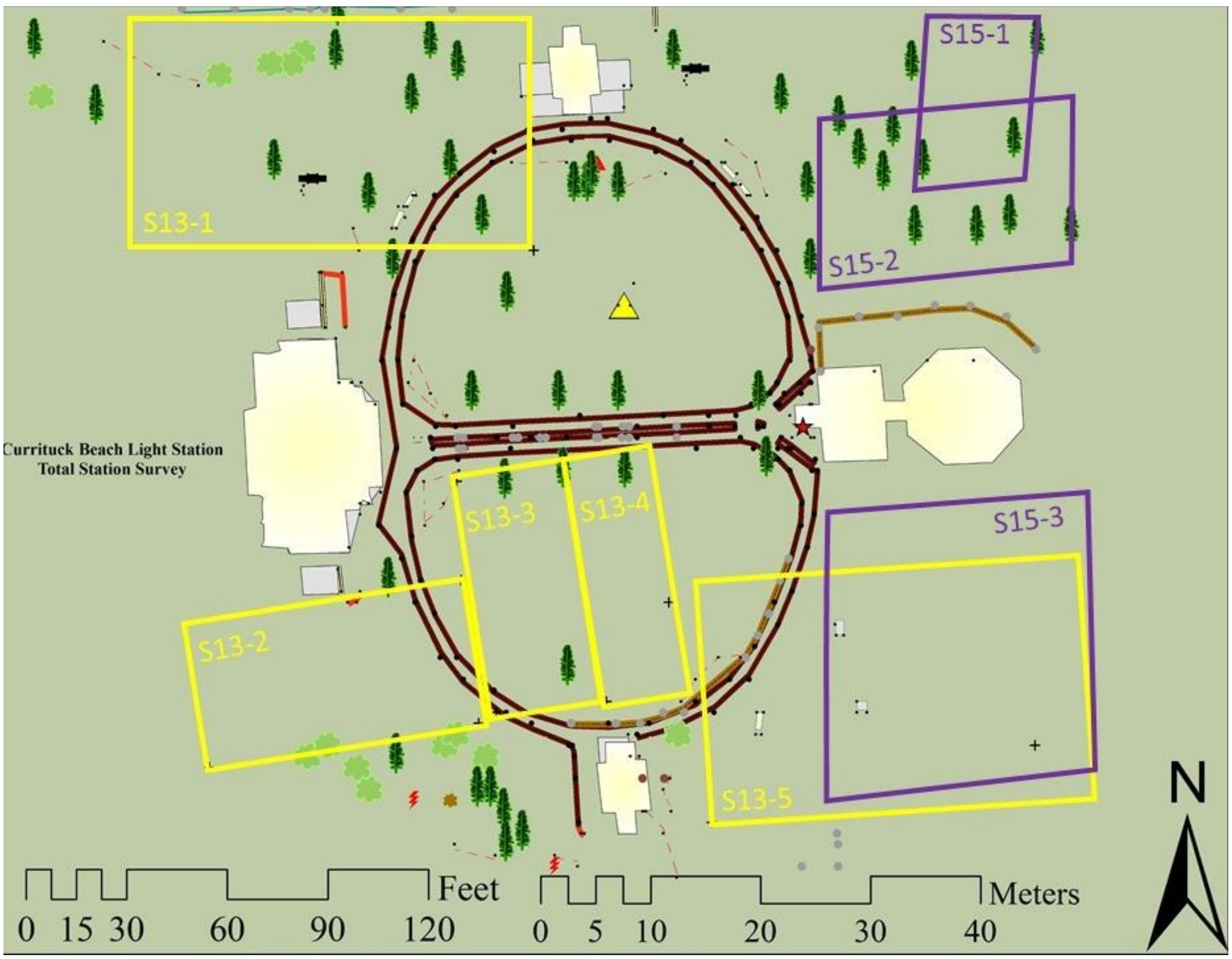

Figure 4.3. Gradiometric survey areas created in *ArcGIS* 10.1. Yellow indicates 2013 fieldwork. Purple indicates 2015 fieldwork. (B. Scott Rose 2017).

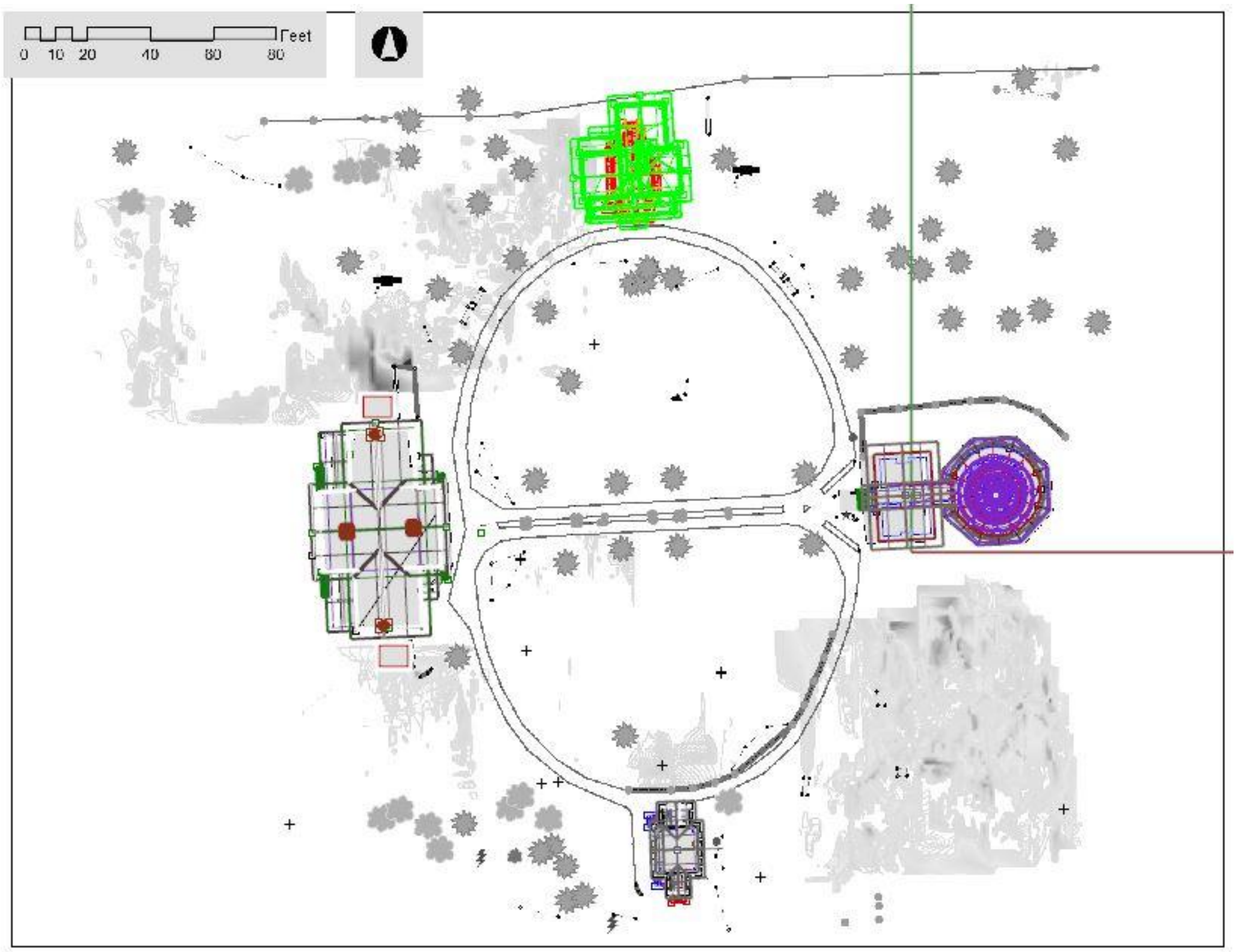

Figure 4.4. A *Rhino 5* software image of the location of the small light keeper's house (in green) over the foundation of the old north storage building (in red) (B. Scott Rose 2017).

The second area selected for survey was to the south of the first area and measured 24 m by 14 m. GPS signal acquisition continued to be a problem in this area due to foliage cover. Information such as the origin point, number of lines, length of lines, and direction of the survey were used to geographically rectify the exact location of the study area. The information recorded in the survey is accurate to one meter due to the GPS error and deviation of the technician from the path of survey line due to obstacle avoidance. Figure 4.5 illustrates the coverage area of each survey.

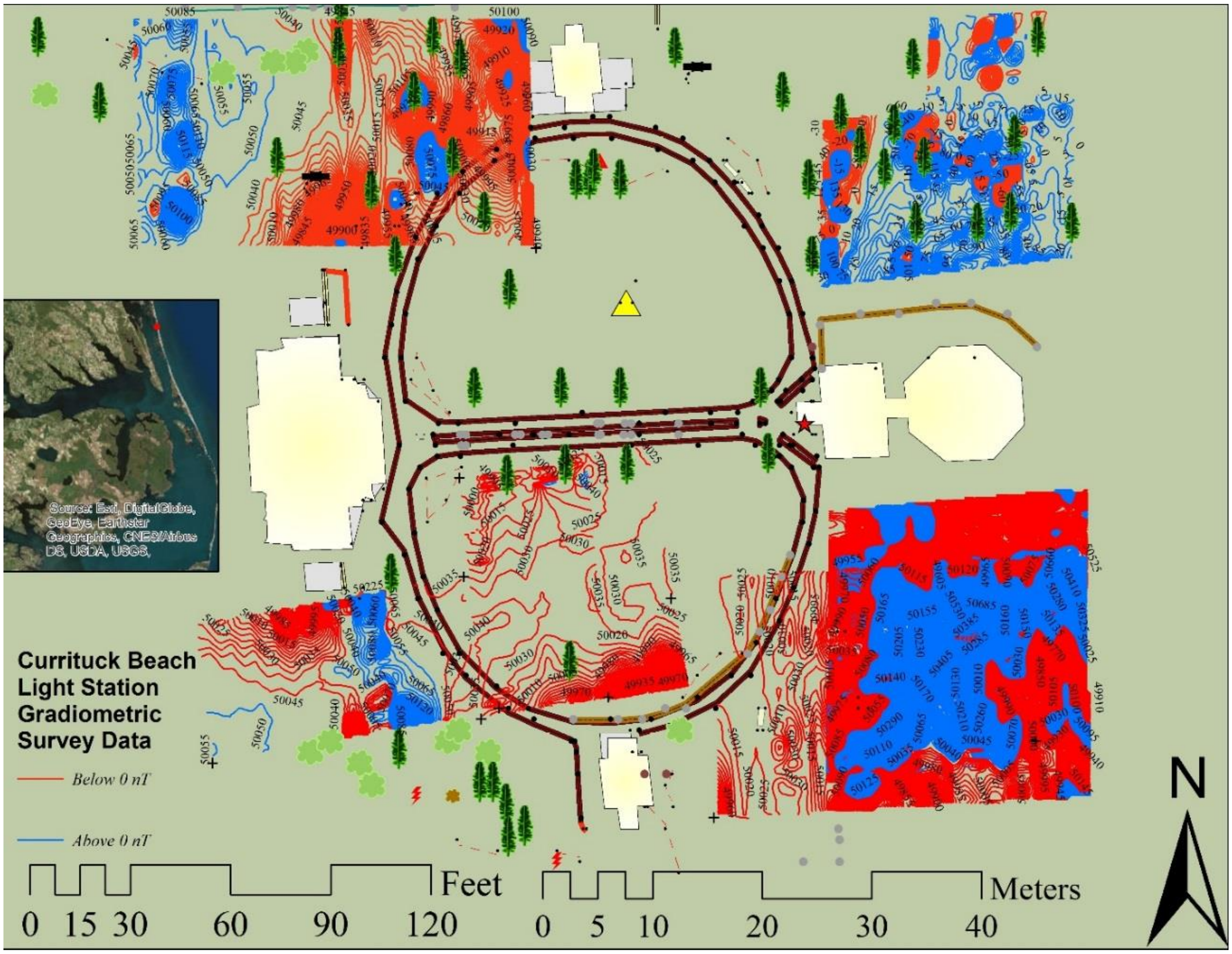

Figure 4.5. Map showing areas of gradiometric surveys conducted at the CBLS and unanalyzed data. (B. Scott Rose 2017).

A third area south of the lighthouse itself was identified and surveyed. The area south of the lighthouse tower overlapped the previous survey conducted in 2013. It measured 20 m by 16 m and was chosen based on historical photographic evidence of a building on the site during the late 1940s. It was divided into 10 transects, oriented north to south, and contained three concrete pads, which was analyzed based on previous historical and archaeological survey. A pattern of anomalies indicated the possible location of the barracks building based on ingress/egress refuse deposits and foundation signatures (NPS 1999:8.8; Lighthouse Friends 2015). The results of this survey were compared to the results of previous fieldwork conducted in 2013.

The lanes of the gradiometric surveys were aligned from north to south, which helped the operator to eliminate error derived from the magnetic signature of Earth, which also runs in a north to south direction. Working from the west side of the first survey area (designated S15-1) to the east side of the study area, Scott Rose (Figure 4.6) completed half of the lines, and Ryan Bradley finished the rest, each of which were 1 m apart (Schmidt 2007:6). Working from the west side of the second study area (designated S15-2) to the east side of the survey area, Rose completed the first half of the lines, and Adam Parker finished the last half of the lines. Rose completed the entirety of the third survey area. While comparing these overlapping surveys conducted in different years, the researcher was able to establish a baseline for error between the two surveys.

Figure 4.6. Scott Rose conducting gradiometric survey (Ryan Bradley 2015).

The data gathered from the gradiometric surveys are usually treated during post processing to properly align the lines of the collected survey with the GPS information. The data from the gradiometer's sensors were not aligned with the GPS sensor (Schmidt 2007:7). GPS data was not gathered during the 2015 portion of this survey as there was either user error or equipment malfunction. The gradiometric data from this portion of the study was geo-rectified in *ArcGIS* by aligning two corners of each survey with points taken during the total station survey.

Metal Detector Survey

Metal detectors have been used effectively on several archaeological sites (Franzen 2004:224; Butler 2011:10). Don Rickey (1958) first published about detector's use in locating firing lines at battlefield sites. Features were documented at Revolutionary War campsites using detectors (Parrington et al. 1984:130-131). Detectors were also used to locate a camp associated with the famous Donner Party (Hardesty 1997).

A metal detector was used to gather data from the area surrounding the lighthouse to the north and near the assumed cistern location to the southeast of the compound proper. This active method involved using metal detectors to reveal metal signatures that the gradiometer was not able to recognize. Another reason for utilizing this technology was its versatility and maneuverability. The gradiometer was large, bulky, and could not be used in areas where vegetation was overgrown. The metal detector was more suited for such duties. Small anomalies, such as nail clusters, were more likely to be located with a metal detector (Green 2004:159-161).

This project utilized two metal detectors. The first was the Minelab CTX 3030, fitted with a "double D" coil, which created a blade like beam for accurate pinpointing of objects. This instrument was also equipped with a GPS, which allowed one to save a point with metadata about the intensity of the conductivity and ferrous content associated with the contact (Minelab 2016:15-16,67,74). The second detector used was the Pioneer 202 Bounty Hunter, which is a simple locator and required the use of a separate GPS device (in this case a Garmin Rino 655t). Using these separately in intersecting search patterns allowed for the surveyors to quantify any errors associated with the location of each anomaly. Although the team did not conduct excavation, the survey method used similar methods utilized by Harwood (2001:35-38). Two metal detectors and two operators were used in two different search patterns to validate points and eliminate error (Figure 4.7).

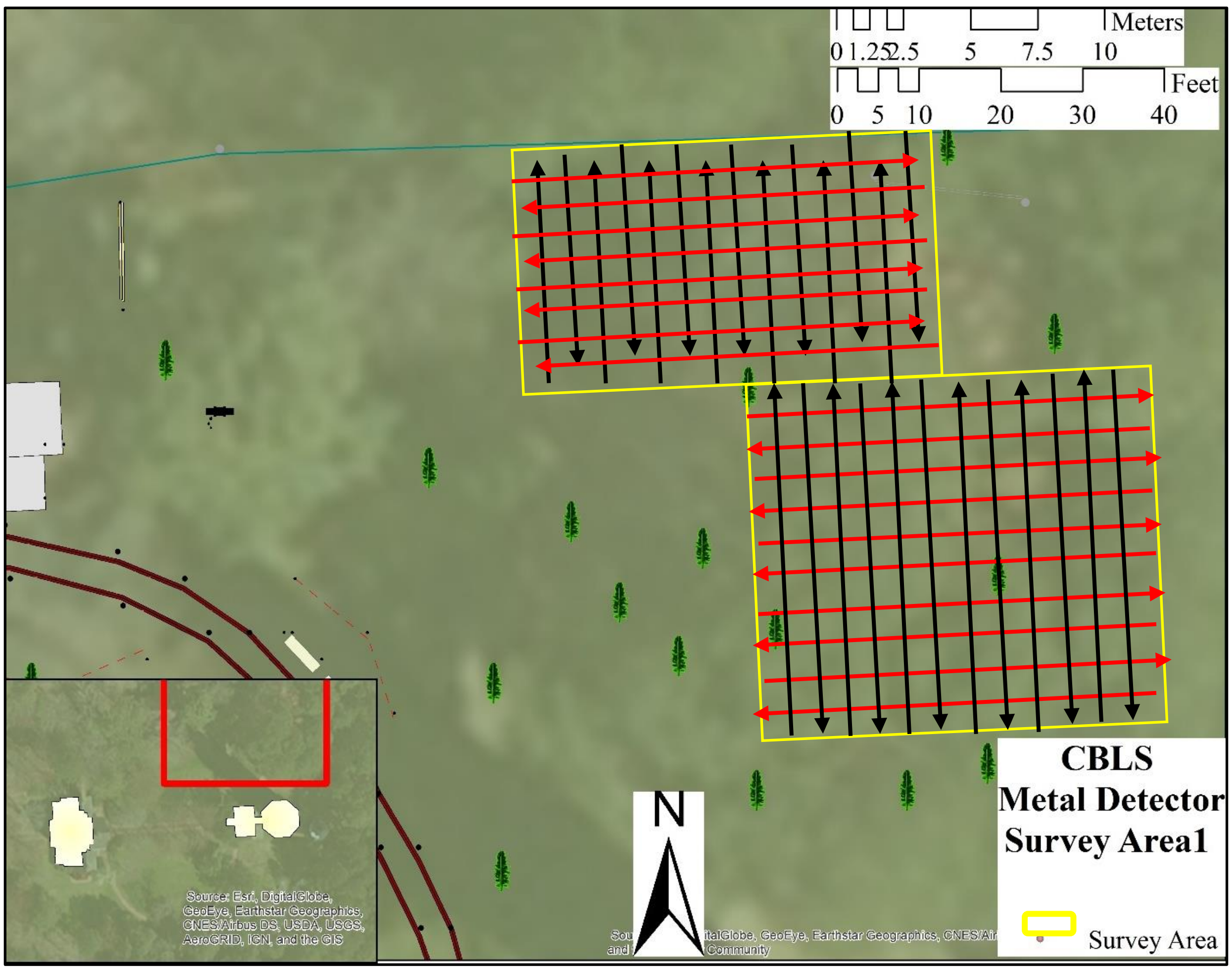

Figure 4.7. First metal detector survey method (B. Scott Rose 2017).

GPS signal acquisition was problematic for metal detection data. The first attempt with the Minelab detector showed a deviation of five meters. The error was too high to establish any anomalous artifact pattern. A second attempt was made to detect in the area of greatest interest with modified techniques. The area was divided into ten transects that ran from north to south, and 15 transects that ran east to west. This area was located just north of the lighthouse tower. The 10 m by 15 m area (designated as M1) was chosen as a possible location of the small north storage building. This area overlapped both gradiometric survey areas on the north side of the tower.

Baseline-offsets were used to record points (Figure 4.8). The metal detector recorded ferrous content and conductivity for each point and assigned a number to the point. Small wooden stakes were placed at each contact. These stakes were labeled to match the number assigned to each point by the detector.

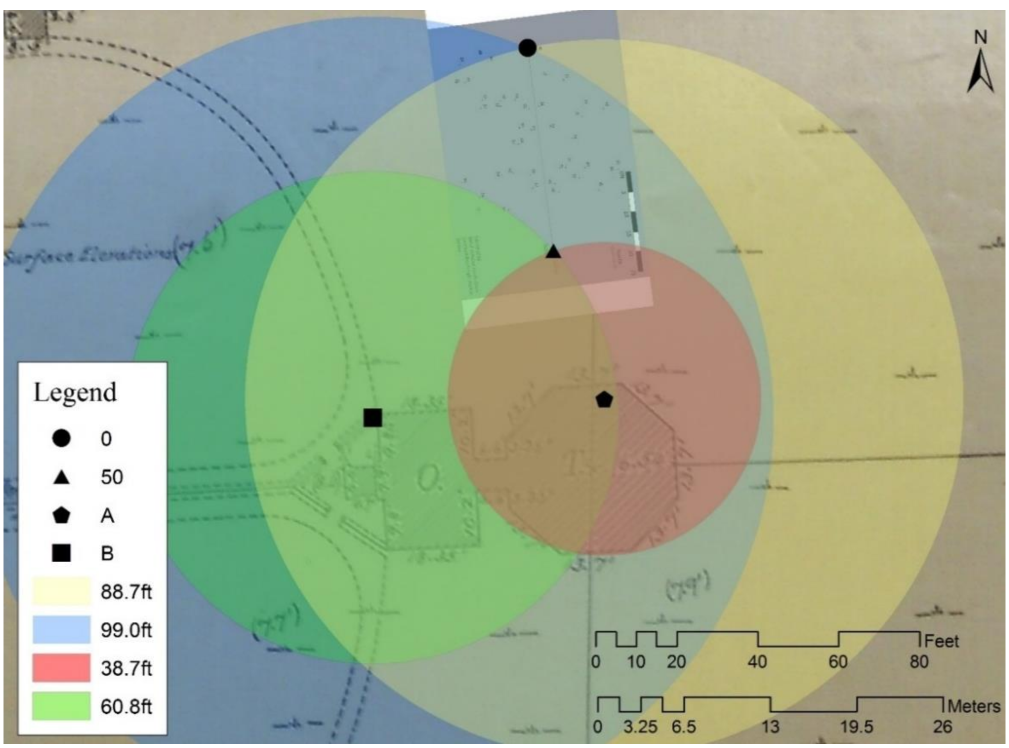

Figure 4.8. Method of triangulation used to situate metal detector survey baseline in GIS map. The gray rectangle to the north represents the baseline survey (B. Scott Rose 2017).

The geographic location of each point was recorded using the baseline established on the site. The author tied the baseline of the survey to two points on the ground. The point labeled "0" and the point labeled "50" on the baseline were measured from the northeast corner of the lighthouse (A) and the northwest corner of the oil-house (B). The measurement from (A) to "0" was 88.7 feet (27.04 m). The measurement from (B) to "0" was 99.0 feet (30.18 m). The measurement from (A) to "50" was 38.7 feet (11.8 m). The measurement from (B) to "50" was 60.8 feet (18.53 m). This triangulation allowed for the placement of the baseline offset map with great accuracy. This method is adapted from Connor and Scott (1998:81).

Another area chosen for metal detector survey was located southeast of the lighthouse complex. H. Bamber (1893) noted a cistern in this area on a survey map. The author used ESRI *ArcGIS* 10.1 to overlay this survey map on a current map of the site to determine the most likely area to contain the cistern (Figure 4.9). The cistern appeared to be situated due east and slightly north of the office on site. Bioturbation was also a consideration because the groundskeeper lives in a house nearby and keeps goats in this fenced in area. Debris existed closer to the house, but there was none near the assumed cistern location. There was also a slight depression inside of a raised area at this location.

This survey was also plagued with GPS problems. The acquisition of GPS satellite signals was not accurately attainable. The tree cover in this area is extensive, and the resulting metal detection data is only accurate to 3 m. The data indicated several contacts of interest in the immediate area assumed to contain the cistern designated in the 1893 survey.

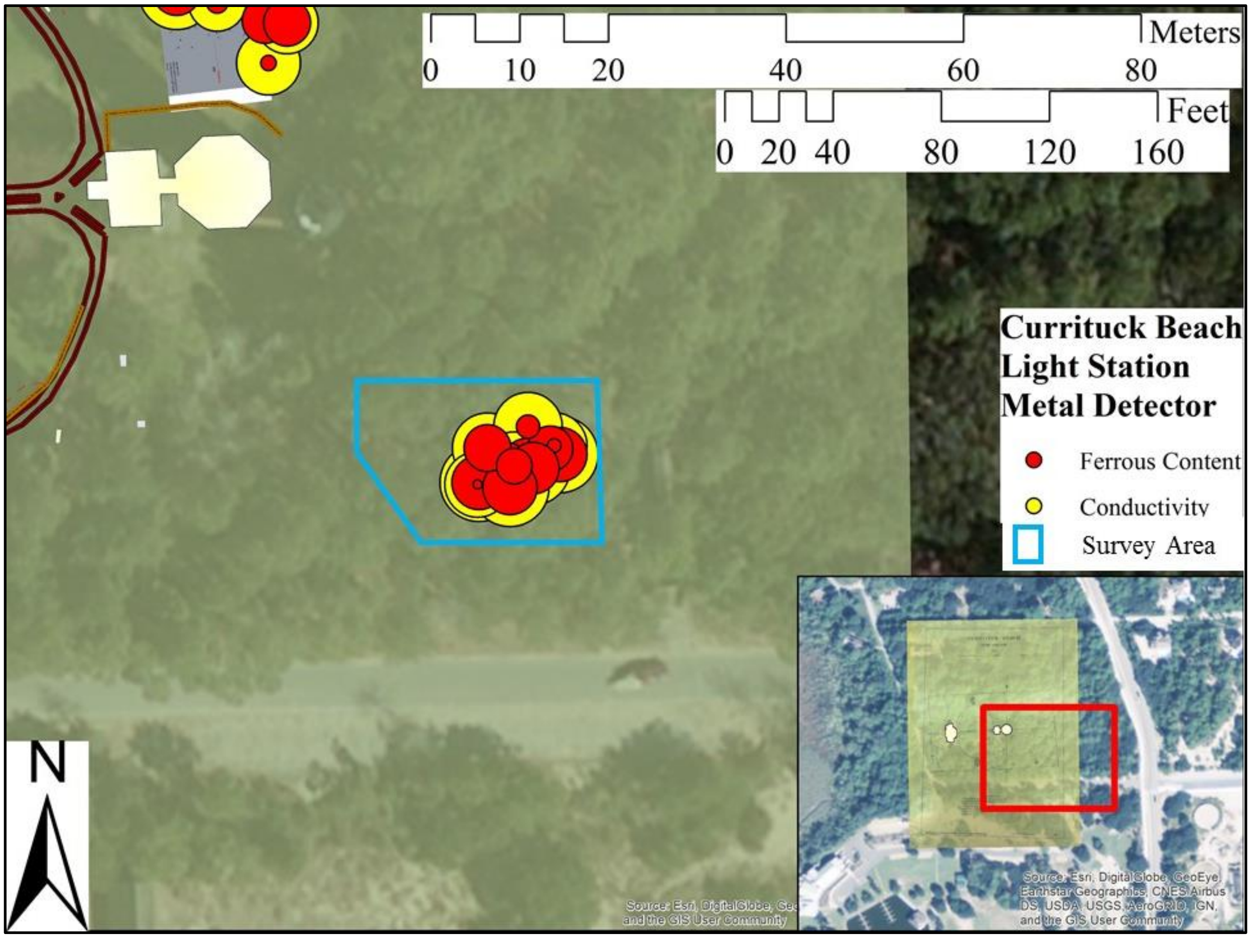

Figure 4.9. Current world image overlain with a survey map from 1893 of the area and metal detector contacts near an indicated cistern (Bamber 1893; B. Scott Rose 2017).

Virtual Modeling Methodology

The creation of 3D models of structures and structural change over time on the site allowed for measuring and analysis of space use. These models were manipulated and placed in context using GIS. There are several steps in this process. Several pictures of the area or structure were systematically taken and processed using Agisoft *Photoscan*. This researcher combined these models with other models of the same structure to add as much detail as possible. Research participants created these models using two technological processes. Photogrammetry and computer-aided drafting (CAD) were used in concert to create these models. The usefulness of these types of models, their creation through varying methods, and problems associated with them are outlined by F. Laroche and Cotte (2008:1). These models can be used to represent and compare various elements of existing features on a site. Virtual 3D models can be created using CAD programs, multibeam sonar technologies, laser-scanning equipment and software, and photogrammetric software. All of these models are susceptible to digital distortion by the model creator. This is avoided by constraining the generated models to a known measurement on the existing artifact. CAD models are created from plans and only need to be placed in geographic context based on two shared points between the model and the landscape to obtain good accuracy (Laroche and Cotte 2008:4). These models represent ideas rather than physical structures on site. The accuracy of these CAD models is irrelevant to the actual structures. Other contextual sensual qualities of the artifact such as smell, sound, temperature, pressure, humidity, and tactile observations cannot be reproduced with model creation at this time.

Photogrammetry

Photogrammetry was the first process used to create virtual models. The author utilized this approach to capture accurate 3D models of the present-day standing structures at the light station. The photogrammetry software, *Photoscan* allowed numerous photos to be stitched together to form a 3D model. This process was also an inexpensive and efficient way to illustrate and compare sites and features. Haukaas states:

> Our results further suggest that archaeologists with limited experience with 3D technologies can incorporate 3D models into their project goals without dedicating significant monetary resources or time while in the field. Archaeologists can rapidly create and disseminate realistic-looking 3D models of their materials to any audience,

which may help to make their research more relevant and accessible to stakeholders (Haukaas 2015:50).

This model was combined with information gathered from other survey methods, which have proven beneficial in the past (Gruen 2002; Verhoeven 2011; De Reu et al. 2014; Yamafune 2015).

The primary investigator and UNC-CSI provided the necessary photographic equipment required for data collection in this phase. A Samsung 16-megapixel cell-phone camera, a Sony Cybershot, a Nikon D300, and a DJI FC350 attached to a drone were used to capture images of the complex. The drone, which was a DJI Inspire 1, was provided and flown by John McCord from the USC-CSI (Figure 4.10).

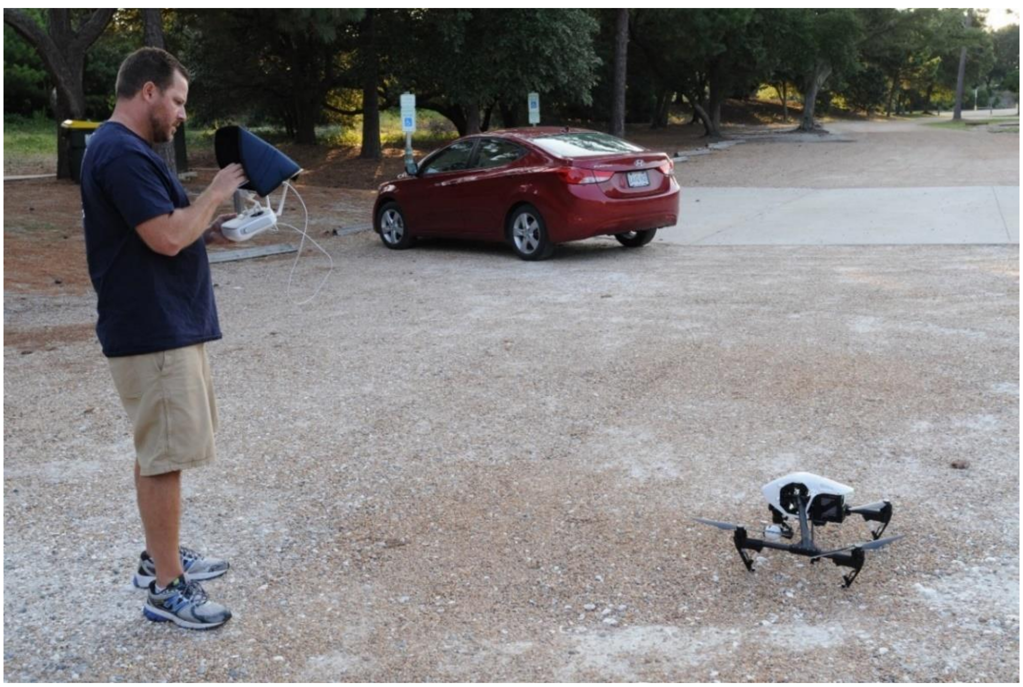

Figure 4.10. John McCord prepares a drone for a flight to capture photos of the lighthouse complex (Nathan Richards 2015).

Photographs were recorded from the ground during the morning hours of 1 August 2015. A pass was made around each structure with at least 30 photographs taken of each structure from several angles. The foliage surrounding the structures complicated the process and made post-processing difficult. Another day of photography was conducted on 3 December 2015. The foliage continued to be problematic; however, the photographs contained more usable data. A slightly different technique was employed during this session. Laminated papers with easily distinguishable designs printed on them were placed around each structure before photographs were taken. These 16-bit designs were included with and used by *Photoscan* to orient the photographs in an accurate way. A ladder was also used during this session to capture the structures at slightly different heights.

Drone photography has recently become an advantageous tool for survey. Stefan and Stefan state:

> Archaeology is one of these domains where drones have been making a difference by opening the regular archaeologists' access to aerial survey, a previously highly specialized and costly investigation method based on man-piloted aircrafts. Reasons for this significant evolution are both technical developments (like the advances of lithium-ion polymer batteries for discharging electrical power at very high intensity, the miniaturization of sensors, including gyroscopes, GPS, telemetry) (Stefan and Stefan 2013:26).

The drone was flown on 1 August 2015, and gathered images from above. The drone's flight began on the south side of the compound. It worked in a counter-clockwise circuit around the complex three times, capturing over 400 photos (Figure 4.11). Most of these photographs were useable by the software (82%); some proved to be problematic due to the long shadows cast by the morning sun. Backlighting by the sun caused some of the photos to be unusable without editing in Adobe *Photoshop* to adjust brightness and contrast of the images. The foliage covered much of the complex from above and masked out much of the detail of several structures. The author used ground photography to compensate for this interference. The orientation of the camera during each capture is illustrated in Figure 4.12.

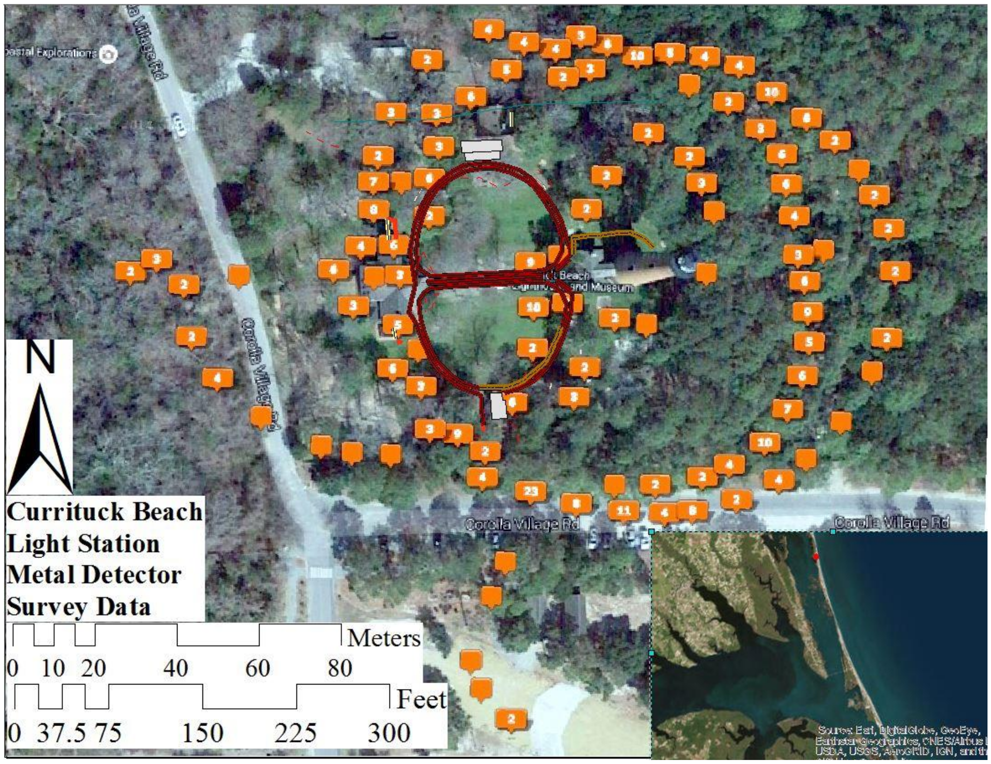

Figure 4.11. Overhead view of the drone's camera positions as photographs were taken (John McCord 2015).

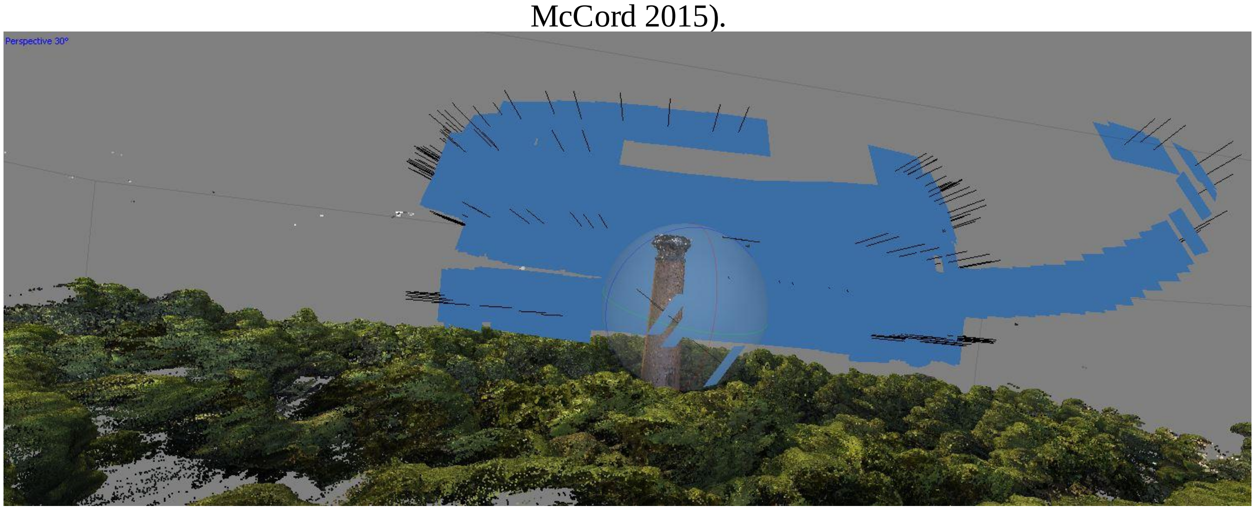

Figure 4.12. Dense cloud data image rendered in *Photoscan* showing each camera's orientation during data capture. (B. Scott Rose 2017).

The top of the lighthouse appeared collapsed due to the reflected and refracted light produced from its many glass fixtures. The model was re-rendered after edits were made to the photos using a process in *Photoscan* called masking. Each photo had to have elements removed or masked so that the software could concentrate on priority areas. Each reflective glass surface had to be masked out, as well. Once this was finished, several steps were then completed within the rendering process for each model. The first step was to create a sparse point cloud (Figure 4.13). Next, a dense point cloud was created (Figure 4.14). After that, a wire frame mesh was generated to connect all the points together (Figure 4.15). This allowed for the final step of applying a texture from photographs over the wire frame (Figure 4.16). There were six models created: the lighthouse, big keeper's house, small keeper's house, storage building north, storage building south, and overall complex.

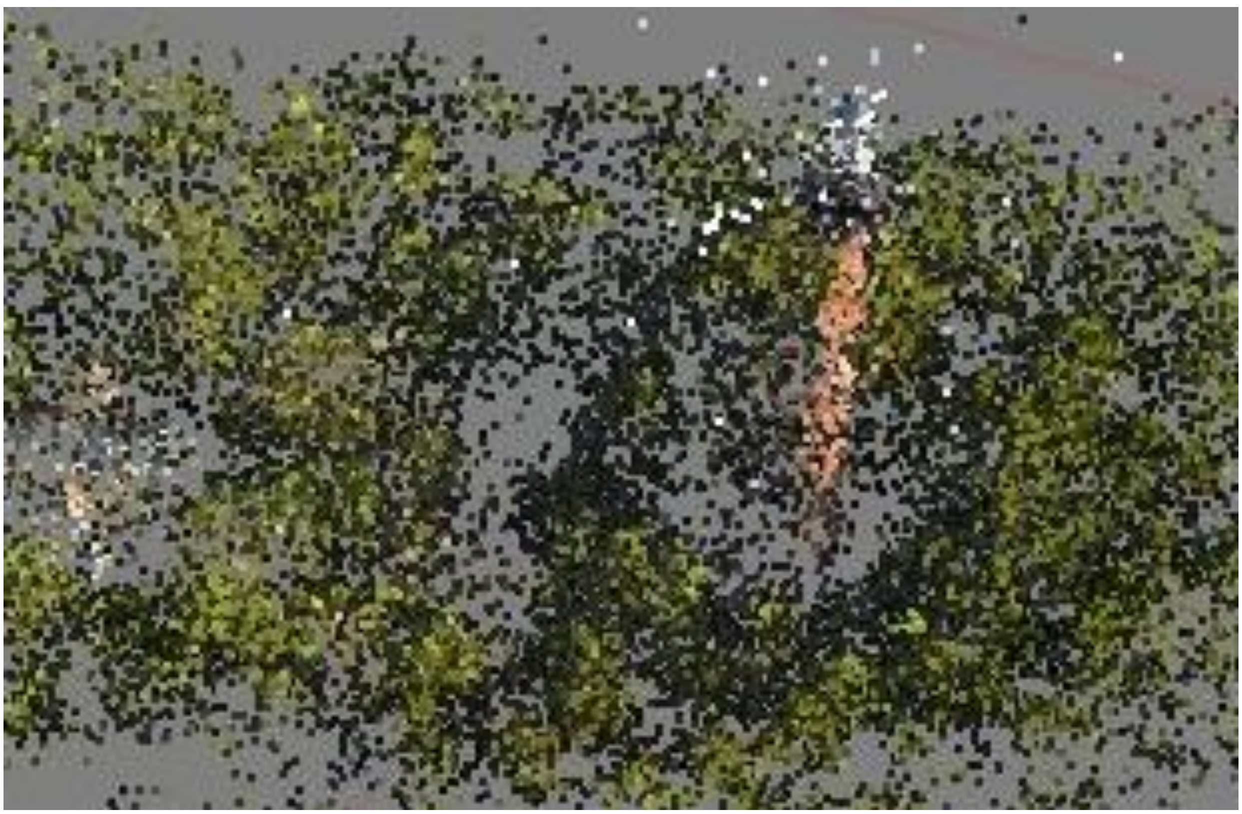

Figure 4.13. Sparse point cloud generated of CBLS of the complex using *Photoscan*. (B. Scott Rose 2017).

Figure 4.14. Dense point cloud generated of CBLS of the complex using *Photoscan*. (B. Scott Rose 2017).

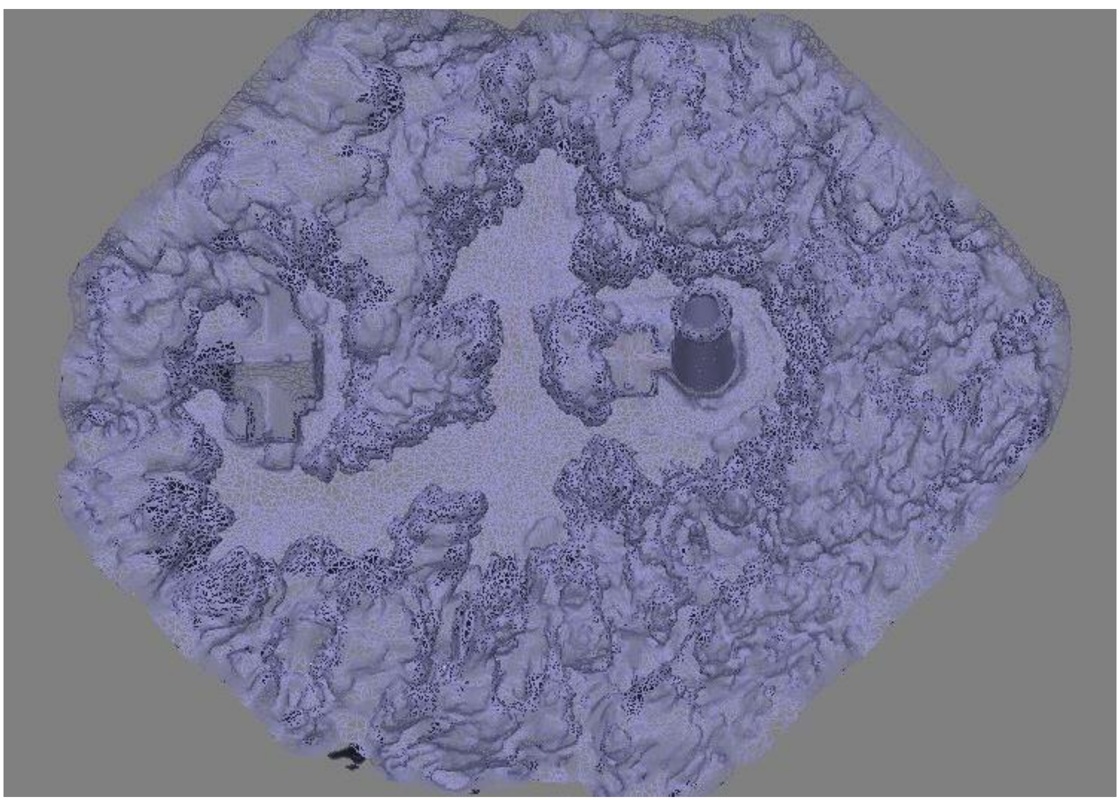

Figure 4.15. Wire frame model generated of CBLS over all complex using *Photoscan*. (B. Scott Rose 2017).

Figure 4.16. Photographic textures applied to wire frame model generated of CBLS over all complex using *Photoscan*. (B. Scott Rose 2017).

The completion of a preliminary site model illustrated the need to use *Rhino 5* software. The models were imported into *Rhino 5* to extend sections of models to correct dimensions and fill gaps that were not photographed due to foliage cover. These corrections were relatively minor and cosmetic. Overall dimensions of the structures were maintained.

Computer-Aided Drafting

CAD has been used to enhance archaeologist's understanding of many sites (Miaozhon 2001; Campi et al. 2014). Architecture virtual reconstruction helps archaeologists understand how inhabitants relate to the structures arranged around them (Lapadula 2012:47). Digital models have been created for many purposes, mainly for envisioning buildings before their construction. Archaeologists use them to envision buildings after they have been destroyed. Building components are modeled first. Buna, Comes, and Badiu state:

> Once a 3D model is generated it can be saved as a standalone part, which can be inserted in as many assemblies as the user wants. The generated 3D models can be separately edited if the user wants to make some changes – without generating new 3D models since there is no link between the generated 3D models (Buna et al. 2014[1]3.96).

In this study, these components were wooden 2x4 studs and 2x8 floor joists. The models were constructed much the same way the original house was constructed. These CAD models were drawn based on original drawings (Outer Banks History Center [OBHC] 1881-1940). The photogrammetric models only provide a relatively accurate representation of existing structures on site. The process of model construction began with an original drawing (Figure 4.17). The drawings were scanned into a digital format and imported into the *Rhino 5* program. Each line was traced (Figure 4.18) and rotated to fit in a 3D context. Surfaces were added, and models were saved to be used later in the GIS software. A completed *Rhino 5* model is visible in Figure 4.19.

