U.S. Army Corps of Engineers
Philadelphia District

Contract No. W912BU-12-D-0021
Task Order No. 0029

CULTURAL RESOURCES INVESTIGATION DATA RECOVERY FOR BARNEGAT INLET NORTH JETTY UNANTICIPATED DISCOVERY BARNEGAT INLET, NEW JERSEY

PREPARED FOR:
U.S. Army Corps of Engineers
Philadelphia District

UNDER CONTRACT TO:
Tetra Tech, Inc.
Germantown, Maryland

PREPARED BY:
Panamerican Consultants, Inc.
Memphis, Tennessee

DRAFT REPORT ♦ MAY 2015

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MAY 2015

ABSTRACT

In the summer of 2014, the U.S. Army Corps of Engineers, Philadelphia District commenced the process of repairing the Barnegat Inlet North Jetty, which was damaged during Hurricane Sandy. A section of the northern jetty completed in the late 1930's was breached by the effects of Hurricane Sandy on its western shore end. However, during repairs, which included removal of the existing damaged jetty, an apparent historic shipwreck was discovered after parts of it had been removed and piled onshore. Specifically, sections of hand-hewn, wooden hull fragments, treenails, and various metal fasteners were observed by the U.S. Army Corps of Engineers Quality Control officer and reported to the U.S. Army Corps of Engineers Cultural Resources Specialist. The U.S. Army Corps of Engineers therefore determined, pursuant to 36 CFR 800.13(c), that the shipwreck site was eligible for listing on the National Register of Historic Places under Criterion D, and that impacts sustained to the site resulting from construction activities constituted an *Adverse Effect* requiring mitigation. Subsequently, Panamerican Consultants, Inc. of Memphis, Tennessee was subcontracted to conduct mitigation that would entail archaeological monitoring of further jetty construction, assessment and documentation of debris already removed during construction, and systematic archaeological documentation and data recovery of the intact historic vessel, as well as archival research to identify the vessel and its history, if possible. Under subcontract to Tetra Tech, Inc., of Georgetown, Maryland, the mitigation investigation was conducted for the U.S. Army Corps of Engineers in response to their Scope of Work entitled *Cultural Resources Investigation Data Recovery for Barnegat Inlet North Jetty Unanticipated Discovery, Barnegat Inlet, New Jersey* under Contract No. W912BU-12-D-0021, Task Order No. 0029.

Conducted from 28 July to 20 August 2014, research, field observations, and wood analysis indicate the vessel was most likely a schooner barge built in the Northeast. Represented by a mostly buried *in situ* run of hull, a "debris pile" comprised of various ships timbers and several disarticulated components including stern deadwood, a rudder, and a windlass, the recovered material comes only from one side of the hull from about the deck down to and through the turn of the bilge. The remaining buried amount of hull is conjecture, but it is likely that at least half the hull to the keel is intact, and even the entire port side of the vessel could be present as well. Additionally, vessel material is associated with the presence of both iron knees and strapping. The use of these components indicates a construction date of the last quarter of the nineteenth century through the first quarter of the twentieth century. Our investigation also indicates the vessel was fairly large, as the large frame sizes and a hull side that is approximately 2 feet (0.6 meters) thick indicate a vessel well over 100 feet (30.5 meters) in length and probably approached the 200-foot (61-meter) range. We know that the remaining *in situ* hull covers an area of at least 55 feet (16.8 meters) in length, and the removed intact hull components represent an additional 40 to 50 feet (12.2 to 15.2 meters). The removed components did not contain any evidence of the bow, suggesting additional buried hull to the west of what was removed.

In summation, while we will never be absolutely certain of the North Jetty Shipwreck's identity, we do know it was constructed somewhere in the Northeast between the last quarter of the nineteenth century through the first quarter of the twentieth century, it was a fairly large vessel probably approaching the 200-foot (61-meter) range, and the best candidates for our wreck are the Schooner Barges No. 20 and No.21 built in Bath, Maine in 1899, and No. 28 built in Baltimore in 1901, all three of which wrecked at the inlet in 1926. This is not surprising given the fact that the schooner barge was an uncelebrated, ubiquitous workhorse of the period, hauling mundane cargos of coal and lumber, with untold numbers passing just offshore Barnegat Inlet during any given year. That many of them wrecked at the inlet is known, that one of them represents the North Jetty Shipwreck is likely.

ACKNOWLEDGEMENTS

The successful completion of this project is the direct result of the input and hard work of numerous individuals. The authors would first like to thank Ms. Nikki Minnichbach of the U.S. Army Corps of Engineers, Philadelphia District, for allowing Panamerican Consultants, Inc. the opportunity to conduct this investigation. Also with the Philadelphia District, Mr. Joe Rossano, Project Engineer and Mr. Bill Roche, Project Quality Manager are both thanked for insights on the wreck and artifacts collected prior to our arrival.

Personnel with the Agate Construction Co., Inc., the company tasked with repairing the jetty, are thanked for allowing us onto their work site, taking an interest in our work, allowing us to direct their equipment when necessary, and lastly, keeping us safe. In alphabetical order they are: John T. Dupnock, Safety Director; Mr. Jeremy Keho, Project Manager; Mr. Buddy Lind, Foreman; Mr. Joe Pinic, Main Equipment Operator; and Mr. Conor Teasdale, Supervisor.

Also thanked is Mr. Ray Bukowski, Park Manager for the Island Beach State Park, on whose land the wreck is located.

Archival research took place in local and national facilities focusing on maritime and New Jersey coastal history. Panamerican Consultants, Inc. would like to thank Fedinand F. Klebold for his valuable insight into the building of the Barnegat Inlet North Jetty. The Ocean County Historical Society, where many important resources were found with help from Betsey Dudas at the Richard L. Stickler Research Center. At the New Jersey Maritime Museum we would like to thank Dave Swope, Jim Vogel, and Deb Whitcraft for access and help examining local maritime and U.S. Lifesaving Station records. Special thanks to the Barnegat Light State Park, the Barnegat Light Museum, and of course Island Beach State Park where our work was based. Thanks to Kevin Walker at the Gorgas Library at University of Alabama, for his help locating important Federal documents regarding Barnegat’s jetty construction. Finally, Bill Barker and Jay E. Moore at The Mariners Museum Library at Christopher Newport University for help assisting us during research of the North Jetty Shipwreck.

The authors would also like to thank the archaeological crew who partook in this investigation. Mr. Stephen R. James, Jr., M.A., RPA. served as the Project Manager. Fieldwork was directed by Mr. Andrew Lydecker, M.A., RPA along with Ms. Erica Gifford, M.A., Mr. Bernard Howard, M.A., and Mr. Stephen James, Jr., M.A., RPA. Ms. Gifford, who conducted the majority of the monitoring, also conducted archival research.

In-house Panamerican Consultants, Inc. personnel, who must be thanked for their assistance with this report production, include Ms. Kate Gilow, Office Manager, and Ms. Anna Hinnenkamp-Faulk, Editor.

Finally, the good people of Coastal New Jersey are thanked for the hospitality shown to the field crew during our stay. We hope to return in the future to sample that hospitality once again.