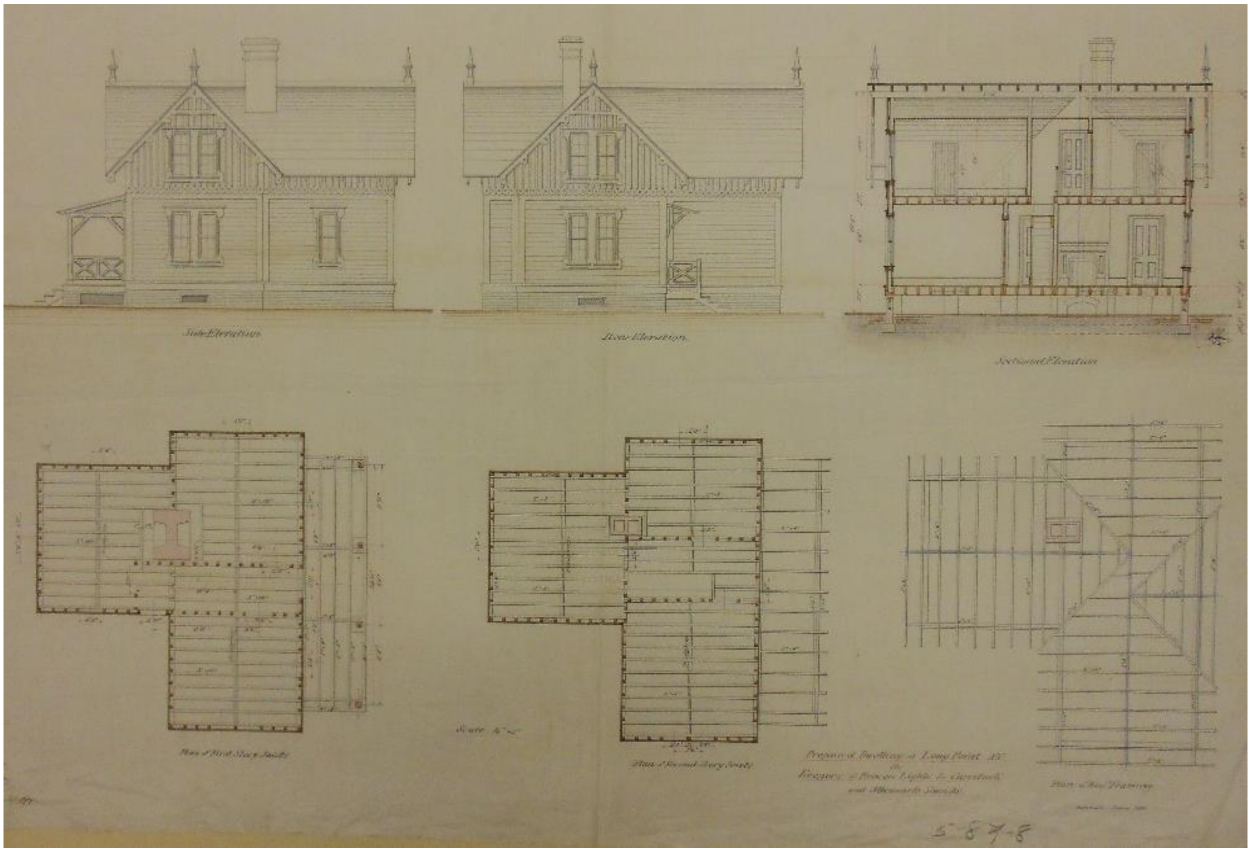

Figure 4.17. Construction drawing of the small keeper's house originally constructed at Long Point Station (OBHC 1881-1940).

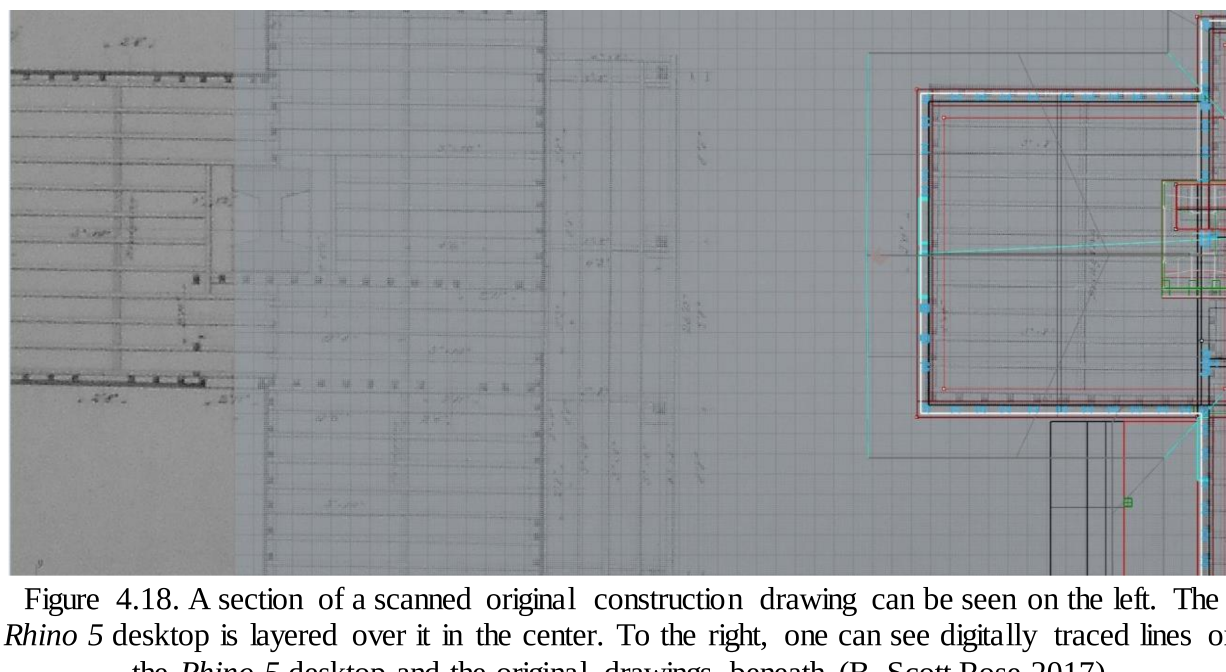

Figure 4.18. A section of a scanned original construction drawing can be seen on the left. The *Rhino 5* desktop is layered over it in the center. To the right, one can see digitally traced lines on the *Rhino 5* desktop and the original drawings beneath (B. Scott Rose 2017).

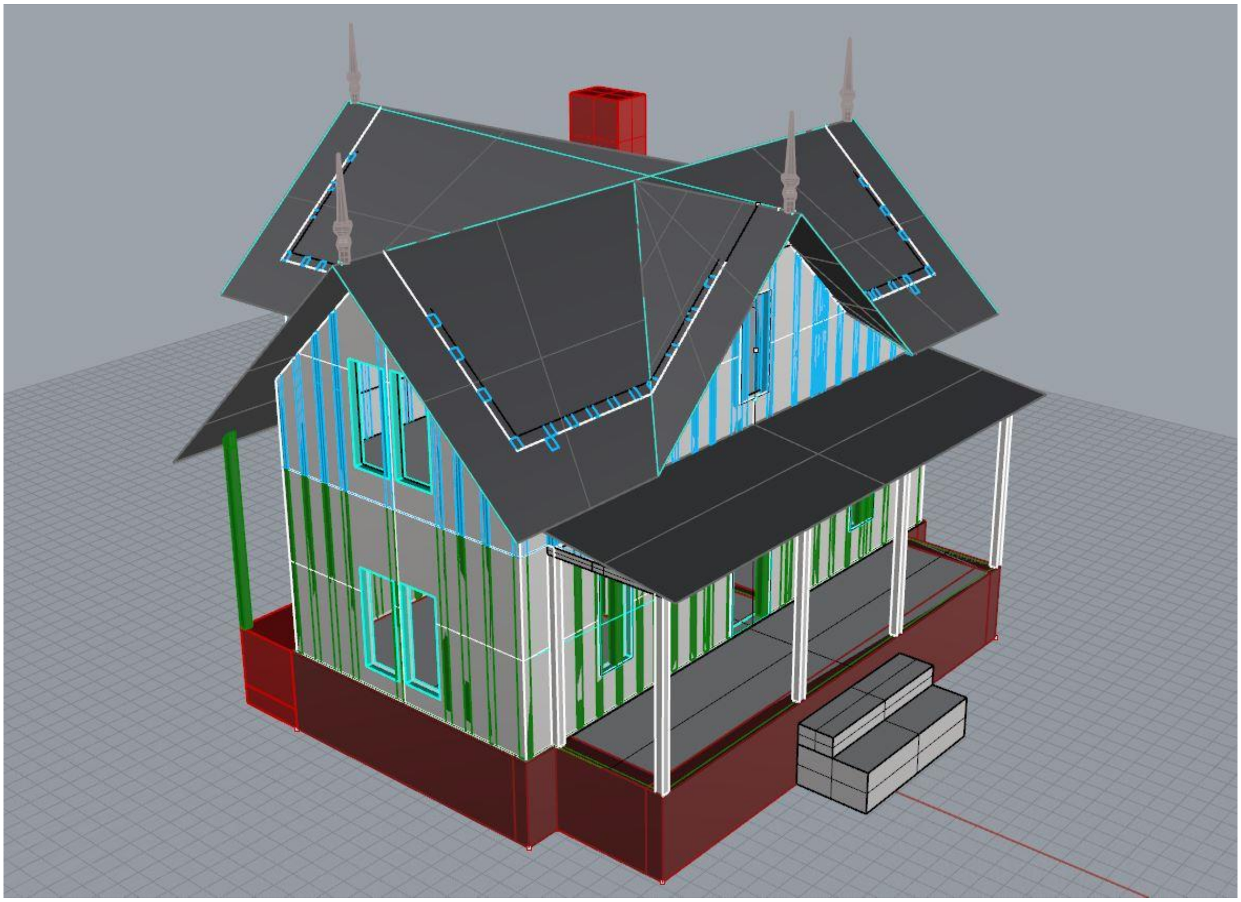

Figure 4.19. Completed *Rhino 5* model of the small keeper's house. Each grid square is one square foot (B. Scott Rose 2017).

After these models were completed, they were placed in such a way as to mimic their original context in the compound (Figure 4.20). Points taken during the total station survey of the structures were used as points of reference for building placement. The differences between original models and existent structure models were analyzed. Details such as additions to and relocation of buildings were more easily seen through this process. In some cases, the *Rhino 5* models and photogrammetric models merge, and both are visible (Figure 4.21). This comparison can indicate a change in position or dimensions over time and will be evident in the analysis.

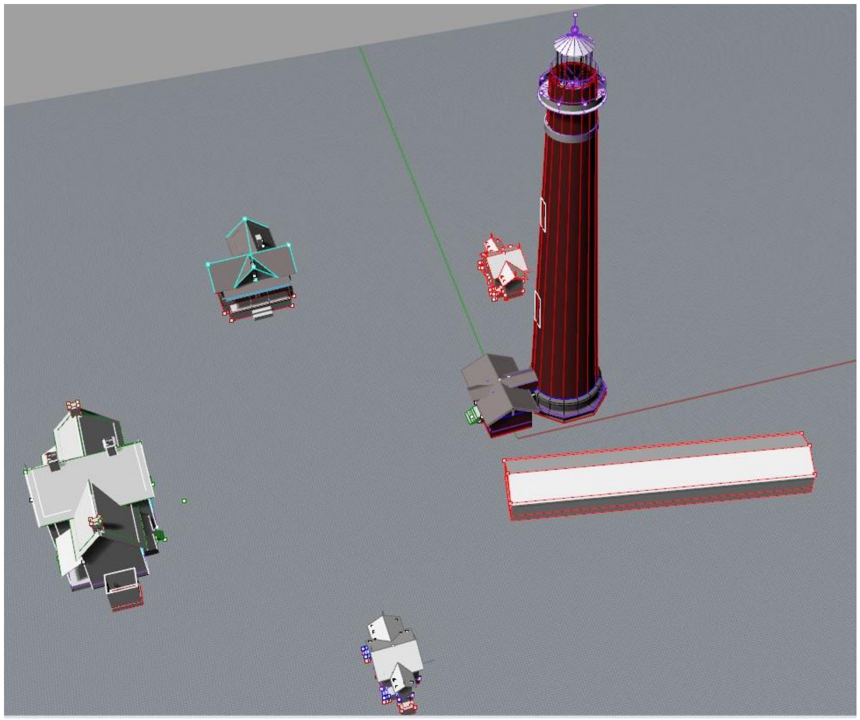

Figure 4.20. Compound model of the CBLS created in *Rhino 5* with assumed locations of missing structures (B. Scott Rose 2017).

Figure 4.21. Photogrammetric and CAD virtual models of the CBLS big keeper's house combined. Both models are visible in this example (B. Scott Rose 2017).

Underwater Archaeological Methodology

The CBLS extends beyond the terrestrial environment into the adjacent waterways. Deep draft cargo ships unloaded materials at Church's Island. Materials were then transported across the sound to the wharf and railway (USLHB 1874:47, 1875:45). To fully understand the construction and development of the station, a survey of these areas was necessary. The original construction included a dock, a railway on the property, and a platform. The primary concern of the underwater survey was the documentation of all existing wharf structures extending into the sound.

Surveying these features enhanced understanding of the station's previous extent and its impact on the landscape. The pier-supporting pilings are all that were discovered in this study. The research team recorded total station data from the existing dock on the property. The points recorded were taken at each piling discovered through a ground survey using sight and tactile discovery. Ferrous and conductive material was located during metal detector survey.

Total Station Survey

The researchers conducted an in-water survey in the shallow water extending toward the sound from the still existent wharf pilings associated with the old Corolla lighthouse site (Figure 4.22). The team deployed a total station on the existing wharf structure (Figure 4.23). This apparatus was set into place, and a back-sight point was taken from the apex of the historic walk bridge that exists on the Whalehead property (McPherron 2005:6,7; McCoy 2009:276). The researchers chose this back-sight location for its potential longevity. Surveyors not only use geodetic markers for back-sighting survey equipment, but large elements of natural or cultural significance are also used because their geographic locations are well-established. The data from the back-sighting proved inaccurate but was corrected for in post-processing. Two students controlled the total station while another student waded into the sound with a range pole-mounted reflector (Smith and Levy 2014:166). The team recorded points for each piling that was located. This process began with the first accessible pilings adjacent to land and continued toward the sound until no further pilings were located. The author discovered several pilings that appeared to be from an earlier wharf structure. These discoveries were expected due to the historical evidence of reconstruction of the pier structure (USLHB 1920).

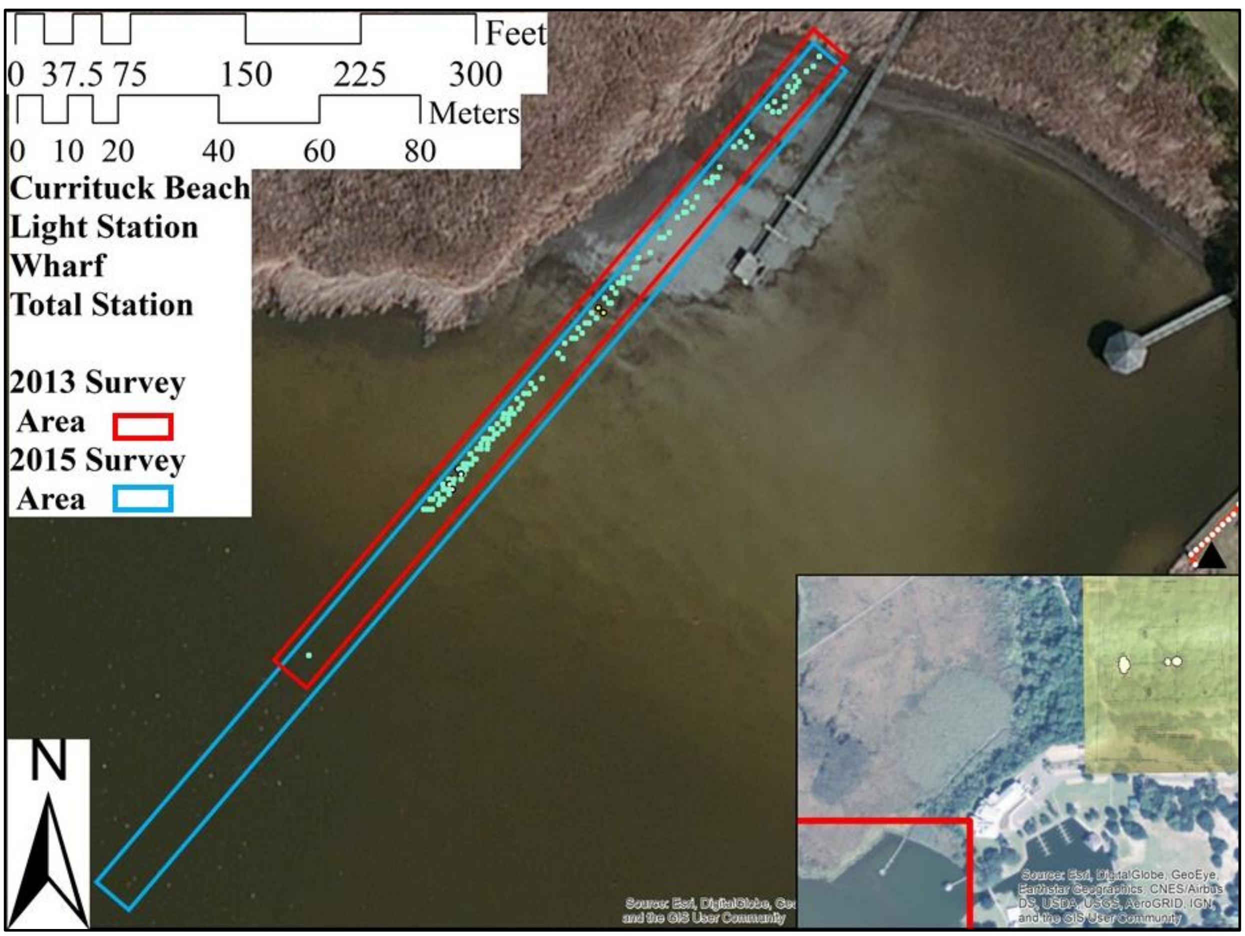

Figure 4.22. Total station points taken from existing wharf piles on a base image from NOAA *World Imagery* (USDC 2015; B. Scott Rose 2017).

The shore team reset the total station on one occasion because of unintentional disturbance by a tourist. A series of three points were taken that repeated the last three before the disturbance. This duplication allowed for recalibration and realignment should it be required during processing and analysis. The researchers saved these points in the total station and noted them in the field notebook.

Figure 4.23. Parker works the total station as Rose holds reflective prism at located pilings in the distance (Ryan Bradley 2015).

The data collected in this survey matched data gathered during the 2013 survey. There were several more pilings recorded during the most recent endeavor. These pilings existed in a line extending far out into the sound (Figure 4.24).

Figure 4.24. Photograph of remaining wharf pilings in Currituck Sound during a rare drying event (Meghan Agresto 2016).

The total station data from the 2015 survey was not properly georeferenced when recorded. This was remedied during post-processing by finding several points that were in the same relative position from each survey. The points from the 2015 survey were rotated into their correct position as described by the 2013 survey. The remainder of the shared points lined up accordingly with the new unmatched points extending to the southwest. These points were used in conjunction with photographic evidence to recreate a virtual model of the wharf structure. The analysis projected the extension of the wharf into the sound and closer to the lighthouse compound.

Metal Detector Survey

A metal detector was used to gather data from the wharf area extending into Currituck Sound. The team used the Minelab CTX 3030 model for this because of its ability to operate underwater. One long pass was made along the path of the pilings located during the total station survey. Two additional passes were made on the southwestern side of the wharf pilings and one to the northwest. These passes were completed to establish a better pattern of metal distribution away from the wharf. This process was conducted over the extent of the assumed wharf structure (Figure 4.25).

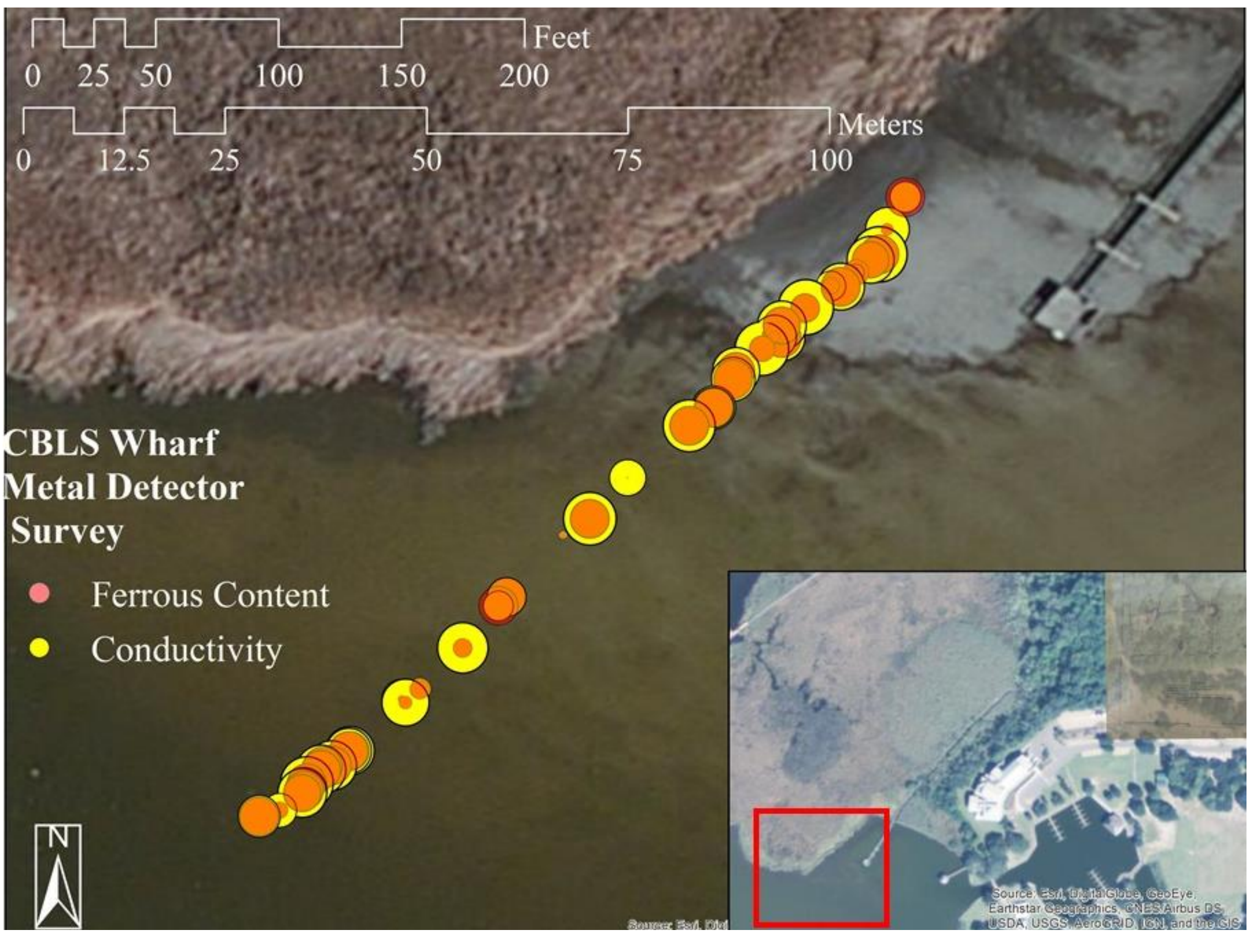

Figure 4.25. NOAA World Imagery with wharf metal detector survey area overlain. Red circles indicate the ferrous content, and yellow circles indicate the conductivity. Where the two overlap, the color appears orange (B. Scott Rose 2017).

An original construction drawing supplied the dimensions of the wharf model (Figure 4.26). This drawing indicated the total quantity and dimensions of each type of wood and metal fasteners needed in the construction of the pier. These dimensions were used in the *Rhino 5* virtual reconstruction of the pier section.

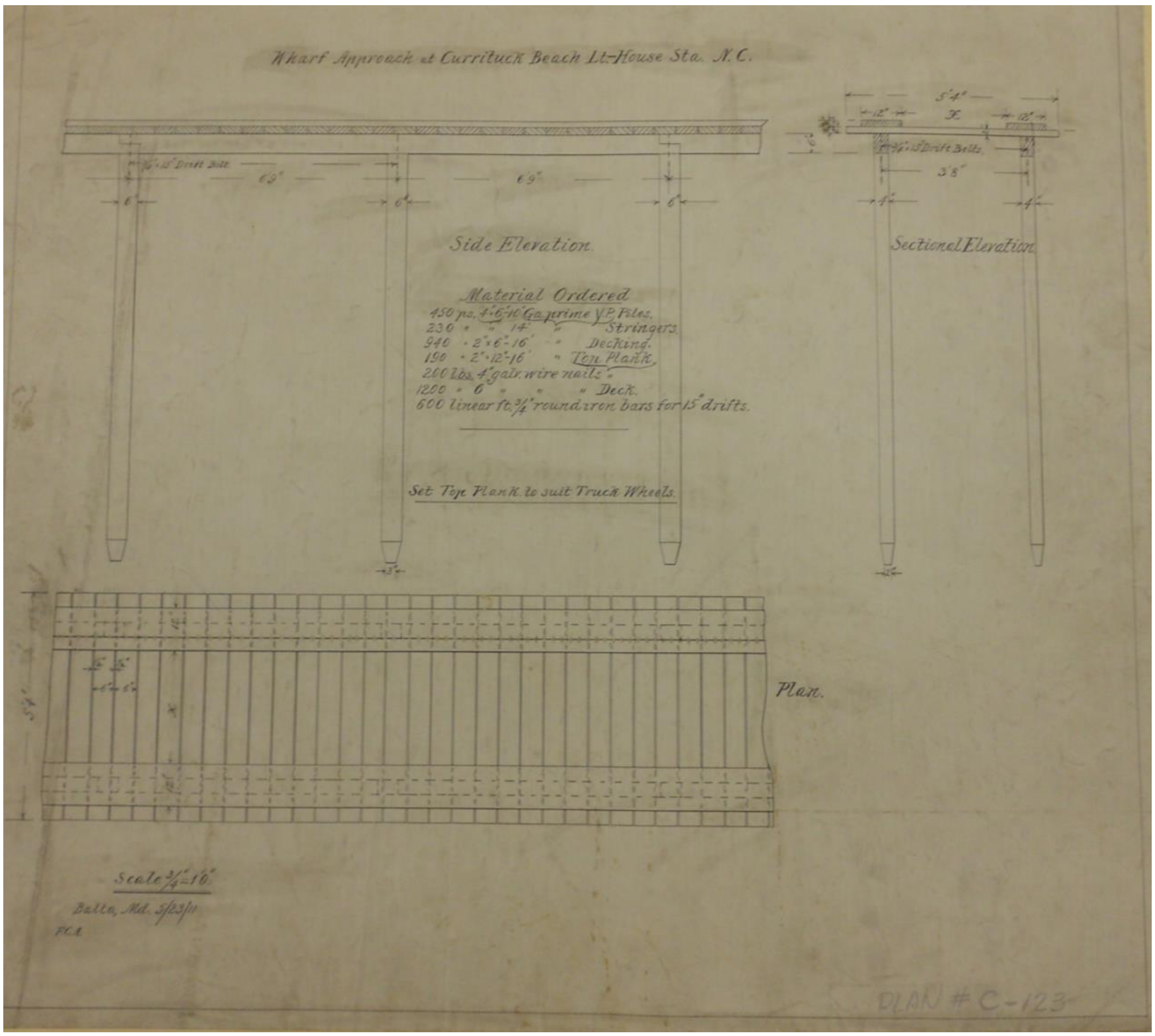

Figure 4.26. Original construction drawing of the CBLS wharf (Stetson 1877).

Conclusion

Using several techniques, the CBLS site was surveyed. The methodologies were based on the total station data, most of which was collected during the 2013 survey. Gradiometric and metal detector surveys were then based on points collected with the total station. These were post-processed using several programs to convert the information into a manageable format for visualization and analysis.

Two types of virtual models were created to, eventually, illustrate structural changes through time. 3D models were first created of the site and each building using CAD. These CAD models helped establish a baseline for changes after the initial construction of these structures. Photogrammetric models were constructed to represent the current structural situation on site. These were then combined in different combinations to represent different construction eras.

The methodologies were changed and improved when flaws became evident. The first attempt at gradiometric survey was unable to gather GPS information, so a second survey was conducted. This survey also failed to gather GPS information. Parts of each survey were used after post-processing adjustments. GPS signal acquisition also proved problematic during the first metal detector survey. A second metal detector survey was conducted to increase accuracy in one area of interest with modified techniques. Other data from the first metal detector survey were used to locate the general area of the east cistern feature.

Using the described methodologies allowed the author to thoroughly analyze the CBLS site. The historical and archaeological evidence link cultural events throughout time to the space of the lighthouse compound. Through this analysis, archaeologists can correlate the historical and archaeological data to infer behavior on the site through the duration of it occupation.

Chapter 5: Elucidation of Elements, Research Results

Introduction

Much of the information gathered through the methods outlined in the previous chapter were aimed at gaining insight into the risk management strategies of those involved in protecting shipping and trade in the region. These strategies, of course, influenced population change and in turn, changed investment ideologies concerning the community. Activities at the lighthouse site reflect these strategies and subsequent effects.

The methodology has produced data in various forms: *Historical Data*, *Terrestrial Archaeological Data*, and *Underwater Archaeological Data*. Each of these forms of data will be discussed in this chapter. Historical information includes: USBC data for the area surrounding the lighthouse compound from several years, data gathered from USTD, United States merchant shipping records pertaining to shipwrecks that occurred near the CBLS, and the quantity of investment in the lighthouse compound from public and private sources. The author organized the archaeological results into terrestrial and underwater sections. Each archaeological result section discusses total station and gradiometric survey data along with metal detector contacts and virtual model creation. Information gathered from these archaeological and historical sources was then imported and converted into a format that was easily manipulated in 3D virtual model creation software. *Rhino 5* and Agisoft *Photoscan* software allowed for an integrated visualization of all the information collected, as well as for future analysis. *ArcGIS* enabled the organization of associated data into a useable format and allowed for a more comprehensive understanding of activities on the site through analysis. The data outlined in this chapter serve as the building blocks of the analyses presented in the following chapter, Chapter 6: Revealing Relevance: Analyzing the Data.

Historical Research Results

While much of the history of the site was already well-documented (Stick 1982; Johnson and Coppedge 1991; Edwards 1999; Davis 2004; Shelton-Roberts and Roberts 2004, 2011), a few questions remained. A detailed historical narrative and quantitative datasets served to answer the research questions in this thesis. Much of the historical narrative was displayed in the history chapter of this work. Other elements, when compared, illuminated otherwise obscured areas in the history of this community. USBC records were gathered for Corolla, North Carolina to determine what social factors guided the development of the CBLS. These records also aided in discovering what changes in population trends over time existed in this specific coastal community. These records also illuminate correlation between population trends and any other factors. Collecting the number of shipwrecks over time in the area helped researchers discover what historical and archaeological data indicated a need for a lighthouse structure at the location of the CBLS during the last half of the 19th century. This data helped answer the question: what risk management strategies were implemented, and when? The author compared this data with other datasets to discover how technological change affected the community. Records of various investments made in the community by public and private entities allowed discovery of which economic factors guided the development of the CBLS. This research helped to define what entity was responsible for those investments.

Census Data

Information was gathered from each United States Census for Corolla, North Carolina every ten years beginning in 1870 until 1940, after which the data is not currently available due to the "72-year rule" (USBC 2015a). USBC record information for Corolla, North Carolina beginning in 1870 until 1940 is included in Table 5.1 below (USBC 1870-1940).

Table 5.1. US Census information from 1870 to 1940 (USBC 1870-1940).

Census Year	Population	Male	Female	Race White	Birthplace NC	Married	Government Employee	Average Home Owned Value	Home Owned Value Equivalent Today
1870	40	22	18	100%	100%	14	n/a	n/a	n/a
1880	486	247	239	77.4	99.80%	155	n/a	n/a	n/a
1890	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1900	76	37	39	100%	100%	23	n/a	n/a	n/a
1910	250	123	127	93.60%	97.60%	114	n/a	n/a	n/a
1920	244	128	116	100%	93.90%	109	19	n/a	n/a
1930	200	94	106	100%	90%	90	20	$906.25	$13,018
1940	78	53	25	98.70%	48.70%	27	29	$675	$11,528

The census records indicated an increase in population between the 1870s and 1880s during the initial construction. There is also evidence of a waning population from the 1880s to the 1900s. This decrease in population may indicate a sharp decline immediately after the 1880 census. There were no enumeration records available for the 1890 census. A fire in the US Census archive destroyed the records for this year (USBC 2015b). The loss of the 1890 census record is discussed further in the analysis chapter of this thesis. From 1900 until 1910, the population numbers more than doubled in the area. After this period, a slow but increasing population loss occurred. The 1940 population for this area indicates a level like that of 1900 (Figure 5.1 below).

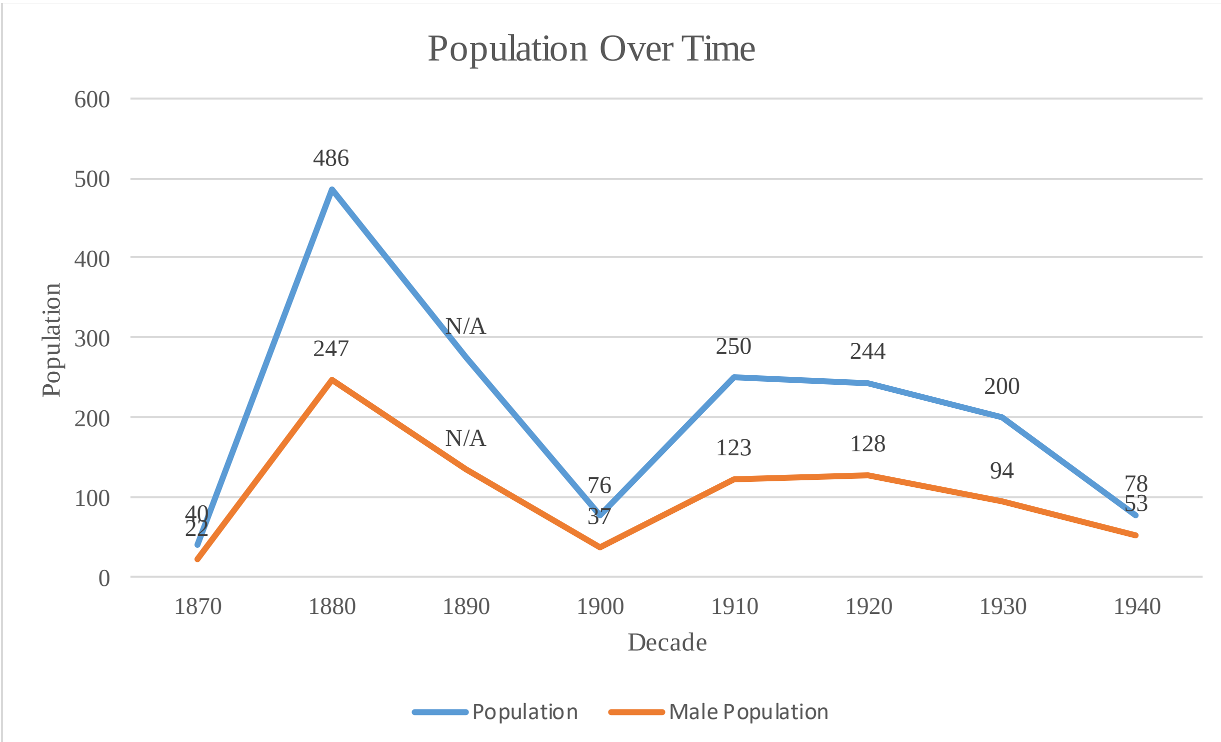

Figure 5.1. The graph shows population and male population through time. Red numbers represent assumed information (USBC 1870-1940; B. Scott Rose 2017).

Census data recovered from each year were problematic in two respects: enumeration districting and data availability. The districting method used by the USBC for each year of recording was not standardized. Early enumeration districts encompassed a much larger geographic area. Until 1940, there was no division suitable to accurately compare population numbers from year to year. The other problem exists in the lack of availability of data after 1940 due to the "72-year rule". This data is not easily parsed in an effective manner for the purposes of this study.

Shipwreck Data

This study gathered data concerning the number of ships wrecked each year near the CBLS to answer the question: what historical and archaeological data indicates a need for a lighthouse structure at the location of the CBLS during the last half of the 19th century? This information helped answer the question: how did technological change affect the community? The count of shipwrecks over time revealed details about risk management implementation.

Between the years of 1750 and 1970, several sources reported no more than four wrecks in each year for the area that was to eventually become lit by the lighthouse's beacon (Figure 5.2). Three yearly entries are missing from the historical record: 1917, 1940, and 1953. A table containing shipwreck data is in *Appendix D: Shipwreck Data* (United States Treasury Department [USTD] 1856-1961; USLHB 1874-1905, 1920; USCG 1915-1932; USDC 2015). The number of shipwrecks for the area covers a period of over 100 years before the CBLS was completed to ascertain the presence of shipwreck patterns in the area.

The shipwreck data had limitations associated with it. The first problem was that shipwrecks sometimes are misreported or under-reported. The area of incident can be inaccurate as well; this study attempted to account for error by including the seven-mile buffer beyond the reach of the light beacon for the data collection area. Every source of information concerning shipwreck data related to this study may not have been exhausted; the dataset is incomplete. Ships wrecked because of conflict were not included in this study but could have been useful as a comparison to general population numbers due to the increased military presence in the community surrounding the CBLS. Increased trade traffic due to wartime activities is well represented in this study. None of the ships lost due to conflict in the research area were merchant vessels.

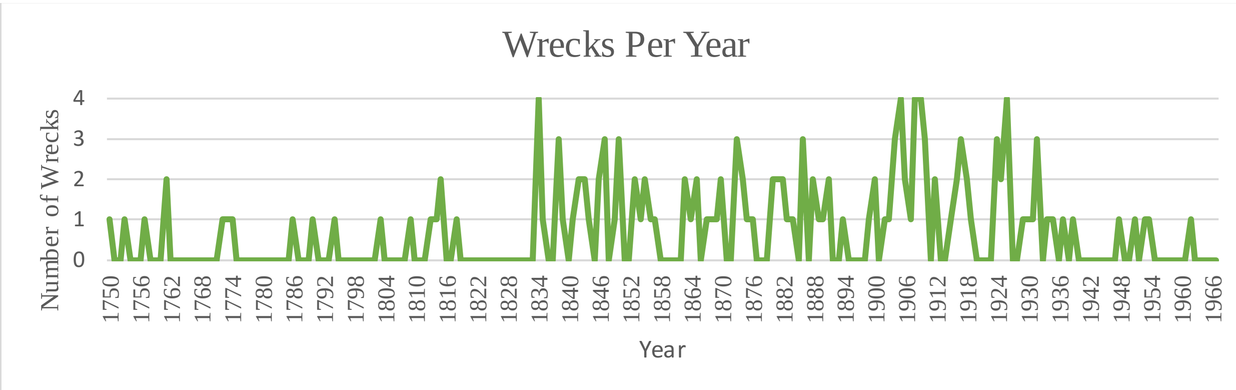

Figure 5.2. Wrecks per Year Located Inside the Beacon's Reach (USTD 1856-1961; USLHB 1874-1905, 1920; USCG 1915-1932; USDC 2015; B. Scott Rose 2017).

Public Investment Data

Currituck County witnessed several public investments in the site and the surrounding community throughout its history. Public investments consisted mainly of federal funds allotted to the construction and maintenance of the compound and the nearby lifesaving station. The federal government made many investments at the lighthouse complex. As reported by the publications of the USLHB, the initial construction of the CBLS was the first and largest investment in the site (USLHB 1873:631). Over the next 70 years, the USLHB awarded several allocations that had been requested by the community.

Other investments by the federal government included funding for the construction and maintenance of the Jones Hill Lifesaving Station. This station represented a $5,302.15 (current value $112,186.91) investment (USLSS 1876:55; Mobley 1994:27; Friedman 2016). Franklin D. Roosevelt's CCC completed projects in the area. Per the National Park Service, the CCC established a camp in Manteo, NC in November of 1934 (NPS 1999:8.8; CCC Legacy 2015).

Many of these camps constructed temporary barracks in work locations. Pfaff included plans for a similar barracks for many CCC projects in her work (Pfaff 2010:9). A virtual 3D model created of this structure is visible in Figure 5.3. A similar building is visible in the historical photo of the light station taken during the late 1940s. USCG leased the nearby hunting club between 1942 and 1945 for training purposes. The USCG used the lighthouse and grounds during this time as well (NPS 1999:7.2, 8.8). The United States Postal Service (USPS) established a post office in Corolla in 1895 (NPS 1999:8.5). Road development and improvement also occurred in the area during this time. The community proposed additional road construction and development in 1949 and again in 1953. Both proposals failed due to political hurdles and funding issues. A road was finally established for access to Corolla in 1984 with the aid of local, state, and federal fiscal investment and time investment by private investors (Schoenbaum 1988:92-101). State and private organizations allocated funds to the area in the early 1980s and 1990s for the conservation of the CBLS and the Whalehead Club by the OBC and its co-founder, John F. Wilson (Davis 2004:130-136). The amount of actual investment dollars was unpublished for some of the annual maintenance tasks at the light station.

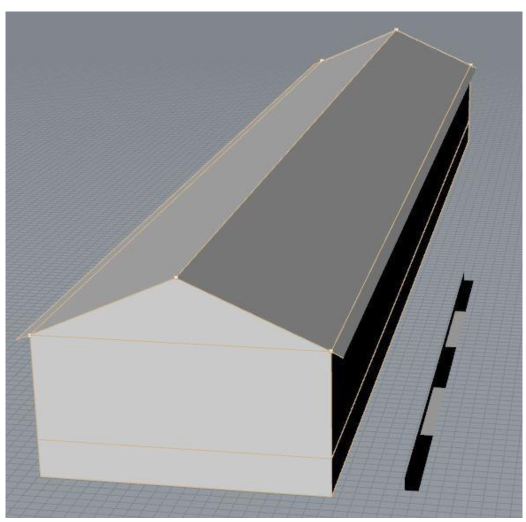

Figure 5.3.Virtual model of barracks like those in photographic record. Created B. Scott Rose (2015) using *Rhino 5*. Scale segments indicate 10feet (Pfaff 2010:9).

Investment data is incomplete; in many cases, reports of investments contained no associated monetary allocations. The USLHB reported several updates and changes to the site, but records did not describe the cost associated with these changes. Quantification of some of this data is possible but not within the scope of this study.

Private Investment Data

The community surrounding the lighthouse complex affected events at the lighthouse compound. Private investment began in the area before lighthouse construction with the establishment of several nearby hunting lodges. The most culturally and economically influential of these to the immediate vicinity was the Lighthouse Club of Currituck Sound. This club was established in 1874 while the CBLS was under construction (Johnson and Coppedge 1991:95). Edward C. Knight bought the property in 1922 and subsequently developed Corolla Island on the property. Knight made several investments in the area during his time there. With his investment of $385,000 (worth ~$5,513,348.73 in 2017), Knight purchased land to build the Whalehead Club (Schoenbaum 1988; Johnson and Coppedge 1991:95; Friedman 2016). During his tenure as owner of the Whalehead Club, Knight supplied jobs for other local citizens (Bishir and Southern 1996:91; Davis 2004:60).

The lighthouse compound began to fall into disrepair after initial abandonment in 1939. A non-profit organization, OBC, was formed to restore and preserve the complex in the 1980s (NPS 1999:8.8). OBC spent well over $1,500,000 ($3,330,749.70 currently) in private funding in the early 1980s for conservation and preservation of the tower. The organization spent another 2,000,000 dollars ($4,798,713.23 now) on the other structures on the site (*The Sun* 2003:1A; *The*

Virginia Pilot 2003:C6; Friedman 2016). In 1992, Currituck County began restoration of the Whalehead Club and grounds after purchasing it for $2.5 million ($4,260,879.36 currently). The cost of this restoration was over $5,000,000 ($8,521,758.77 currently) (*The Virginia Pilot* 2002:C2; Davis 2004:144; Friedman 2016). Public and private investments are in Table 5.2. The information is further illustrated in Figure 5.4. Investment data is listed in *Appendix E: Investment Data*.

Table 5.2. Public and private investment in the CBLS and its surrounding community (USLHB 1873-1905, 1920; USLSS 1876:55; Schoenbaum 1988:92-101; Johnson and Coppedge 1991:95; NPS 1999:8.8; *The Virginia Pilot* 2002:C2, 2003:C6; *The Sun* 2003:1A; Davis 2004:144; Friedman 2016).

Decade	Investment	Decade	Investment
1870-1880	$2,951,514.63	1940-1950	NA
1880-1890	$479,208.76	1950-1960	NA
1890-1900	$512,790.66	1960-1970	NA
1900-1910	$486,664.71	1970-1980	$3,330,749.70
1910-1920	$607,051.08	1980-1990	$4,798,713.23
1920-1930	$6,024,218.31	1990-2000	$12,782,638.13

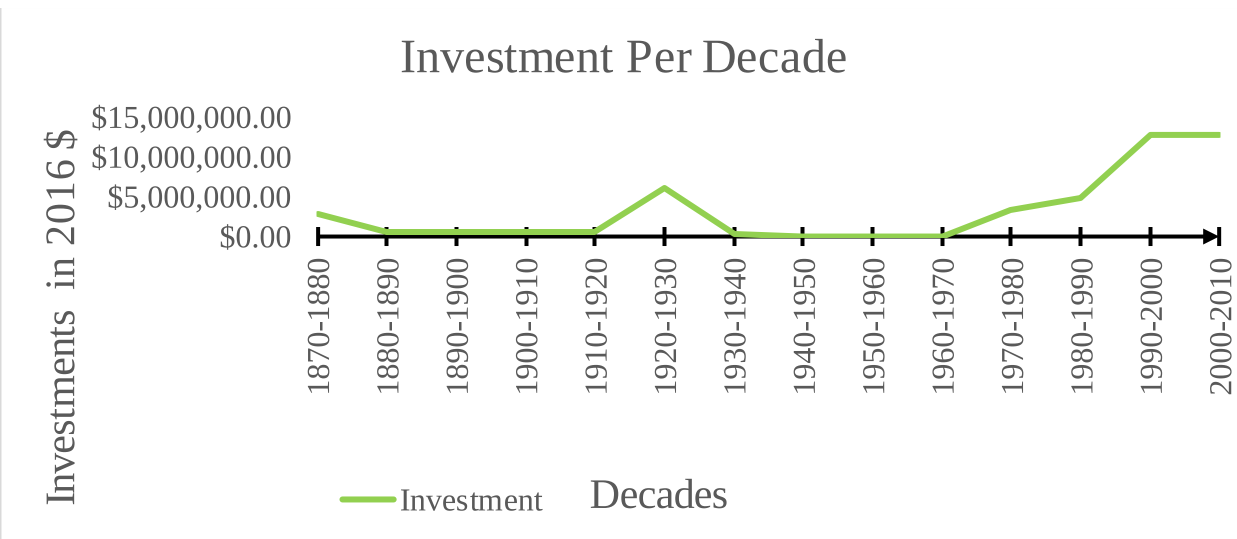

Figure 5.4. Investment Over Time (B. Scott Rose 2017) (USLHB 1873-1905, 1920; USLSS 1876:55; Schoenbaum 1988:92-101; Johnson and Coppedge 1991:95; NPS 1999:8.8; *The Virginia Pilot* 2002:C2, 2003:C6; *The Sun* 2003:1A; Davis 2004:144; Friedman 2016).

Terrestrial Archaeological Results

The most appropriate way to find changes to structures and structure location due to economic and cultural demands on the CBLS site is through evaluation and comparison of historical and archaeological data. The terrestrial information gathered from the site served to answer the question: what are the social factors that guided the development of the CBLS? This information was gathered to aid in understanding how technological change affected the community. These efforts also uncovered the utilization of public and private investments concerning the site.

Terrestrial archaeological methods produced data from three surveys: total station survey, gradiometric survey, and metal detector survey. 2013 fieldwork supplied total station points that were collected and used for future analysis. Proximal to the lighthouse, the author and research assistants gathered data using a gradiometer and a metal detector over two separate site visits. The author used a metal detector to collect contacts from the area surrounding the lighthouse to the north and near the assumed cistern location.

Total Station Data

Total station survey data was used to create a virtual space to evaluate and record other datasets. These points became the basis of all other surveys. Reference points were generated on a GIS map using the points gathered in the 2013 survey that was performed by Dr. Nathan Richards. Corners of buildings, fence posts, footpath boundary lines, and tree trunk locations were all recorded as points. Some points served as anchors for positioning virtual models of buildings, while others served to define areas of gradiometric and metal detector surveys. The researchers plotted these points in GIS software (represented by symbols) as seen in Figure 5.5. The raw total station data is shown in *Appendix F: Total Station Raw Data*. The data recorded with this device is accurate to plus or minus one centimeter (cm) (Topcon 2011:23.1).

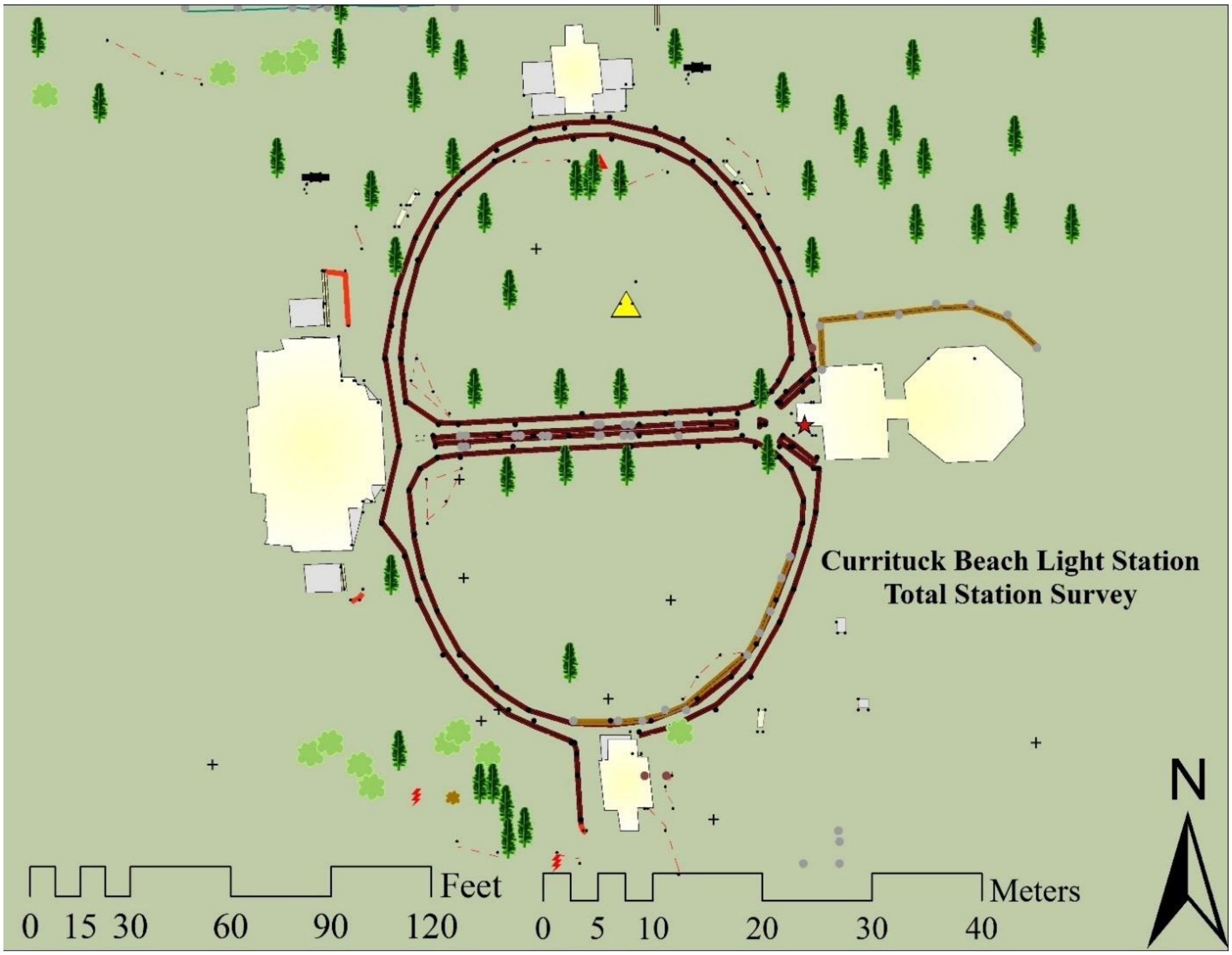

Figure 5.5. Total station points plotted in GIS software indicating features on the site (B. Scott Rose 2017).

Gradiometer Data

The gradiometric data once analyzed would show the team possible locations of important features on site. This researcher conducted two gradiometric surveys. Technical problems related to the integrated GPS system complicated both of those efforts. The information gathered was useful for estimating a general concentration of active elements in the areas surveyed. The first study revealed little of relevance since the geographic location of the survey was not accurately mapped. The integrated GPS in the survey device did not function properly.

The second attempt at a gradiometric survey was more successful than the first. Because of previous experience with problematic GPS, the surveyors conducted the search based on points recorded during the 2013 total station survey. The information recorded in the survey is accurate to one meter due to deviation of the technician from the path of survey line. Figure 5.6 shows the coverage area of each survey. The study compared the results of this survey with the results of previous fieldwork conducted in 2013 to determine accuracy.

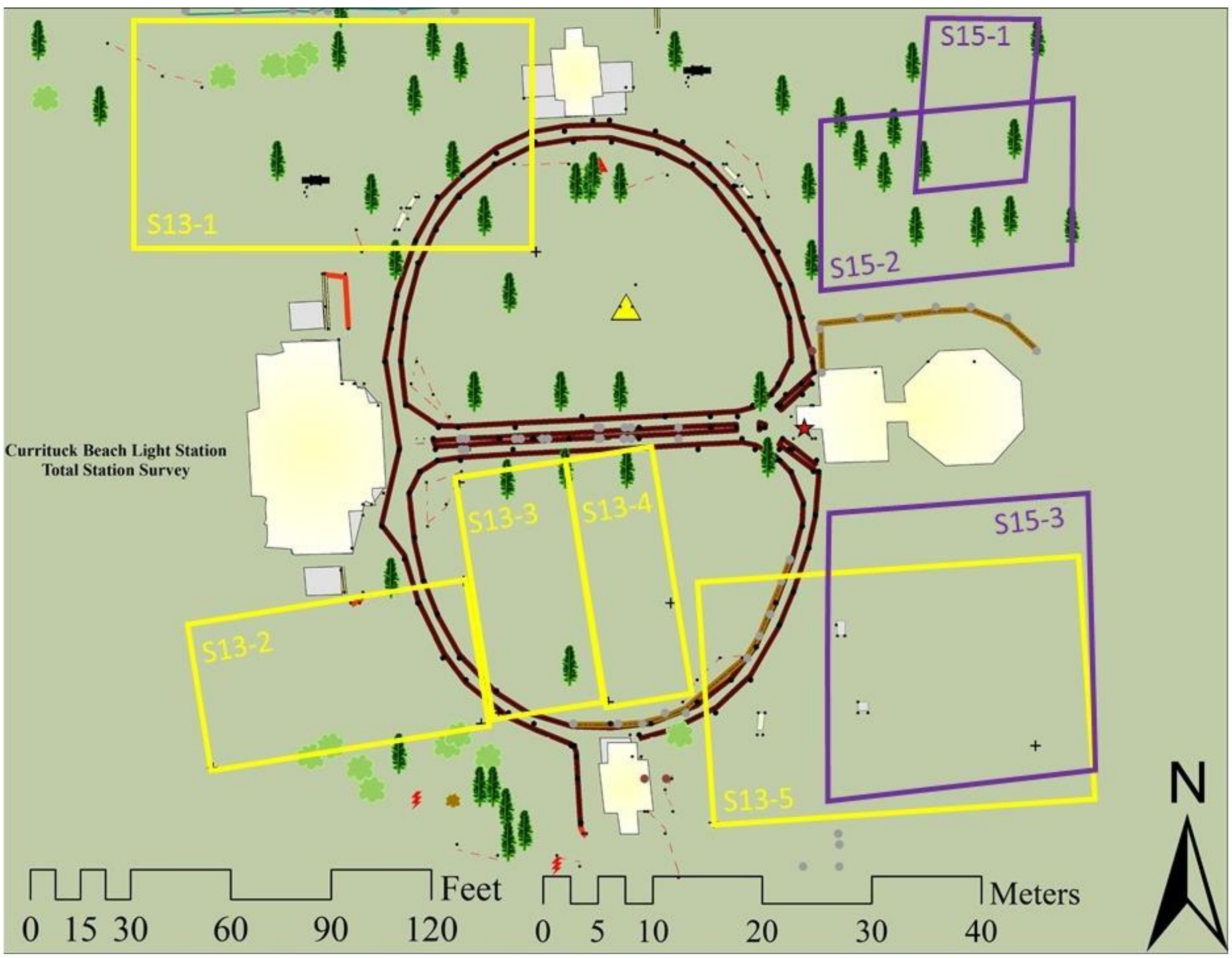

Figure 5.6. Gradiometric survey areas created in ESRI *ArcGIS*, S13 indicates 2013 fieldwork, S15 indicates 2015 fieldwork (B. Scott Rose 2017).

The gradiometric survey data are depicted in Figures 5.7 through 5.14. These results include several features of interest. These areas are discussed further in the analysis chapter of this study. The color shades in each image indicate a range of magnetic measurement above 0 to below 0 nano Tesla (nT).

Several publications set guidelines for determining types of magnetic anomalies (Weymouth 1986:343; Clark 1990:64; Gaffney and Gater 2003:110-111; Bevan 2006:2,6). In most cases, these guidelines tend to be tailored to the particular study. An example of these guidelines is evident in *Wintershead Head, Exmoor: Combined earth resistance and extended gradiometer survey* (Carey and Ventre 2012), in which anomalies were divided into levels. When light and dark colors are present in close proximity to one another, the data indicate a possible dipolar anomaly. The analysis chapter of this work describes possible anomalies.

The first area of importance was S13-1, located just north of the big keeper's house (Figure 5.7). Feature A indicated a compound dipolar feature along the western extant of the survey area exhibiting a 185nT to -15nT range. A line of evenly spaced relatively high nT readings extended to the north. These readings may indicate a historic fence line. Feature B indicated a strong dipolar compound contact with a range of 155nT to -255nT. Feature C is associated with the large keeper's house cistern to the south and the benches located near the walk path in the north west of the site. Feature D is associated with the small keeper's house, the walk path, and other known structures.

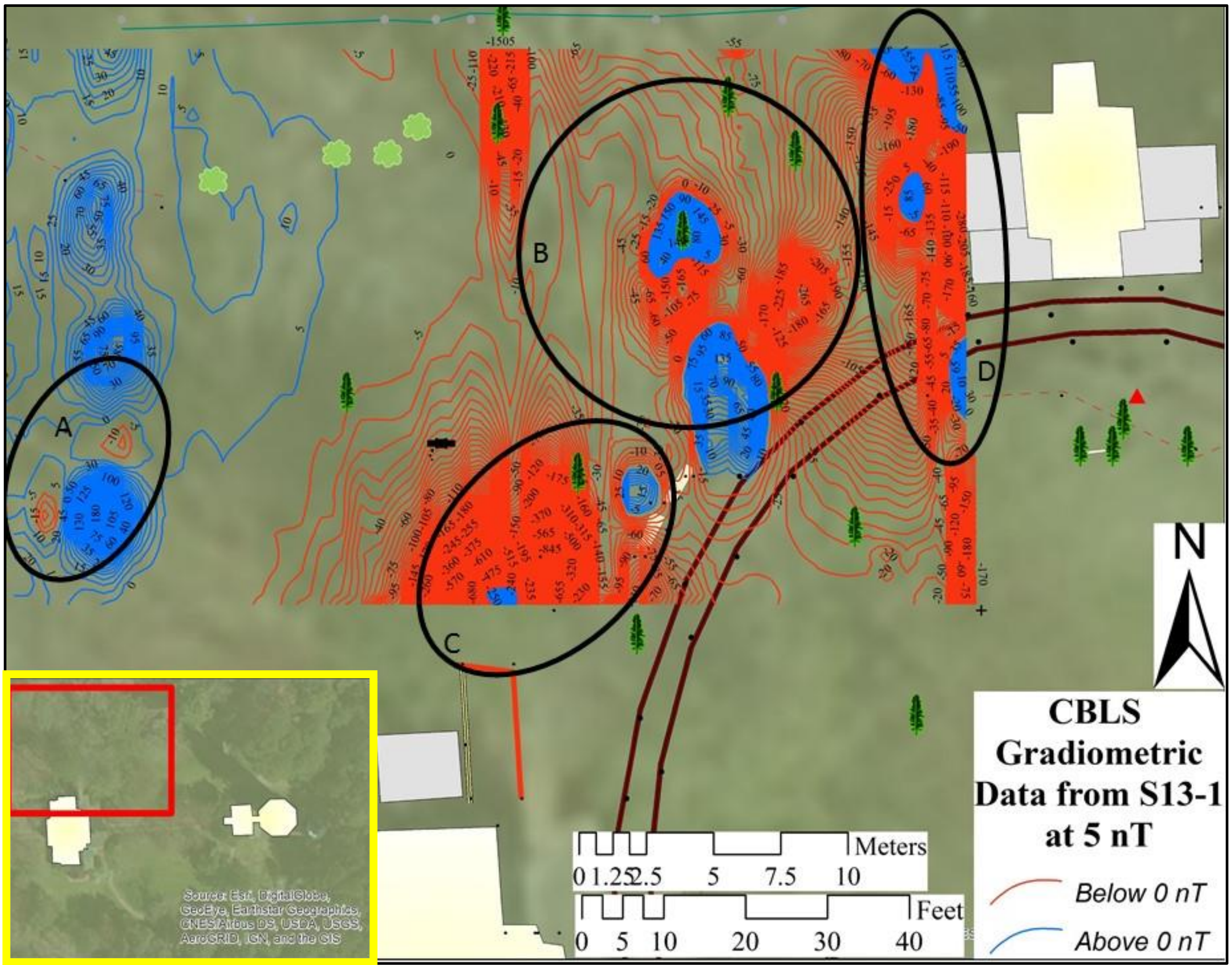

Figure 5.7. Survey area S13-1 (B. Scott Rose 2017).

The S13-2 survey area to the south of the big keeper's house exhibited two areas of interest (Figure 5.8). Feature A is associated with the southern extent of the big keeper's house elements. The compound dipolar anomaly in Feature B ranged between 325 nT and -1490 nT. This feature was at the southern extent of the survey area and was not entirely represented by this survey. An exterior electric supply outlet existed six and a half meters to the south. Its associated underground supply wires may account for these readings.

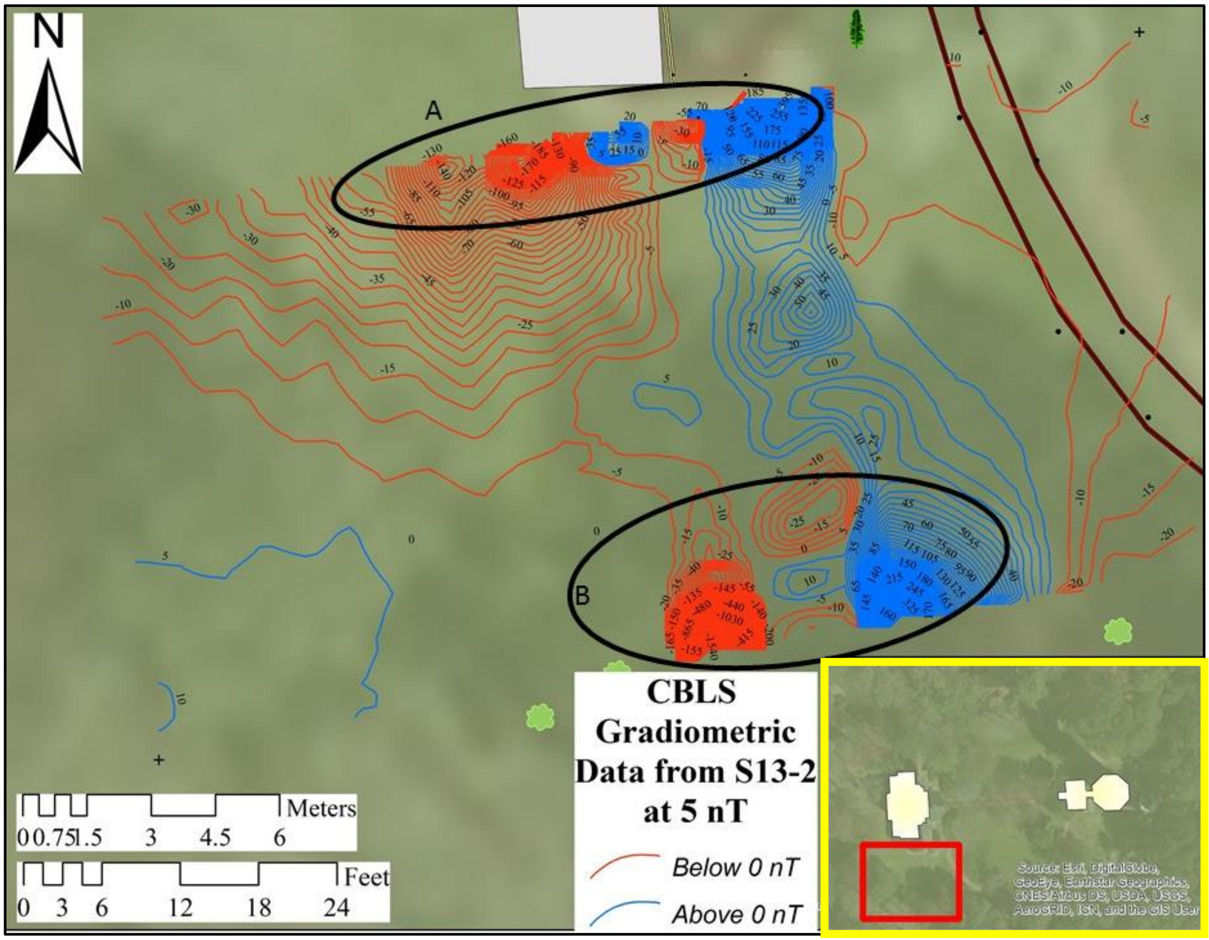

Figure 5.8. Survey area S13-2 (B. Scott Rose 2017).

The survey area S13-3 was located to the northwest of the storage building. This study region contained two areas of interest. The first area of note was in the southeastern corner of the survey area and could be associated with the office structure to the southeast. The largest measurement here was 72 nT. Only one feature existed in survey area S13-3. This feature was centrally located immediately to the south of the adjoining path between the tower and big keeper's house. This convenient location, paired with a dipolar reading between 15 nT and -15 nT and photographic evidence (Figure 5.9) makes this feature appear to be a structure footprint location.

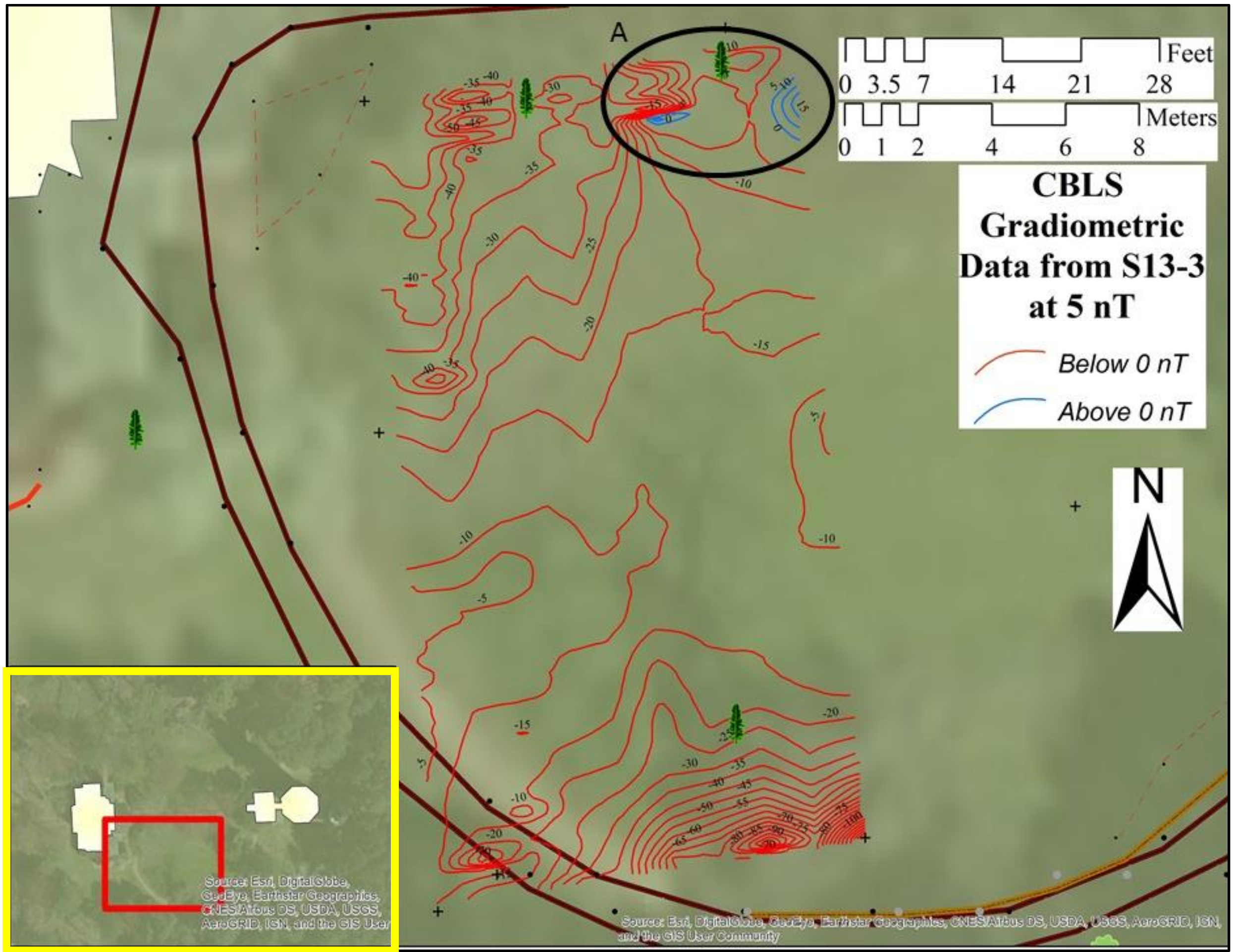

Figure 5.9. Survey area S13-3 (B. Scott Rose 2017).

The survey area S13-4 was a continuation of the study area S13-3 (Figure 5.10). It was located directly to the east of S13-3 and north of the storage building. Two features located in this area may represent a continuation of the features found in S13-3. Of these, the southernmost reading was the strongest at 277 nT.

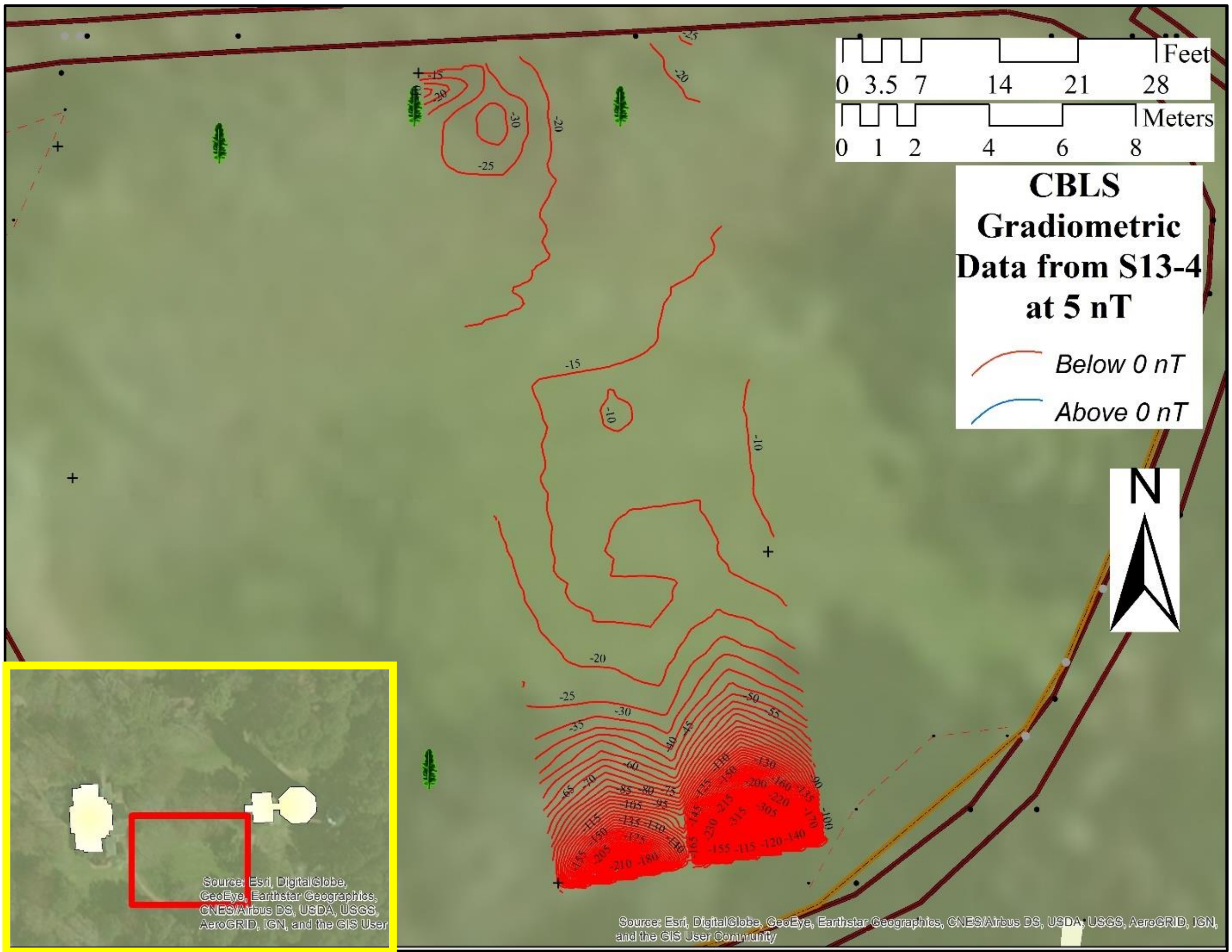

Figure 5.10. Survey area S13-4 (B. Scott Rose 2017).

The S13-5 survey area exhibited several complex features. Feature A was located just south of the tower and was complicated by its association with this structure. Feature B showed two compound dipolar contacts that are most likely related. These contacts ranged between 500 nT to -200 nT. This may indicate a structure footprint, such as an alternative location for the structure mentioned in the discussion of Feature A in area S13-3. A concrete slab existed in the northern part of Feature B. Feature C proved to be another complicated area and illustrated a large compound dipolar contact with a range between 450 nT to -1500 nT. This feature may represent a structural footprint based on its location and photographic evidence, which shows a long barracks building at this location during the 1950s (Figure 5.11) (NPS 1999:8.8). Feature D illustrated a dipolar feature with a range between 800 nT to -800 nT located in the southeast corner of the survey area. This feature was not fully represented in this study and cannot be accurately analyzed.

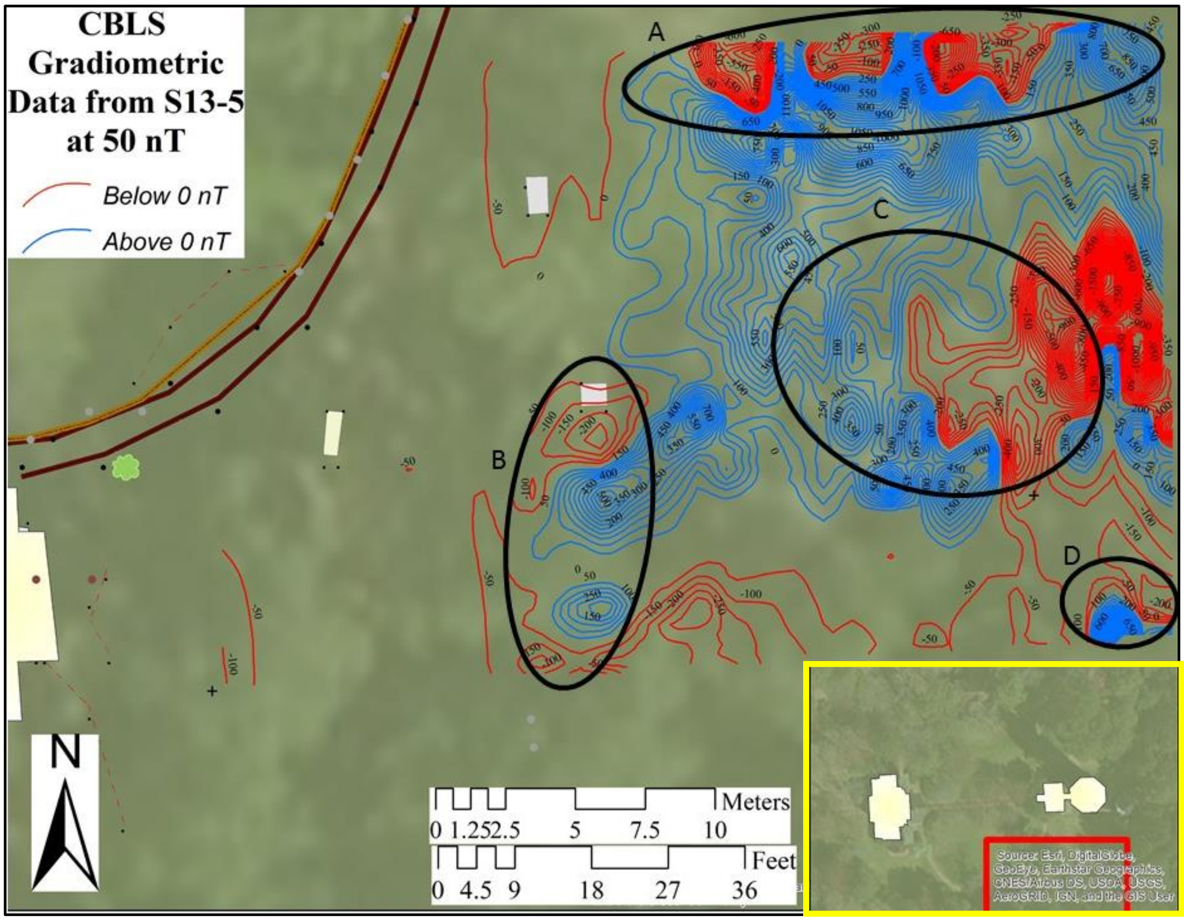

Figure 5.11. Survey area S13-5 (B. Scott Rose 2017).

The last area surveyed in 2013 was S13-6. This area was located 50 feet north of the lighthouse and contained modern backfill that was associated with an academic training activity. Two features existed in this area, both of which represented elements of this recent disturbance.

Survey S15-1 was completed directly north of the tower. This survey uncovered three features, the first of which appears in Figure 5.12 as a series of possible anomalies along the western edge of the study area (A). This feature also had a large dipolar contact ranging from 110 nT to -500 nT. The second contained one or more strong dipolar contacts located in the center of the northern half of the survey area (B). These contacts ranged from 223 nT to -212 nT. The light feature on the southern edge of the study area is directly north of S15-2 and was associated with features in this field (C). The highest reading in this feature was 85 nT. Feature D.

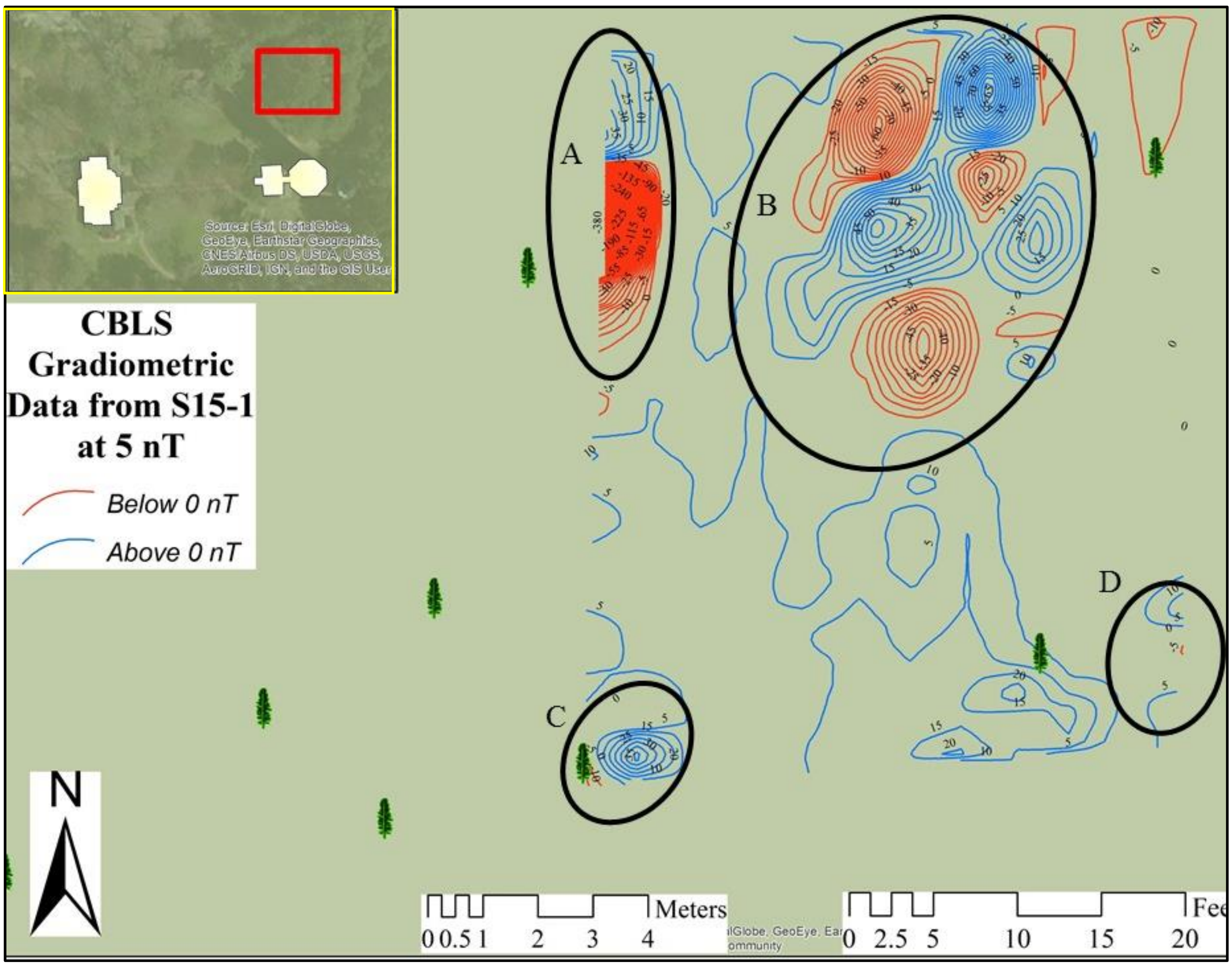

Figure 5.12. Survey area S15-1 (B. Scott Rose 2017).

The most interesting area of survey was S15-2, which contained three features (Figure 5.13). Feature A consisted of a long strip of strong compound dipolar contacts along the western edge of the survey area with measurements ranging between 275 nT to -105 nT. This feature may represent a historic fence line, a trampled path area, or an underground drain pipe or electric supply. A drain to the south of this area (Feature C) existed near the oil-house. Feature B displayed several strong compound dipolar features that could be indicative of a structural footprint. This was independently confirmed by the metal detector contacts located in the same area.

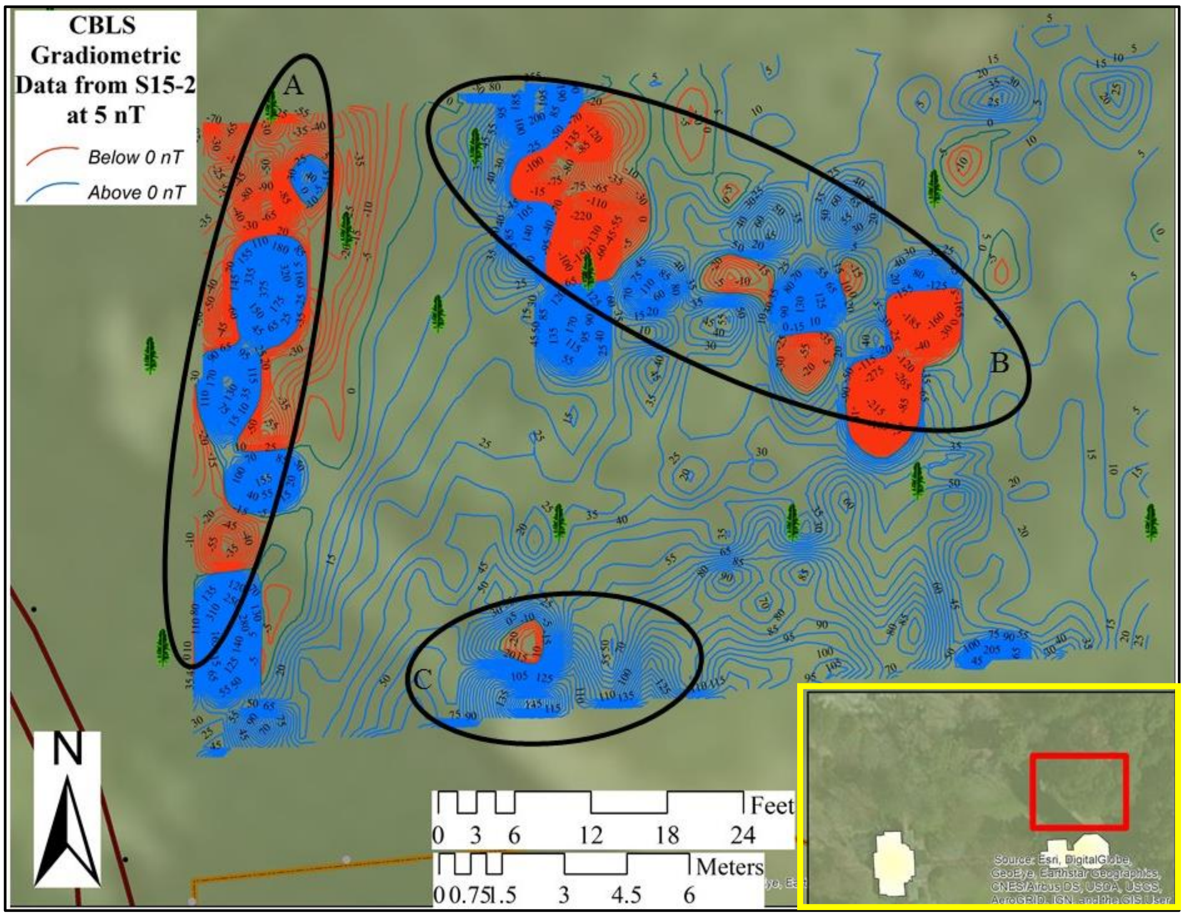

Figure 5.13. Survey Area S15-2 (B. Scott Rose 2017).

The last gradiometric survey area, S15-3, shown in Figure 5.14, was located to the south of the tower and overlapped area S13-5. It contained many of the same features, which were interpreted the same as in S13-5. The gradiometric measurements were different due to the separation of these two surveys by almost three years. The data also varied because equipment operators varied during each survey. The range of measurements in Feature A of S15-3 was between 1000 nT to -1000 nT. Feature B displayed a range between 300 nT to -300 nT. Feature C contained a range between 950 nT to -1100 nT.

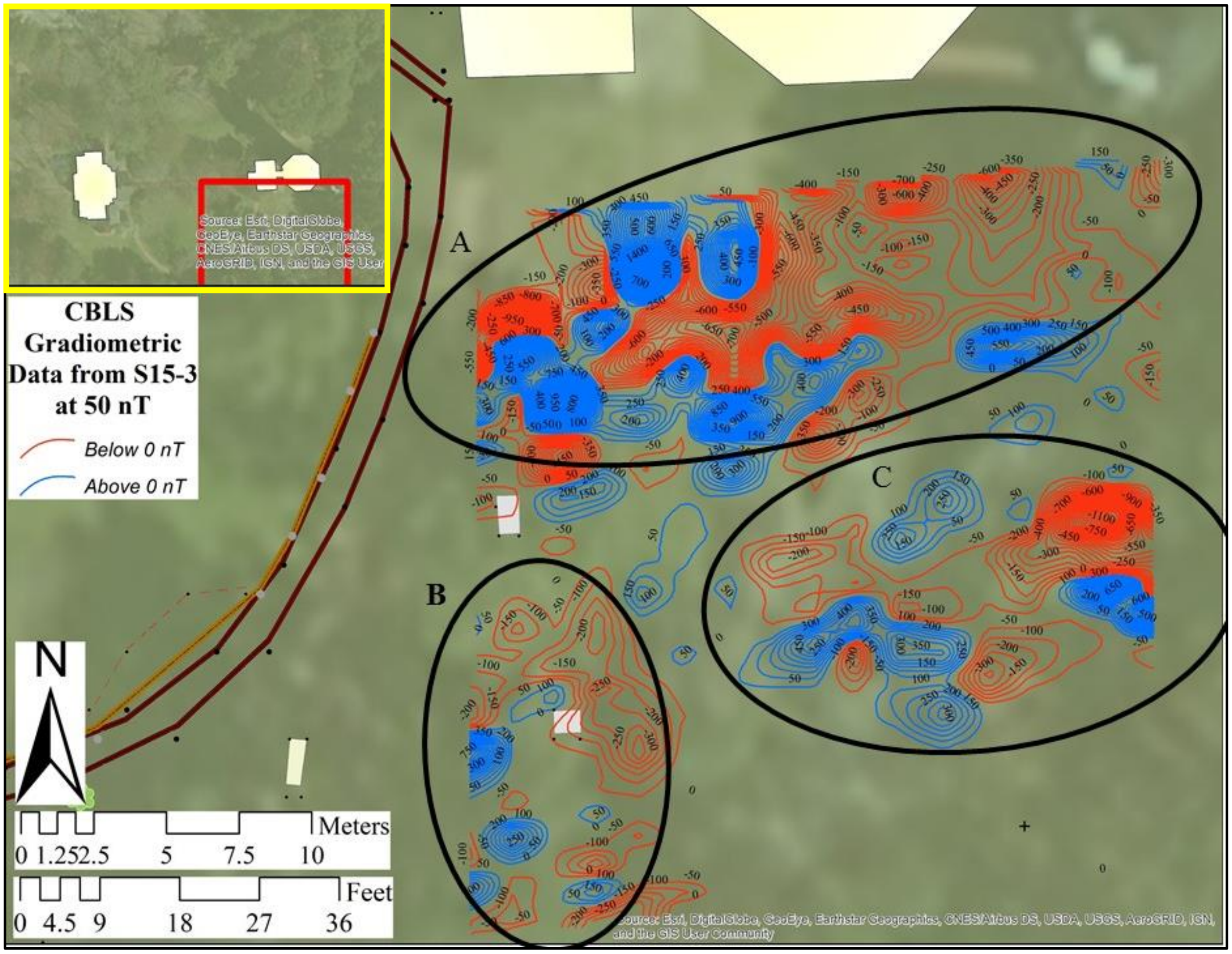

Figure 5.14. Survey area S15-3 (B. Scott Rose 2017).

The gradiometric survey data accuracy can be discussed in three ways. The surveys conducted on site are accurate to plus or minus three meters on a global scale based on the geodetic marker on site (NGS 2016). The gradiometric survey data inside of the survey area is accurate to within plus or minus one meter. The survey area is accurate to plus or minus one cm based on total station points, which are relative to the geodetic marker (Topcon 2011:23.1).

Metal Detector Data

GPS signal acquisition was problematic for metal detection data as well. The first attempt with the Minelab detector showed a deviation of five meters. The error was too high to establish any noticeable artifact pattern. An attempt to use the Pioneer 202 Bounty Hunter and Garmin GPS together provided better accuracy to within three meters. Limited by the error range, each of the two detectors could not validate data from the other in a reliable manner. However, these first attempts did indicate a significant number of metallic objects in the area north of the lighthouse. These results are visible in Figure 5.15, along with the northern edge of the tower and its attached oil-house to the south.

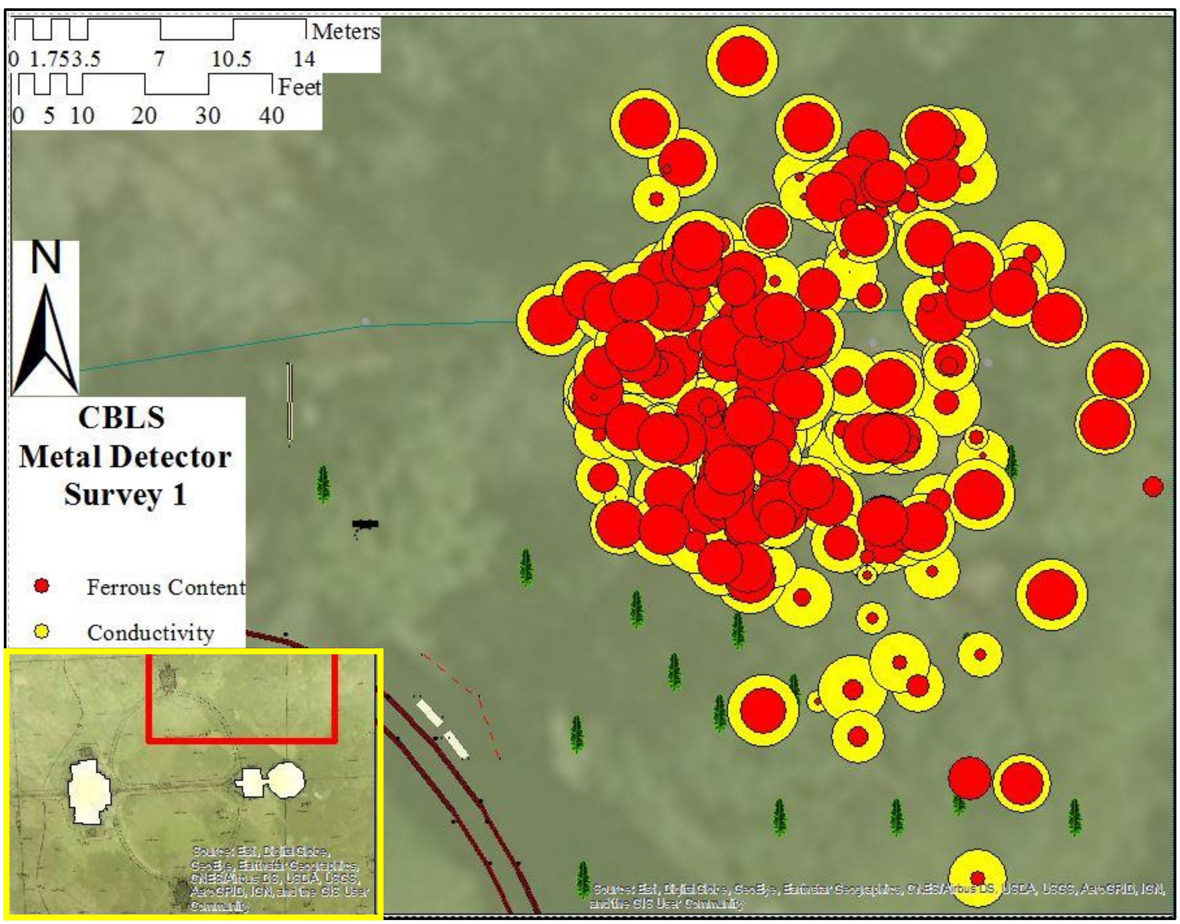

Figure 5.15. Initial metal detector survey on the north side of the tower (B. Scott Rose 2017).