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I. INTRODUCTION

In the summer of 2014, the U.S. Army Corps of Engineers (USACE), Philadelphia District commenced the process of repairing the Barnegat Inlet North Jetty, damaged during Hurricane Sandy. A section of the northern jetty completed in the late 1930's was breached by the effects of Hurricane Sandy on its western shore end (Figures 1-01 through 1-03). The USACE previously evaluated the proposal to repair the Barnegat Inlet North Jetty Post-Sandy Project pursuant to Section 106 in consultation with the New Jersey State Historic Preservation Office (NJSHPO) and found the action to have no adverse effect to historic properties eligible for or listed on the National Register of historic Places (NRHP). However, during repairs, which included removal of the existing damaged jetty, an apparent historic shipwreck was discovered after parts of it had been removed and piled onshore (Figures 1-04 through 1-06). Specifically, sections of hand-hewn, wooden hull fragments, treenails, and various metal fasteners were observed by the USACE Quality Control officer and reported to the USACE Cultural Resources Specialist on 26 June 2014. In order to get a better understanding of the artifacts, the USACE contacted Panamerican Consultants, Inc. (Panamerican) of Memphis, Tennessee and a maritime archaeologist visited the site on 9 July 2014. The assessment of the site (i.e., based on recovered timbers, fasteners, and other artifacts) indicated the presence of at least one historic vessel with a potential construction period of the late nineteenth century within the existing North Jetty repair footprint.

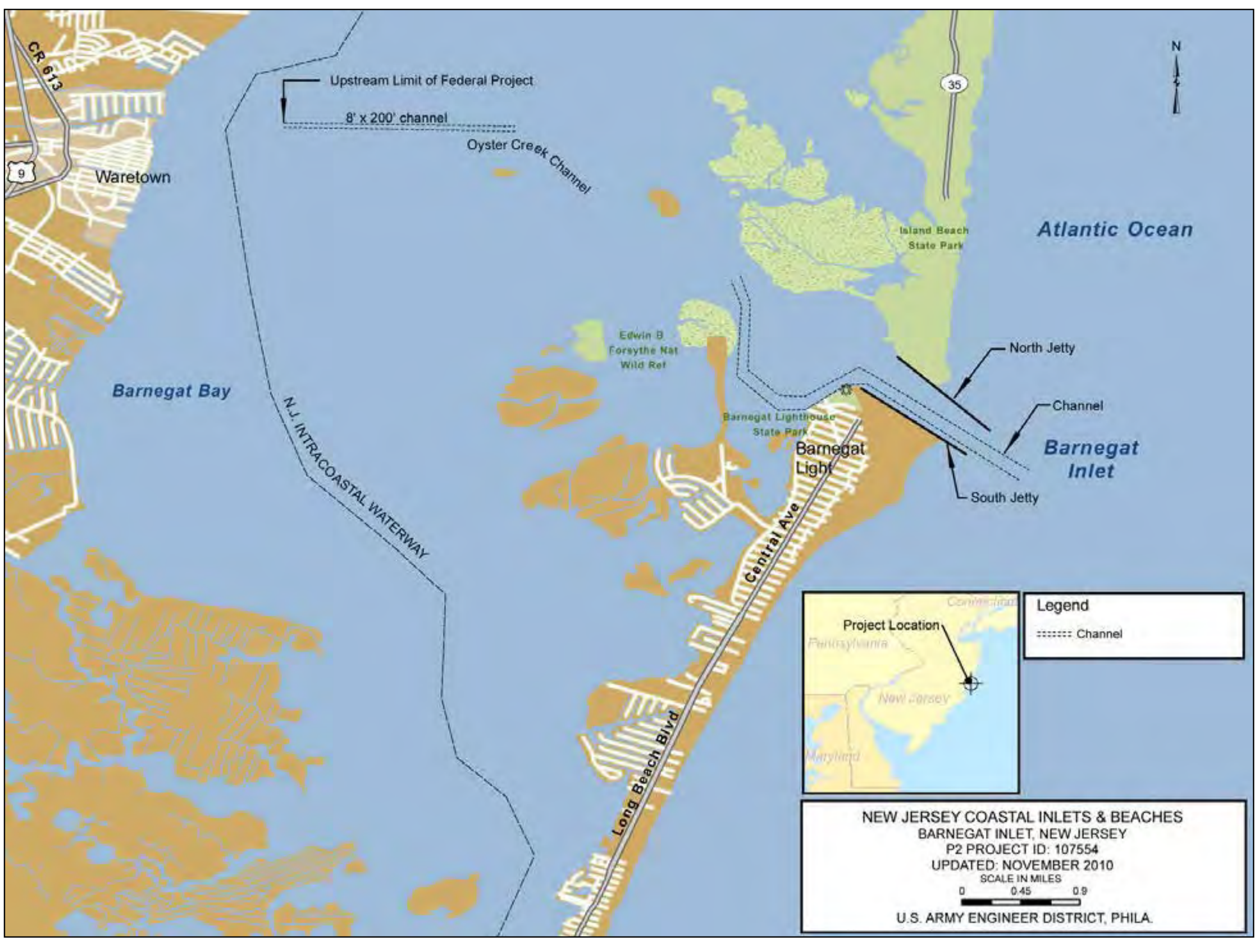


Figure 1-01. Project Area location map showing the North Jetty (courtesy of the USACE).

The USACE therefore determined pursuant to 36 CFR 800.13(c) that the nineteenth-century shipwreck site, and possibly other structures located between Station 22+80 east to 23+50 (see Figure 1-03 construction control points), were eligible for listing on the NRHP under Criterion D, and that impacts sustained to the site resulting from construction activities constituted an *Adverse Effect* requiring mitigation. Subsequently, Panamerican was subcontracted to conduct mitigation that would entail archaeological monitoring of further jetty construction, assessment and documentation of debris already removed during construction (Figure 1-06), and systematic archaeological documentation and data recovery of the intact historic vessel, as well as archival research to identify the vessel and its history, if possible. Under subcontract to Tetra Tech, Inc. (Tetra Tech), of Georgetown, Maryland, the mitigation investigation was conducted for the USACE in response to their Scope of Work (SOW) entitled *Cultural Resources Investigation Data Recovery for Barnegat Inlet North Jetty Unanticipated Discovery, Barnegat Inlet, New Jersey* under Contract No. W912BU-12-D-0021, Task Order No. 0029.

Conducted from 28 July to 20 August 2014, fieldwork was directed by Mr. Andrew Lydecker, M.A., RPA along with Ms. Erica Gifford, M.A., Mr. Bernard Howard, M.A., and Mr. Stephen James, Jr., M.A., RPA. Ms. Gifford, who conducted the majority of the monitoring, also conducted archival research. Authored by Mr. James and Ms. Gifford, the following chapters present the Research Design developed to address all project aspects, the conduct of all field operations, and findings from the extensive archival research. Research, coupled with both field observations and wood analysis indicates the vessel was most likely a schooner barge built in the Northeast. Several identified vessels are possible candidates, but the exact identity of the wreck remains unknown.

Figure 1-02. Aerial photograph showing the location of Hurricane Sandy damage and the location of the shipwreck remains (courtesy of the USACE; view is to the north).

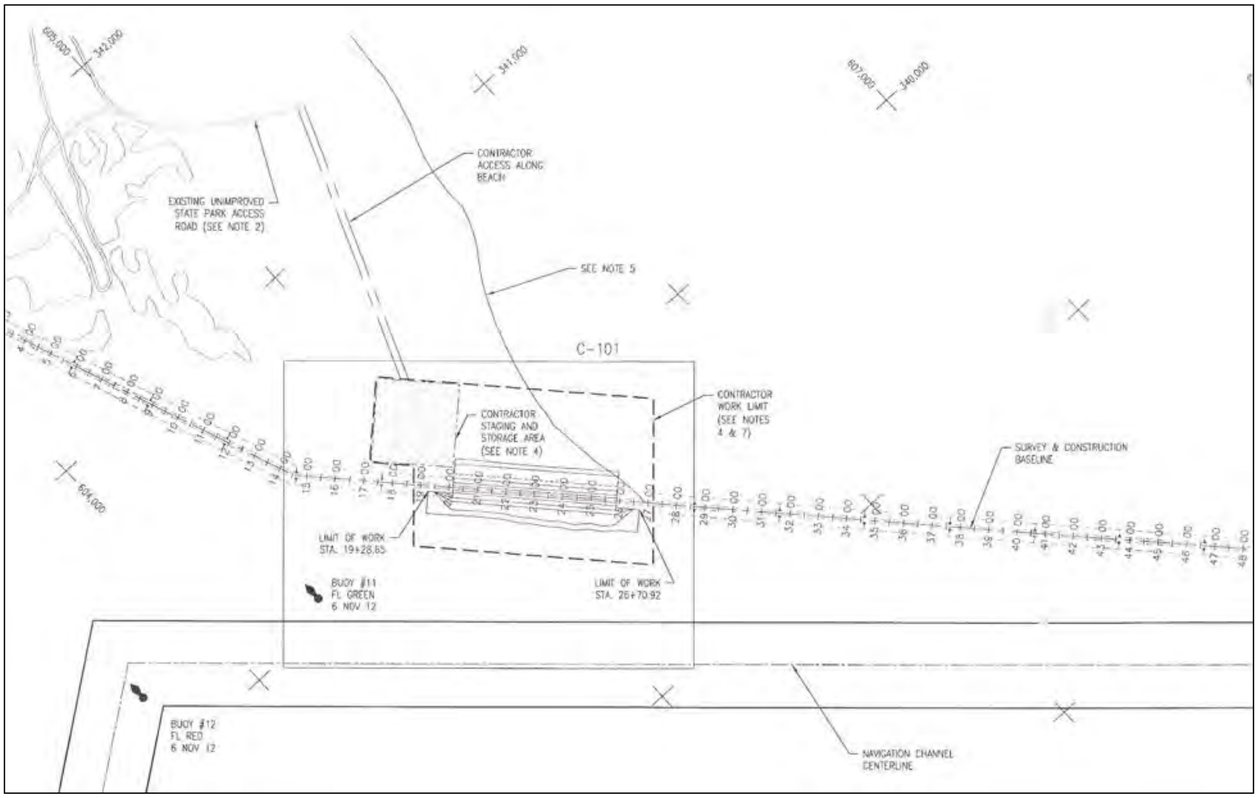


Figure 1-03. Construction map showing location of jetty repair area between Station 19+00 and 27+00 (courtesy of the USACE).

Figure 1-04. Initial repair excavation at northern end of the jetty that exposed wreckage, some of which is seen in amongst jetty rock.

Figure 1-05. Excavation showing exposed wreckage, the northern portion of which was inadvertently impacted prior to archaeological assessment.

Figure 1-06. Pile of "debris" that represented excavated ship timbers from the northern extent of the shipwreck remains.

II. MITIGATION RESEARCH DESIGN

Given the nature and scope of the surviving vessel remains and the necessity for burial of those remains under the jetty structure, a Research Design based on systematic archaeological documentation and data recovery was proposed. This Research Design was focused on the *in situ* documentation of the archaeological record and surviving physical evidence at the wreck site, along with recovery and conservation of diagnostic artifacts. As specified in the SOW, the following requirements were addressed as part of this Research Design:

1. development of a Health and Safety Plan (HASP)
2. archival research;
3. archaeological monitoring of jetty construction
4. assessment and documentation of debris already removed during construction
5. data recovery of *in situ* vessel structure
6. description of requirements for on-site stabilization of recovered artifacts
7. conservation and disposition of diagnostic artifacts
8. public interpretation and education

The Research Design contained numerous aspects and consisted of both on-site and off-site activity. On-site activity consisted of archaeological monitoring of jetty construction, assessment and documentation of debris, in place documentation of vessel remains, and on-site artifact recovery and stabilization prior to conservation. Off-site activity consisted of artifact conservation, archival research, public interpretation, and long-term disposition of conserved artifacts. No diving or need to be aboard a vessel was associated with this project.

DEVELOPMENT OF HEALTH AND SAFETY PLAN

A HASP was developed and submitted prior to field investigations, and served as a safety plan for the on-site data recovery and recordation of vessel structures and components. The HASP complied with applicable sections of the USACE *Safety and Health Requirements Manual* (EM 385-1-1 2008), and safety of project participants was given priority in all decisions and actions undertaken during the investigation. The HASP was reviewed and approved by the USACE, Philadelphia District’s Health and Safety Officer.

During field investigations, off-site safety briefings were held each morning prior to commencement of work and prior to entering the work area. All personnel wore personal safety gear including hard hats, safety vests, safety glasses, and steel-toed boots.

It should be stated that the on-site contractor, AGATE Construction Company, Inc. (AGATE), operated all heavy equipment (i.e., excavator, trackhoe, backhoe, etc.). Archaeologists observed and at times verbally directed the operations of the equipment (i.e., to move individual pieces of debris, uncover an area of the wreck, etc.). Archaeologists did NOT operate any heavy equipment (Figure 2-01).

Figure 2-01. During field investigations, off-site safety briefings were held each morning prior to commencement of work and prior to entering the work area. All personnel wore personal safety gear including hard hats, safety vests, safety glasses, and steel-toed boots.

ARCHIVAL RESEARCH

Archival research was undertaken with several objectives in mind. First, a general background history of Barnegat Inlet and the surrounding area, including a detailed maritime history and shipwreck inventory, was compiled to provide historic context for the wreck site. Further research was also undertaken to establish a baseline history of the jetties and their history of construction and maintenance. Efforts were also be made to locate information pertaining to the jetty construction including photographs, maps, construction drawings, invoices, contracts, reports, and any other information deemed valuable. Research also addressed known wreck sites in the vicinity as well as historic vessel losses in an effort to identify the vessel. Sources consulted included, but were not limited to, historic maps, archaeological reports, historical summaries, photograph collections, and other historical collections deemed valuable (Figure 2-02). Archives consulted included the USACE records at Ft. Mifflin, offices of the NJSHPO, and local museums and historical societies (including the Mariners Museum in Newport News, Virginia).