The second metal detector survey proved more successful than the first. The baseline-offset method was more accurate and useful for this study. Figure 5.16 illustrates the information gathered from this survey. The study combined information from the Minelab Metal Detector CTX 3030 and through a baseline offset mapping technique. The metal detector provided the ferrous content and conductivity information for each numbered point. The baseline-offset technique provided the actual location of the point to within one meter.

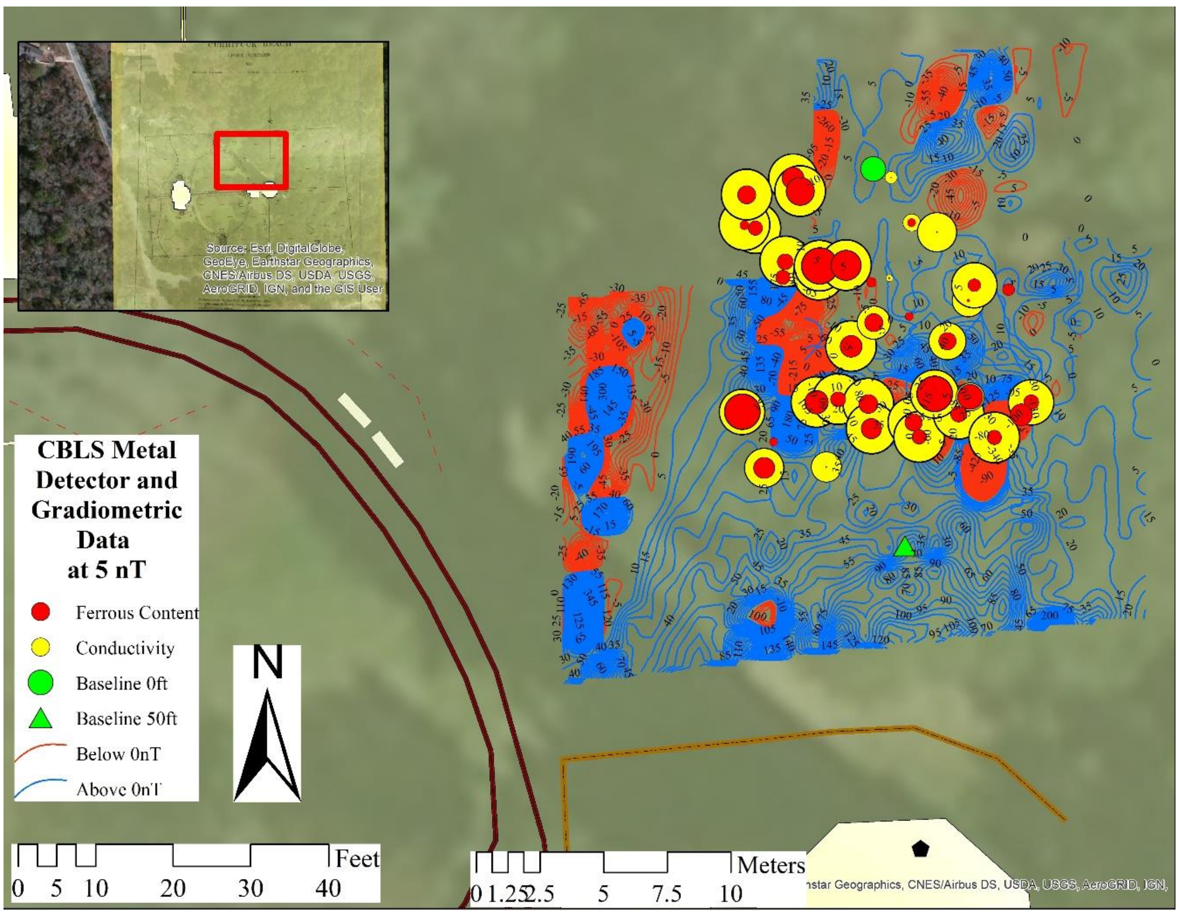

Figure 5.16. Gradiometric and metal detector survey data in area S15-1 and S15-2 (B. Scott Rose 2017).

The second area of the survey using the metal detector was east of the lighthouse complex and in line with the southern edge of the south storage building. It was about 12 feet from the current east fence line. The area included a historically documented brick cistern located in this general area on a map completed in 1893 by H. Bamber, the Surveyor General of the USLHB. The cistern area survey revealed a large concentration of active hits in the southeast corner (Figure 5.17), though the accuracy of the survey may be questionable due to foliage cover. However, the recovered data seemed to indicate a tighter pattern of contacts; the accuracy deviance was as much as three meters. These contacts could represent metal reinforced concrete or other ferrous building materials.

The accuracy of the second metal detector survey was based on the geodetic marker, which was accurate to within plus or minus three meters (NGS 2016). The information was accurate to within one meter inside the survey area. The survey area was accurate to plus or minus one cm based on the total station (Topcon 2011:23.1). This data is shown in *Appendix G: Metal Detector Raw Data*.

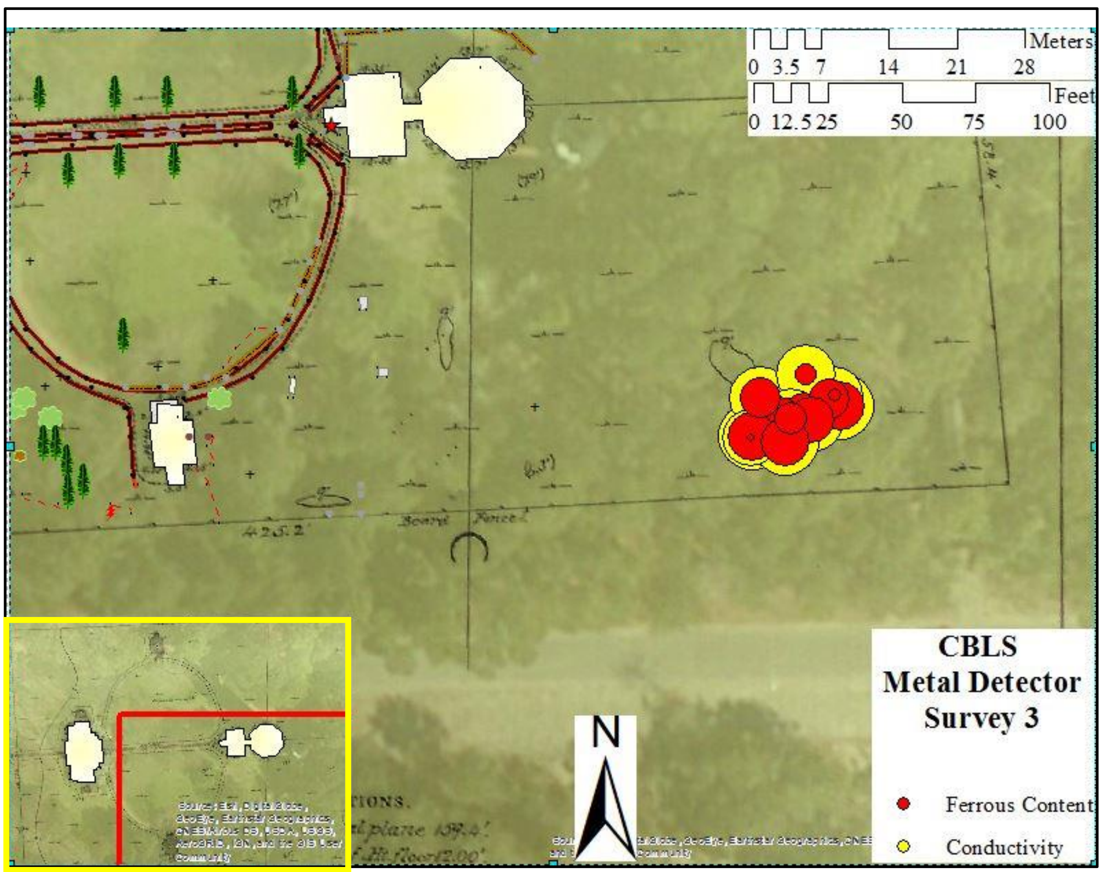

Figure 5.17. Metal detector survey area associated with historical cistern location and resulting contacts (B. Scott Rose 2017).

Three-Dimensional Model Creation Results

Virtual models aided in understanding whether the buildings on site have changed throughout time. The study developed 3D virtual models in two programs using two different datasets. The first method included the use of photographs to create a virtual model representative of the current landscape and architecture. In the second method, the researcher converted the original construction plans into 3D virtual models reflective of the vision of the architect. The author then processed the data gathered from each of these methods into a more analyzable virtual model form.

<u>Photogrammetric Data</u>

Hundreds of photographs were taken from several locations and compiled with aerial photographs for processing in photogrammetric software. Each existing structure was modeled. Due to the foliage cover, not all the photographs were usable for this application. Each model was placed in latitude and longitude coordinates based on known corners of each building in *Rhino 5*. Photogrammetric models were created for each of these and combined with the models from the original construction drawing that were completed using the program *Rhino 5*. After these models were combined, the author compared the actual construction of the buildings and changes to the buildings over time to the original intent of the designer. Eventually, all models were imported into GIS software for integration and illustration. The actual data collected from the photogrammetric process included photos coupled with GPS points and directional information. The completed compound model is illustrated in Figure 5.18 and 5.19. The big keeper's house model is visible in Figure 5.20. Figure 5.21 illustrates the small keeper's house model. Figure 5.22 illustrates the storage building model.

Figure 5.18. Virtual 3D model created using Agisoft *Photoscan* (B. Scott Rose 2017).

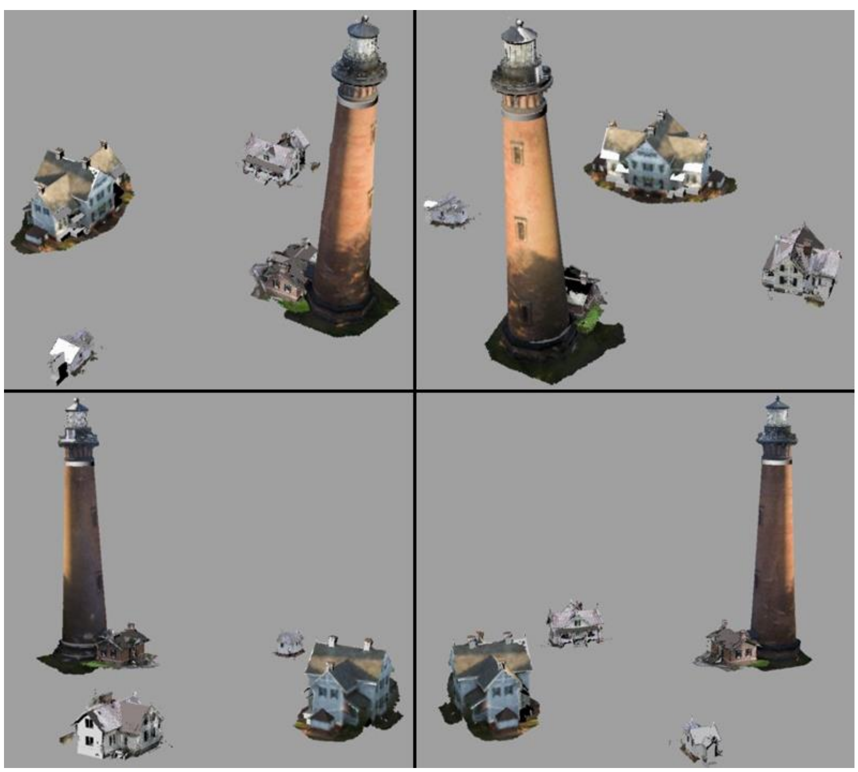

Figure 5.19. Virtual 3D individual models created using Agisoft *Photoscan* (B. Scott Rose 2017).

Figure 5.20. Virtual 3D Model of the big keeper's house at the CBLS, rendered in Agisoft *Photoscan* (B. Scott Rose 2017).

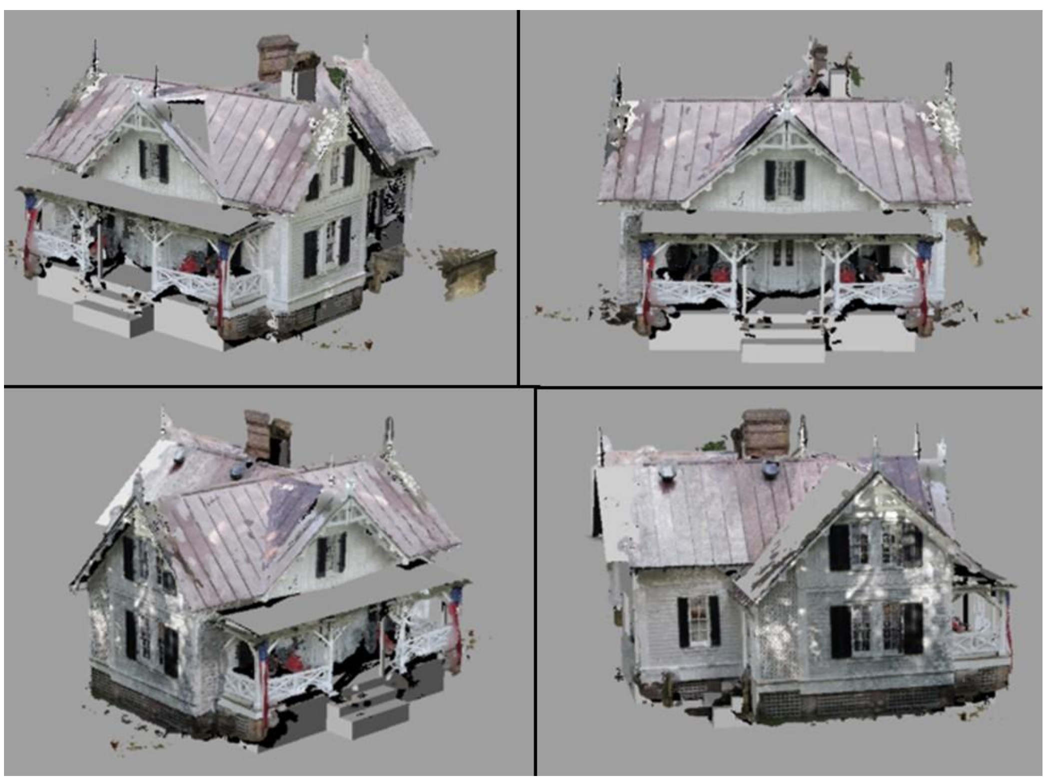

Figure 5.21. Small keeper's house model rendered in *Photoscan* (B. Scott Rose 2017).

Figure 5.22. South storage building model rendered in *Photoscan* (B. Scott Rose 2017).

There were issues with apparent holes in and sections missing from photogrammetric models due to foliage cover. These were remedied easily due to the symmetric quality of all structures on the site. The data produced from the virtual modeling effort did not affect the researcher’s ability to use it in a qualitative manner to find differences between the architect’s intent and the current status of structures on site. The model’s accuracy on the map is based on the geodetic marker, which is accurate to within plus or minus three m (NGS 2016). The models are accurate to plus or minus one cm based on the total station data (Topcon 2011:23.1). Model accuracy is negligible due to the ability to constrain the model to a known measurement. This was accomplished using measurements taken of the south storage building.

Computer-Aided Drafting Data

Digital reconstruction of the site using *Rhino 5* CAD software included actual construction plans for the compound (Figure 5.23). The author created the data for this process with CAD software. Each structure had a file associated containing spatial data about the outside dimensions of each structure based on copies of the original architectural drawings from the area planners. The tower is visible in Figure 5.24; the big keeper's house model is shown in Figure 5.25. The small keeper's house model is shown in Figure 5.26. The storehouse model is visible in Figure 5.27.

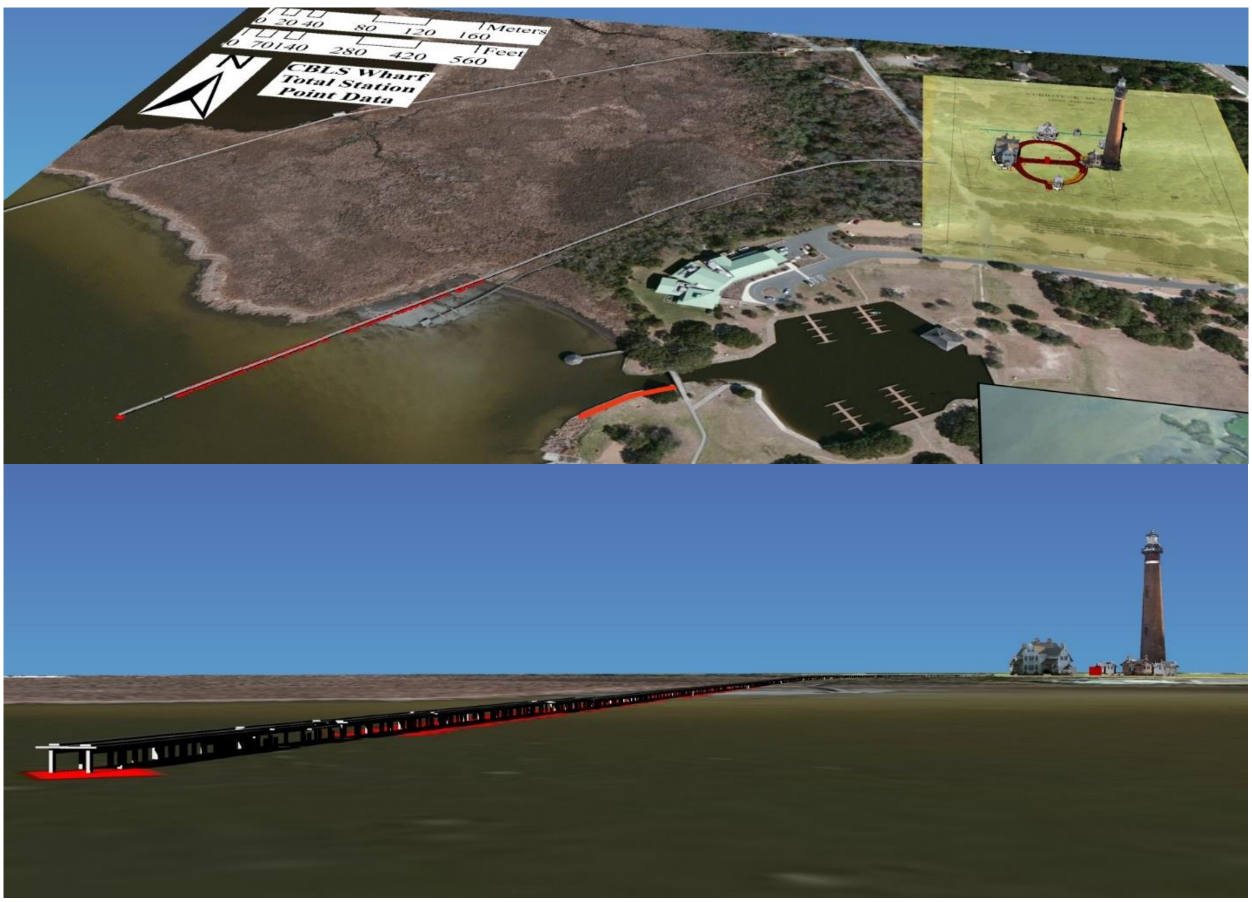

Figure 5.23. CBLS 3D Reconstruction using *Rhino 5* based on original construction drawings by USLHB (OBHC 1881-1940; B. Scott Rose 2017).

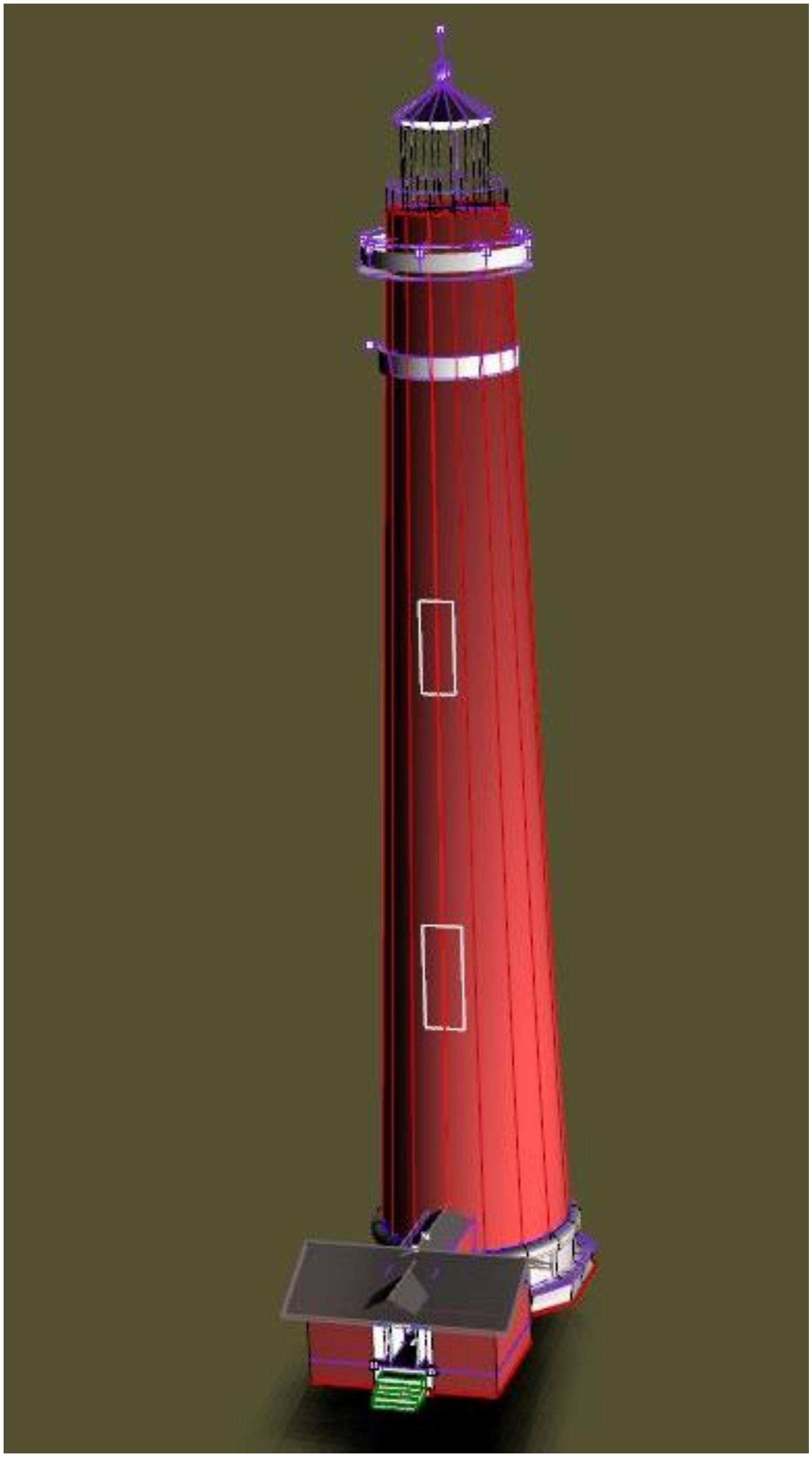

Figure 5.24. Virtual model of the CBLS tower created using *Rhino 5* (B. Scott Rose 2017).

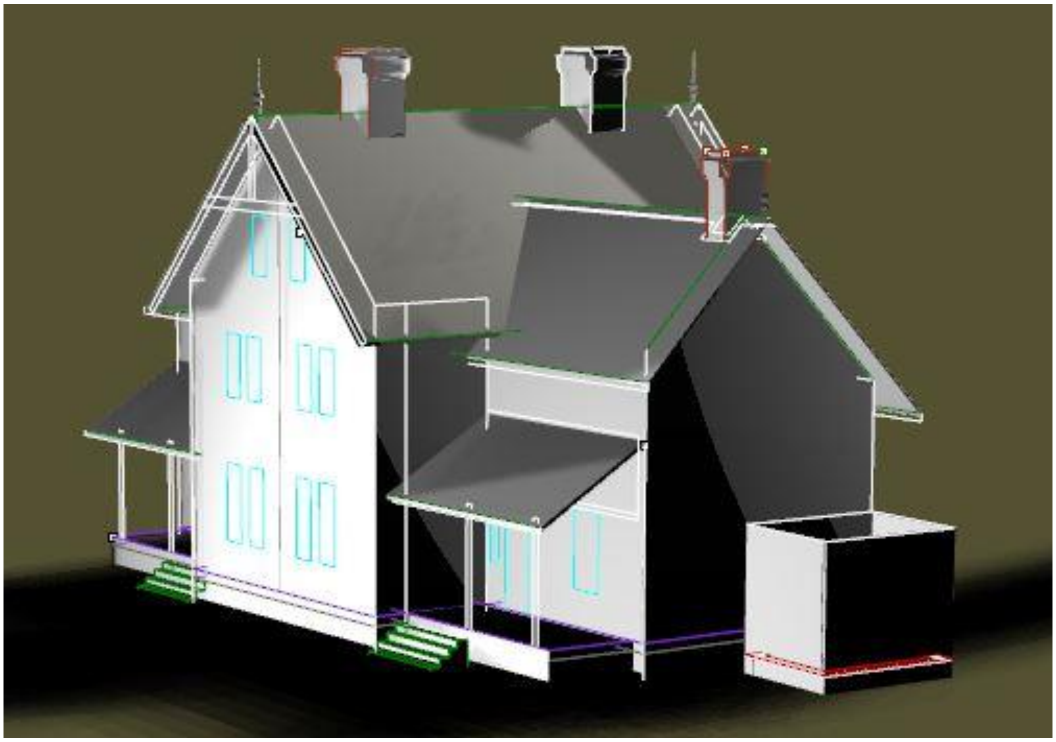

Figure 5.25. Big keeper's house virtual model created using *Rhino 5*. (B. Scott Rose 2017).

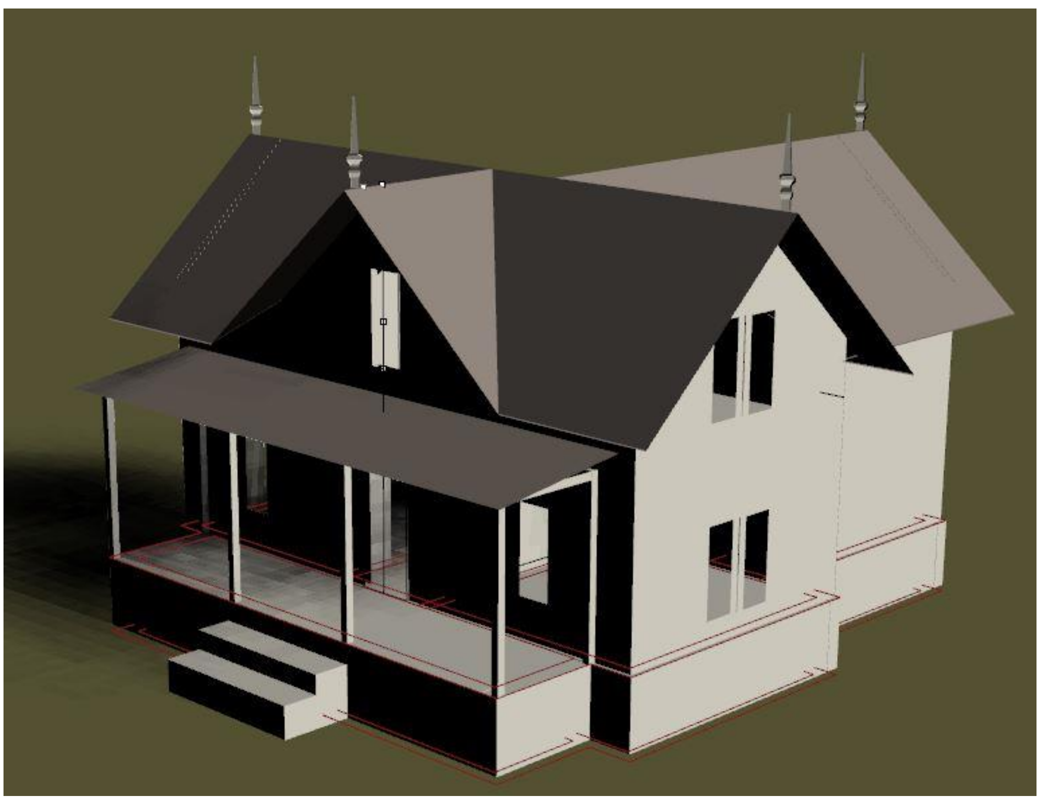

Figure 5.26. Virtual model of the small keeper's house created in *Rhino 5* (B. Scott Rose 2017).

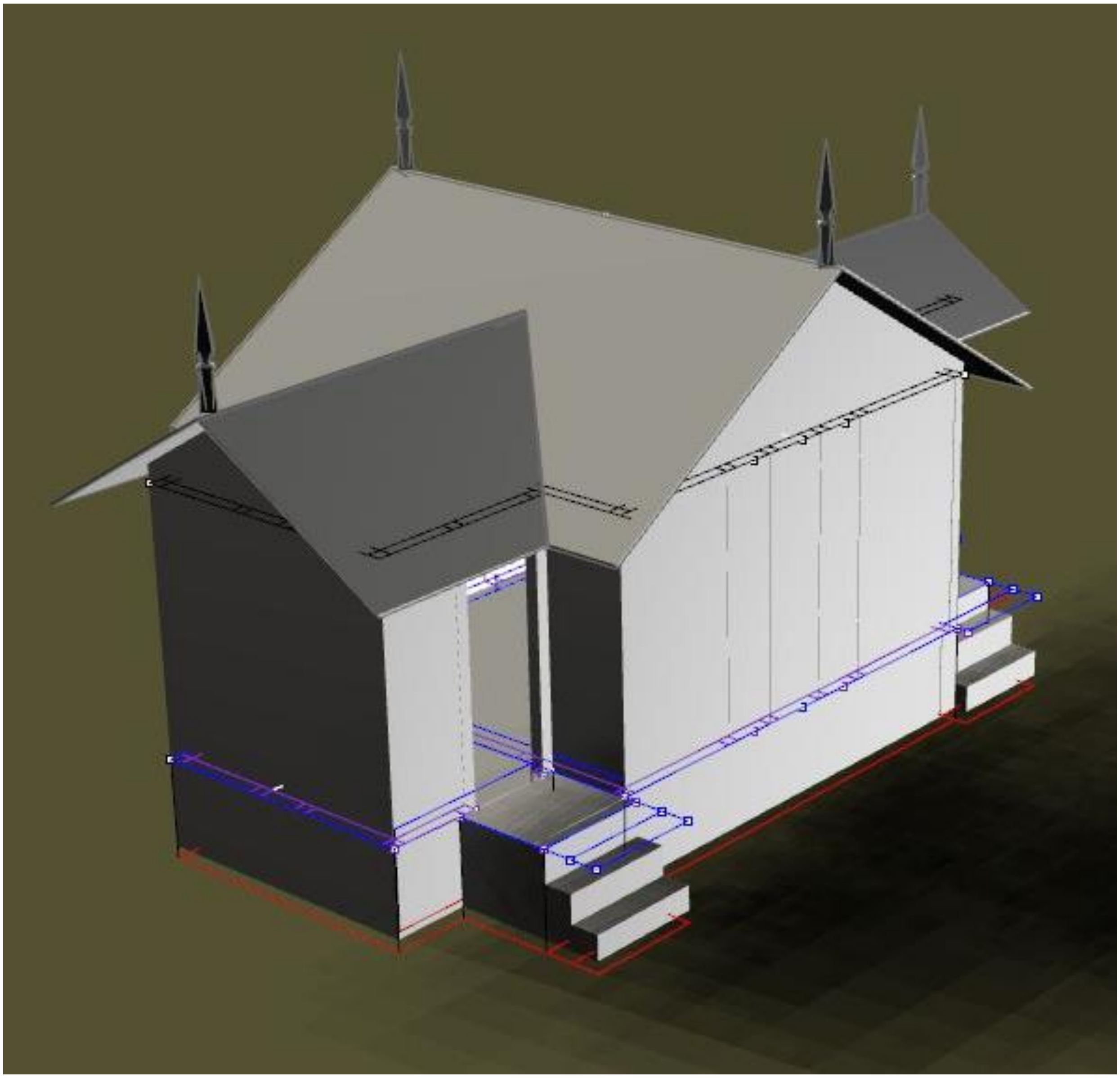

Figure 5.27. Virtual model of the storehouse on the CBLS site created in *Rhino 5* (B. Scott Rose 2017).

Photogrammetric models were imported into the *Rhino 5* program. The photogrammetric models were placed in the footprint of each original construction model for comparison. Details on this process and an analysis of the results are provided in the following chapter. The original plans are illustrated in *Appendix H: Original Construction Plans* (OBHS 1881-1940).

Underwater Archaeological Results

The underwater methodology produced information that answered the same questions as the terrestrial data, but with regards to supplying the lighthouse, initial construction at the site, and how the lighthouse and surrounding community related to the larger world. Of primary concern in the marine survey was the documentation of all existing wharf structures extending into the sound. The wharf structure was a link between the agencies who invested in the lighthouse and the compound itself.

The only features located were piles that supported the dock. The study utilized a total station, which was installed on the existing dock on the property. The author completed the ground survey using sight and tactile discovery. Technicians located some ferrous and magnetic material in the metal detector survey.

Total Station Data

The author conducted a total station survey to locate the original wharf pilings that extended into the sound several hundred meters. Technicians recorded many of these points in 2013. The data collected in the 2015 survey by the author matched the data gathered during the 2013 survey. There were several more pilings recorded during the most recent endeavor. These extend in a line far into the sound as seen in Figure 5.28. This illustration included a satellite image, a map created in 1877, and an overlay of red and green dots. The green points indicate data taken during the 2013 field survey. The red points show the positions recorded during the 2015 field study. Data points were collected with a total station.

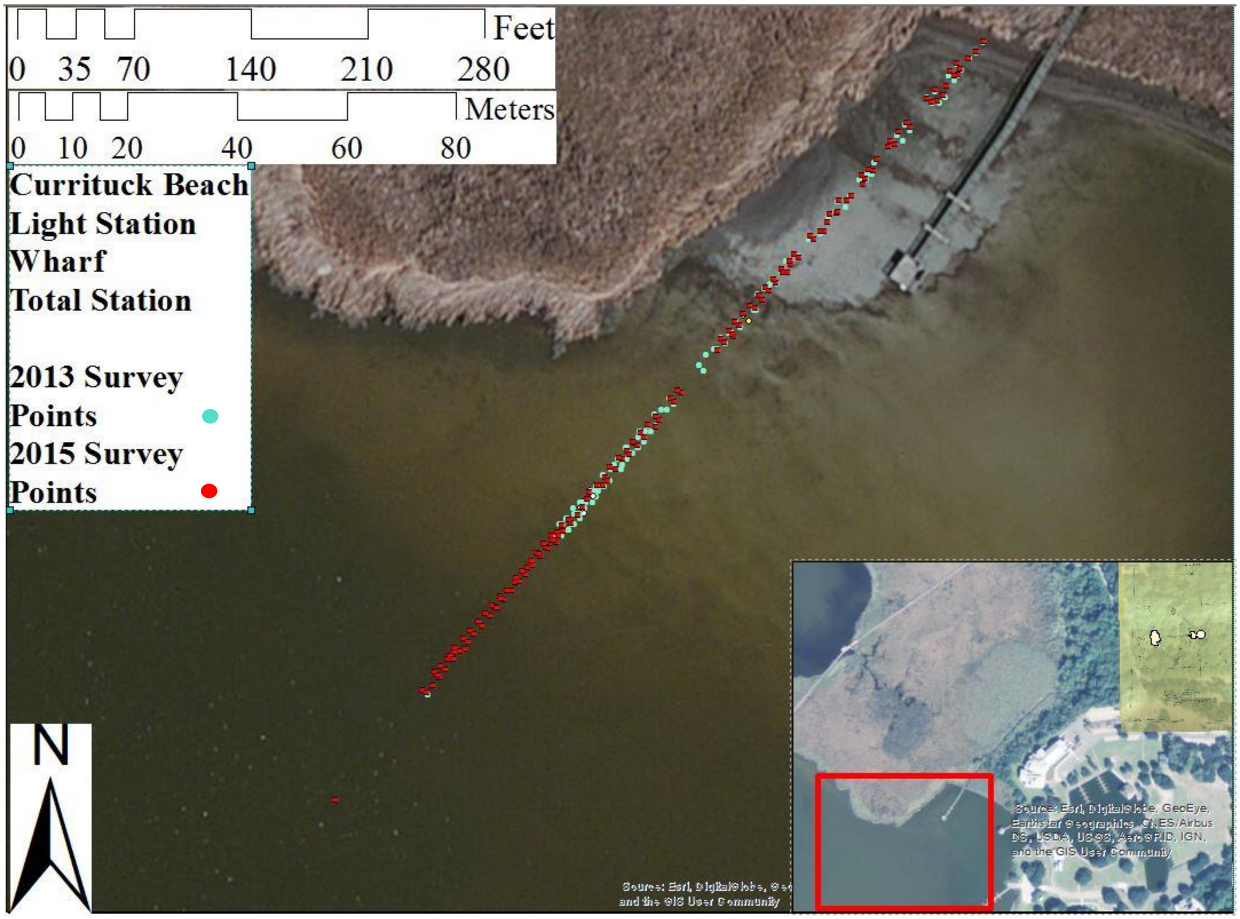

Figure 5.28. Total station points recorded from existing wharf piles overlaid on a base image of a survey from 1886 located at the CBLSA, and NOAA World Imagery (USDC 2015; B. Scott Rose 2017).

The total station data from the 2015 survey were not georeferenced properly when initially recorded due to a back-sighting error. Post-processing remedied this situation as the researcher discovered several points in the same relative position from each survey. Points from the 2015 survey were rotated into their correct position per the 2013 survey. The remainder of the shared points lined up accordingly with the new unmatched points extending to the southwest. The author combined these points with photographic evidence to create a virtual model of the wharf structure at the location surveyed. The analysis will project the extension of the pier into the sound and closer to the lighthouse compound. There is more grassland visible to the southwest on the map than existed in the satellite image.

Metal Detector Data

A systematic search was conducted in the area surrounding the existing wharf pilings using the Minelab Metal Detector and gathered the results illustrated in Figure 5.29. The survey located several contacts along the northeast edge of the area. This side of the study area corresponded to 5 m to the northwest of the line of existing pilings on site and 10 m to the southeast. Further tactile surveys were completed in the area to the southwest of the wharf pilings in the hopes of discovering more substantial structures as seen in historical photographs from the 1920s, one of which is shown in Figure 5.30. Recordings of these anomalies and the ferrous content and conductivity information along with the GPS coordinates were recorded. Data collected during the metal detector survey was assumed accurate to within three to five meters based on the GPS information.

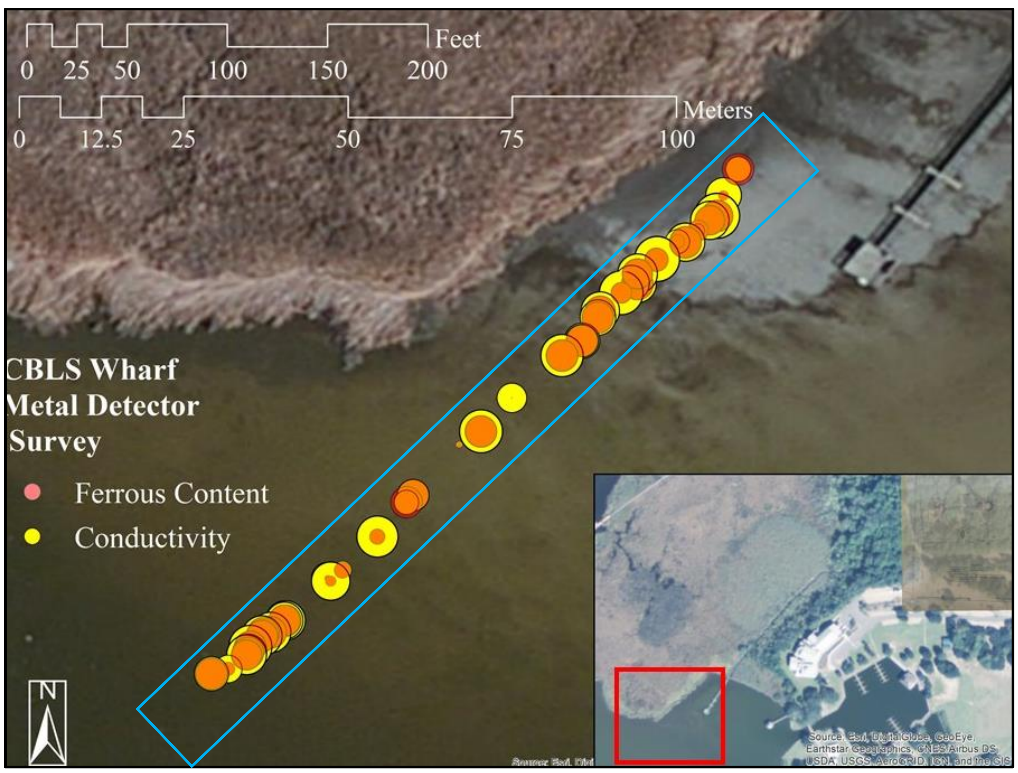

Figure 5.29. Metal detector survey results of the area with ferrous concentration and conductivity of anomalies (B. Scott Rose 2017).

Figure 5.30. Historical photograph of the end of wharf structure at the CBLS (Khoury 2003:14).

Virtual Modeling Results

The original construction plans of the wharf structure along with the data taken from the total station were consulted to reconstruct and accurately place the virtual model section of the pier in *Rhino 5*. In order to reconstruct the wharf section, the author referenced the existing piling locations, then created and placed in sequence each piece of the original supply list (Stetson 1877). Every *Rhino 5* model was created in virtual space using vector line graphics. All solid features are made from surface features. Each surface is made from line features traced from the original drawings. These models were created to compare structural interactions at different points in time.

An original construction drawing supplied the dimensions of the wharf model. This drawing indicated the total quantity and size of each type of wood and metal fasteners needed in the construction of the pier. With these dimensions, the author developed a virtual reconstruction of the wharf section using *Rhino 5* (Figure 5.31).

Figure 5.31. 3D virtual model created using existing wharf piles in *Rhino 5* overlaid on Google Earth image (B. Scott Rose 2017).

Conclusion

This chapter presented the historical information found in several reports. Various yearly copies of *The Annual List of Merchant Vessels of the United States* along with *Annual Reports of the United States Coast Guard and Annual Reports of the Light-House Board,* contained information about shipwrecks in the waters near the CBLS. Several United States Census population schedules were consulted to gain information about the population of the same area. Investment data was gathered from volumes of the *Annual Reports of the Light-House Board,* and several other sources referenced within this chapter.

Archaeological data gathered through several methods was processed and organized. Total station data became the most important information in this study, as all other datasets were geo-referenced from these total station points in *ArcGIS*. Most of the remaining information was problematic, which was detailed in this chapter. Gradiometric datasets were processed in *MagMap* and imaged in *ArcGIS*. Metal detector data was recorded and processed in *Xchange2* and imaged in *ArcGIS*. Virtual 3D models were created in *Photoscan* and *Rhino 5* and imaged in *ArcGIS* and *Google Earth*.

Chapter 6: Revealing Relevance, Analyzing the Data

Introduction

Analysis of the data gathered at CBLS were evaluated in four ways, which are discussed in this chapter. Firstly, the spatial data gathered from the archaeological survey are analyzed, compared, and discussed in the *Spatial Analysis* section. Second, a comparison of population change and economic investment is made (see section *Socio-Economic Analysis*). Next, *Risk Investment* correlates economic investment and shipwreck data. Finally, the relationship between population and disasters at sea is examined within the *Population and Disaster* section. The archaeological and historical information is discussed simultaneously within each section to reinforce correlations and to finally answer the research questions.

Reconstruction of the Light Station, Spatial Analysis

Spatial data including metal detector data, gradiometric data, and virtual models provide clues to the changing layout of the CBLS compound. Metal detector data indicate two possible building footprints. Gradiometric data show several possible building footprints or other cultural activity patterns. Additionally, virtual reconstructions of buildings show changes from original designs. With this in mind, the first section of this spatial analysis discusses structures that are on site today. The second section discusses buildings that are missing from the site and are referenced in historic photographs and documents. The third section discusses the temporary or transient buildings that are missing and are referenced in historical documentation only. Different phases of construction are defined in this section and incorporated into subsequent analyses.

Extant Structures

The Currituck Beach Light Station as it exists today is represented in Figure 6.1. Two structures built during the first construction phase at the site exist today. The lighthouse and the big keeper’s house were the first permanent structures to be completed on site. During the 1980s, several efforts and investments were made to reconstruct and maintain these two structures (Figure 6.2).

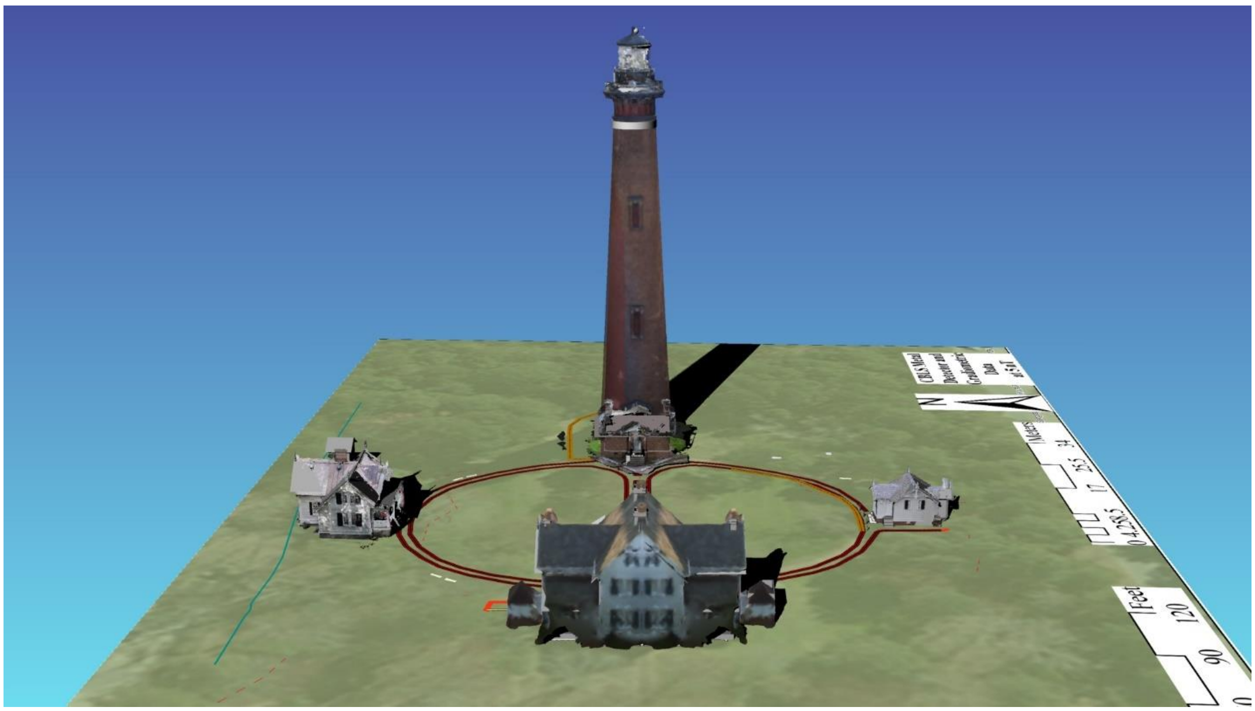

Figure 6.1. Virtual model depicting the CBLS as it exists today without natural overgrowth. (B. Scott Rose 2017).