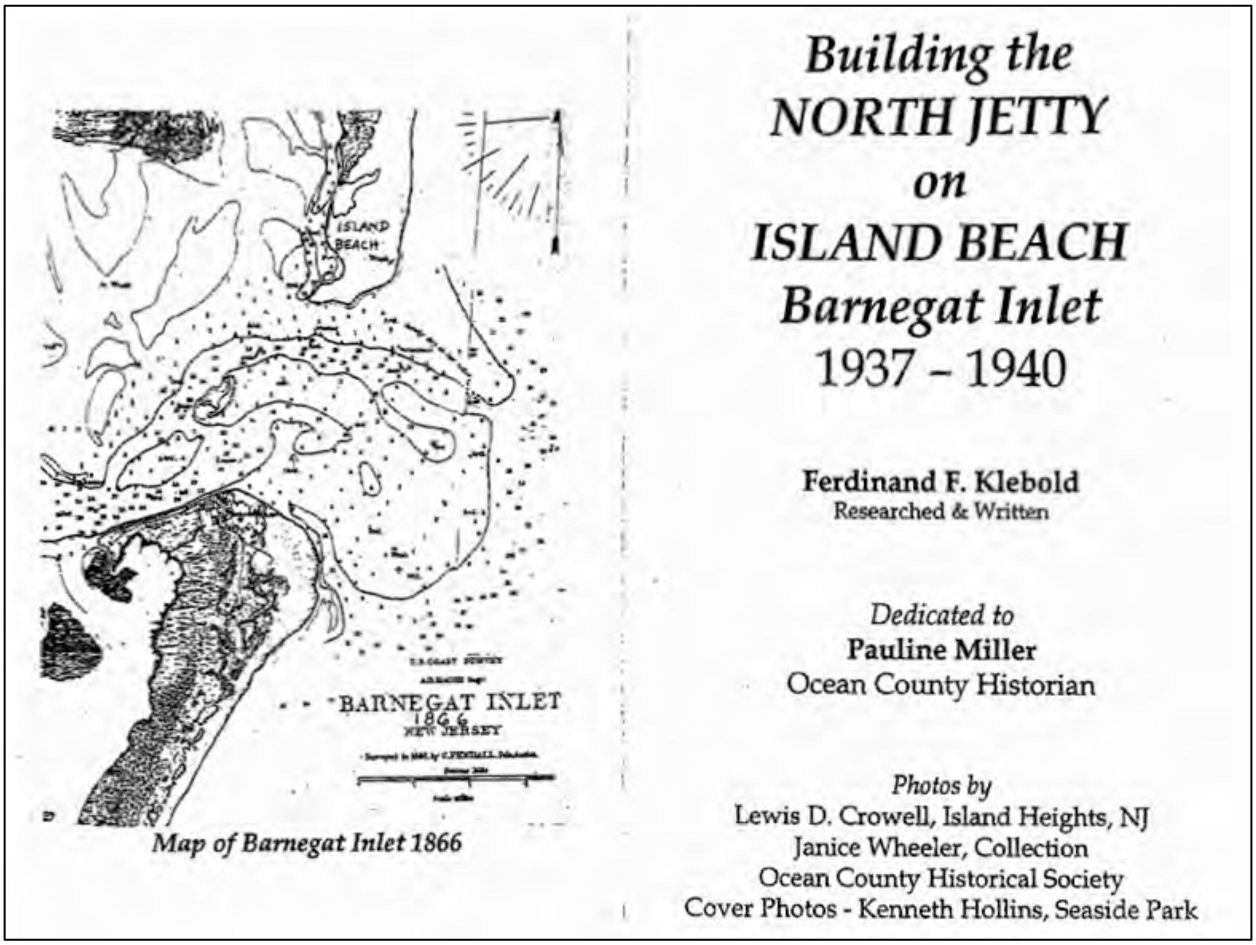


Figure 2-02. Sources consulted included, but were not limited to, historic maps, archaeological reports, historical summaries, photograph collections, and other historical collections deemed valuable. This pamphlet on the construction of the jetty was one of many sources consulted.

MONITORING OF CONSTRUCTION

Because the possibility existed that additional significant historic resources were located in the vicinity of the ongoing construction, in concert with the fact that the currently known site had not been fully delineated, monitoring of construction activities were to occur from station 23+50 seaward. In the event that unexpected potentially significant resources were identified, the monitor was to immediately cease construction and contact the USACE Cultural Resources Specialist Nikki Minnichbach, who would then notify the NJSHPO within 24 hours of the discovery. Additional resources besides the one wreck site, however, were not encountered (Figure 2-03).

Figure 2-03. Archaeologists monitored all excavations to ensure no additional impacts to the resource (*note bene*: Barnegat Inlet Lighthouse in the background).

DEBRIS DOCUMENTATION

Prior to recognizing the remains as a shipwreck site, a substantial collection of various timbers, beams, fragments, hardware, fasteners, frames, and so forth, had been recovered from the site and placed at several locations within the construction compound. The majority of the vessel timbers was concentrated in a large debris pile that was spread out by heavy equipment for ease of documentation (Figure 2-04). This debris was to be analyzed for relevant fragments of historic resources, which would then be subject to baseline documentation. Documentation and analysis would include, but not necessarily be limited to, the following, where possible or appropriate:

a. Measured drawing of each fragment, plan and/or profile, and cross section(s) where possible or appropriate.
b. Digital photography and video where possible or appropriate, including scale.
c. Recording of scantlings, construction details such as joinery and fastener patterns, fasteners, and other potentially diagnostic features.
d. Collection of wood samples for species identification.
e. Collection of diagnostic artifacts for conservation (see Figure 2-05).

Artifacts that were recovered for conservation were subject to the on-site artifact stabilization plan discussed below.

Figure 2-04. Debris pile spread out for ease of recordation. Orange paint marks indicated item requiring recordation while green mark indicated item had been recorded.

Figure 2-05. Once spread out, documentation included measured drawings, photographs, and samples for wood analysis.

DATA RECOVERY OF THE IN SITU VESSEL STRUCTURE

In addition to the documentation of the existing previously removed debris and vessel timbers, the remaining *in situ* vessel structure was to be examined and recorded to the extent allowed by the environment in which it sits. Data recovery activities would be limited to what could be accomplished by crews safely working from shore. No floating plant operations nor diving was to be conducted.

A primary goal of the recordation of extant remains was the physical examination and documentation of vessel construction. Since the vessel structure is buried beneath sand and jetty structure, subsurface testing and excavation was to be used to delineate and expose the structure for recording. The site was to be excavated by heavy equipment. When construction commenced at the portion of the jetty under which the wreck is situated, removal of the jetty structure over the site was monitored so the site could be exposed. The vessel was cleared of sand using a water jet where practicable or applicable (Figure 2-06).

All measurements and site documentation were to be controlled and tied into existing station control points. A detailed investigation of the vessel was to be conducted to determine exact horizontal site limits, detection of artifact densities, and assess the relationship between vessel and vessel components. Detailed drawings were made of the site to illustrate the location of artifacts, structural components, machinery, and hull lay out. Documentation was designed to address the following to the extent possible given the location of the vessel with respect to sea level and remaining jetty structure:

- Documentation included three-dimensional recordings of the hull design and construction features where practical. A plan of the surviving deck structure was made and the configuration of the bow and stern recorded.
- Identification of maximum length, beam, and draft and/or depth of hold if extant.
- Detailed descriptions of vessel construction and repair techniques, components, and materials.
- Scantling list (i.e., measurements of construction components, floor futtock, hull planks, etc.).
- Wood samples of various components for the purpose of identifying species and possible place of construction.
- Recovery of diagnostic artifacts.

Comprehensive documentation of general and specific dimensions, construction details, and other features were carried out with measuring tapes. Mapping entailed plan views, cross sections, and profiles, and provided detailed documentation of hull construction. Illustrations included diagrams of architectural components and construction techniques. Photographic documentation—both digital still and video—recorded *in situ* components, artifacts, construction techniques, materials (visibility permitting), and methodology.

Figure 2-06. Documentation of the exposed run of hull on the *in situ* vessel.

ARTIFACT CONSERVATION

ONSITE STABILIZATION OF RECOVERED ARTIFACTS

Certain artifacts determined to be diagnostic in nature with respect to the vessel were recovered subject to limitations on total cost of conservation and curation. Because recovery of diagnostic artifacts required a method of on-site stabilization due to the fragile nature of the recovered items, on-site stabilization of artifact material included submersion in fresh water. Temporary wet storage facilities included suitable containment vessels of a size sufficient to submerge artifacts of various sizes. Recovered material was cataloged, tagged, documented, and shipped to laboratory facilities for conservation.

All of the artifacts were assessed from a conservation standpoint to determine if they needed any immediate treatment prior to their shipment to the conservation facility. Generally speaking, all of the artifacts were stored in a wet environment. Fragile artifacts (i.e., wooden block) received their own storage containers, with suitable packing material, so that they were not damaged by other artifacts jostling against them. The majority of the artifacts were stored wet in plastic containers of various sizes at the USACE's construction staging office in just inside the Island Beach State Park entrance.

All individual artifacts were accessioned, color photographed using a digital camera, and measured (Figure 2-07). All files were backed up onto an external hard drive on a daily basis so as to provide two separate locations.

Figure 2-07. Stored at the USACE's construction staging office, all recovered diagnostic artifacts, like the block shown here, were recorded, as well as kept wet prior to shipment for conservation.

CONSERVATION OF ARTIFACTS

Ultimate conservation of the artifacts was conducted by the Conservation Research Laboratory (CRL). The CRL is part of the Center for Maritime Archaeology & Conservation, at Texas A&M University. The CRL is one of the larger artifact conservation facilities located in the U.S., and has been in continuous operation since it started in 1978. Since 1996, the CRL has been involved in more than 120 different projects, and has cleaned and conserved more than 1,750,000 artifacts. Directed by Dr. Donny Hamilton and run by Mr. Jim Jobling, the CRL is located at a satellite campus away from the main university, in two adjoining conservation buildings (6,800 square feet). The CRL is fully equipped to conserve artifacts from both underwater and land sites, with more than 40 power supplies for electrolysis, a 350-peak kilovoltage industrial X-ray unit with a digital Computed Radiography scanner, the largest archaeological freeze dryer in North America (larger than 2,000 cubic feet), a 6-foot Faro Arm digital scanner, etc.

All the artifacts were shipped to the CRL for conservation. Figures 2-08 and 2-09 show before and after conservation photographs of an iron strap employed for internal hull bracing. Upon completion of conservation, all artifacts were returned to the USACE, Philadelphia District archaeologist.

Figure 2-08. Internal hull strap (Artifact No. BI-28) before conservation treatment.

Figure 2-09. Internal hull strap (Artifact No. BI-28) after conservation treatment.

PUBLIC INTERPRETATION AND EDUCATION

The Barnegat Inlet North Jetty Shipwreck offered an excellent opportunity to educate local, regional, and national audiences about local maritime history and the USACE's mission. As such, a USACE Web Site Addition has been prepared as part of the mitigation measures for the site.

III. HISTORICAL CONTEXT

Archival research was undertaken with several objectives in mind. First, a general background history of Barnegat Inlet and the surrounding area, including a detailed maritime history and shipwreck inventory, was compiled to provide historic context for the wreck site. Further research was also undertaken to establish a baseline history of the jetties and their history of construction and maintenance. But paramount to the research was identifying the name of the vessel, and subsequently the history of the vessel from construction to sinking. The results of the archrival research are as follows.

GENERAL HISTORY OF THE PROJECT AREA

New York Harbor is located north of the Project Area. It is one of the best harbors in the Americas and one that would become a maritime focal point for the country and the world. Europe's first exposure to the New York Bay was during the voyages of Verrazano, an Italian from Florence sailing for Francois I, the King of France. Verrazano left European waters in January 1524 to find a route to China. His vessel, *La Dauphine*, named after the French heir to the throne, measured 100 tons and was manned by a crew of 50. In early March, after a tempest-tossed crossing, he came close to Cape Fear, North Carolina. By mid-April, Verrazano had coasted far enough northeast to enter New York Bay. After some brief reconnaissance, he continued on his voyage and returned to France in July. Being a competent seaman and navigator, Verrazano was able to conclude that he did not reach China, but rather a "New World" (Morison 1971:314). However, the French did not follow up on Verrazano's discovery.

Henry Hudson, an Englishman in the employ of the Dutch East India Company, investigated portions of the American eastern coast in 1609 (Labaree et al. 1999). He described the area of Barnegat Bay and Barnegat Inlet as "…a great lake of water, as we could judge it to be…The mouth of the lake hath many shoals, and the sea breaketh on them as it is cast out of the mouth of it" (Lloyd 1994:42). Hudson was the next European after Verrazano to enter New York Harbor; he then sailed 150 miles (241.4 kilometers) up the river that was to bear his name. The Dutch were a bit more industrious and inaugurated European control of the region, with headquarters at Manhattan. Numerous exploratory ventures occurred after the founding of the trading post, and by the mid-1610s much of the area was well known. The Dutch named this region New Netherlands in 1614, with private fur-trading operations expanding into the surrounding country. In 1623, the Dutch West India Company took over trading operations of the region, and the town of New Amsterdam was founded in 1625 (Moir 1979:A-12, A-13).

Other explorers followed Hudson in search of trading opportunities. In 1614, the Dutch vessel *Fortyn* landed in modern day Atlantic County, naming the area "*Eyren Haven*" ("Little Egg") Harbor. Other explorers followed. Just up the coast, the turbulent nature of the inlet earned Barnegat Inlet its name in 1614, initially being called "*Barendegat*" ("Inlet of the Breakers") by Dutch settlers (Lloyd 1994:42). Soon after, between 1616 and 1624, an explorer by the name of Mey explored the Cape May area. The following year, beginning in 1624, the Dutch established several trading colonies along the Delaware River.

While the Dutch were settling Manhattan, the Swedes, inspired by the success of other European powers in North America, sought to increase their influence in the New World. The New Sweden Company, formed in 1637 by Swedish, Dutch, and German investors, outfitted an expedition to trade for furs and tobacco. Landing in Delaware Bay in 1638, they built a fort and settlement at "*Nye Svierge*" ("New Sweden"), on the site of present day Wilmington. The small colony grew in size as more expeditions from Sweden arrived, eventually covering both sides of the Delaware River into modern day Delaware, New Jersey, Pennsylvania, and Maryland under Governor Johan Printz (1643 to 1653).

Although the Swedes lived peacefully with their Dutch and native Lenni Lenape neighbors, the close proximity of the Dutch to the Swedish colony did not sit well with the new governor, Johan Rising. Rising attempted to remove the Dutch from near the colony by seizing Fort Casimir (near present day New Castle, Delaware) in 1655. Dutch Governor Wilhelm Stuyvesant promptly sent seven armed ships and 317 men to retake the fort, renamed “Fort Trinity” by the Swedes. Rising surrendered to the Dutch in short order and the Swedish colony came under Dutch rule, although they were pretty much left to their own devices. This Swedish nation, which survived until the incorporation of the Commonwealth of Pennsylvania, represented the largest influx of Swedes to the New World until the nineteenth century.

Dutch influence in the area ceased after the capture of New Amsterdam by the British in 1664, and the establishment of the Port of New York. As early as the 1640s, New England merchants had attempted to secure a portion of the Delaware River fur trade by establishing the Delaware Company. The thwarting of this attempt made the British realize that the Dutch represented a threat to their colonial expansion in the New World. Consequently, in 1664, Charles II ordered the conquest of all Dutch possessions in the New World.

The land captured from the Dutch was presented to Charles II’s younger brother James, the Duke of York. The portion between the Hudson and Delaware rivers, known as “the Colony of New Jersey,” was given by James to his friends Lord John Berkeley and Sir George Carteret. Berkeley in turn sold his share to John Fenwick and Edward Byllynge, a pair of Quakers. The pair immediately disagreed over the management of their purchase and William Penn was asked to arbitrate their dispute. The Colony of New Jersey was divided into two, East Jersey and West Jersey, with the western portion in the hands of the Quakers and the eastern owned by Carteret. The Governor of New York refused to recognize the sovereignty of either colony and the disputes continued into the sixteenth century.

During the Revolutionary War, coastal New Jersey was home to a fair number of American privateers, who found the activity quite lucrative, given the region’s close proximity to British shipping lanes. In addition, the abundance of narrow rivers and small back bays along the coast gave cover to privateering operations. The biggest stronghold of privateering during this period was located at Chestnut Neck, a village just north of Absecon Island (present-day Atlantic City), 11 miles (17.7 kilometers) up the Mullica River, in the vicinity of modern day Egg Harbor. Second in size only to Toms River, Chestnut Neck was the chief port for shipping in and out of Great Bay. Outside of Great Bay smaller communities like Absecon, Bakersville, Tuckahoe, and Leedsville focused on shipbuilding for various types of fishing and whaling activities in the Atlantic (Dolan Research, Inc. and Hunter Research, Inc. 1997).