The lighthouse was completed on 1 December 1875. While technologies changed inside the lighthouse, its structure has changed little since completion. Although this structure has been maintained throughout the years as other structures on site became overgrown and dilapidated, a large investment was required to reconstruct and conserve it. The tower kept its primary use throughout the site’s abandonment.

In 1876, the big keeper’s house was completed. It has housed every primary lighthouse keeper and his family since its founding. Four years after its construction, the big keeper’s house served as a home for 24 individuals (USBC 1880). The house was a constant fixture on site, even as it began to deteriorate after abandonment. The primary use of this structure was lost after abandonment.

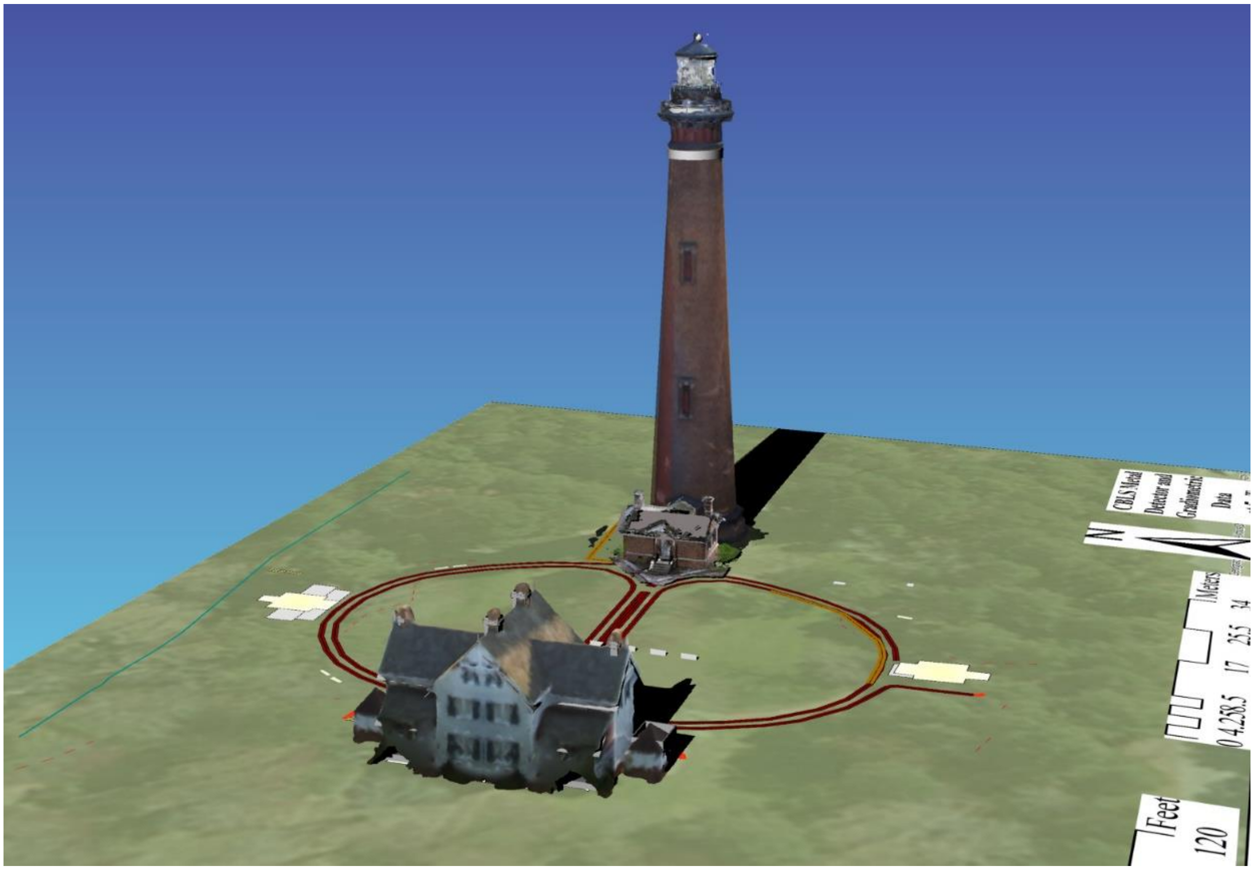

Figure 6.2. Virtual models of permanent structures including lighthouse tower and big keeper's house. (B. Scott Rose 2017).

Missing Buildings

Three buildings of interest exist in the historical and photographic records but not on the site today. These are the southeast cistern, unattached oil-house, and the circa 1936 CCC Barracks.

Placement of these buildings within the virtual model are based on historic photographs, gradiometric, and metal detector survey data.

The southeast cistern was present in 1893 and is evident in the 1906 map based on a survey completed in by H. Bamber in 1893 and in a historical photograph of the site from 1920 (Khoury 2003). Metal detector survey data confirms cultural activity in the same area (Figure 6.3). A preliminary test excavation near the largest concentration of these points would likely locate the remnants of this cistern and provide cultural information about activities on the site since its construction.

Figure 6.3. Virtual models of the southeast cistern placed based on metal detector contacts and photographic evidence. (B. Scott Rose 2017).

An unattached oil-house (Figure 6.4) is also present in the photograph of the site from 1920 (Khoury 2003). This building's erection was also mentioned in the Annual Report of the

Lighthouse Board in 1896 (USLHB 1896). This location was chosen based on the author's interpretation of the building location apparent in the historic photo; however, it is possible that the building was located to the south of the tower. The consideration of this possibility is logical due to the interpretation of a pattern in the gradiometric data to the south of the tower and the uncertainty involved in interpreting the historic photograph (Figure 6.5).

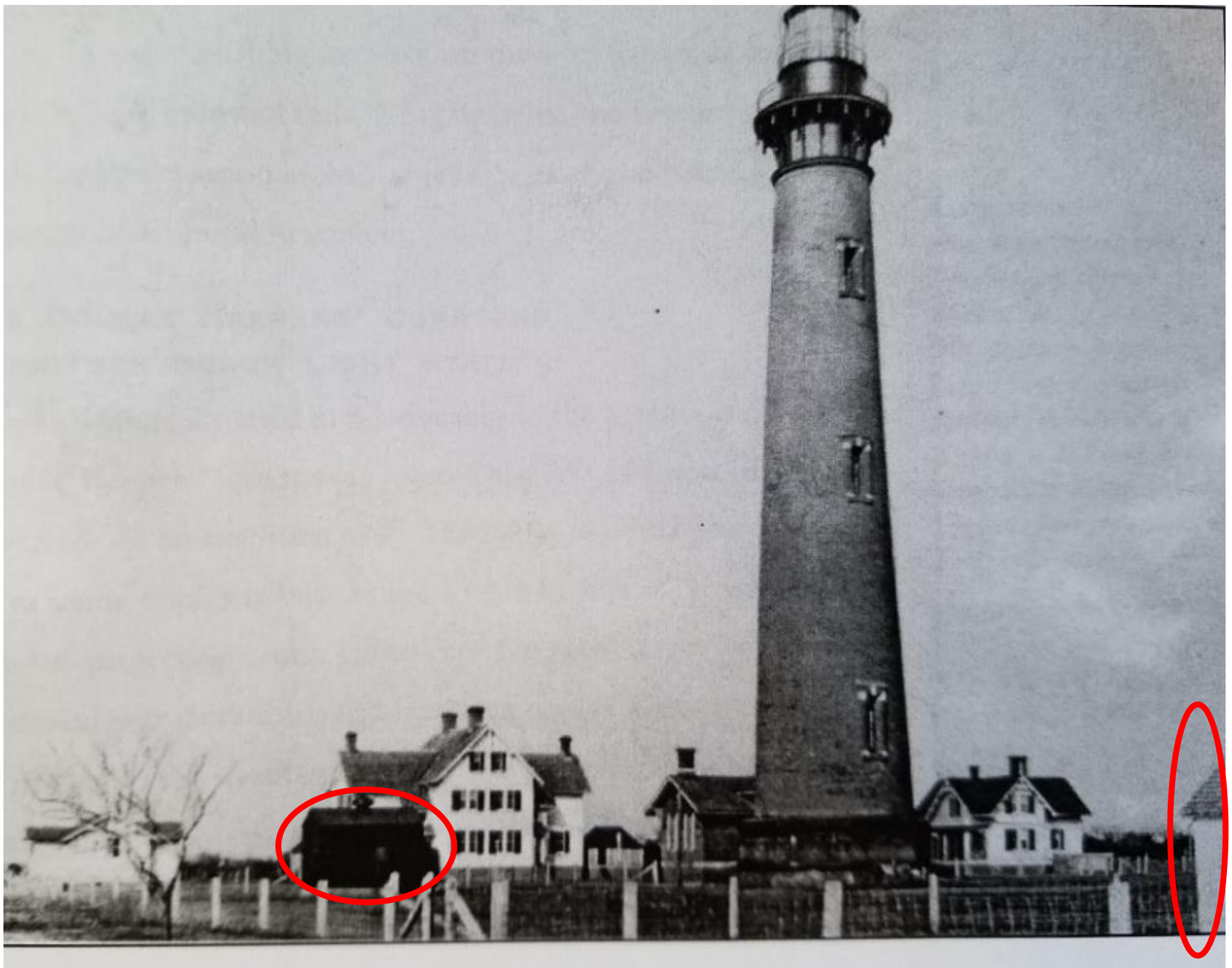

Figure 6.4. Historical photograph illustrating now non-existent structures on site from ca. 1920 (Khoury 2003:62). Oil-house center-left. Cistern building bottom-right corner. Indicative elements added by B. Scott Rose (2017).

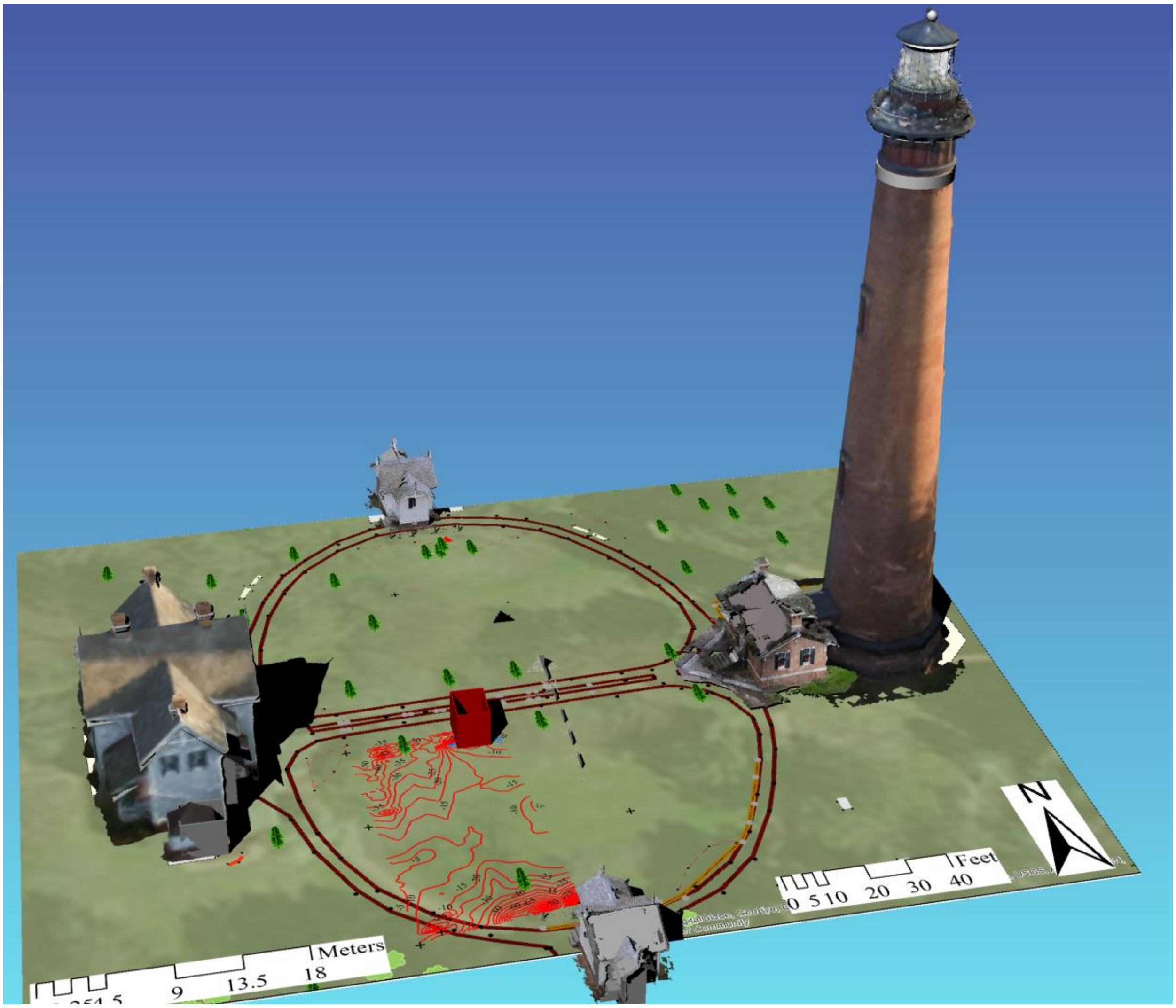

Figure 6.5. Virtual model depicting the placement of the oil-house based on a gradiometric anomaly and photographic evidence. (B. Scott Rose 2017).

The ca. 1936 CCC barracks is no longer on site. It has been located to the north of the complex and is being used as a private residence. It appears in the photographic record on site during the 1940s. Although complicated by the proximity of the lighthouse itself (a very large magnetic anomaly), the gradiometric data indicates a pattern consistent with a building's previous location. The model was placed in this area based on the photographic and gradiometric analysis (Figures 6.6 and 6.7).

Figure 6.6. Historical photograph from ca. 1950 depicting a long barracks structure located to the south of the CBLS tower (Lighthouse Friends 2015).

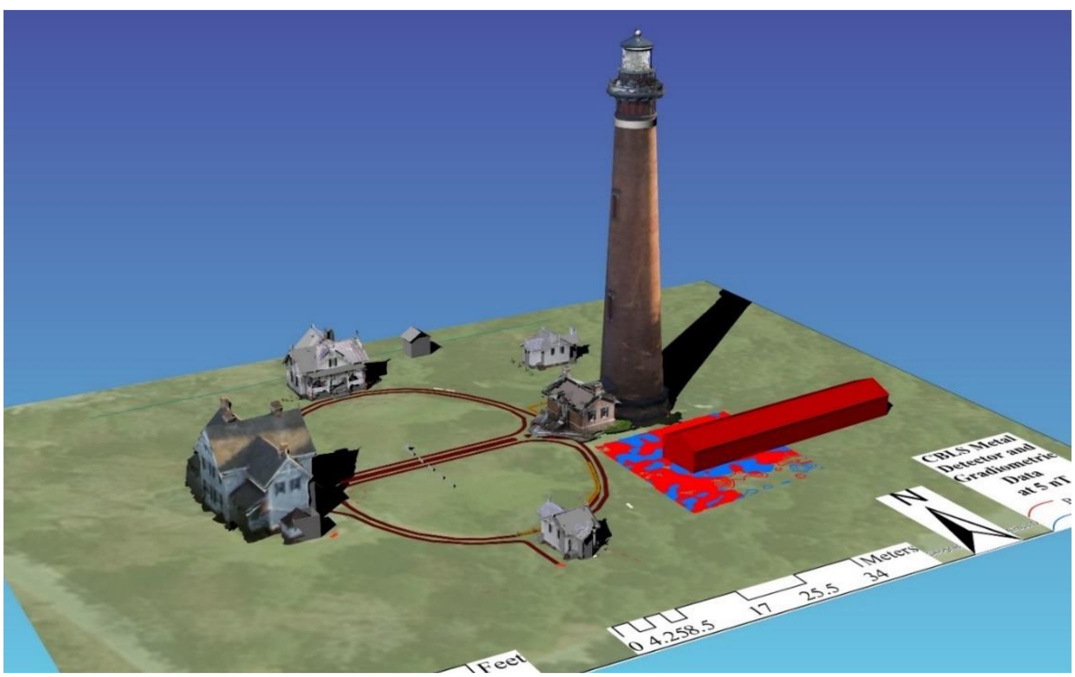

Figure 6.7. Virtual model depicting placement of the CCC Barracks based on gradiometric survey data. (B. Scott Rose 2017).

Temporary or Transient Buildings

Several structures were constructed on site that were temporary. Sheds, or other supplemental buildings, were referenced in historical documentation. Some structures existed early in the historical and photographic record but are now missing from the site. These structures were built to be permanent but had been moved to a new location on site or from the site completely. The movement of these structures are documented or have been made evident in some way.

The first activity on site involved construction of temporary buildings used as shops for trade groups. Some of these structures are mentioned in the historical record but are not seen in any historic photographs. Most of the temporary structures on site stayed in place until the other permanent structures were completed (Babcock 1880:1). They were in use throughout 1876 while these permanent structures were completed. The gradiometric interpretation indicates several areas of cultural activity scattered around the site. These locations were interpreted as possible locations for these temporary trade structures (Figure 6.8).

Sometime after the other permanent structures were erected, the temporary buildings were torn down, but were used for other purposes. Others were relocated to accommodate activities of the keepers (Babcock 1880:1). This is the first sign of scavenging or salvaging activity on site (Schiffer 1996:106). In this case, the original locations of these temporary structures needed to be identified more accurately to establish *reuse* and *reclamation* patterns. Depositional processes may be identified more thoroughly in future studies using excavation methods in the areas indicated in this study.

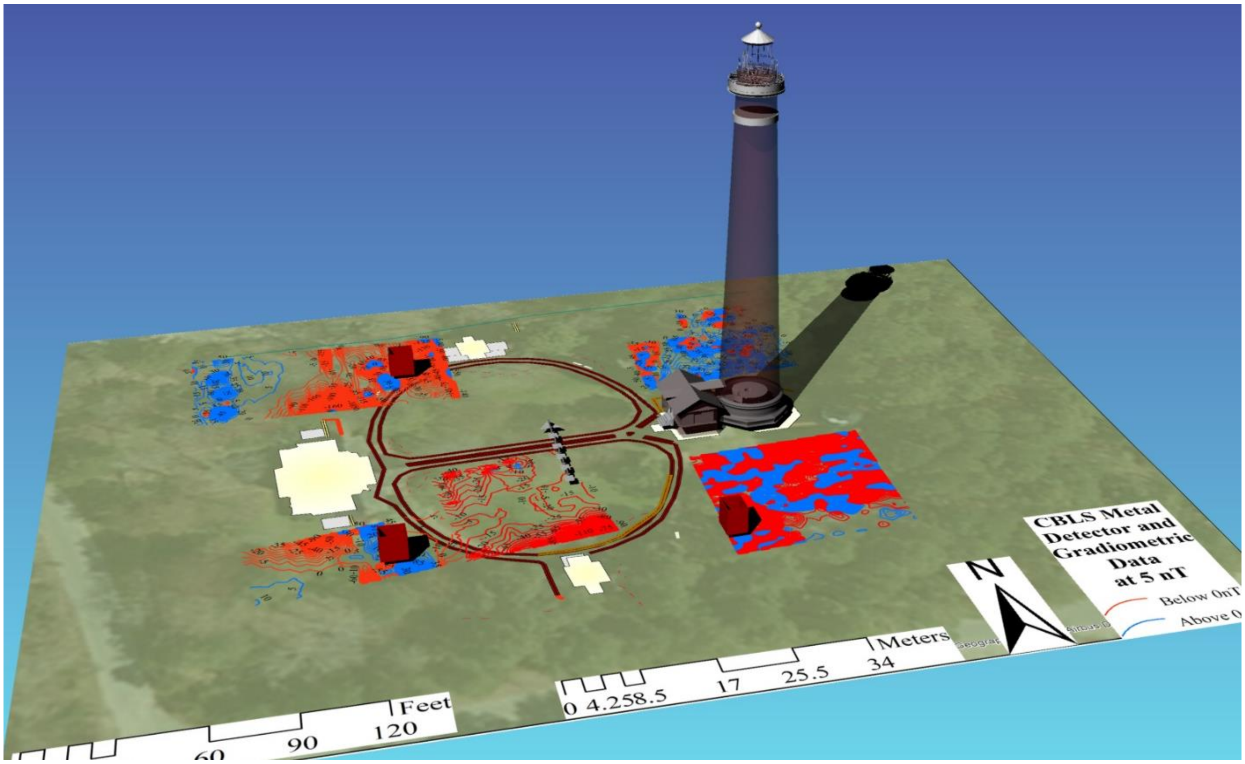

Figure 6.8. Virtual model of temporary structures placed based on gradiometric survey data before the tower's construction. (B. Scott Rose 2017).

The two storage buildings on site were planned to be permanent. With the incorporation of the small keeper's house, the north storage building was moved to a new location not referenced in the historical or photographic record. It was assumed by the researcher that the area to the north of the tower once held a structure. The metal detector data collected in this area confirmed this assumption. The gradiometric survey offered evidence of a building located north of the tower and east of the north storage building's original location (Figure 6.9). This area could also be the location of other cultural activity not limited to the north storehouse position. After its relocation to this spot in 1920, both storage buildings were removed from the site in the late 1950s.

Figure 6.9. Virtual models depicting the placement of the small keeper's house, outhouse, and new location of the north storage building based on gradiometric and metal detector survey data. (B. Scott Rose 2017).

The movement of the north storage building made room for the small keeper’s house. This house was brought to the site in 1920 and placed over the foundation of the north storage building. An outhouse and a cistern were constructed to accommodate the small keeper’s household. The outhouse had disappeared from the site before 1980. The cistern still resides in its original location.

Phases of Construction

Five phases of construction were designated through time at the site. These are labeled Phase I, Phase II, Phase III, Phase IV, and Phase V. Each phase represents a time of growth, or lack thereof, on the site. Table 6.1 illustrates these construction phases and the investment amounts during each phase.

Table 6.1. Phases of Construction. Intensification of the color blue indicates larger investment based on amounts adjusted to 2016 dollars.

Phases of Construction					
Phase Name	Initial	Upgrade	Technological	Neglect	Conservation
Phase #	I	II	III	IV	V
Years	1872-1876	1877-1922	1923-1939	1940-1980	1980-2017
Investment	$2,732,487.50	$5,611,938.21	unknown	$0	$20,912,101.06
Structures	Temporary Tower Big keeper's house Storage buildings Oil-house	Small keeper's house Outhouse Cistern Whalehead Club Post office	CCC barracks Electrification		South storage building Big keeper's house Small keeper's house Outhouse Cisterns Tower

Phase I, or the *Initial Construction Phase*, represents the third largest era of investment and spans the period 1872 to 1876. During the first stage of construction on the CBLS, several small temporary buildings were constructed. These were only present during a few years at the site. These are visible in some assumed locations around the base of the tower in the *Rhino 5* model. After the initial construction events, the lighthouse tower was completed in December 1875. Most of the temporary structures on site stayed in place until the other permanent structures were completed (Babcock 1880:1). They were in use throughout 1876 while these permanent structures were completed.

Temporary structures like carpenter shops, blacksmith buildings, and concrete sheds were erected first to accommodate the construction of larger permanent structures. These permanent structures including the tower, big keeper's house, north and south storage buildings, and a separate oil-house were then completed (Figure 6.10). Regular operation continued for the next 29 years with minor investments in maintenance and technological upgrades.

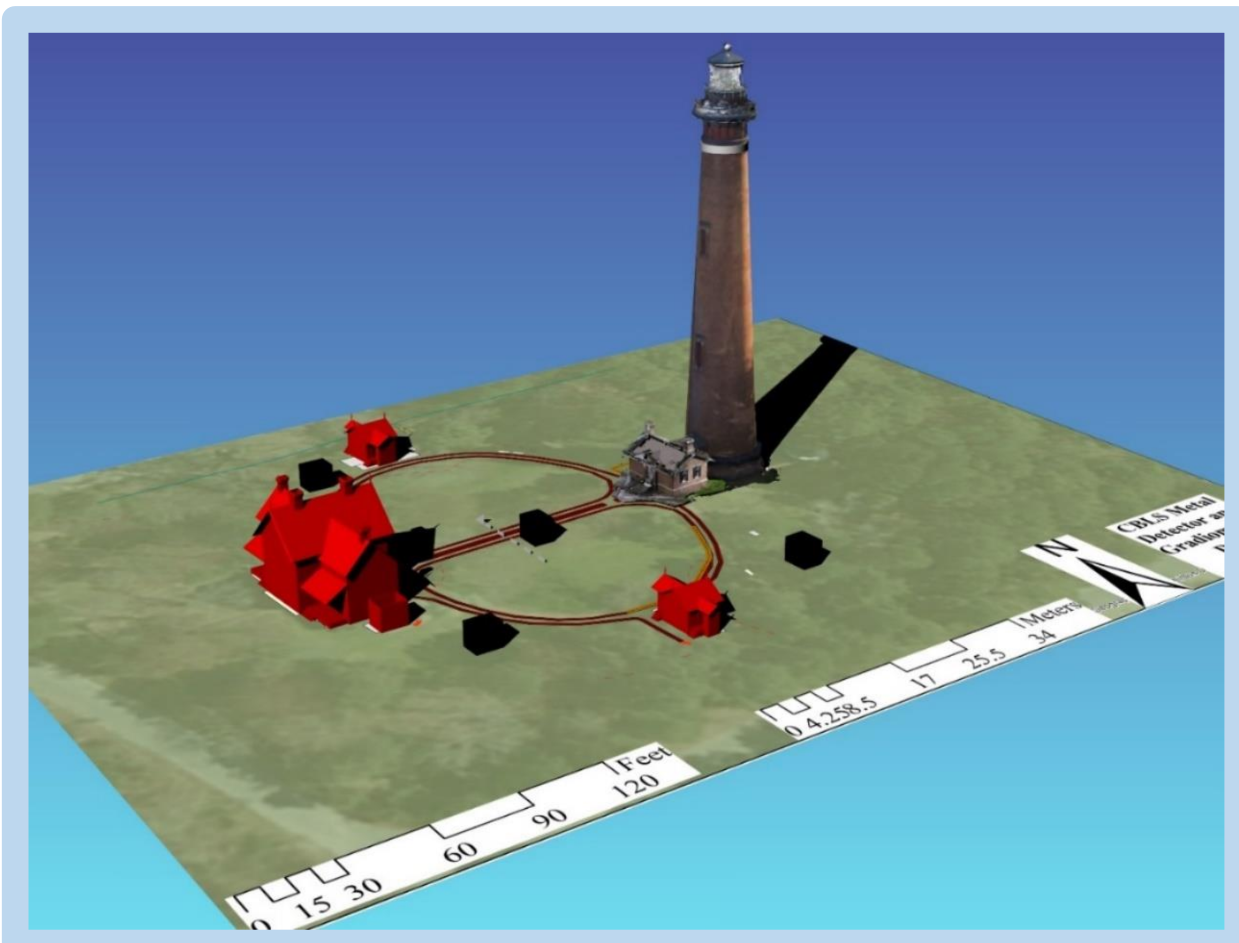

Figure 6.10. Virtual model depicting the completion of the big keeper's house, north and south storage building and illustrates the completion of Phase I, or the Initial Construction Phase at the site.

Phase II, or the *Upgrade Construction Phase*, includes the period from 1877 to 1922 (Figure 6.11). During this time, several structures were built in or moved to the community, and the north storage building was moved from its original location. The small keeper's house was brought to the site, and a cistern and outhouse were constructed. Edward Knight built the Corolla Island Club nearby. Corolla's post office was established to the north of the site, which is the second largest era of investment in the site.

Figure 6.11. Virtual model depicting construction Phase II shows the probable movement of the north storage shed to the east and the newly arrived small keeper's house and outhouse. (B. Scott Rose 2017).

An important element in this analysis was the existence of the remnants of wharf pilings that did not align with remaining pilings (Figure 6.12). These items were represented with virtual model creation and GIS illustrations. These became evident during the construction of the *Rhino 5* model of the wharf. The historical record indicated at least two instances of reconstruction of the wharf over time. During at least one of these reconstructions in the early 1900s, new pilings were most likely driven. Most of the existing pilings line up in a logical path while a few are slightly out of line in a slightly different distance pattern. The outliers can be attributed to an earlier construction effort. These construction and maintenance efforts represent investments in the area to accommodate the population at the light station.

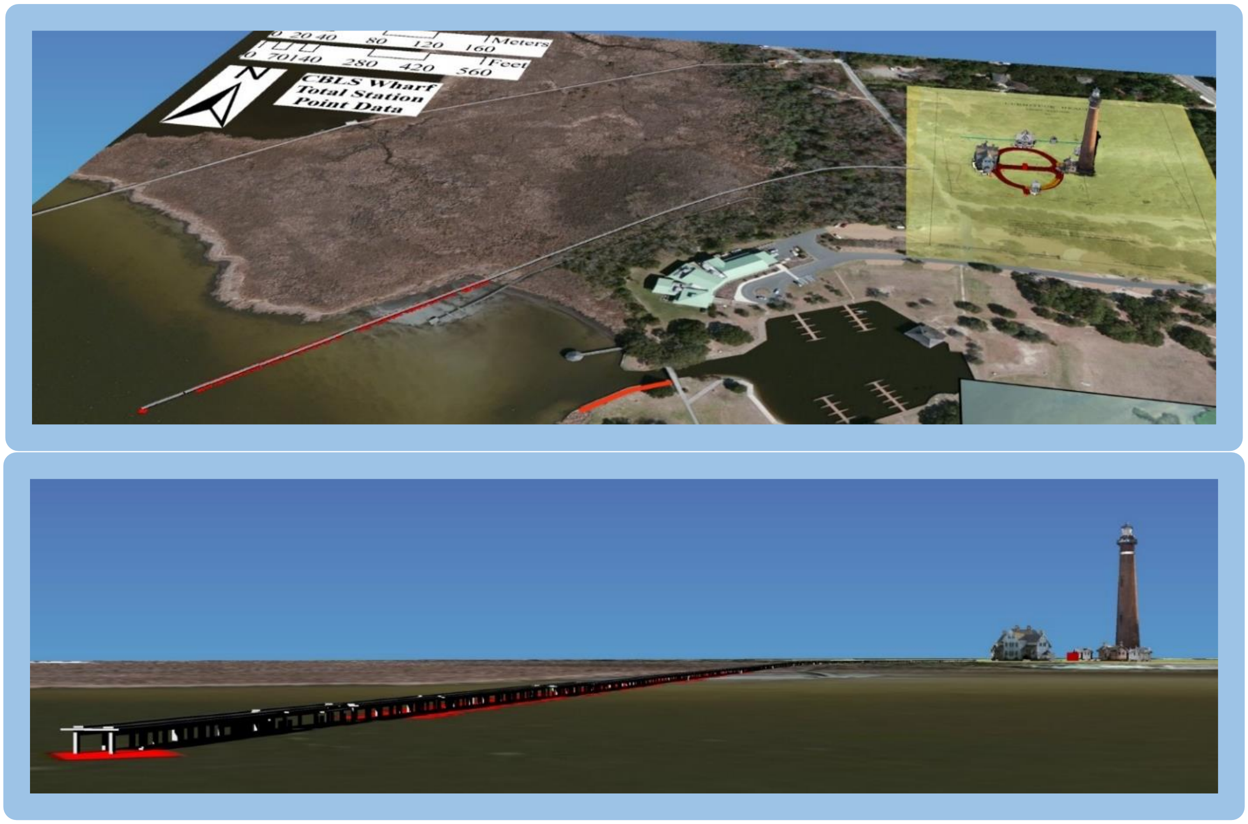

Figure 6.12. Virtual model depicting the wharf that was reconstructed in 1902. The area in red indicates where the model was built based on pile data, the rest of the model is conjectural. (B. Scott Rose 2017).

Phase III, or the *Technological Construction Phase*, includes the construction of the CCC barracks and technological upgrades to the tower and light from 1930 to 1939 (Figure 6.13). Electrification and automation occurred throughout the 1930s. In 1936, a barracks structure was constructed south of the tower (NPS 1999:8.8). This area was magnetically active and contained several complex features. These features may indicate several instances of construction and structural movement and could have contained temporary structures before or after the barracks installation. This area also contained several concrete pads probably associated with other structures no longer visible on site. The planned gradual abandonment of the site occurred during this phase, except for the tower, which was maintained for its original use.

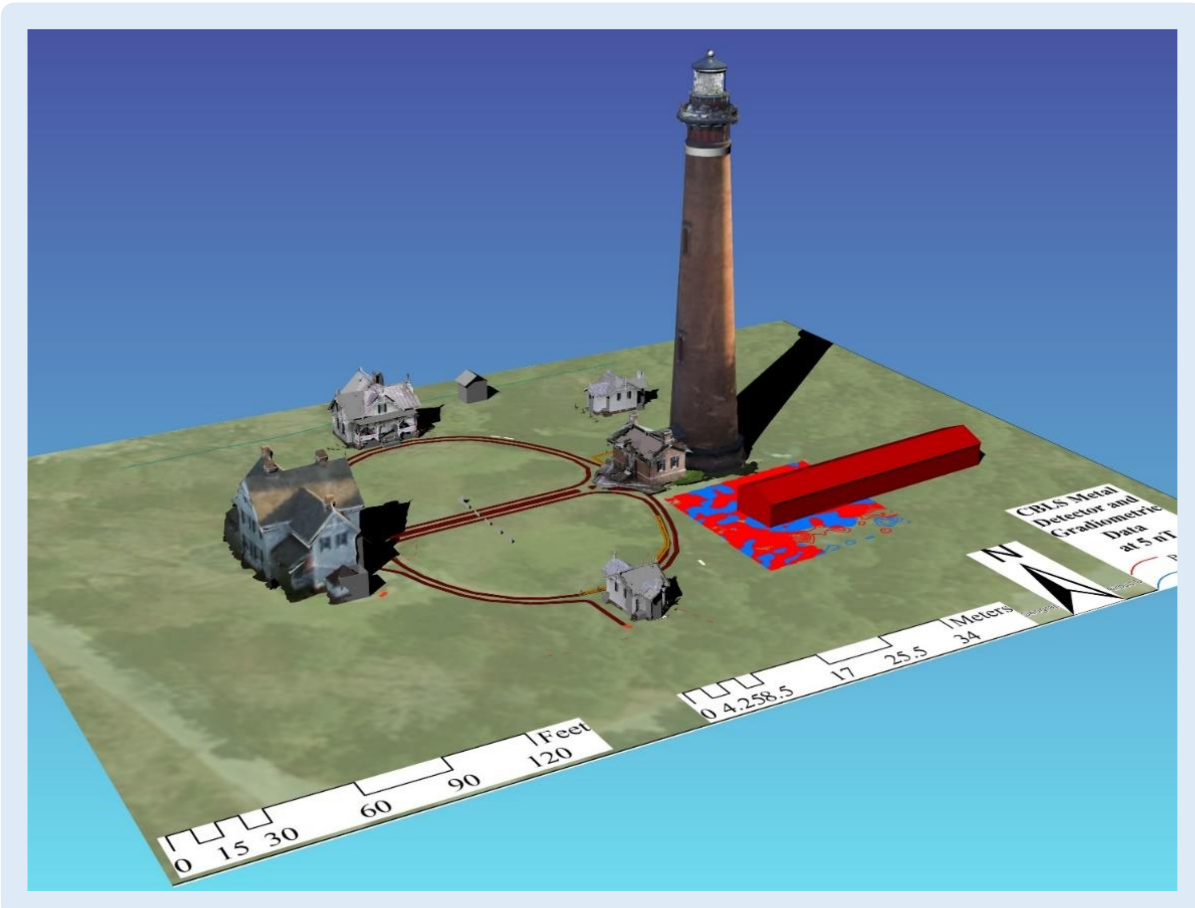

Figure 6.13. Virtual model depicting construction Phase III shows the construction of the CCC barracks. (B. Scott Rose 2017).

Phase IV or the *Neglect Phase* is an era devoid of investment in the site (Figure 6.14). The community saw investments from the military, but the CBLS did not. These investments in the area include the construction of military barracks to the southeast of the site. Documentation pertaining to the monetary investment in this construction was not located by this researcher. The small keeper's house was used as a makeshift barn for hay storage during this time. This is a reuse pattern indicating the building's decreased cultural value. Photographic evidence from the 1940s depicted a lack of a structure at the location designated as the new temporary site of the north storage building. If this was the site of the structure, it was removed by the 1940s. Further investigation involving test excavation in this area could determine if a structure was present.

By the mid-1950s, both storage buildings disappeared from the photographic record. The south storage building disappeared before 1955, which indicates that salvage activity associated with structural reuse took place (Schiffer 1996:99, 2010:38). The structure was utilized as a storage facility for another resident in the community (NPS 1999:7.7). This structure was later returned to the property.

The next structural change occurred sometime after 1955. The large barracks structure disappeared from the site (Lighthouse Friends 2015). It is now used as a private residence in the community, representing another instance of reuse. Research has not found evidence of the sale of the structure; however, this movement of the structure indicates a salvaging activity whether monetary exchanges occurred or not (Schiffer 1996:104).

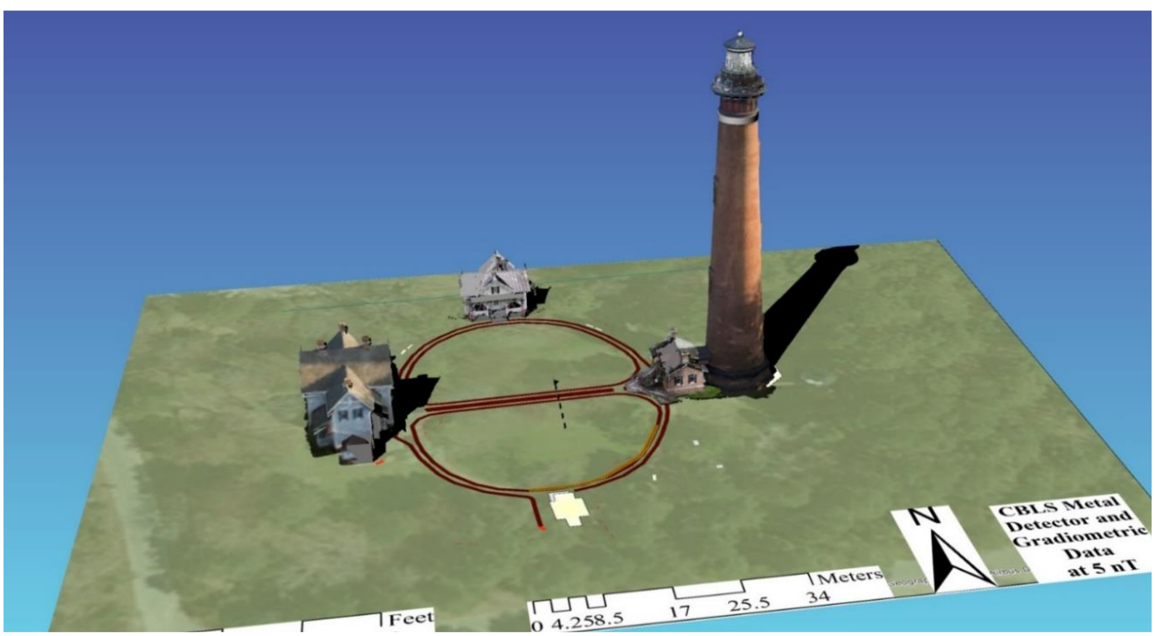

Figure 6.14. Virtual model depicting construction Phase IV shows a lack of structures, including both the north and south storage buildings and the barracks. (B. Scott Rose 2017).

Phase V, or the *Conservation Construction Phase* represents the largest investment era on the site (Figure 6.15). After 1980, a restoration effort began at the CBLS site. This effort involved reconstruction and repairs to several buildings and represented a reclamation activity (Schiffer 1996:104). At this point, the land on the Outer Banks was assigned new value based on wildlife and cultural heritage conservation and tourism. The tower was repaired first, then the large keeper's house. Next, the small keeper's house, cistern, and outhouse building was repaired. This structure is now the gift shop for the historical site. Finally, the south storage building was purchased from a neighbor and brought back to the site, placed back on its original foundation, and repaired. This structure is now being used by the Historical Site Manager as an office.

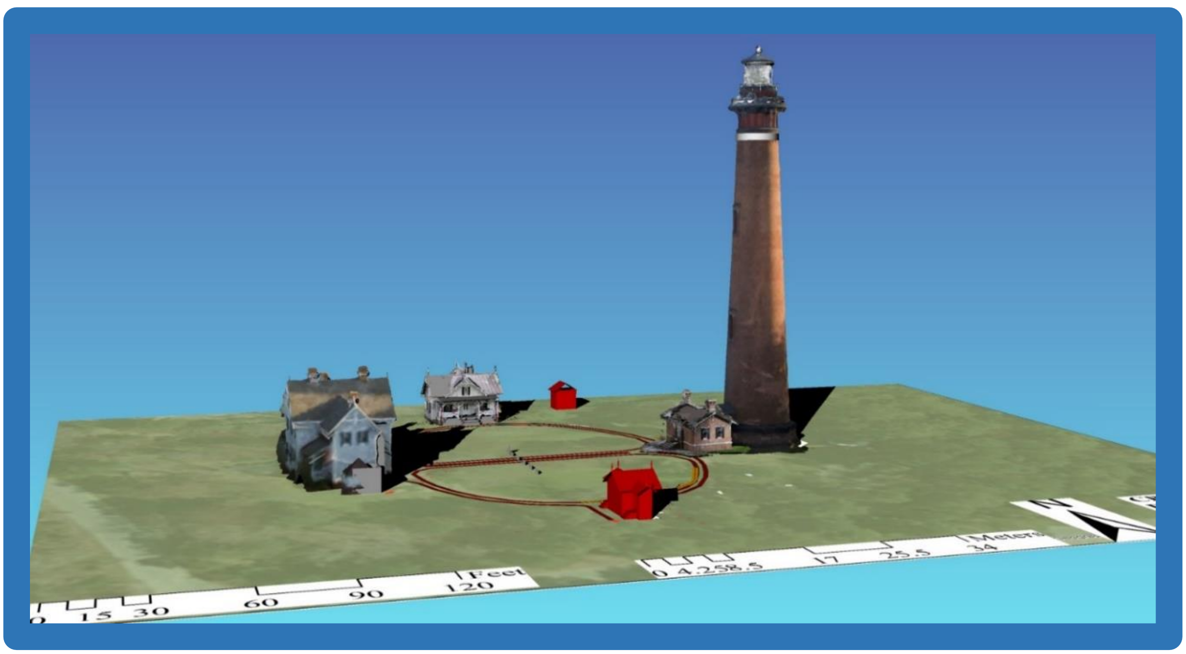

Figure 6.15. Virtual model depicting construction Phase V shows the re-incorporation of the south storage building and the reconstructed outhouse. (B. Scott Rose 2017).

Socio-Economic Analysis

All historical data outlined in the previous chapter was analyzed qualitatively. The three major types of quantitative data were gathered from many sources and organized in a format that made comparison simple. Census records were collected for the area surrounding the lighthouse compound from the year 1870 to the year 1940.

The population figures reflected population increases during times of construction and military occupation. The 1880 census reflected the largest population until modern times. This is likely due to the several construction projects in the area during that decade. Another increase in population took place between 1900 and 1920. A slight decrease in the 1920 census may be attributable to the Great War's end in 1918.

The percentage of males in the population provides insight into the evolving utilization of CBLS. During decades of construction and military occupation, these numbers were higher than average. During the 1870s, the male population represented 55 percent of the total population in the Corolla area. In 1880, during the population peak, males were only 51 percent of the population. Other than 1940, the proportion of males has remained relatively stable over time. The male population increased to 68 percent reported in 1940, during which time the CCC was active in the area (Figure 6.16).

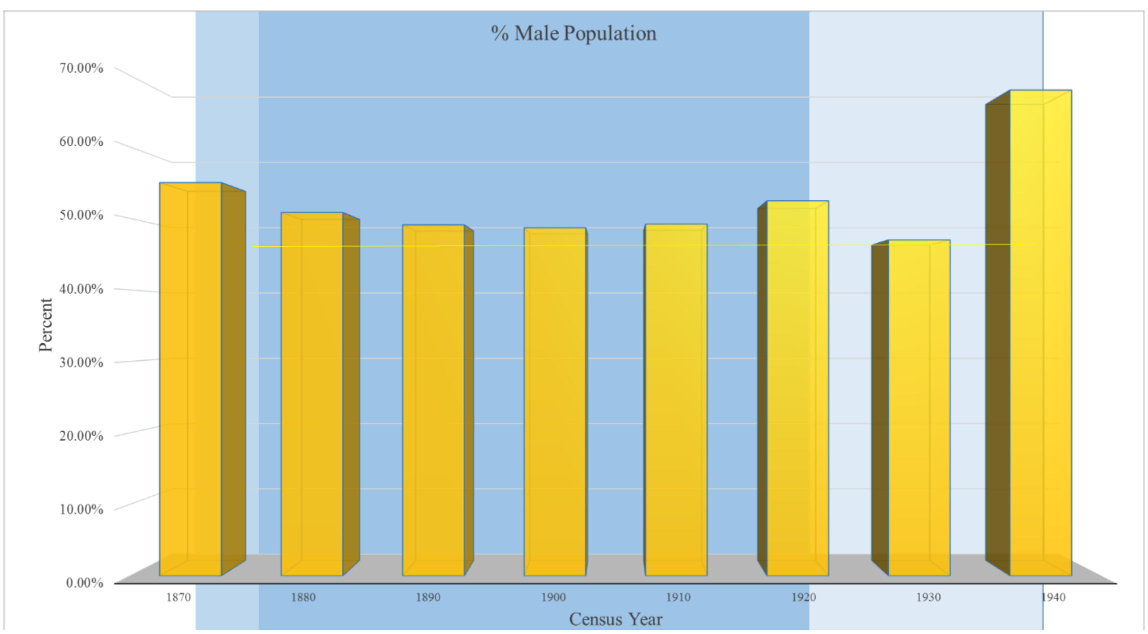

Figure 6.16. Percent of Male Population through Time (USBC 1870-1940; B. Scott Rose 2017).

People and Money

Investments into the CBLS had a direct impact on the population in the area. These investments were evaluated in several ways (Figure 6.17). The first assessment evaluated how investment impacted the population in the area and vice versa. Similarly, the second comparison evaluated how private investment over time affected the shipwreck occurrence numbers.

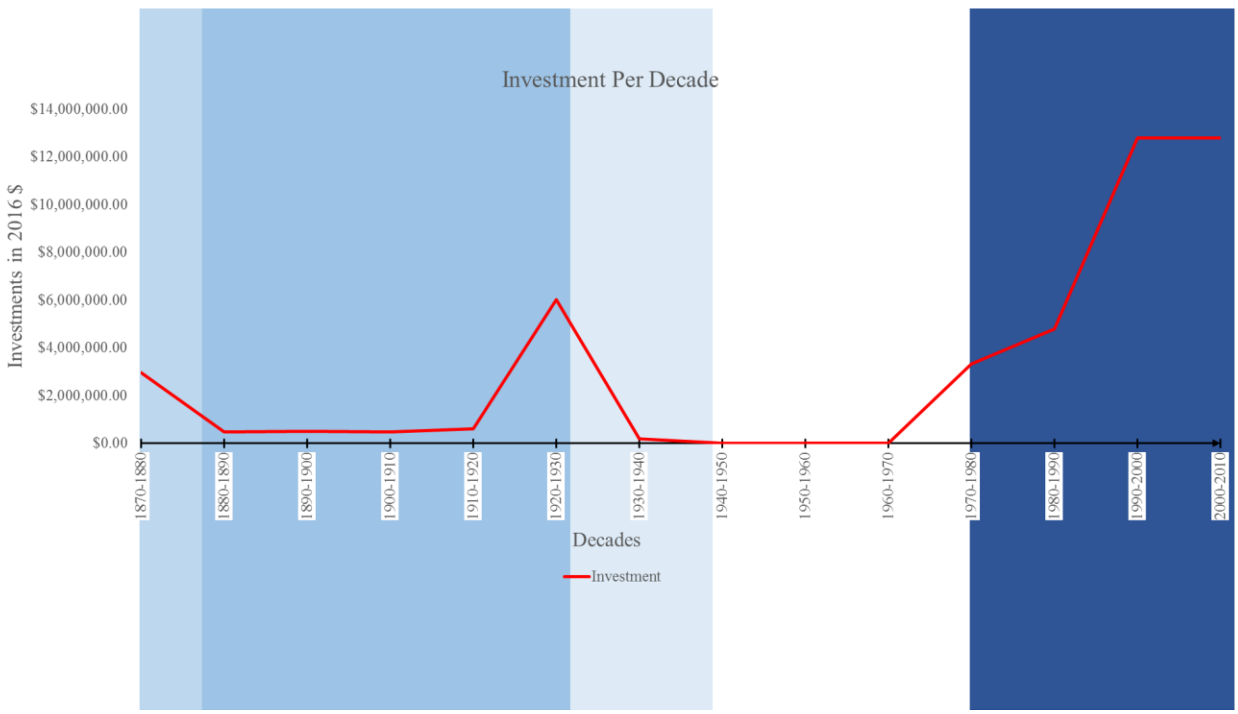

Figure 6.17. Investment Per Decade showing phases of construction in blue.