In the summer of 1788, 13 prizes were listed in Colonial Admiralty records as having been brought into Chestnut Neck and sold (Atlantic Alliance for Maritime Heritage Conservation 1985), including a former American privateer captured by the British warship *HMS Galatea* in 1777, and two merchantmen the *Venus of London* and the *Major Pearson,* whose cargoes together brought over $500,000.

The capture of these latter two vessels did not go unnoticed by the British Admiralty, who sent a fleet of nine vessels including three sloops, two galleys, and four other armed vessels, along with at least 400 men of two battalions, arriving off Egg Harbor on 6 October 1778. The British landed in a heavy fog and met resistance from the Pulaski Legion, led by Count Casimir Pulaski, who had been sent to oppose the British landing by General Washington. Although the Colonial forces kept the British army at bay, Tory militia volunteers managed to set fire to eight sloops and schooners, a number of whale boats, and several structures on shore including a storehouse.

Captain Ferguson, the British commander, advanced up the river and destroyed a salt works, a sawmill, and a number of houses belonging to Colonials. The British retreated, losing the *HMS Zebra*, which ran aground and had to be destroyed, before returning to New York. Although privateer operations continued from Chestnut Neck, most of the town's residents relocated to the Port Republic area.

With intercolonial trade well established, and foreign imports and exports on the increase, the port of New York continued to grow. By the last decade of the eighteenth century, the port of New York had surpassed Boston in importance; by the first decade of the nineteenth century, the port was larger than Philadelphia. Two-thirds of all the nation's imports and one-third of its exports went through the port by 1860, with only London and Liverpool exceeding the port in the volume of shipping and value of imports and exports (Albion 1984:336; Ferguson 1986:17). Population growth mirrored the increase in shipping activities, declining only through war and epidemics. Associated reductions in maritime commerce occurred while the British occupied the port during the Revolutionary War, the yellow fever epidemics of 1795 and 1798, the Embargo Act of 1807, and the British closure of the port during the War of 1812 (Ferguson 1986:17).

During the nineteenth century, sailing vessels of varying sizes and shapes sailed up the coast of New Jersey to enter and exit the port of New York. These vessels included sloops, coastal schooners, merchantmen, and packet ships, which increased in size as time and technology progressed. In all of the smaller communities along the coast of New Jersey, the schooner was the leading ship type, used largely for trading lumber and charcoal (Dolan Research, Inc. and Hunter Research, Inc. 1997). The late 1840s and 1850s saw the famous clipper ships entering the port, to be followed in the 1890s by the last of the American square-rigged, deep-water sailing ships (the "down easters"). These were followed by large, multi-masted schooners—the largest sailing vessels ever constructed. In addition to these major vessel categories, other vessel types present in the area included schooner barges, pilot boats, lighters, fishing boats, and other types of small craft (Morris and Quinn 1989:87-88).

The invention of the steam engine in the late eighteenth century and its application on vessels at the turn of the century played a profound role in the history of the area, and cut into the trades previously controlled by sailing vessels. After Fulton's *North River Steam Boat* completed its successful voyage from New York to Albany in 1807, steam power became the dominant method of vessel propulsion and would form the catalyst for the evolution of not only vessel shape and type, but trade and economics as well (Brouwer 1987).

The advent of steam heralded the creation of the famous river and coastal sidewheel steamers, several of which are listed as having wrecked near the approaches to New York. Huge transatlantic liners followed in the wake of the sidewheel steamers, making New York the center for passenger travel to and from foreign ports. Steam also allowed the ever important "tugboat" to evolve. After 1860, the tugboat industry expanded rapidly, with steam being employed on the tugs until just after World War I (Morris and Quinn 1989:87-88).

MARITIME HISTORY OF THE NEW JERSEY AREA

Geographically situated adjacent the entrance to the Port of New York, one of the world's busiest shipping ports, the coastline of New Jersey furnishes the unwary mariner with a multitude of hazards in the form of rocks, shoals, and sand bars—all the worse to meet up with in treacherous weather. As early as 1640, New Jersey claimed her first shipwreck with the grounding of a Dutch vessel at Sandy Hook during a severe storm (Downey 1983:3).

There is no major port along the coast of New Jersey from Delaware Bay to New York Harbor; however, a consistently high amount of ship traffic between these two ports occurred during the Historic period. In 1855, Lieutenant George Meade, a government engineer, estimated as many as 6,000 ships per year passed by the Barnegat Bay area (Dolan Research, Inc. 2001). There were few options available to ships in distress along this route, three of which being Absecon, Barnegat, and Manasquan inlets. Nevertheless, entering these and other inlets, particularly during a storm, could be quite hazardous, as there were many wrecks on the approaches to the New Jersey shore.

Lesser ports along the New Jersey shore, including Absecon, Barnegat, and Manasquan inlets, were used primarily by commercial fisherman up through much of the twentieth century. Presently, the majority of vessel traffic in and out of these and lesser ports consists primarily of personal recreational vessels, along with a steadily shrinking number of commercial fisherman and head boats.

Absecon Inlet was developed primarily as the harbor for Atlantic City in the late nineteenth century. Merchants transporting various goods including lumber, ice, coal, brick, and fish, to and from the various local waterfront communities had long used the inlet, but pleasure vessels became an increasingly larger component of the traffic by the end of the nineteenth century. Until the establishment of navigational aids in the inlet in the late nineteenth century, the high energy and constantly changing nature of the shoals made navigating the inlet hazardous. In 1911, the USACE surveyed the inlet, constructed a jetty, and began maintaining the channel at a 12-foot (3.7-meter) depth.

Barnegat Inlet provided an access point to the many settlements surrounding Barnegat Bay. As early as 1684, the area was recognized for its rich fishing grounds, which were exploited as the area's main economic staple well into the twentieth century. Settlement was sparse in this region until the beginning of the eighteenth century, when William and John Cranmer reportedly were residing in the area opposite the inlet (Fischer 1889:233). The northern side of Barnegat Inlet, the area of Island Beach remained unaltered and a "New Inlet" separated the island from Squan Beach (Manasquan) in the eighteenth century. However, by 1720, this inlet closed permanently (Miller 1998). Cranberry Inlet, opposite Toms River and north of the Project Area, opened in 1750 (Figure 3-01). Settlement in the area increased after the inlet closed naturally in 1812, and vessel traffic was directed through Barnegat Inlet. In the latter half of the nineteenth century, Barnegat became known as a beach resort community, with construction booming after the third quarter of the nineteenth century.

U.S. LIFESAVING SERVICE AND AIDS TO NAVIGATION

Despite the relatively small number of vessels hailing from New Jersey shore ports, the high level of historic coastal shipping traffic led to hundreds of wrecking events. This was addressed in two ways: the U.S. Lifesaving Service (LSS) and aids to navigation (lighthouses and lightships). "The topography and the approaches to New York Harbor..." writes LSS historian Dennis Noble, "made the coast of New Jersey a logical choice to begin a Federal lifesaving service" (Noble 1994:20-21). William A. Newell, a physician and Congressman from New Jersey's second district, spearheaded the campaign for a Federally funded lifesaving service, testifying that of the 338 shipwrecks that had occurred on the approaches to New York Harbor between 1839 and 1848, nearly half (n=158) went ashore on the coast of New Jersey (Noble 1994:21). Congressman Newell, with the strong support of his own constituency as well as New York's powerful political machine, was successful in securing an appropriation for the construction of a system of lifesaving stations along the U.S. seaboard, beginning with the New Jersey coast.

Despite the Federal funding of navigation aids, the LSS remained a volunteer effort until 1871 (Noble 1994:25-28). In the first quarter of the nineteenth century, local fisherman who volunteered their time and equipment typically manned stations. It was not until 1848, that Congress allocated funds, in this case $10,000 for lifeboats and rockets for the coast from Sandy

Hook to Little Egg Harbor, for the LSS. This funding enabled the construction of eight lifeboat stations, and the following year money was appropriated for the construction of six more between Little Egg Harbor and Cape May. By 1872, there was one station for every 5 miles (8 kilometers) of coastline, and by 1886, paid crews manned all stations (Wilson 1964). The number of stations was expanded to 42, or one for every 3 miles (4.8 kilometers) of coast, by 1900. Then in 1915, the U.S. Coast Guard assumed the duties of the LSS.

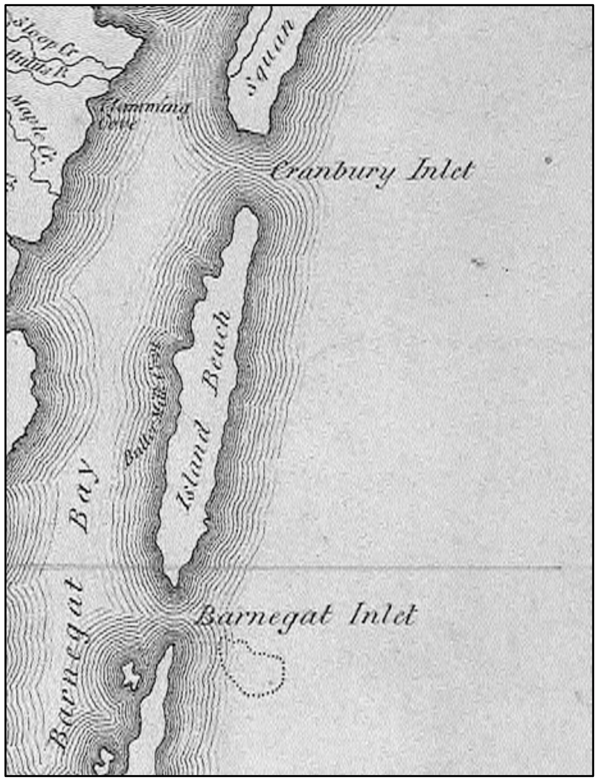


Figure 3-01. 1812 New Jersey map showing Barnegat and Cranbury inlets with Island Beach (the Project Area) between them prior to the closing of Cranbury Inlet the same year (Chart 853 from National Oceanic and Atmospheric Administration's [NOAA's] Office of Coast Survey's Historical Map and Chart Collection).

Concerning the area of Barnegat, five LSS Stations operated and patrolled near the inlet and surrounding beaches for distressed ships (Figure 3-02). North of Barnegat Inlet were three LSS Stations: Forked River Station No. 15; Cedar Creek Station (Coast Guard Station No.111); and Island Beach Station No. 14. South of the inlet was Barnegat Station No. 17 and Loveladies Island Station No. 18. Assistance by neighboring stations often occurred during rescues and rough winter storms.

The closest LSS Station to the Project Area was Barnegat Station No. 17. This station provided much of the rescue efforts to ships distressed at Barnegat Inlet and on the outer Barnegat shoals. The LSS Station at Barnegat was built in 1855 near the northern end of Long Beach Island (U.S. Coast Guard 2014a). The station was located on the beach side in an area in which the U.S. Government had no title. In 1911, a title was obtained and the station was moved to the bay side of Barnegat, approximately 0.375 mile (.6 kilometer) south of Barnegat Light (Figure 3-03). Currently, Barnegat Coast Guard Station No. 113 remains in operation and provides service to the surrounding areas. The keeper and fellow surfmen of the Loveladies Island Station No. 18 would often help the Barnegat crew when vessels were stranded off on the southern shoals near the inlet. Loveladies Island Station No. 18, built in 1871, was located 2.25 miles (3.6 kilometers) south of the lighthouse (U.S. Coast Guard 2014b). This station's service was discontinued in 1922.

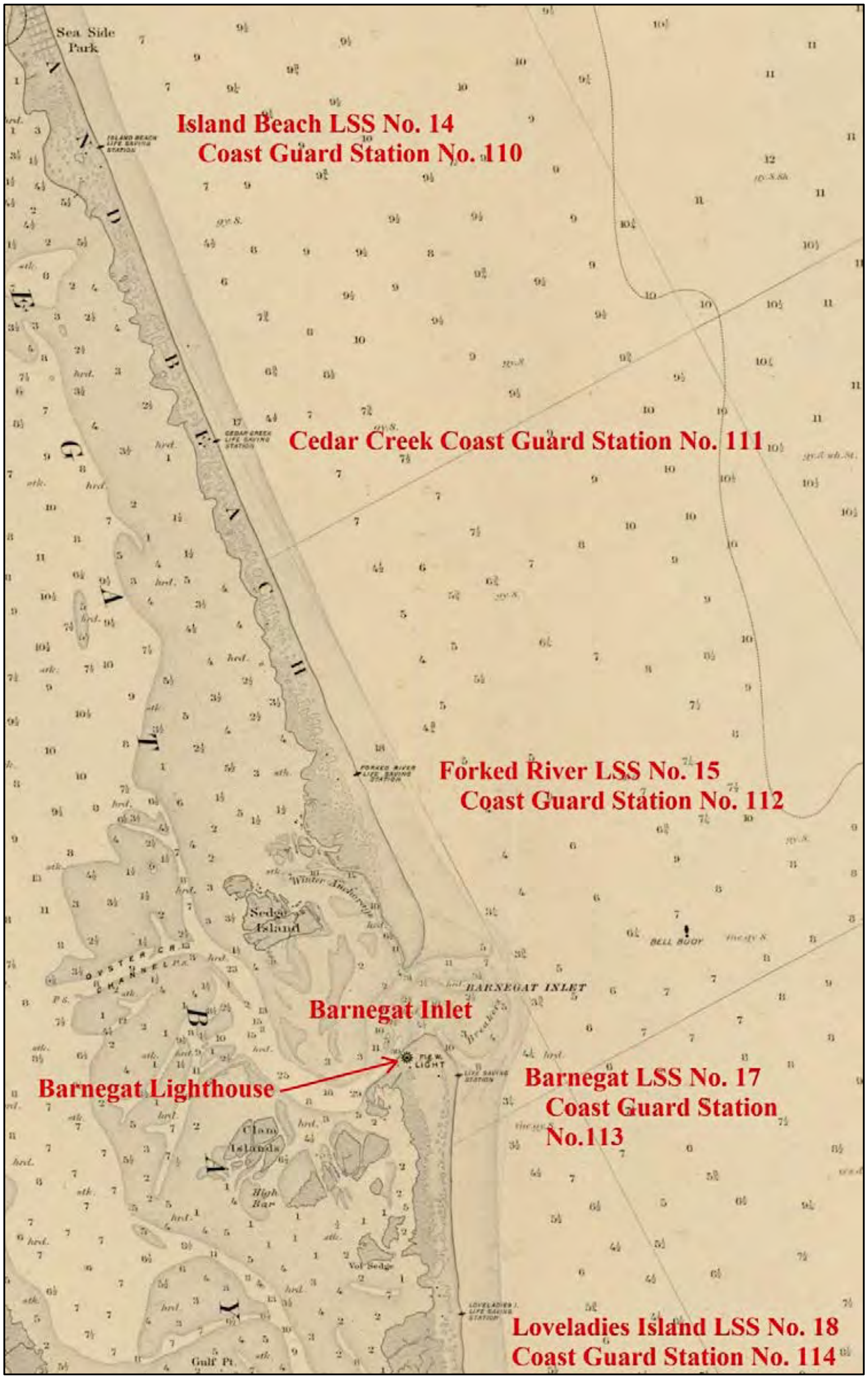


Figure 3-02. 1879 navigational chart illustrating the many LSS Stations (and later U.S. Coast Guard Stations) found nearby the Project Area at Barnegat Inlet (Chart 122 from NOAA's Office of Coast Survey's Historical Map and Chart Collection).