Public investment can be divided into federal, state, and local categories. Investments by the federal government were initially the largest category of investments to the area as discussed in this study. Several agencies have contributed investments to the area including: USLHB, USLSS, United States Postal Service, CCC, and the USCG (USTD 1856-1961; USBC 1870-1940; USLSS 1876:55; USLHB 1874-1905, 1920; USCG 1915-1932; USDC 2015). State investment in the area consisted of records from North Carolina Department of Transportation

(NCDT) and pertained to road construction and maintenance. Local investments are limited to the timespan between 1970 and the present. Some of the property on the lighthouse grounds was purchased by the county for the purposes of restoration and for further development with potential income generation (Schoenbaum 1988; Johnson and Coppedge 1991:95; Mobley 1994:27, Bishir and Southern 1996:91; *The Virginia Pilot* 2002:C3; Davis 2004:60).

Private investors in the area included those who purchased and developed property to create an improved physical or financial atmosphere. These investors were present throughout the life of the light station, but they became more substantial and visible as time progressed. Most of this private investment appeared in the latter half of the 20th century (Schoenbaum 1988; Johnson and Coppedge 1991:95; Mobley 1994:27, Bishir and Southern 1996:91; *The Virginia Pilot* 2002:C3; Davis 2004:60).

General economic investments reflect population trends in the area. Increases in investments in the area tended to correlate with growth in population. Decreases in investment tended to correlate with population decline. Several examples of this trend are illustrated in Figure 6.18.

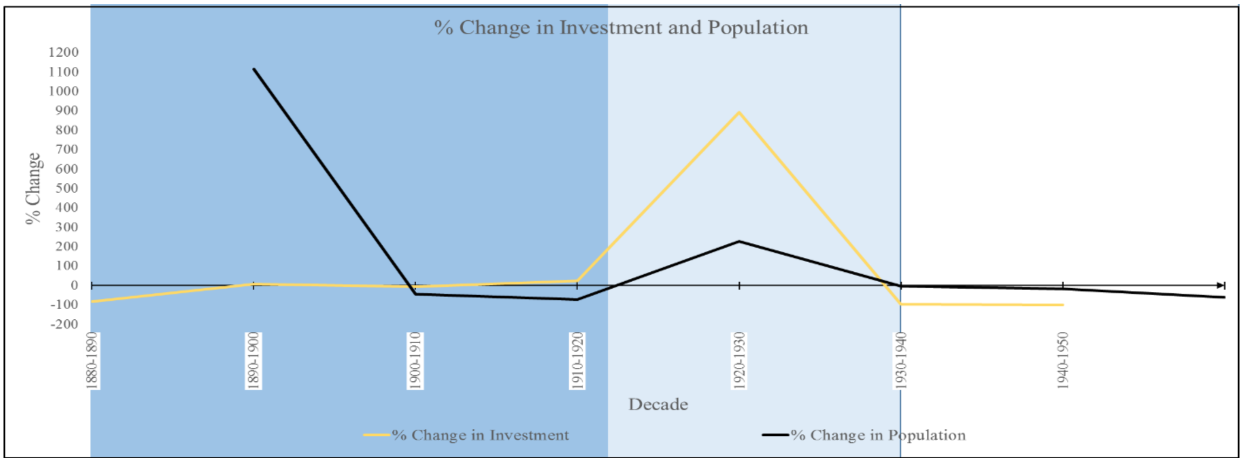

Figure 6.18. Yearly % Change of Investment and Population (USTD 1856-1961; USBC 1870-1940; USLHB 1874-1905, 1920; USLSS 1876:55, USCG 1915-1932; Schoenbaum 1988; Johnson and Coppedge 1991:95; Mobley 1994:27, Bishir and Southern 1996:91; *The Virginia Pilot* 2002:C3; Davis 2004:60; USDC 2015; B. Scott Rose 2017).

The initial investments in the lighthouse, hunt clubs, and lifesaving stations during the 1870s changed the population at the compound and surrounding community. A temporary increase occurred in the area due to construction activity. A more long-lasting population increase was necessary to maintain, supply, and operate these facilities. Another episode of construction occurred between 1920 and 1923 as preparations for the importation of the small keeper's house from Long Point and the construction of Corolla Island were completed (CBLKJ 1922: NPS 1999:7.6).

At the end of the 1930s, a decrease in population occurred due to technological advancement at the compound. An economical investment in the automation of the lighthouse correlated with a decrease in population numbers (USBC 1930; 1940). As the technology increased the efficiency of the lighthouse operation, lighthouse keepers became obsolete and left the area (OBC 2003:17).

In 1984, a major investment in road access took place. This investment came from local, state, and federal sources and included a natural resource protection plan. A major access road was completed, and a wildlife preserve was created to the north. This access road allowed for greater commercial development in the area (OBC 2003:27, 28).

Finally, two instances of private investment affected the population in the area. Both included the preservation efforts in 1980 and 1992 of the newly created OBC (NPS 1999:8.8). As with the initial construction investment during the 1870s, these efforts also created a temporary construction-related increase in population and a more permanent management-oriented increase in population (Sperling 2016).

Risk Investment

Shipwreck data was collected for the area encompassed within the reach of the lighthouse beacon for the years between 1760 and 1970 to compare instances of change to investments in the area (Figure 6.19). Investments include public investment from federal, state, and local sources and from private sources. These datasets were compared with other events and datasets to generate correlations. The goal of these comparisons was to provide a timeline of events and likely correlations of these events that would illustrate a more complete historical account of the evolution of society and cultural pressures at the compound. The quantitative data comparison does not always show correlation; therefore, qualitative data was included. These events are included in the last graph in this section.

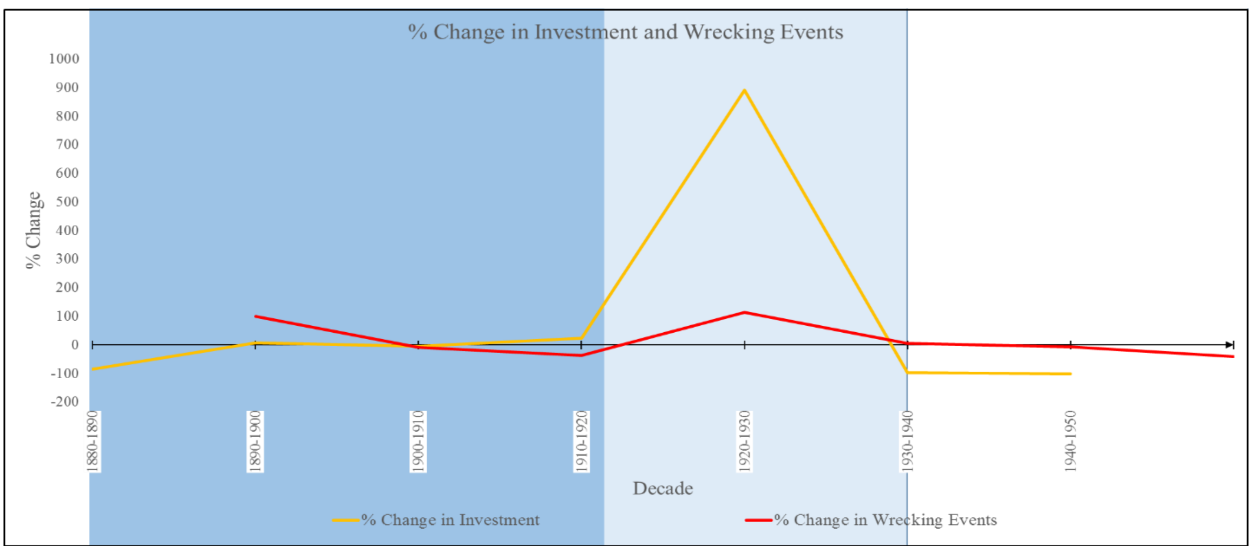

Figure 6.19. Yearly % of Wrecking Events and Investments (USTD 1856-1961; USBC 1870-1940; USLHB 1874-1905, 1920; USLSS 1876:55, USCG 1915-1932; Schoenbaum 1988; Johnson and Coppedge 1991:95; Mobley 1994:27, Bishir and Southern 1996:91; *The Virginia Pilot* 2002:C3; Davis 2004:60; USDC 2015; B. Scott Rose 2017).

This inclusion of qualitative information helped reveal related events. After the completion of the lighthouse tower, there was a 300 percent increase in wrecking events inside the beacon's reach. Immediately following the wrecking of *Metropolis* and USS *Huron*, there was an increase in investment into the USLSS that was not quantified in this study (*The Washington Post* 1878:1; USLSS 1879). There is a correlation evident between the installation of the new lamp in 1881 and another 300 percent increase in wrecking events. Soon after this, a 100 percent decrease in these occurrences in 1884 correlated to the alteration of the fuel type used at the station. After installation of the vaporizer lamp in 1912, wrecking event occurrences dropped by 100 percent (CBLKJ 1912). This was interpreted as an investment in the lighthouse to decrease wrecking event occurrences. Within two years of the beacon's electrification in 1933, a 200 percent increase in wrecking events occurred (CBLKJ 1933; NPS 1999:8.8). There was a 100 percent decrease in wrecking event occurrences after the lighthouse was automated in 1937. In reviewing these correlations, all the investments mentioned above represent technological changes at the site.

Population and Disaster

The population of the area was affected by shipwrecks off the coast, though this relationship was not easily illustrated. This relationship can primarily be seen in the investments made into the CBLS to prevent shipping disasters off the coast. The first increase in population correlated to the first episode of construction on the site and was related to efforts in lowering the risk of wrecking events in the area during the 1870s (Figure 6.20). This included a period of increased investment in the USLSS after the public outrage over the handling of the *Metropolis* disaster and the loss of USS *Huron* (*The Washington Post* 1878:1). Due to lack of census information for the 1890 census, no information concerning population decreased between 1880 and 1900 exists (USBC 1880, 1900). There was a correlation concerning increase in population after the Jones Hill LSS was moved closer to the CBLS (USBC 1900, 1910). This may have helped consolidate the communal atmosphere in the area. The population decreased significantly after 1930 (USBC 1930, 1940). This decrease correlated to a general decrease of wrecking event occurrences in the area. This is most likely due to the technological investment in risk management in the compound.

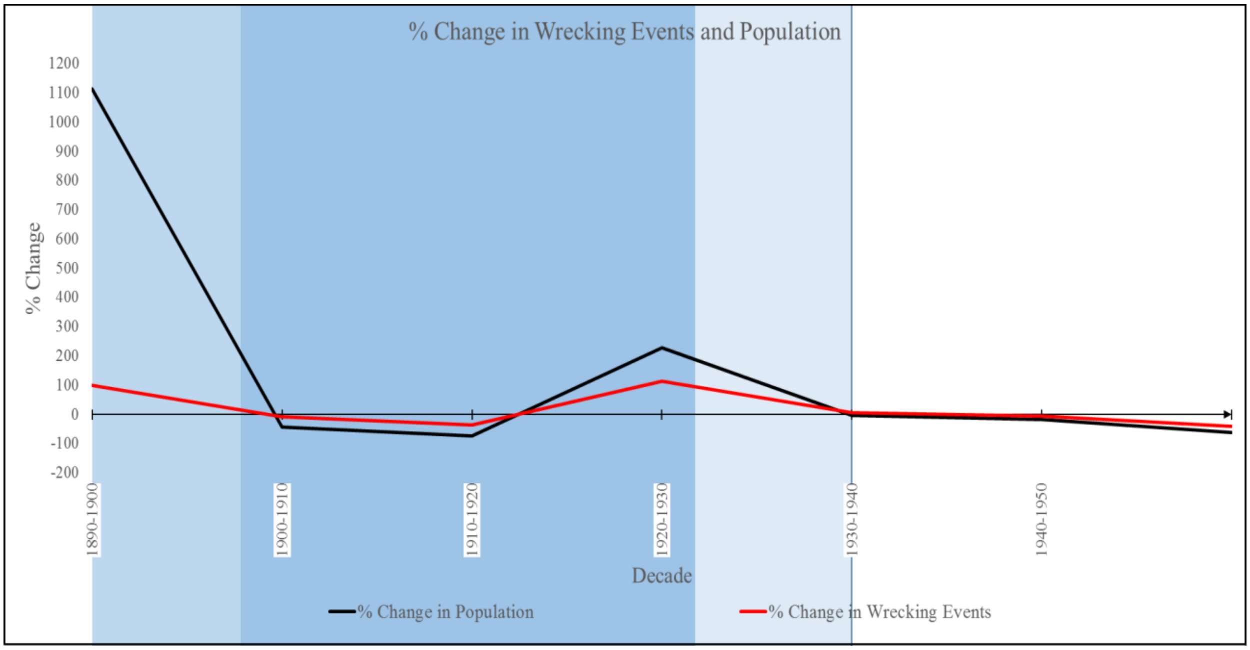

Figure 6.20. Yearly % Change of Wrecking Events and Population (USTD 1856-1961; USBC 1870-1940; USLHB 1874-1905, 1920; USLSS 1876:55, USCG 1915-1932; Schoenbaum 1988; Johnson and Coppedge 1991:95; Mobley 1994:27, Bishir and Southern 1996:91; *The Virginia Pilot* 2002:C3; Davis 2004:60; USDC 2015; B. Scott Rose 2017).

Conclusion

In this case, the eventual abandonment of buildings at the site did not reflect the importance of the site in relation to its primary use. While abandonment processes occurred to several structures on site, the tower was maintained. It continued to serve as a beacon for commerce and defense for the nation and region, even during the site's abandonment due to technological advancement and investments. The other structures lost their primary use importance. The abandonment of the supporting structures that occurred in 1939 left the site in disrepair.

Technological investments drove change at the CBLS site. Subsequent investments were directly or indirectly driven by technological progress, whether to improve accommodations for those who operated the technology or to install automated technologies (Manyon 1937:1). These factors caused change to the light station complex to create a safer environment for trade and for aiding in national defense. After 1980, the site's use changed to natural and cultural preservation and tourism (Figure 6.21). These changes were evident in the virtual models in this chapter and represent one way that *Rhino 5* can be used to illustrate change to archaeological sites over time.

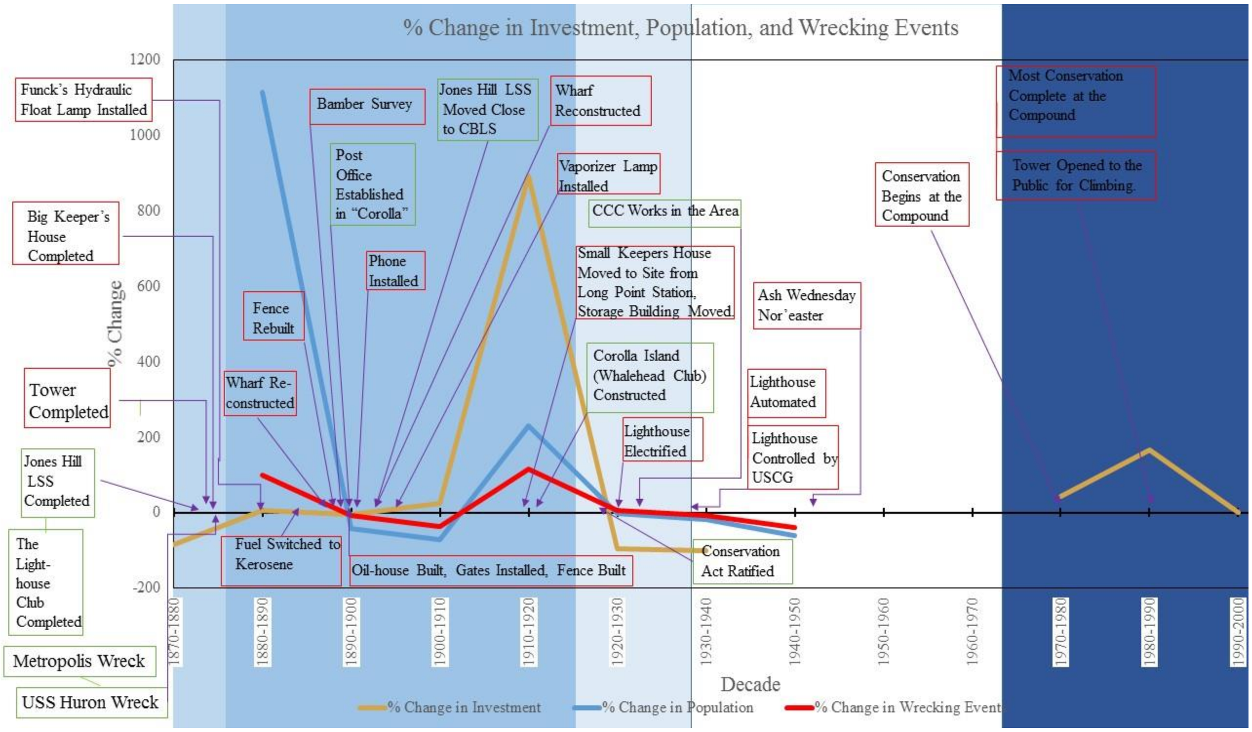

Figure 6.21. % Change in Investment, Population, and Wrecking Events showing activities on the site and in the community that were impactful. Phases of construction are indicated in blue.

Chapter 7: Focus on Import, a Conclusion

Answering Research Questions

The primary research question for this project is: is there evidence within archaeological and historical records that demonstrates how local, state, and federal economic investments paired with social developments affected and guided the development and changing role of the CBLS within its community? To assist with answering this overarching question, secondary research questions were developed. The secondary research questions asked in the introduction of this thesis are:

- What are the economic factors that guided the development of the Currituck Beach Light Station?
  - What role did federal investment play in this process and what trends influenced this investment?
  - What role did state investment play in this process and what trends influenced this investment?
  - What role did local investment play in this process and what trends influenced this investment?
- What are the social factors that guided the development of the Currituck Beach Light Station?
  - What are the changes in population trends over time in this specific coastal community and how do they correlate with other factors such as shipwrecking events and economic investment?
  - What risk management strategies were implemented, when, by who, and why?

- o How did technological change affect the community?

- What historical and archaeological data indicates a need for a lighthouse structure at the location of the Currituck Beach Light Station during the last half of the 19th century?

There is evidence within archaeological and historical records that demonstrates how local, state, and federal economic investments paired with social developments affected and guided the development and changing role of the CBLS within its community. The primary economic factors that guided the development of the CBLS were initially federal risk management investments. The CBLS was established through investments by the federal government to light an otherwise dark area of coast along the North Carolina shore. This area was one of several chosen after the Civil War to alleviate political pressures by the shipping industry to have comparable coastal lights like those in Europe (USLHB 1872:508, 1873:631; NPS 1999:8.3).

The CBLS exhibited many changes over the duration of its use-life: buildings were reused and removed, lamps and phones were installed, and fuel sources changed (CBLKJ 1881:2; 1884:2; 1912:5; USLHB 1884:51; Jones 1898:1). These changes were initiated to manage risk and allow employment of the most reliable lights and communication.

The community grew because of the construction of the CBLS and the increase in employees at the USLSS office nearby. This reflected federal risk management investment due to public outcry over increased wrecking events in the area (Mobley 1994:66-73; Duffus 2007:144-145). Growth was spurred again with the establishment of the Corolla Post Office through federal investment and later with the construction of the Corolla Island through private investment (Johnson and Coppedge 1991:95; NPS 1999:8.5; Davis 2004:48-51;).

At the lighthouse compound, an additional building was brought to the site to accommodate the keepers' expanding families through further federal investment (USLHB 1881:40; CBLKJ 1920:3). Overall population numbers in the area, however, were decreasing. As new technology was introduced, fewer keepers were needed at the compound. When the lighthouse was electrified and automated, the last keeper left the area (Manyon 1937:1). This fact illustrates a correlation between federal risk management investment in technology and population at the compound. All three variables begin to decline after automation.

Several developments occurred at the site during the 1930s and 1940s. The CCC brought a new structure to the site. It also brought a large male population to the area due to the occupation of the old CCC barracks by USCG troops. The CCC occupation represented a federal investment in the area, as well as, arguably, the beginning of conservation and preservation on the Outer Banks (USBC 1940; Schoenbaum 1988:89-90; NPS 1999:8.8). The lighthouse site was relinquished to the USCG for periodic monitoring (Manyon 1937:2). Several barracks were built nearby to accommodate troops during WWII (NPS 1999:8.8).

After this period, the population dropped due to abandonment of the lighthouse compound at the end of the war (Schoenbaum 1988:90). The light station fell into disrepair. Scavenging or salvaging activity removed the storage buildings and the barracks from site (NPS 1999:8.8). Eventually, a new value was assigned to the area based on cultural and natural resource preservation and tourism.

The primary economic factors that guided the development of the CBLS near the end of the 20th century were state, county, and private investments used to reconstruct and preserve the site for tourism and preservation purposes (Holland 1989:181). The new value attached to its original historical form aided in its importance to the community in a novel way. Its value as a tourism icon and commerce driver prodded a larger investment by public and private sources than did its original construction for defense and commerce. The importance of the site had shifted from a national and regional entity to one that was local and regional (NPS 1999:8.9; Shelton-Roberts and Roberts 2011:112). The ways chosen to analyze these varied datasets created a new way to tell the story of the CBLS.

Hence, a behavioral theoretical framework can be applied in order to answer the overarching research questions of this study. At each stage of site transformation involving construction, destruction, or movement of structures, this study analyzed the data in search of patterns of interactions. For analysis, the structures and remnants of structures were studied and considered as artifacts. The dimensions of the artifacts found on site were of greatest concern. The *formal dimension* of artifacts (structures) on site defined its history of use (Schiffer 1996:15-17, 2010:20). *Spatial dimensions* related each structure to the others on site (Schiffer 1996:17-18, 2010:20). The *frequency dimensions* of smaller artifacts defined structural footprints on site (Schiffer 1996:18-19, 2010:20). Possible pathways were evaluated in their *relational dimensions* (Schiffer 1996:19-21, 2010:20). Historical dimensions of each structure were evaluated to determine successive use of each structure through time (Schiffer 2010:192).

The CBLS site, in total, exhibited evidence through the historical record of *lateral cycling*. The use of the site through time by different people for the same purpose was exemplary of this type of reuse (Schiffer 1996:29). Both smaller items and structures were reused in the lateral cycling method. This reflects an importance of the activity performed at this site during each reuse period.

Disturbance activity was documented at the site in many ways. The walk paths on site represented trampling activity. Other trampling events were present as indicated in historical photographs depicting drive paths located around the site (Stockton 1973:116-117). Historical documentation of farming illustrated tilling activity (Schiffer 1996:126-133). Underground utility supply implied evidence of earth moving equipment. These activities were considered during the analysis of archaeological data.

Conservatory processes began in 1980 during a period of extended re-occupation of the site (Schiffer 1996:103). The artifacts (structures) on site were used for different purposes while their forms were altered to a new state. In this case, the change in form did not render the artifacts (structures) unusable (Fowler and Fowler 1981:185; Schiffer 1996:32-35).

Primary and secondary refuse was located on site by the OBC and underwent conservatory processes. Artifacts (including structures) that remain to date represent de facto refuse. These items are on display at the CBLS. Abandonment occurred each time a light keeper permanently left the site with his family. Usually, this abandonment period was short-lived as a new keeper arrived. In each case, abandonment was gradual in nature (Stevenson 1982:260).

C-transforms recorded at the site included reuse strategies such as: *lateral cycling* by successive occupants, recycling by occupants, secondary use of buildings, and conservatory cycling of artifacts and buildings for a different purpose. Deposition transforms found on the site included: *discard, loss, child's play*, and *refuse*. *Gradual* and *planned abandonment* strategies were noted as was the creation of *de facto refuse*. Reclamation behavior was reported in the historic record including: reoccupation of the entire site, scavenging, and salvaging activities. Disturbance transforms were also found in the form of evidence of earthmoving equipment, trampling, and tilling processes.

Future Research Suggestions

The CBLS warrants further study. Historical research could be examined in more detail. Archaeological evaluation of the individual areas around the site could also take place. A more detailed evaluation of 3D models could locate discrepancies between planned construction and existing structures. Historical activity of the CCC along the coast could also be pursued, as there was little documentation readily available surrounding this agency. Furthermore, similar studies on other lighthouses would prove beneficial for comparison purposes.

With the limitations described in the data, a study should be performed to work to eliminate the problems discussed. This would add more validity to the correlations discussed in this study. Census data could be evaluated on a county-wide and district-wide basis. Improved methods designed to extract actual population numbers of Corolla for each enumeration period could be deployed. Shipwreck data could incorporate losses from conflict, rather than merely losses attributed to navigational error or other factors. Investment data could be better quantified for comparison purposes by investigating fiscal reports of the USLHB and similar documents for USCG, USPS, CCC, and USLSS.

Each feature indicated through gradiometric survey should be ground-truthed. Shovel test pits or standard one m test pits could be excavated to determine actual content of features. This could determine exact locations and orientations of previous buildings on site and serve to aid researchers in understanding the way in which individuals on site interacted with the cultural and natural landscape.

The virtual models created during this study formed new questions for researchers. Why do existing structures differ from original construction drawings? There could have been several construction bids for the project or other design proposals that were not located by this study. The process of comparing the two types of models created in this study allowed for comparison of these two subjects in a stark way. This process could be completed on other sites or incorporated into an existing study to evaluate differences between concept and current structure.

The CCC was quite active along the coast for a limited time. Where were all their camps? Which ones were temporary? How many young men served in them? What lasting impacts have they had? These questions can be addressed in future studies.

Other studies such as this one could prove useful. Other lighthouses were developed along the coast. Do the same risk management investments exist in their construction? How did they affect the area population? Were they effective in their employment? These questions could be addressed.

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Appendix A: Comparative Table of Lens Orders

Original Fresnel Orders			**Oil consumption per Hour**		**Relative Brightness**	**Focal Length**		**Use**
Order		**No. of Wicks**	**gm.**	**oz.**		**mm.**	**in.**	
1st		4	750	26.25	17.69	920	36.22	Largest Seacoast Lights
2nd		3	500	17.5	11.54	750	27.55	Great Lakes, Seacoasts, Islands, Sounds
3rd	Large	2	200	7	3.85	500	19.69	River Entry, Sounds, Bays, Channels
	Small	1	150	5.25	2.31	250	9.84	Shoals, Reefs, Harbor, and River Islands
4th	Large	2	90	3.15	1.23	182.5	7.19	Breakwater, River, Channel, Small islands
	Small	1	90	3.15	1	150	5.9	Pier, Breakwater, Harbor

Original Fresnel Orders			**Approximate Weight Of Assembled Lens**		**Height of Components (Reflectors)**								**Modern lens Order**
					Lower		**Central**		**Upper**		**Total**		
Order		**No. of Wicks**	**Kg.**	**lbs.**	**mm.**	**in.**	**mm.**	**in.**	**mm.**	**in.**	mm.	in.	
1st		4	5800	12,800	539	21.22	980	38.58	1001	39.4	2590	102	1st
2nd		3	1600	3,530	378	14.88	854	33.62	810	31.89	2069	81.46	2nd
3rd	Large	2	900	1,985	278	10.94	660	25.98	593	23.35	1576	62.05	3rd
	Small	1	200-300	440-660	144	5.67	300	11.81	358	14.09	722	28.43	4th
4th	Large	2	120-200	265-440	105	4.13	226	8.9	196	7.72	541	21.3	5th
	Small	1	100	220	84	3.31	180	7.09	157	6.18	433	17.05	6th

Comparative Table of Lens Order (Baiges 1988).

Appendix B: List of Light-Keepers

Year	Keeper	1st Assistant	2nd Assistant
1875	Nathaniel.G. Burris *Appointed: October 12, 1875*	Lewis Napoleon Simmons *Appointed: November 23, 1875*	Thomas T .Everton *Appointed: November 23, 1875*
1876	N.G. Burris	Lewis Napoleon Simmons	Thomas T. Everton
1877	N. G. Burris	Lewis Napoleon Simmons *Removed: April 26, 1877* Horatio William Heath *Appointed: April 26, 1877*	Thomas T. Everton
1878	N.G. Burris	Horatio William Heath	Thomas T. Everton
1879	N.G. Burris *Removed: December 12, 1879* Lewis Napoleon Simmons *Acting: December 23, 1879 (journals indicate a slightly later, January 1880 date)*	Horatio William Heath	Thomas T. Everton
1880	Lewis Napoleon Simmons	Horatio William Heath	Thomas T. Everton *Removed: September 9, 1880* F. W. Bell *Appointed: October 12, 1880*
1881	Lewis Napoleon Simmons *Removed: January 29, 1881* William Shinnault *Acting: February 1, 1881*	Horatio William Heath	F. W. Bell
1882	William Shinnault *Transferred: May 25, 1882* William Scott *Acting: May 25, 1885*	Horatio William Heath	F. W. Bell *Resigned: May 16, 1882* Thomas P. Reid *Appointed: May 16, 1882*
1883	William Scott	Horatio William Heath	Thomas P. Reid
1884	William Scott *Resigned: September 26, 1884* Amasa J. Simpson *Acting: September 26, 1884*	Horatio William Heath	Thomas P. Reid
1885	Amasa J. Simpson *Appointed: June 16, 1885*	Horatio William Heath *Removed: June 13, 1885* Fabius E. Simpson *Appointed: June 16, 1885*	Thomas P. Reid *Removed: June 13, 1885* George W. Wallace *Appointed: June 24, 1885*
1886	Amasa J. Simpson	Fabius E. Simpson	George W. Wallace *Removed: February 25, 1886* Charles E. Ansell *Appointed: March 29, 1886*
1887	Amasa J. Simpson	Fabius E. Simpson	Charles E. Ansell
1888	Amasa J. Simpson *Transferred: June 29, 1888* Lazarus G. Hinnant *Appointed: June 1888*	Fabius E. Simpson	Charles E. Ansell
1889	Lazarus Hinnant	Fabius E. Simpson	Charles E. Ansell

1890	Lazarus Hinnant	Fabius E. Simpson	Charles E. Ansell
1891	Lazarus Hinnant	Fabius E. Simpson	Charles E. Ansell *Removed: May 23, 1891* William Riley Austin *Appointed: June 2, 1891*
1894	Lazarus Hinnant	Wesley Austin	William Riley Austin
1895	Lazarus Hinnant *Transferred: July 1, 1895* William Joseph Simmons *Acting: July 1895 (These two switched positions - Hinnant to Brant Island Light Station, NC and Simmons from Brant Island)*	Wesley Austin	William Riley Austin
1896	William J. Simmons *Appointed: April 2, 1896*	Wesley Austin	William Riley Austin
1897	William J. Simmons	Wesley Austin	William Riley Austin
1898	William J. Simmons	Wesley Austin	William Riley Austin
1899	William J. Simmons	Wesley Austin	William Riley Austin
1900	William J. Simmons	Wesley Austin	William Riley Austin
1901	William J. Simmons	Wesley Austin	William Riley Austin
1902	William J. Simmons	Wesley Austin	William Riley Austin
1903	William J. Simmons	Wesley Austin	William Riley Austin
1904	William J. Simmons	Wesley Austin	William Riley Austin
1905	William J. Simmons *Resigned: September 24, 1905* Nathan Hooker Swain *Appointed: October 1, 1905*	Wesley Austin	William Riley Austin
1906	Nathan H. Swain	Wesley Austin	William Riley Austin
1902	William J. Simmons	Wesley Austin	William Riley Austin
1901	William J. Simmons	Wesley Austin	William Riley Austin
1907	Nathan H. Swain	Wesley Austin	William Riley Austin
1908	Nathan H. Swain	Wesley Austin	William Riley Austin
1909	Nathan H. Swain	Wesley Austin	William Riley Austin
1910	Nathan H. Swain	Wesley Austin	William Riley Austin
1911	Nathan H. Swain	Wesley Austin	William Riley Austin
1912	Nathan H. Swain	Wesley Austin (through 11/24/12) then William Riley Austin 11/25/12	William Riley Austin (11/24/12) George Garner Johnson 11/25/12
1913	Nathan H. Swain	William Riley Austin	George Garner Johnson
1914	Nathan H. Swain	William Riley Austin	George Garner Johnson
1915	Nathan H. Swain	William Riley Austin	George Garner Johnson
1916	Nathan H. Swain	William Riley Austin	George Garner Johnson
1917	Nathan H. Swain	William Riley Austin	George G. Johnson
1918	Nathan H. Swain	William Riley Austin	George G. Johnson
1919	Nathan H. Swain	William Riley Austin	George G. Johnson
1920	Nathan H. Swain	William Riley Austin	George G. Johnson
1921	Nathan H. Swain William Riley Austin (8/1/21)	William Riley Austin (7/31/21) George G. Johnson (8/1/21)	George G. Johnson (7/31/21) Loren Edward Tillett (8/1/21)
1922	William Riley Austin	George G. Johnson	Loren Edward Tillett
1923	William Riley Austin	George G. Johnson	Loren Edward Tillett
1924	William Riley Austin	George G. Johnson	Loren Edward Tillett
1925	William Riley Austin	George G. Johnson	Loren Edward Tillett

1902	Loren Edward Tillett	William Riley Austin	
1901	Loren Edward Tillett	William Riley Austin	
1926	William Riley Austin	George G. Johnson	Loren Edward Tillett
1927	William Riley Austin	George G. Johnson	Loren Edward Tillett
1928	William Riley Austin (leaves 3/7/28) (Additional Keeper Goesh? For a time…) Homer Treadwell Austin (4/16/28)	George G. Johnson	Loren Edward Tillett
1929	Homer Treadwell Austin	George G. Johnson (8/4/29) Mr. Quidley (8/20/29)	Loren Edward Tillett (7/6/29) (he goes to Thimble Shoals for a bit) - Mr C.P. Morgan (from journals) (7/16/29)
1930	Homer Treadwell Austin	Mr. Quidley leaves (1/15/1930) Loren Edward Tillett 1/17/30-7/03/30	Mr. C.P. Morgan leaves 7/9/1930 (journals) Edward.B. Austin arrives (8/23/1930) (journals; National Personnel records say 9/1/30 started))
1931	Homer Treadwell Austin	James Benjamin Cox (2/7/1931 per journals)	Edward B. Austin
1932	Homer Treadwell Austin	James Benjamin Cox	Edward B. Austin
1933	Homer Treadwell Austin	James Benjamin Cox	Edward B. Austin (through 6/30/33 - National Personnel email)
1934	Homer Treadwell Austin	James Benjamin Cox	
1935	Homer Treadwell Austin	James Benjamin Cox	
1936	Homer Treadwell Austin	James Benjamin Cox (no date)	
1937	Homer Treadwell Austin (9/7/37?) William James Tate, (weekly keeper from Coinjock Station)	Bill Lindsay, Assistant	
1938	William James Tate, (weekly keeper from Coinjock Station)	Bill Lindsay, Assistant	
1939	William James Tate, (weekly keeper from Coinjock Station)		
1939 to 1940	Lloyd Vernon Gaskill Lighthouse Tender and Commanding Officer of North Landing Aids to Navigation		

In **1937** the Currituck Beach Lighthouse was automated and the keepers vacated the station. A keeper from the Coinjock Depot came over weekly to charge the battery. The United States Coast Guard assumed responsibility for all lighthouses on **July 1, 1939**, under the President's Reorganization Plan No. 11 which stated "that the Bureau of Lighthouses in the Department of Commerce and its functions be transferred to and consolidated with and administered as a part of the Coast Guard".

When the United States Coast Guard took over the Currituck Beach Light Station in **1940**, members of the Coast Guard stationed at the Currituck Beach Lifesaving Station maintained the lighthouse. Their duties included maintaining the Fresnel lens, cutting the grass, and painting the interior of the tower. A garage located in the staff parking lot was turned into a stable for the horses used for the Mounted Guard during WWII. Hay was stored in the little keeper's house.

Around **1947**, after the end of WWII, the Currituck Beach Lifeboat Station was closed and the care and maintenance of the lighthouse was taken over by members of the USCG from the Caffey's Inlet Station, which today is part of the Sanderling Restaurant.

	In **1955** when electricity became available in the Corolla area, there was no further need to charge the batteries used to light the lens, but a generator continued to be used in the event of a power failure. The generator, along with cleaning the lens, cutting the grass and painting the interior tower, continued to be maintained by the Coast Guard. In **1963**, Lamplighters, civilian personnel hired by the USCG, took over the duty of maintaining the lighthouse. *History provided by Norris Austin, Ottley W. Austin, and L. M. "Tink"Scarborough.*		
1963	Gene Austin, Lamplighter *Until **1990***		
1990	"On **June 1, 1990**, Outer Banks Conservationists, Inc. (a 501(c)(3) nonprofit) signed a 20-year lease with the United States Coast Guard that included standard clauses requiring it to "protect, maintain, and keep in good order" the light-tower premises. In an "Addendum to License," OBC further agreed that "all work of any nature (including labor or material) that will affect historical aspects of the Licensed Property, either external or internal to the structures will only be done in accordance with the 'Standards of rehabilitation' published by the Secretary of the Department of the Interior..."* On **July 21, 1990** OBC was able to open the lighthouse for the first time to the public for climbing. * Excerpt from OBC's application to obtain light station property **February 7, 2003** written by Angel Ellis Khoury		
1994	Debbie Westner *Keeper and Site Manager*		
1995	Debbie Westner	Pat Riley	
1996	Debbie Westner	Pat Riley	
1997	Lloyd Childers *Keeper and Executive Director*	Pat Riley	
1998	Lloyd Childers	Pat Riley	
1999	Lloyd Childers	Pat Riley	
2000	Lloyd Childers	Pat Riley	
2001	Lloyd Childers	Pat Riley	
2002	Lloyd Childers *Retired - November 2002* John Birkholz *Keeper - October 2002* Jenn Barr *Executive Director - October 2002*	Pat Riley	
2003	John Birkholz Jenn Barr	Pat Riley	
	On **February 7, 2003**, OBC submits application to obtain the Currituck Beach lighthouse through the provisions of the National Historic Lighthouse Preservation Act of 2000. The United States Department of the Interior awards OBC the lighthouse tower on **July 30, 2003**. The deed for the lighthouse was finally recorded on **October 17, 2003.**		
2004	John Birkholz Jenn Barr	Pat Riley	
2005	John Birkholz *Resigned - May 2005* Jenn Barr *Resigned - May 2005* Luis Garcia *Keeper - May 2005* Meghan Agresto *Site Manager - May 2005*	Pat Riley	
2006-present	Luis Garcia, Meghan Agresto	Pat Riley	

Table 1 List of Light-Keepers at CBLS (Agresto 2015)

Appendix C: Census Data

1870 Census District Poplar Branch								
Page	Surname	Gender	Page	Surname	Gender	Page	Surname	Gender
13	Adams	Male		Owens	Female		Parker	Male
	Adams	Female		Owens	Female		Parker	Female
	Adams	Male		Owens	Female		Parker	Male
	Adams	Female		Sykes	Male		Parker	Male
	Adams	Male		Parker	Male		Parker	Male
	Hampton	Male		Parker	Female		Parker	Male
	Hampton	Female		Parker	Male		Ballance	Female
	Hampton	Male		Parker	Male		Danton	Male
	Hampton	Male		Parker	Male		Danton	Female
	William	Female		Parker	Male		Danton	Female
	Waterfield	Female		Parker	Female		Ballance	Male
	Owens	Male		Sanders	Female		Danton	Male
	Owens	Female		Sanders	Male		Danton	Female
1880 Census Data								
Page	Surname	Gender	Page	Surname	Gender	Page	Surname	Gender
19	Walker	Male		Jones	Female		Wescott	Male
	Walker	Female		Jones	Male		Wescott	Female
	Walker	Male		Murcer	Male		Wescott	Male
	Walker	Male		Baker	Male		Sykes	Male
	Sawyer	Male		Hampton	Male		Sykes	Female
	Taylor	Female		Hampton	Female		Sykes	Male
	Barco	Male		Hampton	Male		Bowser	Male
	Barco	Female		Hampton	Female		Bowser	Female
	Barco	Male		Hampton	Male		Bowser	Male
	Barco	Male		Hampton	Female		Bowser	Male
	Barco	Male		Hampton	Male		Owens	Female
	Barco	Female		Hampton	Female		Owens	Male
	Barco	Male		Brumsey	Female		Owens	Male
	Walker	Female		Brumsey	Female		Owens	Male
	Walker	Male		Brumsey	Male		Owens	Male
	Walker	Female		Brumsey	Male		Owens	Female
	Walker	Male		Brumsey	Female		Owens	Female
	Sowyer	Male		Fisher	Male		Owens	Female
	Hampton	Male		Gravis	Male		Gordon	Male

	Hampton	Male	20	Bowser	Male		Gordon	Female
	Hampton	Female		Bowser	Female		Gordon	Female
	Hampton	Female		Bowser	Female		Olds	Male
	Dunton	Male		Bowser	Male		Olds	Female
	Taylor	Female		Bowser	Female		Olds	Male
	Jones	Male		Case	Male		Olds	Male
1880 Census Data continued								
Page	Surname	Gender	Page	Surname	Gender	Page	Surname	Gender
	Gordan	Female		Baum	Female		Harris	Male
	Olds	Male		Smith	Male		Curls	Male
	Olds	Female		Knight	Male		Curls	Female
	Olds	Male		Forbes	Male		Curls	Female
	Olds	Female		Taylor	Male		Curls	Male
	Olds	Male		Taylor	Female		Curls	Male
	Olds	Female		Taylor	Male		Curls	Female
	Olds	Male		Taylor	Male		Curls	Male
	Owens	Male		Taylor	Female		Curls	Female
	Owens	Female		Taylor	Female		Hampton	Male
	Owens	Male		Taylor	Female		Hampton	Female
	Owens	Female		Taylor	Female		Hampton	Male
	Owens	Male		Hampton	Male		Hampton	Female
	Forbes	Female		Hampton	Female		Walker	Male
	Forbes	Male		Dunton	Male		Walker	Female
	Forbes	Male		Taylor	Female		Curls	Female
	Forbes	Male		Berry	Female		Lewaill	Female
	Forbes	Female		Griggs	Male		Tuiferd	Male
	Forbes	Male		Griggs	Female		Gard	Female
21	Jarvis	Male		Griggs	Male		Parker	Female
	Jarvis	Female		Griggs	Female		Parker	Male
	Jarvis	Male		Griggs	Male		Parker	Male
	Jarvis	Female		Griggs	Male		Ballance	Female
	Jarvis	Male		Baum	Female		Simmons	Male
	Jarvis	Female		Sanderson	Female		Simmons	Female
	Ball	Male		Sanderson	Male		Simmons	Female
	Hampton	Male		Sanderson	Female		Simmons	Male
	Hampton	Female		Sanderson	Female		Simmons	Male
	Knight	Male		Sanderson	Female		Simmons	Male
	Gray	Male	22	Mercer	Male		Simmons	Male

	Smith	Male		Mercer	Female		Simmons	Male
	Smith	Female		Mercer	Female		Simmons	Male
	Smith	Male		Mercer	Male		Heath	Male
	Sanderson	Female		Walker	Male		Heath	Female
	Sanderson	Female		Mercer	Female		Heath	Female
	Medgett	Male		Turner	Male		Heath	Female
	Medgett	Female		Turner	Female		Keeton	Female
	Medgett	Female		Walker	Male	23	Everton	Male
	Medgett	Female		Walker	Female		Everton	Female
	Medgett	Male		Sanders	Female		Everton	Male
1880 Census Data continued								
Page	Surname	Gender	Page	Surname	Gender	Page	Surname	Gender
	Everton	Male		Poyner	Male		Harrison	Male
	Everton	Male		Poyner	Female		Harrison	Male
	Everton	Male		Poyner	Male		Martin	Male
	Everton	Female		Poyner	Male		Martin	Female
	Everton	Female		Poyner	Female		Martin	Male
	Everton	Female		Poyner	Male		Martin	Female
	Mercer	Female		Poyner	Female		Thomas	Male
	Rodgers	Male	24	Hunt	Male		Thomas	Female
	Rodgers	Female		Hunt	Female		Thomas	Female
	Rodgers	Male		Hunt	Male		Thomas	Female
	Rogers	Female		Hunt	Female		Thomas	Female
	Rodgers	Female		Hunt	Male		Thomas	Female
	Gordon	Female		Hunt	Female		Thomas	Male
	Toler	Male		Hunt	Female		Jarvis	Male
	Toler	Female		Hunt	Female		Jarvis	Female
	Toler	Female		Hunt	Female		Jarvis	Female
	Toler	Female		Thomas	Male		Jarvis	Female
	Toler	Male		Thomas	Female	25	Jarvis	Male
	Toler	Male		Thomas	Male		Jarvis	Female
	Toler	Male		Thomas	Female		Sikes	Male
	Mccray	Male		Thomas	Female		Sanders	Male
	Mccray	Female		Thomas	Female		Sanders	Female
	Mccray	Male		Thomas	Female		Sanders	Female
	Mccray	Female		Jarvis	Male		Sanders	Female
	Lindsey	Male		Jarvis	Female		Sanders	Male

	Lindsey	Female		Jarvis	Male		Sanders	Female
	Lindsey	Female		Thomas	Female		Gordon	Male
	Lindsey	Male		Thomas	Female		Jarvis	Male
	Lindsey	Female		Thomas	Female		Jarvis	Female
	Lindsey	Female		Thomas	Male		Jarvis	Female
	Perry	Male		Newbim	Male		Jarvis	Female
	Perry	Female		Newbim	Female		Brable	Male
	Perry	Male		Newbim	Male		Brable	Female
	Perry	Female		Newbim	Female		Paterson	Female
	Jarvis	Female		Harrison	Male		Owens	Male
	Jarvis	Female		Harrison	Female		Owens	Female
	Jarvis	Female		Harrison	Female		Owens	Female
	Jarvis	Male		Harrison	Female		Owens	Male
	Jarvis	Male		Harrison	Male		Owens	Female
	Gallop	Male		Harrison	Female		Owens	Male
1880 Census Data continued								
Page	Surname	Gender	Page	Surname	Gender	Page	Surname	Gender
	Owens	Male		Thomas	Male		Morse	Male
	Owens	Male		Thomas	Female		Morse	Female
	Owens	Female		Gordon	Male		Morse	Male
	Owens	Male		Reddick	Female		Morse	Male
	Owens	Male		Snow	Male		Morse	Male
	Owens	Male		Snow	Female		Forbes	Male
	Owens	Male		Snow	Female		Forbes	Female
	Owens	Female		Rodgers	Male		Forbes	Male
	Owens	Male		Snow	Female		Evans	Male
	Owens	Male		Snow	Male		Evans	Female
	Dutcher	Male		Snow	Female		Evans	Female
	Dutcher	Female		Evans	Female		Evans	Female
	Dutcher	Male		Toler	Female		Parker	Female
	Dutcher	Female		Evans	Male		Wind	Female
	Gallop	Male		Laughton	Male		Wind	Male
	Gallop	Female		Laughton	Female		Wind	Female
	Gallop	Male		Laughton	Male		Wind	Male
	Gallop	Female		Laughton	Female		Garnett	Male
	Dough	Female		Brinson	Male		Garnett	Female
	Etheridge	Male		Brinson	Male		Garnett	Female
	Etheridge	Female		Brinson	Female		Cramer	Male

	Etheridge	Male		Brinson	Female		Cramer	Female
	Etheridge	Male		Owens	Male		Doudy	Male
	Etheridge	Male		Owens	Female		Doudy	Female
	Etheridge	Male		Wright	Male		Snow	Female
	Etheridge	Female		Wright	Female		Perry	Male
26	Evans	Male		Wright	Male		Sanders	Male
	Evans	Female		Wright	Male		Sanders	Female
	Evans	Female		Snow	Female		Sanders	Female
	Evans	Male		Parker	Male		Sanders	Male
	Evans	Male		Parker	Female		Sanders	Male
	Evans	Male		Parker	Male		Forbes	Female
	Evans	Female		Parker	Female		Forbes	Male
	Evans	Male		Burgess	Male		Brickhouse	Male
	Evans	Male	27	Parker	Male		Harrison	Male
	Evans	Female		Parker	Female		Harrison	Female
	Gallop	Male		Parker	Female		Harrison	Male
	Gallop	Female		Parker	Male		Harrison	Female
	Gallop	Female		Parker	Female		Harrison	Female
	Gallop	Female		Parker	Male		Harrison	Male
1880 Census Data continued								
Page	Surname	Gender	Page	Surname	Gender	Page	Surname	Gender
	Harrison	Female		Simpson	Female		Partridge	Female
	Dowdy	Male		Newbern	Male		Partridge	Male
	Dowdy	Female		Newbern	Female		Partridge	Male
	Shrewill	Female		Newbern	Female		Partridge	Male
28	Outlaw	Male		Newbern	Female		Whitehurst	Female
	Outlaw	Female		Newbern	Female		Green	Male
	Woodhouse	Male		Newbern	Male		Owens	Male
	Woodhouse	Female		Midgett	Male		Owens	Female
	Woodhouse	Female		Midgett	Female		Owens	Female
	Woodhouse	Male		Midgett	Male		Owens	Male
	Brumsey	Male		Delon	Male		Owens	Male
	Brumsey	Female		Delon	Female		Gordon	Female
	Newbern	Male		Delon	Male		Myres	Male
	Newbern	Female		Newbern	Male		Barrot	Male
	Newbern	Female		Newbern	Female		Barrot	Female
	Newbern	Female		Parker	Female		Scott	Male
	Newbern	Female		Parker	Female		Scott	Male

	Simpson	Male						
1900 Census District Whalehead 37								
Page	Surname	Gender	Page	Surname	Gender	Page	Surname	Gender
7	Surname	Gender		Austin	Male		Oneil	Male
	Simmons	Male		Austin	Female		Oneil	Female
	Simmons	Female		Austin	Female		Lesark	Male
	Simmons	Female		Austin	Female		Lesark	Female
	Simmons	Female		Naymon	Female		Lesark	Male
	Simmons	Male		Naymon	Male		Lesark	Female
	Simmons	Female		Naymon	Female		Lesark	Female
	Simmons	Male		Naymon	Male		Miford	Male
	Austin	Male		Naymon	Female		Miford	Female
	Austin	Female		Naymon	Female		Miford	Female
	Austin	Female		Naymon	Female		Miford	Female
	Austin	Female		Naymon	Male		Miford	Male
	Austin	Female		Nayman	Male		Miford	Male
	Austin	Male		Nayman	Female	8	Turford	Male
	Austin	Female		Nayman	Male		Turford	Male
	Austin	Male		Nayman	Female		Turford	Female
	Austin	Female		Nayman	Male		Turford	Male
	Austin	Male		Oneil	Male		Turford	Male
	Austin	Male		Oneil	Female		Turford	Male
1900 Census District Whalehead 37 continued								
Page	Surname	Gender	Page	Surname	Gender	Page	Surname	Gender
	Curls	Male		Roddy	Male		Parker	Male
	Curls	Female		Roddy	Female		Johnson	Male
	Curls	Male		Parker	Male		Simmons	Male
	Curls	Female		Parker	Female		Nelson	Male
	Curls			Parker	Male		Nelson	Female
	Curls	Female		Parker	Female		Nelson	Male
	Curls	Female						
1910 Census District Poplar Branch 30								
Page	Surname	Gender	Page	Surname	Gender	Page	Surname	Gender
27	Greggs	Male		Beay	Male		Mercer	Female
	Griggs	Female		Beay	Female		Mercer	Female
	Griggs			Beay	Male		Roberto	
	Griggs	Female		Beay	Male		Roberts	Male

	Etheredge	Male		Beay	Female		Roberts	Female
	Olds	Male		Baxler	Male		Roberts	Female
	Spry	Male		Jones	Male		Barco	Male
	Spry	Female		Jones	Female		Barco	Female
	Spry	Male		Jones	Female		Barco	Female
	Spry	Female		Lees	Male		Barco	Female
	Mercer	Female		Lees	Female		Kuny	Male
	Palmer	Male		Spry	Male		Kuny	Female
	Palmer	Female		Spry	Female		Kuny	Female
	Palmer	Male		Overton	Male		Kuny	Female
	Palmer	Male		Overton	Female		Kuny	Female
	Palmer	Male		Overton	Female		Kuny	Male
	Palmer	Female		Overton	Male		Tancay	Male
	Palmer	Male		Overton	Male		Wolshea	Male
	O Neal	Male		Hales	Male		Wolshea	Female
	O Neal	Female		Hales	Female		Wolshea	Male
	Oneil	Male	28	Hall	Male		Wolshea	Male
	Woodham			Hall	Male		Daunn	Male
	Woodham	Female		Ladd	Female		Daunn	Female
	Woodham	Female		Ladd	Male		Breden	Male
	Woodham	Female		Hall	Female		Breden	Female
	Beale	Male		Spry	Male		Breden	Male
	Beale	Female		Spry	Female		Paul	Male
	Beale	Female		Mercer	Male		Paul	Female
	Beale	Female		Mercer	Female		Paul	Male
	Beale	Male		Mercer	Male		Paul	Male
1910 Census District Poplar Branch 30 continued								
Page	Surname	Gender	Page	Surname	Gender	Page	Surname	Gender
	Breden	Male		Austin	Female		Parker	Female
	Breden	Female		Austin	Male		Parker	Male
	Breden	Male		Austin	Male		Parker	
	Maced	Male		Austin	Female		Fulcher	Male
	Macet			Austin	Female		Fulcher	Female
	Macet	Female		Austin	Female		Fulcher	Male
	Macet	Female		Austin	Female		Fulcher	Female
	Macet	Female		Austin	Male		Fulcher	Male
	Mufield	Male		Austin	Female		Fulcher	Female
	Mufield	Female		Austin	Male		Midgett	Male

29	Henes	Male		Austin	Male		Sanderta	Male
	Henes	Female		Austin	Male		Sanderlin	Female
	Bringley	Male		Austin	Female		Sanderlin	Male
	Bringley	Female		Austin	Male		Sanderlin	Male
	Bringley	Female		Swain	Male		Sanderlin	Female
	Bunkley	Male		Swain	Female		Sanderlin	Male
	Brinkley	Female		Swain	Female		Sanderlin	Female
	Brinkley	Female		Austin	Male		Sanderlin	Male
	J*S	Male		Austin	Female		Baur	Male
	J*S	Female		Austin	Female		Baur	Female
	J*S	Female	30	Grey	Male		Baur	Female
	Pallergar	Male		Grey	Female		Baur	Male
	Patterson	Female		Lenford	Male		Baur	Female
	Foulks	Male		Lenford	Female		Baur	Male
	Foulks	Female		Lenford	Male		Baur	Female
	Foulks	Female		Lenford	Female		Branson	Male
	Foulks	Female		Lenford	Female		Bramson	Male
	Foulks	Male		Lenford	Male		Simon	Male
	Nelson	Male		Lenford	Male		Simon	Female
	Nelson	Female		Roddy	Male		Simon	Female
	Nelson	Female		Roddy	Female	31	Hayman	Male
	Nelson	Male		Roddy	Female		Haymon	Female
	Walkes	Male		Lewark	Male		Haymon	Male
	Walker			Lewark	Female		Haymon	Female
	Walker	Female		Lewark	Female		Haymon	Male
	Walker	Male		Lewark	Male		Haymon	Female
	Walker	Female		Lewark	Female		Haymon	Male
	Walker	Female		Parker	Male		Haymon	Male
	Tu?Ford	Male		Parker	Female		Haymon	Male
	Austin	Male		Parker	Male		Hampton	Male
1910 Census District Poplar Branch 30 continued								
Page	Surname	Gender	Page	Surname	Gender	Page	Surname	Gender
	Hampton	Female		White	Male		Ross	Male
	Lurford	Male		White	Female		Crane	Male
	Rodas	Female		White	Female		Crane	Female
	Smith	Male		White	Female		Crane	Male
	Smith	Female		White	Male		Crane	Male
	White	Female		White	Female		Crane	Male

	Smith	Female		Ross	Male		Crane	Male
	Baves	Male		Ross	Female		Crane	Male
	Barco	Female		Ross	Male		Crane	Female
	Hampton	Female		Ross	Female		Crane	Female
	Hampton	Female		Ross	Male		Carls	Male
	Hampton	Female		Ross	Female		Curls	Female
	Hampton	Male		Ross	Male		Curls	Female
	Sanners	Male						
1920 Census District Poplar Branch 28								
Page	Surname	Gender	Page	Surname	Gender	Page	Surname	Gender
1	Lewark	Male		Brumsey	Male		Hampton	Female
	Lewark	Female		Brumsey	Female		Hampton	Male
	Lewark	Male		Austin	Male		Hampton	Male
	Lewark	Male		Austin	Female	2	Twiford	Male
	Lewark	Female		Austin	Female		Twiford	Female
	Lewark	Female		Cason	Male		Twiford	Male
	Lewark	Male		Perry	Male		Twiford	Male
	Lewark	Female		Midgett	Male		Twiford	Female
	Lewark	Female		Midgett	Female		Twiford	Male
	Lewark	Male		Fulture	Male		Taylor	Male
	Lewark	Female		Beasley	Male		Lewark	Male
	Haman	Male		Beasley	Female		Lewark	Female
	Haman	Female		Beasley	Male		Sanderlin	Male
	Haman	Male		Beasley	Female		Sanderlin	Female
	Hinley	Male		Beasley	Male		Sanderlin	Male
	Hinley	Female		Beasley	Male		Sanderlin	Male
	Hinley	Female		Austin	Male		Sanderlin	Female
	Hinley	Male		Austin	Female		Sanderlin	Female
	Hinley	Male		Austin	Male		Sanderlin	Male
	Hinley	Female		Austin	Male		Sanderlin	Male
	Brumsey	Male		Gray	Male		Lewark	Male
	Brumsey	Female		Gray	Female		Lewark	Female
	Brumsey	Female		Hampton	Female		Lewark	Male
1920 Census District Poplar Branch 28 continued								
Page	Surname	Gender	Page	Surname	Gender	Page	Surname	Gender
	Lewark	Male		Swain	Female		Curls	Female
	Swain	Male		Ross	Male		Curls	Male

	Swain	Female		Ross	Female		Curls	Male
	Swain	Female		Ross	Male		Curls	Female
	Austin	Male		Ross	Female		Weatherington	Male
	Austin	Female		Pigott	Male		Weatherington	Female
	Austin	Male		Hampton	Male		Weatherington	Female
	Austin	Female		Hampton	Female		Weatherington	Male
	Austin	Female		Hampton	Female		Weatherington	Male
	Austin	Female		Phalen	Male		Weatherington	Female
	Johnson	Male		Ackiss	Male		Perry	Male
	Johnson	Female		Ackiss	Female		Perry	Female
	Johnson	Male		Ackiss	Male		Ross	Male
	Johnson	Male		Ackiss	Female		Ross	Female
	Johnson	Male		Ackiss	Male		Waterfield	Male
	Johnson	Male		Barco	Male		Waterfield	Female
	Johnson	Female		Barco	Male		Waterfield	Female
	Dowdy	Male		Barco	Male		Waterfield	Female
	Dowdy	Female		Barco	Female		Waterfield	Female
	Haman	Male		Melson	Male		Waterfield	Male
	Haman	Female		Melson	Female		Waterfield	Female
	Haman	Male		Melson	Female		Waterfield	Female
	Guard	Male		Melson	Male		Barco	Male
	Guard	Female		Melson	Female		Barco	Female
	Guard	Male		Melson	Female		Smith	Male
	Yeomans	Male		Melson	Male		Smith	Female
	Woodhouse	Male		Melson	Female		Smith	Female
3	Harris	Male		Melson	Male		Griggs	Male
	Harris	Female		Ross	Male		Griggs	Female
	Harris	Male		Ross	Female		Perry	Male
	Rogers	Female		Ross	Female		Hampton	Male
	Payner	Male		Jones	Male		Hampton	Female
	Payner	Female		Jones	Female		Oneill	Male
	Payner	Male		Jones	Male		Oneill	Female
	Payner	Male	4	Hampton	Male		Oneill	
	Payner	Female		Hampton	Female		Oneill	Male
	Baum	Male		Hampton	Male		Oneill	Male
	Baum	Female		Hampton	Female		Oneill	Male
	Baum	Male		Hampton	Female		White	Male
	Baum	Male		Curls	Male		White	Female

1920 Census District Poplar Branch 28 continued								
Page	Surname	Gender	Page	Surname	Gender	Page	Surname	Gender
	White	Female		Ferebee	Male		Crain	Male
	White	Female		Ferebee	Female		Crain	Female
	Phaup	Female		Ferebee	Female		Crain	Male
	Roberts	Male		Beasley	Male		Crain	Male
5	Bowden	Male		Beasley	Female		Crain	Male
	Bowden	Female		Beasley	Female		Crain	Female
	Bowden	Female		Curls	Male		Crain	Female
	Bowden			Curls	Female		Crain	Male
	Bowden			Curls	Male		Crain	Female
	Parker	Female		Curls	Female		Crain	Female
	Curls	Male		Curls	Female		Mitchell	Male
	Curls	Female		Curls	Female		Mitchell	Male
	Curls	Male		Curls	Male		Heatwol	Male
	Curls	Female		Curls	Female		White	Male
	Curls	Female		Curls	Female		White	Female
	Sears	Male		Dunton	Male		White	Male
	Sears	Female		Dunton	Female		Thomas	Male
	Sears	Male		Pigott	Male		Thomas	Female
	Sears	Female						
1930 Census Record								
Page	Surname	Gender	Page	Surname	Gender	Page	Surname	Gender
15	Madgett	Male		Walker	Male		Poyner	Female
	Madgett	Female		Walker	Female		Saunders	Female
	Madgett	Male		Walker	Male		Butler	Male
	Madgett	Female		Cartwright	Male		Neidzvicke	Male
	Hughes	Female		Cartwright	Female		Tarleton	Male
	Cowan	Female		Young	Male		Joringdal	Male
	Howe	Male		Forbes	Male		James	Male
	Cohoon	Female		Forbes	Female		Twiford	Male
	Mc Cloud	Female		O Neal	Male		Twiford	Female
	Austin	Female		O Neal	Female		Twiford	Male
	Mc Dowell	Female		O Neal	Female		Baum	Male
	Raymond	Female		O Neal	Female		Baum	Female
	Randolph	Female		Jones	Female		Baum	Male
	Tillett	Male		Aydlett	Male		Baum	Female
	Tillett	Female		Aydlett	Female	16	Hampton	Male

	Woodhouse	Female		Aydlett	Male		Matthews	Male
	Woodhouse	Male		Poyner	Male		Matthews	Female
	Owens	Male		Poyner	Female		Matthews	Female
1930 Census Record continued								
Page	Surname	Gender	Page	Surname	Gender	Page	Surname	Gender
	Matthews	Male		Dunton	Male		Beasley	Female
	Matthews	Male		Dunton	Male		Jones	Male
	Matthews	Male		Dunton	Female		Jones	Female
	Evans			Dunton	Female		Johnson	Male
	Evans	Female		Jones	Male		Johnson	Female
	Saunders	Female		Jones	Female		Johnson	Male
	Saunders	Female	17	Jones	Male		Midgett	Male
	Saunders	Male		Jones	Female		Midgett	Female
	Saunders	Female		Jones	Male		Midgett	Female
	Aydlett	Male		Jones	Female		Midgett	Female
	Aydlett	Female		Jones	Male		Henley	Male
	Aydlett	Female		Jones	Female		Henley	Female
	Aydlett	Male		Hampton	Male		Henley	Female
	Aydlett	Female		Sanders	Male		Barnett	Male
	Aydlett	Male		Parker	Male		Barnett	Female
	Sargeant	Male		Parker	Female		Barnett	Female
	Sargeant	Female		Parker	Male	18	Beasley	Male
	Cassey	Female		Doxey	Male		Beasley	Female
	Newbern	Male		Morgan	Male		Beasley	Female
	Newbern	Female		Morgan	Female		Lewark	Male
	Newbern			Austin	Male		Lewark	Female
	Newbern	Female		Austin	Female		Lewark	Male
	Newbern	Female		Jones	Female		Lewark	Female
	Newbern	Male		Austin	Female		Lewark	Female
	Dunton	Male		Austin	Female		Parker	
	Dunton	Female		Austin	Female		Parker	Female
	Dunton	Female		Austin	Male		Parker	Female
	Dunton	Female		Austin	Female		Parker	Male
	Dunton	Female		Tillett	Male		Parker	Male
	Parker	Male		Tillett	Female		Gallop	Male
	Parker	Female		Tillett	Female		Gallop	Female
	Dunton	Male		Tillett	Female		Twiford	Male
	Dunton	Female		Tillett	Female		Twiford	Female

	Dunton	Female		Tillett	Male		Twiford	Male
	Dunton	Male		Tillett	Female		Twiford	Male
	Dunton	Male		Tillett	Male		Lewark	Male
	Dunton	Female		Henley	Male		Lewark	Female
	Dunton	Male		Henley	Female		Lewark	Female
	Sawyer	Male		Beasley	Male		Johnson	Male
	Dunton	Female		Beasley	Male		Lewark	Male

1930 Census Record continued

Page	Surname	Gender	Page	Surname	Gender	Page	Surname	Gender
	Lewark	Female		Sanderlin	Male		Austin	Female
	Lewark	Male		Sanderlin	Female		Austin	Male
	Lewark	Female		Austin	Male		Austin	Male
	Lewark	Female		Austin	Female		Austin	Male
	Lewark	Female		Austin	Male		Austin	Female
	Tillett	Male		Austin	Male		Austin	Female
	Tillett	Female		Austin	Female		Baum	Male
	Sanderlin	Male		Austin	Male		Baum	Female
	Sanderlin	Female		Austin	Male			

1940 Census Record continued

Page	Surname	Gender	Page	Surname	Gender	Page	Surname	Gender
	Tweiford	M		Duncan	M		Austin	M
	Tweiford	F		Sellers	M		Austin	M
	Tweiford	M		Hensley	M		Austin	F
	Midgett	M		Kline	M		Austin	F
	Midgett	F		Geraghty	M		Austin	M
	Midgett	M		SulliVAan	M		Austin	M
	Midgett	F		Threatt	M		Austin	M
	Midgett	M		Gilliatt	M		Trainia	M
	Philps	M		Bowman	M		Trainia	F
	Midgett	M		LawS	M		Trainia	F
	Midgett	M		Mooney	M		Bartan	M
	Austin	M		Hackmburg	M		Bartan	F
	Austin	F		Hart	M		Bartan	M
	Austin	M		Poole	M		Dunton	M
	Austin	M		Nesler	M		Dunton	F
	Austin	F		Jurinn	M		Jones	M
	Barco	M		Reiley			Jones	F
	Barco	F		Sherwood	M		Jones	F

	Barco	F		Schulte	M		Jones	M
	Henley	M		Bronce	M		Payner	M
	Henley	F		Lewark	M		Payner	F
	Henley	M		Lewark	F		Jonis	F
	Henley	M		Lewark	M		Finnegan	M
	Sanderlin	M		Austin	F		Finnegan	F
	Sanderlin	F		Austin	M		Finnegan	M
	Kirkpatric	M		Austin	F		Finnegan	F

Census data for CBLS between 1870 to 1940 (USBC 1870, 1880, 1900, 1910, 1920, 1930, 1940)

Appendix D: Shipwreck Data

Name of Vessel	place	year	Name of Vessel	place	year
Flower of Cork	False Cape, Va	1753	Leonora	False Cape, Va	1847
Duke of Cumberland	Currituck Beach, NC	1756	Hornet	False Cape, Va	1849
Neptune	Currituck Beach, NC	1760	Evergreen	Currituck Beach, NC	1849
Shannon	Currituck Beach, NC	1764	Nettle	False Cape, Va	1850
Countess of Leicester	Currituck Beach, NC	1764	Edward Wood	Currituck Beach, NC	1850
Hibernia	Currituck Beach, NC	1775	Franklyn	Currituck Beach, NC	1850
Margrette and Rebecca	False Cape, Va	1776	Mountaineer	Kitty Hawk, NC	1852
Molly	False Cape, Va	1777	Grey Eagle	False Cape, Va	1853
Lynx	Currituck Beach, NC	1789	Eliza	Currituck Beach, NC	1853
Nancy	Currituck Beach, NC	1793	Henrieta Pierce	Currituck Beach, NC	1853
Betsy	Currituck Beach, NC	1797	City of Philadelphia	False Cape, Va	1856
Shepherdess	False Cape, Va	1806	John Randolph	False Cape, Va	1856
Eagle	False Cape, Va	1812	Baltic	Currituck Beach, NC	1857
Mary	Currituck Beach, NC	1816	John Almack	False Cape, Va	1858
Emperor of Russia	Currituck Beach, NC	1817	Amanda Coons	Currituck Beach, NC	1858
Revenue	Currituck Beach, NC	1818	Agammemnon	Currituck Beach, NC	1859
Georgia	Currituck Beach, NC	1818	Jane Henderson	False Cape, Va	1860
Sophia	Currituck Beach, NC	1821	Andrew Johnson	Kill Devil Hill, NC	1866
C. I. Allen	False Cape, Va	1837	State of Georgia	Currituck Beach, NC	1866
Ralph	Currituck Beach, NC	1837	Martha	Currituck Beach, NC	1867

Oran Sherwood	Currituck Beach, NC	1837	Blanche	False Cape, Va	1868
Hunter	Kill Devil hill, NC	1837	Figogna	False Cape, Va	1868
Horse	Currituck Beach, NC	1838	M. A. Forbes	Currituck Beach, NC	1870
Volta	False Cape, Va	1841	William Muir	Currituck Beach, NC	1871
Alonzo	Currituck Beach, NC	1841	M. McFarlane	Currituck Beach, NC	1872
American Trader	Currituck Beach, NC	1841	Faugh-A-Ballagh	Currituck Beach, NC	1873
Kilgore	Currituck Beach, NC	1842	Annie Mcfarlane	Currituck Beach, NC	1873
McDonough	Kitty Hawk, NC	1844	Tinto	Currituck Beach, NC	1876
Emilie French	Currituck Beach, NC	1845	Nuova Ottavia	Currituck Beach, NC	1876
Victoria	Currituck Beach, NC	1845	Henry G Fay	Currituck Beach, NC	1876
James T. Hetfield	False Cape, Va	1846	Ed J. Heraty	Kill Devil hill, NC	1877
Pacific	False Cape, Va	1846	Ed. J Herty	Kitty Hawk, NC	1877
Name of Vessel	place	year	Name of Vessel	place	year
Metropolis	Currituck Beach, NC	1878	Alva	Albemarle Sound, NC	1909
Admiral	Currituck Beach, NC	1879	Nina	Elizabeth City, NC	1909
Thomas J. Martin	Currituck Beach, NC	1883	Gracie D. Chambers	Currituck Beach, NC	1910
Angela	Kitty Hawk, NC	1883	Ella Crosby	Albemarle Sound, NC	1911
Lewis A Rommel	False Cape, Va	1884	Charles J. Dumas	Pea Island, NC	1911
Ario Pardee	Currituck Beach, NC	1884	Gray	Elizabeth City, NC	1911
Ada F. Whitney	Poyners Hill NC	1885	Montrose W. Hauck	Currituck Beach, NC	1911
Harkaway	Currituck Beach, NC	1885	Undine	Currituck Sound, NC	1912
Jennie Beasley	Currituck Beach, NC	1886	L. O. Muir	Elizabeth City, NC	1912
Kimberly	Currituck Beach, NC	1887	Joseph A. O'Brian	Albemarle Sound, NC	1912

Henrey P. Simmons	False Cape, Va	1889	Virginia	Elizabeth City, NC	1912
John S Wood	Currituck Beach, NC	1889	Montrose W. Houck	Currituck Beach, NC	1913
N. Boynton	Currituck Beach, NC	1889	Hilda	Elizabeth City, NC	1913
Vibilia	Currituck Beach, NC	1891	St. Rita	Kitty Hawk, NC	1913
Vilita	Currituck Beach, NC	1891	The Josephine	Kill Devil hill, NC	1915
Mattie E. Hiles	Currituck Beach, NC	1892	William H Macy	Currituck Beach, NC	1915
Emma J. Warington	Kitty Hawk, NC	1893	Annie	Elizabeth City, NC	1918
Clythia	False Cape, Va	1894	Lucrecia	Elizabeth City, NC	1919
Clythie	Currituck Beach, NC	1894	Sunbeam	Currituck Beach, NC	1919
Staffa	Currituck Beach, NC	1897	Louisa M.	Currituck Beach, NC	1920
Express	False Cape, Va	1902	Tallac	False Cape, Va	1920
Mable Rose	False Cape, Va	1903	Momie T	Currituck Beach, NC	1920
J. B. Holden	Kill Devil hill, NC	1903	Mary J. Haynlo	Albemarle Sound, NC	1921
Thomas A Goddard	Nags Head, NC	1905	Carrie B. Bell	Currituck Beach, NC	1921
Jennie Lockwood	Pea Island, NC	1906	Louise	Coinjock, NC	1922
J. Daggit	Albemarle Sound, NC	1907	Annie Lena White	Currituck Beach, NC	1927
Tourist	Albemarle Sound, NC	1907	Waterlilly	Elizabeth City, NC	1927
Oriente	Currituck Beach, NC	1907	Kyzickes	Kill Devil hill, NC	1927
Arlevillie H Peary	False Cape, VA	1908	Alna W. E. R.	Currituck Beach, NC	1928
Wm. H. Lermond	Currituck Beach, NC	1908	Commodore Bartlett	Elizabeth City, NC	1928
Florence Shay	False Cape, Va	1908	A. Ernest Mills	Currituck Beach, NC	1929
Charles S. Hirsch	Kitty Hawk, NC	1908	Adele	Coinjock, NC	1929
Name of Vessel	place	year	Name of Vessel	place	year

Wenona	Pasquotank River NC	1929	Isle of Surry	Pasquotank River NC	1938
Carl Gerhard	Kill Devil hill, NC	1929	Neuse	Albemarle Sound, NC	1940
Madeline	Elizabeth City, NC	1932	Pan Maine	False Cape, Va	1942
Sparrow III	Albemarle Sound, NC	1933	Margaret	Albemarle Sound, NC	1951
Nova Julia	Currituck Beach, NC	1934	Confederate	Albemarle Sound, NC	1954
Virginia Dare	Currituck Beach, NC	1935	Monocracy	Elizabeth City, NC	1956
B. W. Leigh	Coinjock, NC	1935	Cathleen	Currituck Beach, NC	1957
Jamie	Elizabeth City, NC	1935	Revenge	Currituck Beach, NC	1965
Wave	Currituck Beach, NC	1937			
1917 list missing					
1940 list missing					
1953 list missing					

Shipwreck data for inside the 25-mile radius of CBLS's beacon's reach (USTD 1856-1961; USLHB 1874-1905, 1920; USLSS 1876:55, USCG 1915-1965; Mobley 1994:27, Bishir and Southern 1996:91; The Virginia Pilot 2002:C3; Davis 2004:60; USDC 2015).

Appendix E: Investment Data

Year	from	$ requested	$ today	notes
1872	Fed.	50,000.00	998,693.38	
1873	Fed.	60,000.00	1198432.05	
1874	Fed.	20,000.00	423175.16	
1881	Fed.			Longpoint Keepers house completed
	Fed.			New lamp installed
1883	Fed.			Repairs made
`1886	Fed.		112,186.91	Repairs made
1888	Fed.			Wharf repairs
1889	Fed.			Repairs made
1890	Fed.			Repairs made
1892	Fed.			Repairs made, new metal fence installed
1894	Fed.			Topographic survey completed
1895	Fed.			Sheet iron oil-house purchased
	Fed.			Post office established
1896	Fed.			Oil-house erected, wood fence built
1898	Fed.			Repairs made
1899	Fed.			Repairs made
1900	Fed.			Repairs made
1901	Fed.			Repairs made, Telephone system installed
1902	Fed.			Repairs made, Wharf reconstruction.
1903	Fed.			Repairs made
1904	Fed.			Repairs made
1905	Fed.	1,710.00	45492.94	Repairs made
1919	State	3,800.00	53,096.54	The Great Marsh Road constructed for postal access.
1920	Fed.	7,438.00	89,899.00	Move dwelling, reconstruct Wharf, repairs
1922	Priv.	385,000	5,513,348.73	Corolla Island
1930	State	308.68	4,468.08	Road improvements in corolla
1980	Priv.	1,500,000.00	3,330,749.70	Tower Restoration
1982	Priv.	2,000,000.00	4,798,713.23	CBLS other buildings
1992	Priv.	2,500,000.00	4,260,879.36	Purchase Whalehead
1998	Priv.	5,000,000.00	8,521,758.77	Restore Whalehead

Table 2 (B. Scott Rose 2016)

Table 3 Investment data for the CBLS and surrounding area (USTD 1856-1961; USBC 1870-1940; USLHB 1874-1905, 1920; USLSS 1876:55, USCG 1915-1965; Schoenbaum 1988; Johnson and Coppedge 1991:95; Mobley 1994:27, Bishir and Southern 1996:91; The Virginia Pilot 2002:C3; Davis 2004:60; USDC 2015).

Appendix F: Total Station Raw Data

Total Station Points 9/27/2013							
POINT	Y	X	ELEV	POINT	Y	X	ELEV
1	4026057	425462	0	46	4026045	425457	-0.14
2	4026070	425460	0.28	47	4026046	425460	-0.09
3	4026064	425474	0.08	48	4026045	425460	-0.09
4	4026062	425476	0.09	49	4026046	425463	-0.07
5	4026059	425477	0.12	50	4026045	425463	-0.07
6	4026056	425478	0.1	51	4026046	425467	-0.06
7	4026052	425479	0.1	52	4026045	425467	-0.04
8	4026051	425479	0.1	53	4026046	425470	-0.01
9	4026050	425478	0.04	54	4026046	425470	0.03
10	4026049	425477	0.04	55	4026046	425472	0
11	4026049	425478	0.05	56	4026046	425472	0
12	4026050	425479	0.08	57	4026043	425479	0.08
13	4026048	425476	0.05	58	4026042	425479	0.06
14	4026048	425476	0.04	59	4026044	425477	0.05
15	4026046	425475	0	60	4026044	425477	0.04
16	4026046	425474	0	61	4026042	425480	0.06
17	4026045	425476	0.03	62	4026038	425479	0.1
18	4026044	425476	0.04	63	4026035	425479	0.1
19	4026046	425474	0.03	64	4026031	425477	0.09
20	4026065	425474	0.09	65	4026028	425476	0.08
21	4026068	425472	0.08	66	4026023	425473	0.04
22	4026070	425470	0	67	4026020	425470	0.03
23	4026072	425467	-0.04	68	4026018	425466	0.05
24	4026073	425465	-0.03	69	4026018	425463	0.03
25	4026074	425461	-0.06	70	4026017	425457	-0.04
26	4026074	425459	-0.06	71	4026014	425458	-0.04
27	4026073	425456	-0.09	72	4026010	425458	-0.02
28	4026073	425453	-0.11	73	4026016	425457	-0.04
29	4026071	425450	-0.13	74	4026017	425457	-0.04
30	4026069	425447	-0.12	75	4026019	425454	-0.05
31	4026067	425445	-0.22	76	4026020	425451	-0.05
32	4026063	425443	-0.23	77	4026023	425447	-0.13
33	4026058	425441	-0.27	78	4026025	425445	-0.18
34	4026055	425441	-0.27	79	4026030	425443	-0.22
35	4026052	425440	-0.29	80	4026034	425442	-0.23

36	4026044	425441	-0.29	81	4026037	425440	-0.23
37	4026045	425444	-0.25	82	4026050	425476	0.11
38	4026044	425445	-0.26	83	4026052	425477	0.12
39	4026045	425447	-0.24	84	4026056	425477	0.1
40	4026044	425448	-0.25	85	4026059	425476	0.11
41	4026045	425450	-0.2	86	4026062	425474	0.1
42	4026045	425450	-0.23	87	4026064	425473	0.08
43	4026045	425454	-0.17	88	4026068	425470	0.04
44	4026045	425453	-0.17	89	4026070	425468	0.02
45	4026045	425457	-0.13	90	4026071	425465	0
Total Station Points 9/27/2013							
POINT	Y	X	ELEV	POINT	Y	X	ELEV
91	4026072	425461	-0.04	136	4026039	425478	0.11
92	4026072	425457	-0.08	137	4026042	425477	0.09
93	4026072	425454	-0.08	138	4026043	425476	0.12
94	4026070	425450	-0.13	139	4026044	425447	-0.24
95	4026067	425447	-0.18	140	4026045	425447	-0.23
96	4026064	425445	-0.23	141	4026044	425447	-0.23
97	4026061	425443	-0.24	142	4026045	425447	-0.25
98	4026056	425442	-0.28	143	4026045	425452	-0.19
99	4026052	425441	-0.26	144	4026045	425452	-0.21
100	4026048	425442	-0.28	145	4026045	425452	-0.17
101	4026046	425445	-0.24	146	4026045	425452	-0.16
102	4026046	425447	-0.22	147	4026045	425454	-0.14
103	4026046	425452	-0.13	148	4026045	425455	-0.13
104	4026047	425458	-0.06	149	4026045	425455	-0.14
105	4026047	425466	-0.01	150	4026046	425459	-0.09
106	4026047	425470	0.05	151	4026045	425459	-0.08
107	4026047	425472	0.08	152	4026045	425460	-0.08
108	4026048	425474	0.1	153	4026046	425460	-0.1
109	4026049	425475	0.14	154	4026046	425462	-0.11
110	4026049	425475	0.15	155	4026046	425462	-0.09
111	4026043	425476	0.14	156	4026045	425462	-0.07
112	4026044	425474	0.1	157	4026045	425462	-0.09
113	4026045	425473	0.09	158	4026045	425467	-0.06
114	4026044	425469	0.03	159	4026046	425467	-0.06
115	4026044	425462	-0.02	160	4026041	425447	-0.1
116	4026044	425452	-0.12	161	4026043	425457	0.06
117	4026043	425447	-0.2	162	4026021	425460	0

118	4026043	425445	-0.24	163	4026020	425450	-0.07
119	4026042	425443	-0.27	164	4026019	425449	-0.08
120	4026040	425442	-0.27	165	4026032	425447	-0.15
121	4026036	425443	-0.25	166	4026015	425424	-0.37
122	4026032	425443	-0.25	167	4026084	425422	-0.39
123	4026029	425445	-0.21	168	4026084	425427	-0.31
124	4026025	425447	-0.17	169	4026084	425432	-0.17
125	4026022	425450	-0.07	170	4026084	425433	-0.08
126	4026020	425453	-0.04	171	4026084	425435	0.04
127	4026019	425457	-0.01	172	4026084	425442	-0.14
128	4026019	425461	0	173	4026084	425446	-0.1
129	4026019	425464	0.05	174	4026087	425493	0.75
130	4026021	425468	0.03	175	4026086	425499	0.66
131	4026023	425472	0.03	176	4026076	425453	-0.12
132	4026026	425474	0.07	177	4026074	425453	-0.11
133	4026030	425476	0.07	178	4026075	425462	-0.01
134	4026034	425477	0.07	179	4026077	425462	-0.09
135	4026037	425478	0.1	180	4026077	425463	-0.05
Total Station Points 9/27/2013							
POINT	Y	X	ELEV	POINT	Y	X	ELEV
181	4026082	425465	0.09	226	4026068	425458	0.02
182	4026086	425465	0.09	227	4026068	425459	0.07
183	4026052	425494	0.08	228	4026069	425459	0.28
184	4026052	425490	0.09	229	4026068	425461	0.21
185	4026051	425485	0.03	230	4026065	425449	0.02
186	4026051	425479	0.11	231	4026049	425448	0.05
187	4026048	425479	0.14	232	4026049	425456	0.15
188	4026048	425479	0.12	233	4026049	425462	0.19
189	4026047	425477	0.08	234	4026049	425474	0.17
190	4026045	425477	0.07	235	4026053	425479	0.15
191	4026045	425479	0.1	236	4026046	425472	0.02
192	4026045	425479	0.11	237	4026046	425472	0.01
193	4026045	425479	0.13	238	4026043	425475	0.31
194	4026042	425480	0.11	239	4026025	425473	0.13
195	4026028	425481	0.44	240	4026025	425471	0.1
196	4026027	425482	0.42	241	4026023	425468	0.08
197	4026027	425481	0.43	242	4026021	425467	0.15
198	4026021	425483	0.39	243	4026024	425457	0.17
199	4026020	425483	0.41	244	4026037	425444	-0.21

200	4026020	425484	0.39	245	4026039	425446	-0.19
201	4026009	425481	0.43	246	4026042	425447	-0.14
202	4026008	425481	0.38	247	4026041	425444	-0.24
203	4026006	425481	0.43	248	4026041	425451	0.03
204	4026006	425478	0.42	249	4026042	425457	0.13
205	4026011	425464	0.05	250	4026042	425462	0.09
206	4026016	425463	0.05	251	4026047	425446	-0.15
207	4026016	425463	0.08	252	4026049	425444	-0.14
208	4026018	425462	0.03	253	4026052	425443	-0.28
209	4026031	425436	-0.21	254	4026050	425442	-0.24
210	4026033	425436	-0.21	255	4026070	425452	-0.04
211	4026035	425437	-0.2	256	4026070	425457	0.06
212	4026038	425438	-0.22	257	4026068	425462	0.1
213	4026039	425438	-0.2	258	4026069	425466	0.02
214	4026039	425439	-0.22	259	4026046	425478	0.91
215	4026040	425440	-0.26	260	4026051	425480	0.13
216	4026048	425439	-0.29	261	4026055	425480	0.21
217	4026050	425438	-0.22	262	4026056	425483	0.18
218	4026050	425437	-0.18	263	4026056	425487	0.22
219	4026050	425437	-0.19	264	4026057	425490	0.24
220	4026050	425436	-0.16	265	4026057	425494	0.28
221	4026054	425436	-0.29	266	4026056	425497	0.25
222	4026055	425435	-0.29	267	4026056	425497	0.25
223	4026057	425435	-0.33	268	4026053	425500	0.19
224	4026060	425434	-0.34	269	4026067	425474	0.26
225	4026058	425451	0.06	270	4026067	425473	0.24
Total Station Points 9/27/2013							
POINT	Y	X	ELEV	POINT	Y	X	ELEV
271	4026068	425473	0.23	316	4026078	425425	-0.34
272	4026068	425472	0.24	317	4026077	425423	-0.43
273	4026069	425472	0.21	318	4026078	425420	-0.5
274	4026068	425472	0.22	319	4026081	425415	-0.44
275	4026070	425471	0.16	320	4026075	425414	-0.38
276	4026070	425471	0.18	321	4026076	425409	-0.46
277	4026072	425471	0.06	322	4026081	425408	-0.46
278	4026070	425474	0.14	323	4026061	425441	-0.09
279	4026067	425475	0.23	324	4026064	425437	-0.2
280	4026061	425479	0.31	325	4026062	425438	-0.21
281	4026068	425479	0.41	326	4026055	425437	-0.29

282	4026076	425476	0.1	327	4026060	425436	-0.36
283	4026074	425482	0.3	328	4026060	425434	-0.34
284	4026071	425483	0.37	329	4026032	425441	-0.06
285	4026069	425486	0.36	330	4026031	425438	-0.27
286	4026064	425488	0.43	331	4026030	425438	-0.28
287	4026073	425487	0.46	332	4026030	425437	-0.25
288	4026070	425489	0.58	333	4026016	425433	-0.24
289	4026064	425494	0.72	334	4026017	425435	-0.24
290	4026065	425497	0.76	335	4026015	425438	-0.25
291	4026064	425503	0.59	336	4026013	425439	-0.2
292	4026072	425498	0.75	337	4026016	425441	-0.05
293	4026081	425500	0.76	338	4026012	425443	-0.25
294	4026089	425502	0.55	339	4026012	425446	0.73
295	4026088	425496	0.75	340	4026017	425446	-0.14
296	4026079	425488	0.45	341	4026018	425447	-0.07
297	4026080	425467	0.15	342	4026016	425449	-0.11
298	4026088	425468	-0.06	343	4026064	425441	-0.16
299	4026078	425469	-0.28	344	4026064	425441	-0.13
300	4026062	425454	-0.12	345	4026066	425442	-0.11
301	4026068	425458	0.01	346	4026065	425442	-0.08
302	4026068	425459	0.06	347	4026066	425442	-0.09
303	4026079	425447	-0.04	348	4026066	425442	-0.11
304	4026081	425444	-0.12	349	4026067	425443	-0.13
305	4026086	425442	-0.07	350	4026067	425443	-0.11
306	4026084	425436	-0.07	351	4026045	425443	-0.25
307	4026080	425436	-0.16	352	4026045	425444	-0.27
308	4026076	425443	-0.19	353	4026013	425450	0
309	4026070	425446	-0.02	354	4026013	425449	0.09
310	4026067	425439	-0.16	355	4026011	425451	0.09
311	4026068	425434	-0.29	356	4026008	425447	-0.09
312	4026070	425430	-0.24	357	4026007	425450	0.05
313	4026080	425433	-0.3	358	4026008	425451	0.16
314	4026079	425432	-0.36	359	4026009	425453	0.15
315	4026079	425430	-0.34	360	4026006	425456	0.24
Total Station Points 9/27/2013							
POINT	Y	X	ELEV	POINT	Y	X	ELEV
361	4026007	425456	0.05	409	4025760	425257	-0.97
362	4026006	425458	0.11	410	4025761	425258	-0.98
363	4026010	425458	-0.01	411	4025763	425259	-0.99

364	4026009	425458	-0.02	412	4025764	425260	-0.98
365	4026009	425458	-0.02	413	4025765	425261	-0.98
366	4026019	425457	-0.02	414	4025766	425262	-0.98
367	4026019	425461	0.04	415	4025767	425263	-0.98
368	4026019	425463	0.06	416	4025768	425264	-0.97
369	4026020	425466	0.08	417	4025769	425266	-0.98
370	4026020	425467	0.09	418	4025770	425266	-0.98
371	4026025	425473	0.08	419	4025771	425268	-0.96
372	4026027	425474	0.11	420	4025772	425269	-0.98
373	4026029	425475	0.12	421	4025773	425270	-0.98
374	4026032	425476	0.11	422	4025774	425272	-0.96
375	4026034	425477	0.12	423	4025774	425273	-0.97
376	4026030	425466	0.03	424	4025775	425274	-0.97
377	4026017	425499	0.46	425	4025776	425276	-0.97
378	4026010	425470	0.15	426	4025777	425277	-1
379	4026014	425466	0.1	427	4025777	425278	-0.99
380	4026014	425464	0.05	428	4025778	425280	-1.04
381	4026018	425467	0.05	429	4025779	425281	-0.99
382	4026011	425464	0.11	430	4025780	425283	-0.99
383	4026009	425466	0.19	431	4025781	425284	-1
384	4026005	425467	0.17	432	4025782	425285	-1.01
385	4026013	425466	0.08	433	4025852	425176	-1.2
386	4026014	425466	0.11	434	4025850	425175	-1.19
387	4026011	425466	0.2	435	4025849	425173	-1.19
388	4026018	425474	0.33	436	4025848	425171	-1.2
389	4026018	425474	0.36	437	4025847	425172	-1.19
390	4026020	425475	0.31	438	4025846	425171	-0.89
391	4026020	425474	0.35	439	4025845	425171	-1.19
392	4025930	425397	-0.62	440	4025846	425170	-1.22
393	4026059	425463	0	441	4025844	425169	-1.18
394	4026057	425463	0.02	442	4025842	425169	-1.01
395	4026057	425461	-0.02	443	4025843	425167	-1.17
396	4025906	425399	-0.6	444	4025841	425168	-0.73
400	4025753	425254	-0.93	445	4025841	425167	-1.18
401	4025751	425251	-0.98	446	4025842	425166	-1.16
402	4025753	425250	-0.97	447	4025836	425162	-1.16
403	4025754	425251	-0.97	448	4025837	425162	-1.51
404	4025755	425252	-0.98	449	4025835	425160	-1.19
405	4025756	425253	-0.97	450	4025834	425161	-1.78

406	4025757	425254	-0.97	451	4025834	425159	-1.15
407	4025758	425255	-0.97	452	4025830	425156	-1.16
408	4025759	425256	-0.98	453	4025828	425156	-1.3
Total Station Points 9/27/2013							
POINT	Y	X	ELEV	POINT	Y	X	ELEV
454	4025828	425155	-1.48	499	4025782	425116	-1.78
455	4025827	425153	-1.18	500	4025782	425115	-1.83
456	4025827	425154	-1.56	501	4025781	425114	-1.84
457	4025824	425152	-1.82	502	4025781	425115	-1.84
458	4025822	425151	-1.87	503	4025781	425113	-1.87
459	4025823	425149	-1.87	504	4025780	425114	-1.82
460	4025821	425149	-1.38	505	4025780	425113	-1.87
461	4025821	425149	-1.16	506	4025779	425114	-1.82
462	4025820	425148	-1.57	507	4025779	425112	-1.83
463	4025817	425146	-1.19	508	4025778	425113	-1.79
464	4025816	425145	-1.17	509	4025778	425113	-1.9
465	4025816	425144	-1.15	510	4025778	425111	-1.86
466	4025813	425142	-1.24	511	4025778	425111	-1.76
467	4025812	425140	-1.16	512	4025777	425111	-1.83
468	4025810	425139	-1.6	513	4025777	425112	-1.83
469	4025810	425140	-1.14	514	4025776	425110	-1.78
470	4025808	425138	-1.16	515	4025776	425111	-1.93
471	4025808	425137	-1.81	516	4025776	425109	-1.79
472	4025807	425137	-1.12	517	4025775	425110	-1.79
473	4025807	425136	-1.54	518	4025775	425109	-1.97
474	4025805	425135	-1.14	519	4025774	425110	-1.89
475	4025806	425135	-1.77	520	4025774	425108	-1.8
476	4025803	425134	-1.17	521	4025774	425109	-1.84
477	4025804	425133	-1.12	522	4025773	425107	-1.89
478	4025803	425135	-1.79	523	4025773	425107	-1.86
479	4025801	425133	-1.85	524	4025772	425107	-1.81
480	4025802	425132	-1.49	525	4025772	425108	-1.89
481	4025801	425131	-1.73	526	4025771	425106	-1.98
482	4025800	425132	-1.71	527	4025771	425106	-1.83
483	4025799	425129	-1.77	528	4025771	425107	-1.95
484	4025799	425130	-1.13	529	4025771	425105	-2.02
485	4025798	425128	-1.55	530	4025770	425106	-1.98
486	4025797	425129	-1.15	531	4025770	425105	-2.16
487	4025796	425127	-1.84	532	4025768	425103	-2.02

488	4025796	425128	-1.82	533	4025770	425104	-1.77
489	4025795	425125	-1.84	534	4025770	425104	-1.99
490	4025793	425124	-1.98	535	4025769	425105	-2.06
491	4025792	425125	-1.85	536	4025769	425105	-2.09
492	4025788	425121	-1.82	537	4025769	425105	-1.78
493	4025787	425119	-1.84	538	4025768	425105	-2.07
494	4025786	425119	-1.87	539	4025768	425103	-1.89
495	4025785	425117	-1.94	540	4025768	425103	-1.8
496	4025785	425118	-1.85	541	4025768	425102	-1.86
497	4025784	425116	-1.81	542	4025767	425102	-2.17
498	4025783	425117	-1.83	543	4025767	425103	-1.87
Total Station Points 9/27/2013							
POINT	Y	X	ELEV	POINT	Y	X	ELEV
544	4025766	425103	-2.23	555	4025764	425101	-1.89
545	4025767	425101	-1.81	556	4025763	425100	-1.89
546	4025766	425101	-1.92	557	4025763	425100	-2.09
547	4025766	425102	-1.82	558	4025764	425099	-2.13
548	4025766	425102	-1.81	559	4025764	425099	-1.86
549	4025765	425102	-1.82	560	4025762	425098	-1.97
550	4025766	425102	-1.83	561	4025762	425099	-1.99
551	4025765	425100	-1.81	562	4025762	425097	-1.83
552	4025765	425100	-1.8	563	4025733	425075	-2.2
553	4025765	425100	-1.83	600	4025720	425309	-0.93
554	4025764	425101	-1.79				
Total Station Points 3/25/2016							
POINT	Y	X	ELEV	POINT	Y	X	ELEV
3	6.8194	-46.429	0.1597	48	-22.391	0.7706	0.2072
4	6.8026	-46.453	0.1609	49	-24.442	1.8584	-0.3696
5	5.7145	-44.703	0.1536	50	-23.529	2.4761	0.2144
6	4.5875	-43.035	0.1658	51	-24.575	4.1766	0.2195
7	3.5517	-41.204	0.1602	52	-25.563	3.6429	-0.2164
8	2.5105	-41.825	0.157	53	-26.684	5.3919	-0.3355
9	3.1276	-39.906	0.4749	54	-25.61	6.0376	0.2138
10	2.4966	-39.722	0.1565	55	-27.721	7.2797	0.2023
11	1.5146	-40.251	0.1336	56	-26.703	7.6791	0.2207
12	1.3962	-37.792	0.1672	57	-28.827	8.9258	-0.1608
13	1.4713	-35.893	0.4365	58	-29.889	10.7034	-0.4932
14	-0.6387	-36.673	0.1695	59	-28.889	11.2428	-0.375
15	0.5909	-34.466	0.6121	60	-30.919	12.3959	-0.4301

16	-0.7662	-34.409	0.1627	61	-29.915	12.9777	0.2088
17	-1.7451	-34.948	0.1707	62	-29.901	13.4768	-0.4825
18	-4.0054	-29.176	0.1699	63	-32.037	14.1895	-0.23
19	-4.9107	-29.686	-0.1139	64	-31.034	14.7248	0.202
20	-6.098	-27.917	0.1703	65	-32.113	16.5073	-0.463
21	-7.1601	-26.141	0.1865	66	-37.521	25.2171	-0.4921
22	-6.2284	-25.671	-0.2883	67	-38.384	24.6146	-0.4828
23	-7.4125	-24.858	-0.3587	68	-39.438	26.3588	-0.4984
24	-9.3115	-22.563	0.1729	69	-38.495	26.9832	-0.5349
25	-9.4413	-20.43	0.1748	70	-41.741	29.9135	-0.4725
26	-10.413	-20.309	-0.113	71	-40.691	30.4547	-0.4707
27	-10.515	-18.628	-0.2742	72	-41.14	31.8109	-0.5401
28	-11.489	-19.121	0.171	73	-41.646	29.921	-0.4781
29	-10.856	-17.581	-0.3082	74	-42.798	31.6528	-0.5048
30	-12.679	-15.073	-0.2673	75	-42.855	33.932	-0.468
31	-13.136	-13.966	-0.3338	76	-43.853	33.4164	-0.5303
32	-14.732	-13.943	-0.2288	77	-44.875	35.1364	-0.4943
33	-14.438	-11.688	-0.0392	78	-44.8	35.4307	-0.4904
34	-14.909	-11.684	0.1744	79	-43.938	35.686	-0.4715
35	-16.053	-11.143	-0.2185	80	-45.914	36.8632	-0.4453
36	-15.921	-9.8797	-0.3026	81	-45.693	36.8649	-0.5175
37	-16.424	-7.9329	-0.2601	82	-45.021	37.4577	-0.4895
38	-17.173	-7.873	0.19	83	-46.132	39.2316	-0.4598
39	-19.023	-6.8665	0.1922	84	-46.372	38.3377	-0.4408
40	-18.08	-6.3359	0.1744	85	-47.029	38.6095	-0.464
41	-21.236	-3.309	-0.4369	86	-48.183	40.4318	-0.4635
42	-20.307	-2.775	0.1637	87	-47.144	40.9137	-0.5033
43	-21.345	-1.062	-0.3148	88	-49.241	42.1564	-0.4664
44	-22.241	-1.5734	0.2027	89	-49.033	42.4205	-0.5262
45	-22.995	-0.0262	-0.2568	90	-48.353	42.8093	-0.4787
46	-21.714	0.3046	-0.3191	91	-50.286	43.8916	-0.4838
47	-21.923	0.4051	-0.353	92	-49.342	44.4785	-0.4857

Total Station Data 3/25/2016

Point	Lat	Long	Depth	Point	Lat	Long	Depth
90	-48.353	42.8093	-0.4787	128	-62.015	62.9938	-0.5597
91	-50.286	43.8916	-0.4838	129	-62.159	63.8199	-0.6881
92	-49.342	44.4785	-0.4857	130	-62.402	65.3903	-0.6494
93	-50.171	44.537	-0.6651	131	-63.161	65.4128	-0.6838
94	-51.255	45.407	-0.4625	132	-63.507	67.1764	-0.5759

95	-50.461	46.285	-0.4438	133	-64.425	66.5343	-0.5747
96	-51.59	47.0199	-0.5597	134	-64.062	67.0718	-0.5778
97	-51.611	47.9989	-0.4716	135	-64.573	68.8949	-0.7004
98	-52.338	48.1082	-0.8179	136	-65.036	68.5726	-0.6341
99	-52.631	49.7781	-0.484	137	-65.607	68.416	-0.5974
100	-53.311	49.6341	-0.6011	138	-65.623	70.5998	-0.6089
101	-53.542	49.1296	-0.4728	139	-66.578	70.1123	-0.6324
102	-53.643	51.4082	-0.4629	140	-66.738	72.472	-0.6434
103	-54.26	51.1245	-0.5498	141	-67.6	71.7699	-0.5703
104	-54.484	50.803	-0.4861	142	-67.852	74.1971	-0.7526
105	-54.981	52.231	-0.6181	143	-68.81	73.5951	-0.6936
106	-55.018	52.4789	-0.6768	144	-68.791	75.8103	-0.8025
107	-55.554	52.4248	-0.517	145	-69.796	75.2963	-0.7461
108	-55.837	53.8458	-0.6657	146	-68.976	77.0278	-0.8662
109	-55.606	52.3469	-0.5154	147	-69.936	77.7321	-0.7432
110	-54.811	53.1769	-0.5046	148	-71.152	77.2643	-1.1178
111	-55.898	53.7152	-0.6577	149	-70.946	78.0078	-0.7454
112	-56.756	54.1931	-0.4973	150	-71.053	79.3494	-0.598
113	-56.6	55.1076	-0.4856	151	-71.82	78.732	-0.6272
114	-56.056	54.998	-0.4805	152	-71.953	79.4694	-0.9496
115	-55.782	55.55	-0.492	153	-72.146	81.2423	-0.7617
116	-57.028	56.6967	-0.747	154	-72.972	81.0881	-0.8478
117	-57.544	56.4953	-0.6951	155	-73.112	82.6862	-0.7331
118	-57.997	56.121	-0.7685	156	-72.789	83.1076	-0.947
119	-58.348	58.3501	-0.5285	157	-73.788	82.5292	-0.9044
120	-58.514	58.0107	-0.5481	158	-74.024	82.1321	-0.758
121	-59.053	57.8656	-0.7833	159	-75.759	85.6199	-0.9639
122	-59.472	60.1758	-0.5218	160	-73.752	84.6217	-1.2251
123	-60.044	59.3354	-0.5222	161	-74.631	86.1102	-0.9171
124	-60.194	60.739	-0.5402	162	-87.924	107.938	-1.3061
125	-60.226	61.9292	-0.5248	bridge	0	0	0
126	-61.197	61.3502	-0.7318	lighthouse	0	0	0
127	-61.298	63.6542	-0.6928	station	0	0	0

Total station raw data compiled 2017 (B. Scott Rose 2017).

Appendix G: Metal Detector Raw Data

First Metal Detector Survey w/Cistern and Wharf							
Date	point	Lat	Long	F	C	Dcm	
3-Dec	FP001	36.376932	-75.830639	30	42	16	
3-Dec	FP002	36.37703	-75.83061	35	46	9	
3-Dec	FP003	36.377047	-75.830612	11	21	18	
3-Dec	FP004	36.37708	-75.830629	15	34	8	
3-Dec	FP005	36.377091	-75.830614	35	45	19	
3-Dec	FP006	36.377102	-75.830606	12	26	8	
3-Dec	FP007	36.377057	-75.830663	7	24	6	
3-Dec	FP008	36.376859	-75.830704	31	49	10	
3-Dec	FP009	36.376863	-75.830675	5	16	6	
3-Dec	FP010	36.376868	-75.830656	13	48	8	
3-Dec	FP011	36.37683	-75.830593	29	1	15	
3-Dec	FP012	36.37687	-75.830621	15	36	12	
3-Dec	FP013	36.376921	-75.830649	1	19	5	
3-Dec	FP014	36.376971	-75.830667	1	36	8	
3-Dec	FP015	36.376998	-75.830693	1	15	9	
3-Dec	FP016	36.377004	-75.830632	12	38	8	
3-Dec	FP017	36.376977	-75.830634	35	50	21	
3-Dec	FP018	36.376993	-75.830607	17	48	7	
3-Dec	FP019	36.377062	-75.830617	34	46	14	
3-Dec	FP020	36.376908	-75.830684	12	43	16	
3-Dec	FP021	36.376787	-75.830588	10	41	20	
3-Dec	FP086	36.376828	-75.830565	30	40	18	
3-Dec	FP087	36.377001	-75.830637	35	45	12	
3-Dec	FP088	36.377058	-75.830562	12	45	15	
3-Dec	FP089	36.377051	-75.830568	17	37	16	
3-Dec	FP090	36.376848	-75.830653	14	37	18	
3-Dec	FP091	36.376884	-75.830588	8	32	18	
3-Dec	FP092	36.377011	-75.830605	23	41	19	
3-Dec	FP093	36.377043	-75.830596	12	45	18	
3-Dec	FP094	36.377036	-75.830617	12	37	8	
3-Dec	FP095	36.37695	-75.830611	18	38	15	
3-Dec	FP096	36.37691	-75.83055	35	49	11	
3-Dec	FP097	36.37697	-75.830587	5	36	9	
3-Dec	FP098	36.377039	-75.830594	35	44	9	
3-Dec	FP099	36.377009	-75.830606	12	37	5	
3-Dec	FP100	36.376899	-75.830646	9	22	6	
3-Dec	FP022	36.376926	-75.830649	11	30	12	

3-Dec	FP023	36.376918	-75.830649	7	13	8	
3-Dec	FP024	36.37688	-75.830631	11	43	10	
3-Dec	FP025	36.376953	-75.830589	35	49	20	
3-Dec	FP026	36.376978	-75.830591	11	17	10	
3-Dec	FP027	36.37637	-75.830264	11	35	4	Cistern
3-Dec	FP028	36.376383	-75.830259	32	47	3	Cistern
3-Dec	FP029	36.376374	-75.83026	15	43	10	Cistern
3-Dec	FP030	36.376377	-75.830288	35	48	8	Cistern
3-Dec	FP031	36.376363	-75.830319	35	50	7	Cistern
3-Dec	FP032	36.376392	-75.830218	35	49	6	Cistern
3-Dec	FP033	36.376398	-75.83023	29	44	7	Cistern
3-Dec	FP034	36.376401	-75.830225	9	42	5	Cistern
3-Dec	FP035	36.376378	-75.830251	33	47	5	Cistern
3-Dec	FP036	36.376358	-75.83028	35	50	6	Cistern
3-Dec	FP037	36.376398	-75.830309	30	45	8	Cistern
3-Dec	FP038	36.37642	-75.830258	15	44	5	Cistern
3-Dec	FP039	36.37638	-75.830275	23	44	12	Cistern
3-Dec	FP040	36.376361	-75.830321	6	42	5	Cistern
29-Nov	FP001	36.376991	-75.830794	35	48	13	
29-Nov	FP002	36.376997	-75.830794	35	48	14	
29-Nov	FP003	36.377	-75.830794	35	18	7	
29-Nov	FP004	36.377096	-75.83075	34	48	18	
29-Nov	FP005	36.377113	-75.83077	35	48	16	
29-Nov	FP006	36.377051	-75.830748	35	49	5	
29-Nov	FP007	36.376988	-75.830738	35	50	5	
29-Nov	FP008	36.376967	-75.830724	35	49	8	
29-Nov	FP009	36.376953	-75.830755	35	49	6	
29-Nov	FP010	36.376946	-75.830735	35	46	23	
29-Nov	FP011	36.377007	-75.830791	30	42	16	
29-Nov	FP012	36.377041	-75.830757	35	50	10	
29-Nov	FP013	36.377047	-75.83075	35	49	16	
29-Nov	FP014	36.37701	-75.830753	35	48	23	
29-Nov	FP015	36.377052	-75.830712	14	37	1	
29-Nov	FP016	36.377049	-75.830731	20	39	1	
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29-Nov	FP018	36.37692	-75.830614	8	39	1	
29-Nov	FP019	36.377018	-75.830682	35	46	25	
29-Nov	FP020	36.377047	-75.83075	27	46	7	
29-Nov	FP021	36.377047	-75.83076	35	48	26	
29-Nov	FP022	36.376916	-75.830712	35	50	2	
29-Nov	FP023	36.376939	-75.830715	29	40	17	

29-Nov	FP024	36.376933	-75.830629	15	36	10	
29-Nov	FP025	36.376939	-75.83062	35	45	15	
29-Nov	FP026	36.376941	-75.830641	35	37	16	
29-Nov	FP027	36.376981	-75.830663	12	25	16	
29-Nov	FP028	36.377003	-75.830679	7	37	25	
29-Nov	FP029	36.377016	-75.830694	35	47	20	
29-Nov	FP030	36.376947	-75.830723	34	45	5	
29-Nov	FP031	36.376959	-75.830791	20	38	27	
29-Nov	FP032	36.376939	-75.830782	33	43	10	
29-Nov	FP033	36.376937	-75.830758	35	49	9	
29-Nov	FP034	36.377012	-75.830725	35	50	10	
29-Nov	FP035	36.37696	-75.830726	35	49	6	
29-Nov	FP036	36.376941	-75.8307	1	41	23	
29-Nov	FP037	36.376941	-75.830712	35	46	8	
29-Nov	FP038	36.37698	-75.830766	1	39	7	
29-Nov	FP039	36.376973	-75.830751	20	29	10	
29-Nov	FP040	36.376987	-75.830725	6	50	10	
29-Nov	FP041	36.37699	-75.830721	9	43	11	
29-Nov	FP042	36.377002	-75.830706	35	48	21	
29-Nov	FP043	36.376992	-75.830686	17	7	15	
29-Nov	FP044	36.376988	-75.83069	1	32	10	
29-Nov	FP045	36.376982	-75.83071	21	41	6	
29-Nov	FP046	36.37695	-75.83067	35	48	10	
29-Nov	FP047	36.376946	-75.830694	33	28	29	
29-Nov	FP048	36.376921	-75.830713	35	47	7	
29-Nov	FP049	36.376923	-75.830728	31	46	11	
29-Nov	FP050	36.376932	-75.830741	15	44	10	
29-Nov	FP051	36.376921	-75.830698	1	28	10	
29-Nov	FP052	36.376932	-75.830663	24	43	10	
29-Nov	FP053	36.376957	-75.830723	35	46	26	
29-Nov	FP054	36.376976	-75.830749	35	43	4	
29-Nov	FP055	36.376984	-75.830691	12	44	23	
29-Nov	FP056	36.376985	-75.830732	12	43	9	
29-Nov	FP057	36.37699	-75.830735	14	43	14	
29-Nov	FP058	36.376989	-75.830717	1	30	10	
29-Nov	FP059	36.376995	-75.830713	1	17	20	
29-Nov	FP060	36.376965	-75.830742	1	30	4	
29-Nov	FP061	36.376951	-75.830784	1	18	5	
29-Nov	FP062	36.377004	-75.83076	34	49	4	
29-Nov	FP063	36.376977	-75.830649	35	49	9	
29-Nov	FP064	36.376978	-75.830701	35	50	10	

29-Nov	FP065	36.377012	-75.830718	1	23	15	
29-Nov	FP066	36.377002	-75.83066	21	45	11	
29-Nov	FP067	36.377021	-75.830715	1	31	14	
29-Nov	FP068	36.377028	-75.830716	35	50	9	
29-Nov	FP069	36.377042	-75.830676	29	42	8	
29-Nov	FP070	36.37709	-75.830687	7	36	20	
29-Nov	FP071	36.377091	-75.830624	17	10	24	
29-Nov	FP072	36.377076	-75.830643	10	18	15	
29-Nov	FP073	36.377102	-75.83065	30	6	8	
29-Nov	FP074	36.377062	-75.83073	15	35	23	
29-Nov	FP075	36.37706	-75.830742	35	46	16	
29-Nov	FP076	36.377008	-75.830762	13	8	19	
29-Nov	FP077	36.377023	-75.830823	1	33	7	
29-Nov	FP078	36.377027	-75.830819	35	49	8	
29-Nov	FP079	36.377038	-75.8308	35	48	7	
29-Nov	FP080	36.377033	-75.830789	35	50	11	
29-Nov	FP081	36.377019	-75.830741	15	44	8	
29-Nov	FP082	36.377033	-75.83075	34	48	5	
29-Nov	FP083	36.377019	-75.830726	35	49	5	
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29-Nov	FP085	36.377013	-75.830708	35	48	9	
28-Nov	FP045	36.377039	-75.830649	17	24	13	
28-Nov	FP046	36.37703	-75.830548	35	42	11	
28-Nov	FP047	36.377006	-75.830515	35	44	10	
28-Nov	FP048	36.377041	-75.830571	34	47	10	
28-Nov	FP049	36.377052	-75.830596	35	50	6	
28-Nov	FP050	36.377092	-75.830597	12	42	10	
28-Nov	FP051	36.377089	-75.830658	35	47	11	
28-Nov	FP052	36.377082	-75.83067	35	49	22	
28-Nov	FP053	36.37702	-75.830702	12	18	14	
28-Nov	FP054	36.377039	-75.830741	17	38	8	
28-Nov	FP055	36.377048	-75.830751	12	37	15	
28-Nov	FP056	36.376996	-75.830687	35	49	7	
28-Nov	FP057	36.376957	-75.830694	33	41	9	
28-Nov	FP058	36.376952	-75.830729	35	42	11	
28-Nov	FP059	36.376957	-75.830496	13	7	17	
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28-Nov	FP061	36.376975	-75.830626	12	39	15	
28-Nov	FP062	36.377049	-75.830659	1	39	12	
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28-Nov	FP064	36.377112	-75.830682	35	46	13	

28-Nov	FP065	36.377108	-75.830603	12	43	14	
28-Nov	FP066	36.377109	-75.830617	35	43	11	
28-Nov	FP067	36.377022	-75.83068	34	46	16	
28-Nov	FP068	36.376948	-75.830697	35	44	7	
28-Nov	FP069	36.376956	-75.830679	31	42	11	
28-Nov	FP070	36.376963	-75.830723	35	45	10	
28-Nov	FP071	36.376968	-75.830701	27	42	14	
28-Nov	FP072	36.376942	-75.830697	26	41	10	
28-Nov	FP073	36.376978	-75.830639	33	35	11	
28-Nov	FP074	36.376994	-75.830715	15	45	15	
28-Nov	FP075	36.377031	-75.83071	34	46	7	
28-Nov	FP076	36.377066	-75.830652	33	43	10	
28-Nov	FP077	36.377087	-75.830642	32	39	9	
28-Nov	FP078	36.377089	-75.830641	30	44	7	
28-Nov	FP079	36.377082	-75.830685	4	34	8	
28-Nov	FP080	36.37708	-75.830764	10	33	18	
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28-Nov	FP082	36.377029	-75.830697	35	50	11	
28-Nov	FP083	36.37701	-75.830773	31	45	8	
28-Nov	FP084	36.376994	-75.830796	4	36	2	
28-Nov	FP085	36.376978	-75.830793	11	35	16	
28-Nov	FP086	36.376981	-75.830777	33	46	12	
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28-Nov	FP088	36.377047	-75.830718	35	50	14	
28-Nov	FP089	36.377042	-75.83072	26	43	18	
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28-Nov	FP092	36.377034	-75.830757	35	49	10	
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28-Nov	FP094	36.376985	-75.83076	1	20	16	
28-Nov	FP095	36.377052	-75.830749	32	47	16	
28-Nov	FP096	36.377093	-75.830758	7	3	23	
28-Nov	FP097	36.377037	-75.830775	34	49	7	
28-Nov	FP098	36.377016	-75.830777	35	49	16	
28-Nov	FP099	36.377052	-75.830742	35	50	19	
28-Nov	FP100	36.37706	-75.830741	35	50	16	
4-Dec	W01	36.374624	-75.834489	35	28	11	Wharf
4-Dec	W02	36.374588	-75.834509	11	40	8	Wharf
4-Dec	W03	36.374562	-75.834519	16	15	15	Wharf
4-Dec	W04	36.37456	-75.834518	35	50	11	Wharf
4-Dec	W05	36.374554	-75.83452814	14	7	9	Wharf

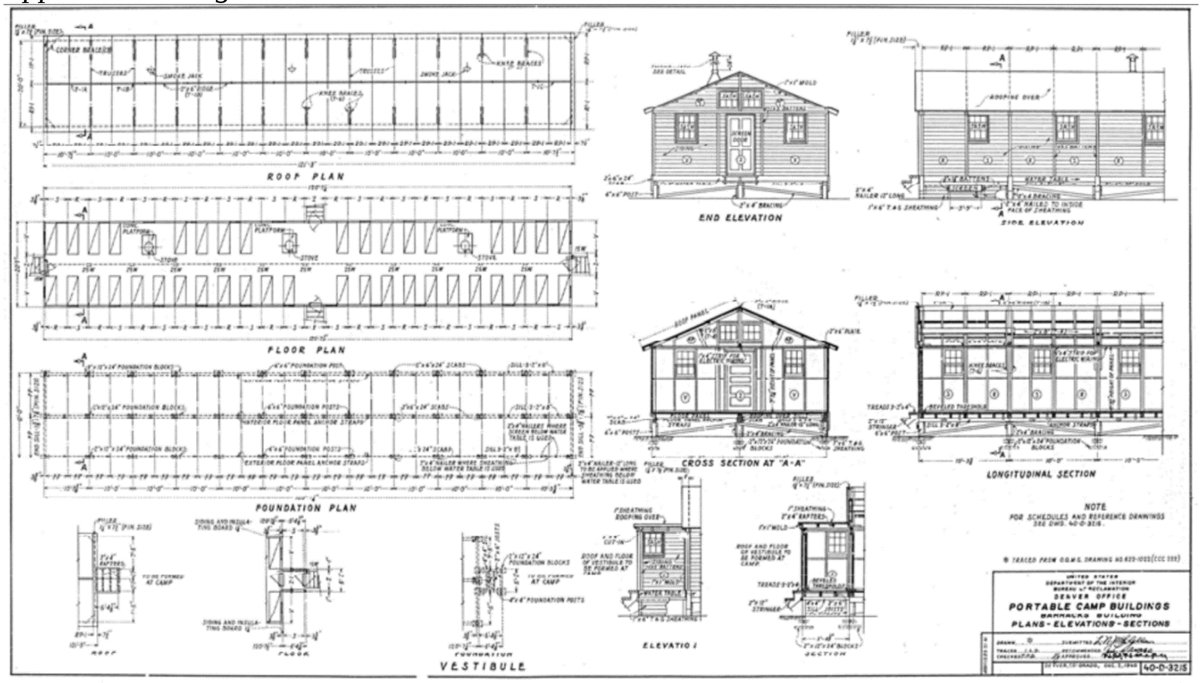
4-Dec	W06	36.374554	-75.834528	33	43	4	Wharf
4-Dec	W07	36.37454	-75.834544	23	15	6	Wharf
4-Dec	W08	36.374539	-75.834548	1	13	25	Wharf
4-Dec	W09	36.374524	-75.834561	35	43	7	Wharf
4-Dec	W10	36.374525	-75.834572	15	27	27	Wharf
4-Dec	W11	36.374494	-75.834588	1	27	30	Wharf
4-Dec	W12	36.3745	-75.834601	26	40	12	Wharf
4-Dec	W13	36.374501	-75.8346	1	50	13	Wharf
4-Dec	W14	36.374467	-75.834627	35	42	10	Wharf
4-Dec	W15	36.374481	-75.834627	34	44	11	Wharf
4-Dec	W16	36.374468	-75.834635	10	40	10	Wharf
4-Dec	W17	36.374455	-75.834649	23	49	19	Wharf
4-Dec	W18	36.37443	-75.834678	34	43	12	Wharf
4-Dec	W19	36.374419	-75.834681	1	34	15	Wharf
4-Dec	W20	36.374421	-75.834681	35	40	15	Wharf
4-Dec	W21	36.374389	-75.834703	14	40	11	Wharf
4-Dec	W22	36.374389	-75.834703	35	37	7	Wharf
4-Dec	W23	36.374369	-75.83473	35	47	26	Wharf
4-Dec	W24	36.374311	-75.834799	1	33	6	Wharf
4-Dec	W25	36.374265	-75.834841	35	48	5	Wharf
4-Dec	W26	36.374247	-75.834871	5	7	9	Wharf
4-Dec	W27	36.374183	-75.834931	9	22	9	Wharf
4-Dec	W28	36.374178	-75.834934	35	35	15	Wharf
4-Dec	W29	36.374168	-75.834943	35	27	17	Wharf
4-Dec	W30	36.374121	-75.834983	17	46	6	Wharf
4-Dec	W31	36.374075	-75.835031	18	20	14	Wharf
4-Dec	W32	36.374064	-75.835051	7	36	16	Wharf
4-Dec	W33	36.37406	-75.835047	12	43	5	Wharf
4-Dec	W34	36.374006	-75.835109	35	44	17	Wharf
4-Dec	W35	36.374006	-75.83511	35	41	7	Wharf
4-Dec	W36	36.37399	-75.835129	35	45	5	Wharf
4-Dec	W37	36.373989	-75.835139	35	27	14	Wharf
4-Dec	W38	36.373985	-75.835141	35	45	10	Wharf
4-Dec	W39	36.37397	-75.835157	35	48	16	Wharf
4-Dec	W40	36.373962	-75.83516	35	42	9	Wharf
4-Dec	W41	36.373959	-75.835162	34	44	6	Wharf
4-Dec	W42	36.37394	-75.835187	15	31	9	Wharf
4-Dec	W43	36.373933	-75.83521	35	38	16	Wharf

Baseline Metal Detector Survey							
6-Jul	MD45	36.37683	-75.830688	21	39	10	
6-Jul	MD46	36.376853	-75.83067	35	45	17	
6-Jul	MD47	36.376991	-75.830749	14	50	14	
6-Jul	MD48	36.376951	-75.83074	9	50	3	
6-Jul	MD49	36.376949	-75.83074	22	49	20	
6-Jul	MD50	36.376968	-75.830812	18	50	14	
6-Jul	MD51	36.37688	-75.830755	16	50	15	
6-Jul	MD52	36.376862	-75.830712	14	5	14	
6-Jul	MD53	36.376848	-75.830696	23	50	14	
6-Jul	MD54	36.376804	-75.830725	8	1	4	
6-Jul	MD55	36.37681	-75.83068	1	30	16	
6-Jul	MD56	36.376828	-75.830648	15	50	12	
6-Jul	MD57	36.376847	-75.830677	2	8	14	
6-Jul	MD58	36.376937	-75.830664	10	50	13	
6-Jul	MD59	36.376957	-75.830706	36	50	3	
6-Jul	MD60	36.376935	-75.830741	28	50	1	
6-Jul	MD61	36.376807	-75.830658	30	50	7	
6-Jul	MD62	36.376891	-75.830668	10	1	15	
6-Jul	MD63	36.376857	-75.830664	2	3	16	
6-Jul	MD64	36.376858	-75.830667	22	50	14	
6-Jul	MD65	36.376842	-75.830616	18	33	9	
6-Jul	MD66	36.376829	-75.830696	19	50	12	
6-Jul	MD67	36.37683	-75.830642	20	50	15	
6-Jul	MD68	36.376821	-75.830619	17	50	13	
6-Jul	MD69	36.3768	-75.830592	14	50	13	
6-Jul	MD70	36.376846	-75.830588	16	50	14	
6-Jul	MD71	36.376876	-75.830602	35	48	5	
6-Jul	MD72	36.37693	-75.830665	3	15	7	
6-Jul	MD73	36.376947	-75.830669	8	2	5	
6-Jul	MD74	36.376895	-75.830665	2	7	16	
6-Jul	MD75	36.376943	-75.830648	8	17	13	
6-Jul	MD76	36.376998	-75.830648	1	12	19	
6-Jul	MD77	36.376915	-75.830672	1	39	8	
6-Jul	MD78	36.37682	-75.830578	3	32	8	
6-Jul	MD79	36.3768	-75.830657	17	37	9	
6-Jul	MD80	36.376775	-75.830644	25	28	9	
6-Jul	MD81	36.376977	-75.830679	13	45	9	
6-Jul	MD82	36.376878	-75.830621	12	6	7	
6-Jul	MD83	36.37683	-75.830596	15	45	11	
6-Jul	MD84	36.376812	-75.830642	22	12	4	

6-Jul	MD85	36.376825	-75.83072	14	50	1	

Metal detector raw data compiled 2017 (B. Scott Rose 2017).

Appendix H: Original Construction Plans



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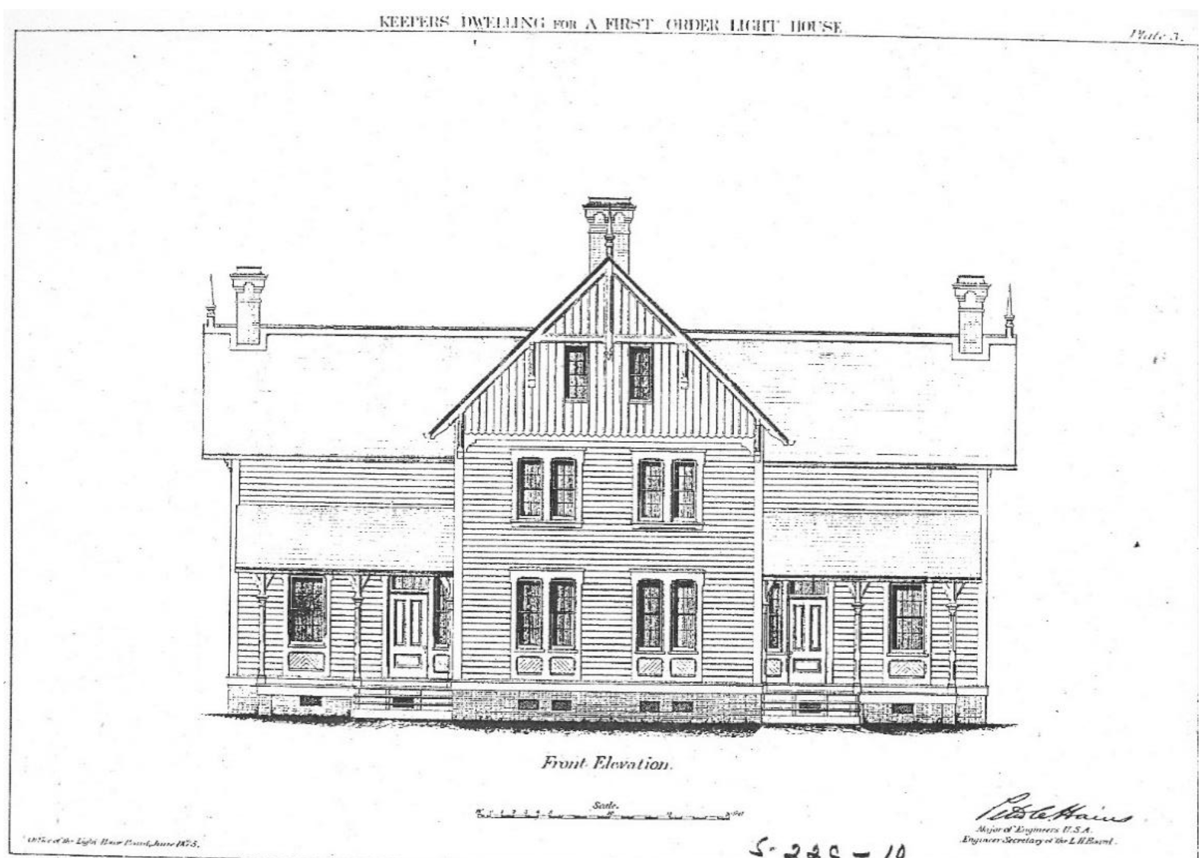
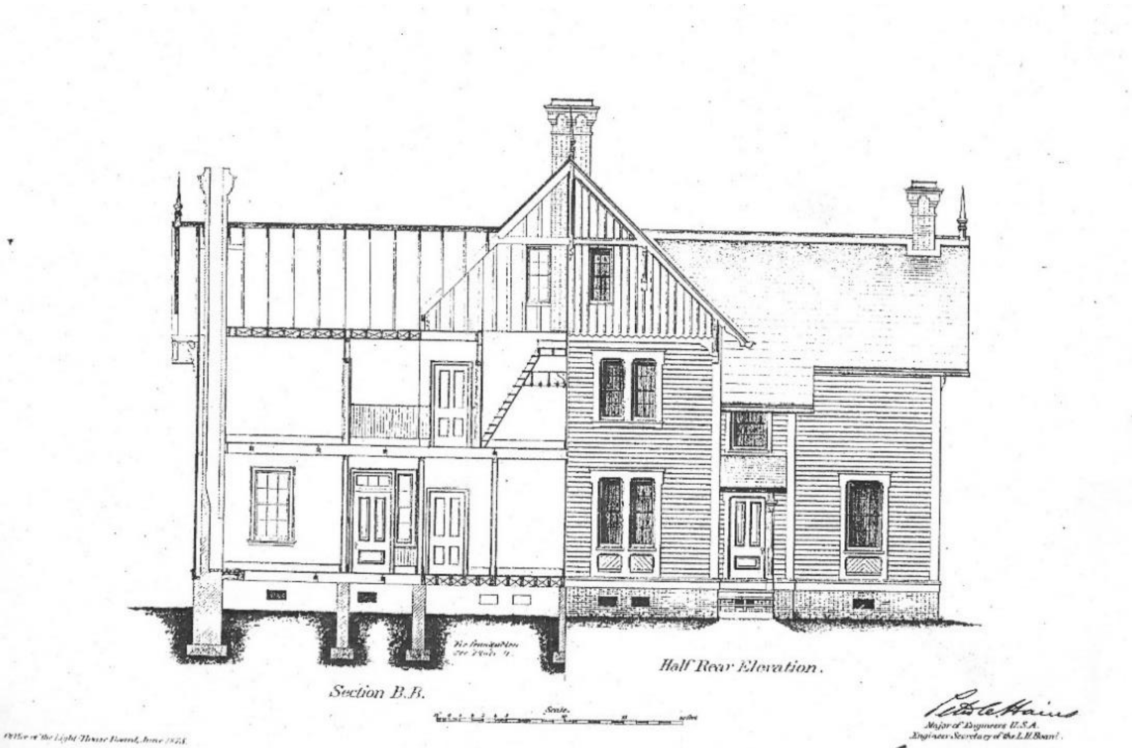


Currituck Beach N.C.

(OBHC 1881-1940)



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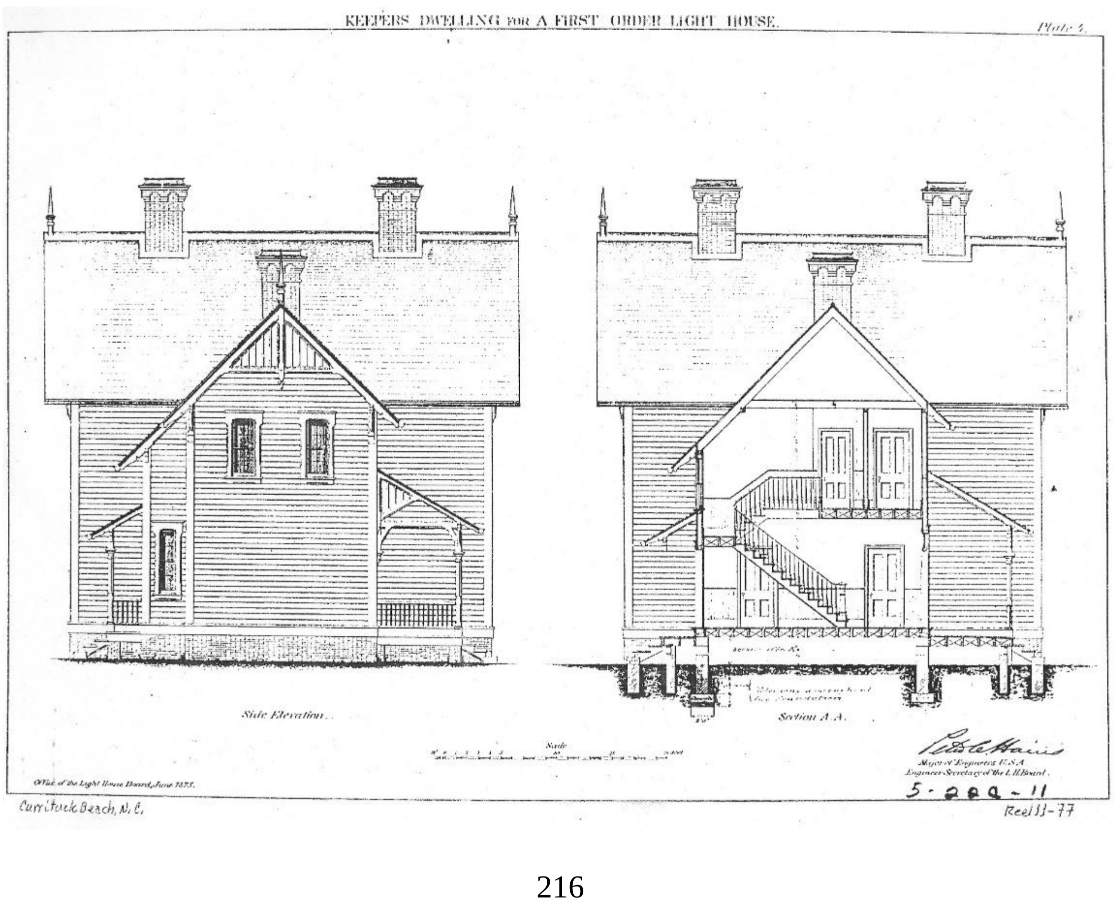

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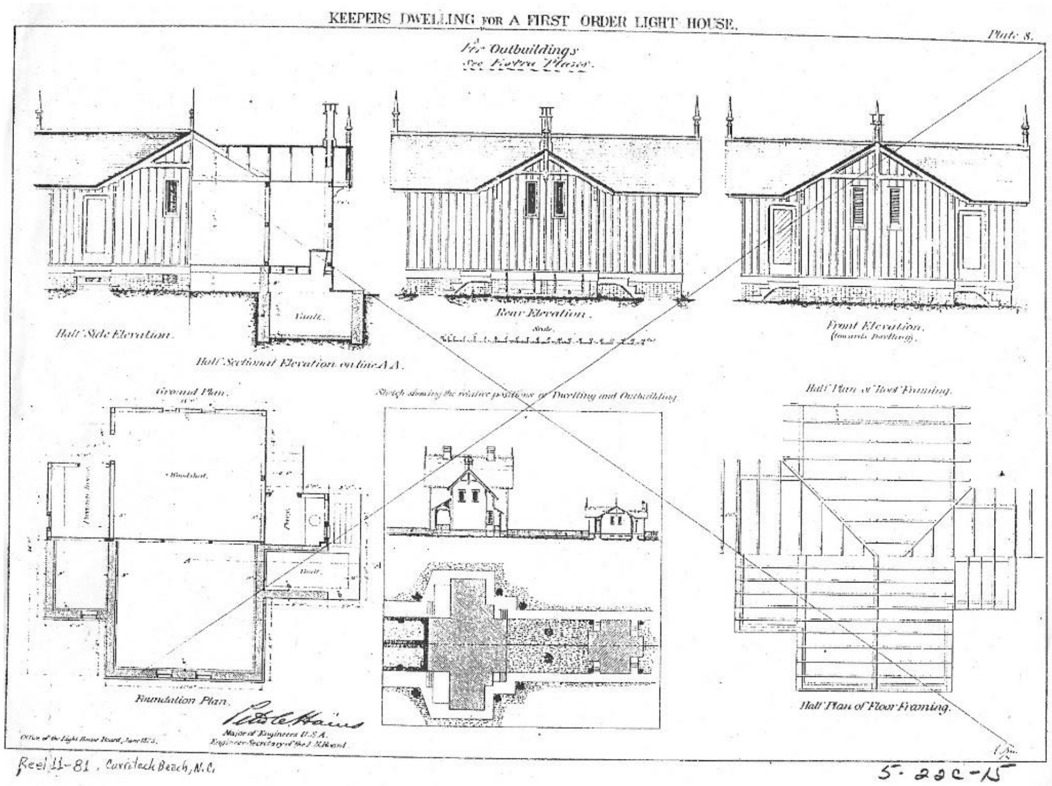

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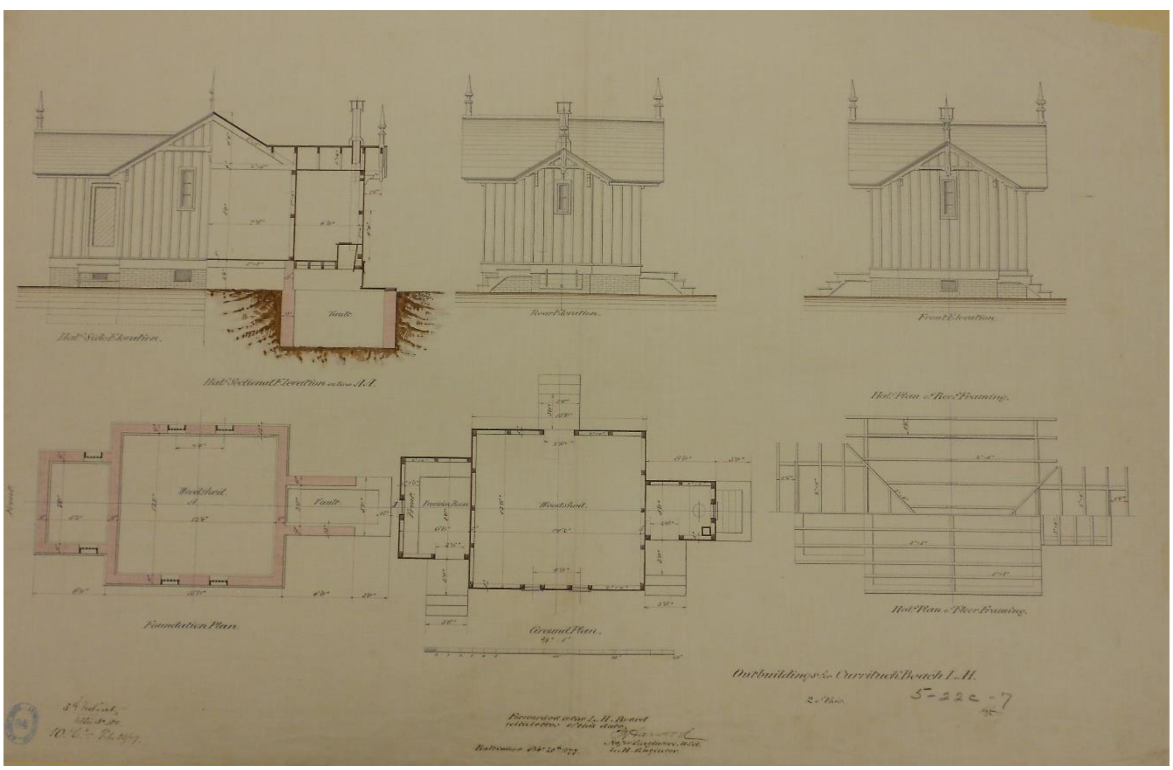

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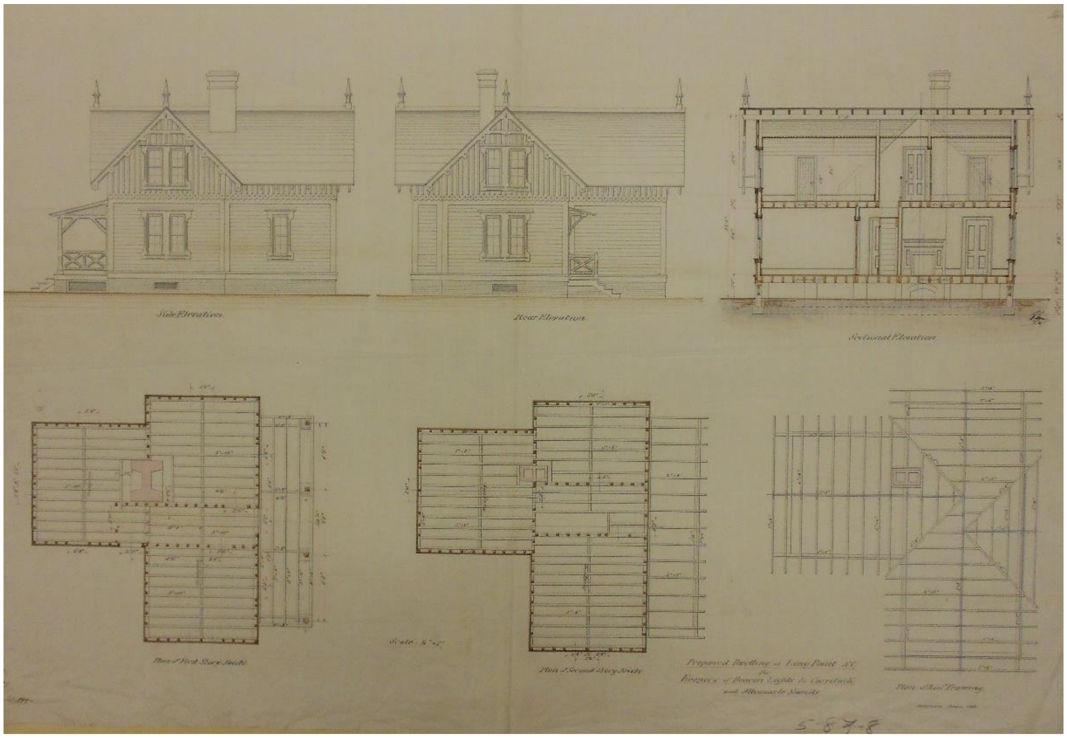

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