Figure 3-03. Post-1911 photograph of unknown date showing the Barnegat LSS Station No. 17 located on the bay side (U.S. Coast Guard 2014a).

The Forked River LSS Station No. 15 more often responded to maritime events at the southern end of Island Beach. This station was located 2 miles (3.2 kilometers) north of Barnegat Inlet and had been in service since 1855, when the station was built (Figure 3-04; U.S. Coast Guard 2014c). Keepers of the LSS Stations included John Parker (1872 to 1876), Henry Chambers (1876 to 1879), Allen R. Allgor (1879 to 1886), David L. Yarnell (1886 to 1905), George M. Blackman (1906 to 1911), and Martin McCarthy who was still known to be serving as keeper until 1915 (Veasey 2000; U.S. Coast Guard 2014c). Later, the station was renamed "Forked River Coast Guard Station No. 112" and would be abandoned in 1948. Today, the buildings are open to the public and serve as Island Beach State Park's Interpretive Center.

Figure 3-04. Aerial photograph of Forked River LSS Station No. 15, later named Forked River Coast Guard Station No. 112. The back building with four large doors served as the boathouse (Veasey 2000:104).

Two more LSS Stations assisted shipwreck victims in the Barnegat area: Cedar Creek and Island Beach. Cedar Creek LSS Station did not have an official station number; however, the crew was in service from 1856, but did not have a station building until 1872 (U.S. Coast Guard 2014d). In the 1920s, Cedar Creek was considered an auxiliary station to Island Beach. Barnegat Inlet is 5.375 miles (8.7 kilometers) south of the Cedar Creek Station. This station fell into disuse in 1939 and by that time Cedar Creek was Coast Guard Station No. 111. Cedar Creek was turned into a beach home for some time after. The State of New Jersey demolished the station in the 1950s transforming the space into a recreational area (Miller 1998). Further north was Island Beach LSS Station No. 14, which operated from 1849 to 1946 (Figure 3-05; U.S. Coast Guard 2014e). Eight miles (12.9 kilometers) north of Barnegat Light, this station largely assisted the Seaside Park community and the spanning beaches of Island Beach. Currently, this station remains in use by Island Beach State Park staff and is closed to the public.

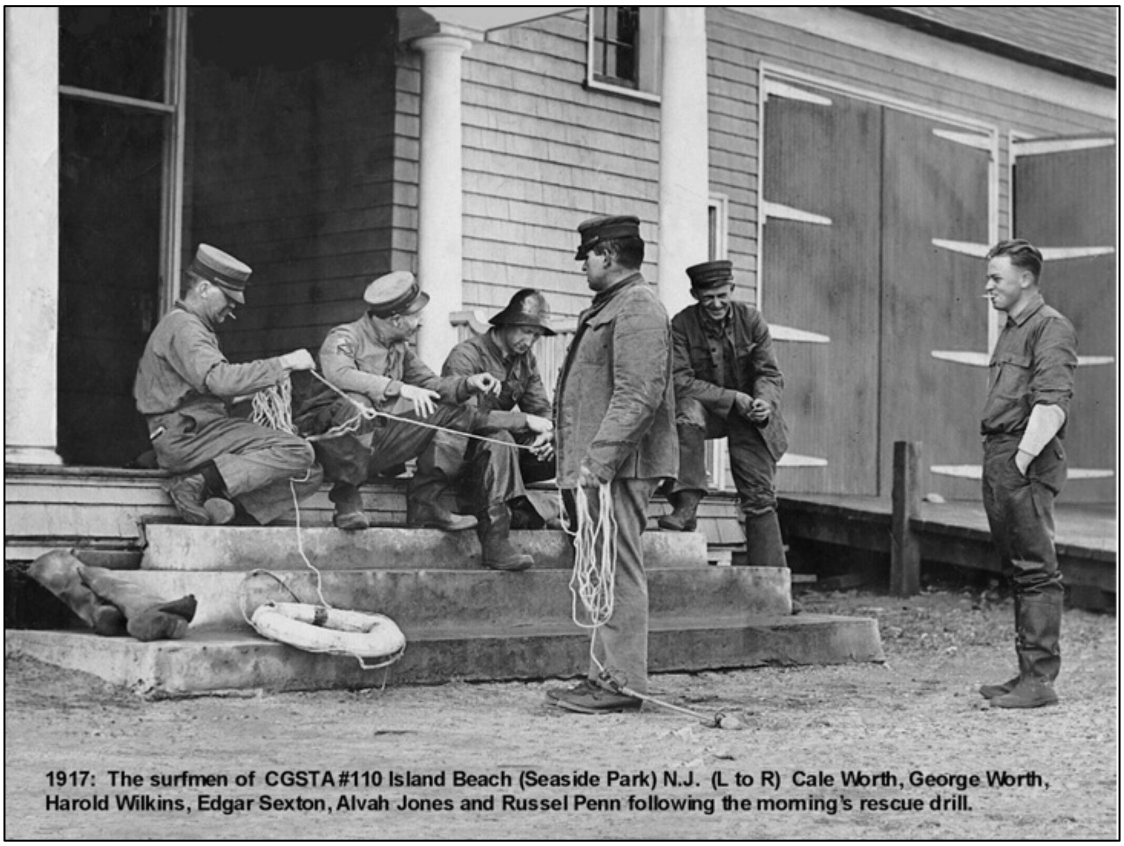


Figure 3-05. Several surfmen of the Island Beach Coast Guard Station No. 110. This photograph was also used in the credits of the 2006 motion picture "The Guardian" (U.S. Coast Guard 2014e).

While the painstaking efforts of the "keepers" and "surfmen" of the LSS no doubt contributed to a reduction in the loss of life and property due to shipwrecks along the coast of New Jersey, the threat of shipwrecks remained constant in the eyes of mariner and pilot alike, and incidences of shipwrecks continued to mark the New Jersey coastline. Although many vessels were refloated or otherwise salvaged either wholly or partially, every now and again circumstances combined to result in the total loss of both vessel and cargo. For example, of the 53 incidents reported for the coast of New Jersey between July 1904 and June 1905, only two shipwrecks, the schooner *Rebecca M. Smith* of Philadelphia, which wrecked 3 miles (4.8 kilometers) southeast of the Little Egg Harbor LLS, and the Boston schooner *Lizzie H. Brayton*, which went ashore 1.5 miles (2.4 kilometers) northeast of the Bayhead station, were total losses (U.S. Department of the Treasury, U.S. Lifesaving Service 1905:280-281).

While efforts were made to rescue the victims of vessels gone ashore, aids to navigation in the form of lighthouses were constructed along the coast. The aid from Congress came in 1823, when funds were allocated for the construction of a lighthouse on Cape May. This was not the first lighthouse on the New Jersey shore, as the Sandy Hook facility was constructed in 1761, but with private funds.

Following the construction of the Cape May lighthouse, a series of facilities were constructed along the coast, including the Barnegat Light in 1835. This facility, standing 40 feet (12.2 meters) tall, utilized what was considered by many ship captains to be an inferior lighting apparatus in addition to being too short. It was replaced with a 4^{th} order Fresnel lens in 1854 (Gately 1998). By 1859, the tower, which had collapsed due to erosion of the beach (Kern et al. 1979), had been replaced by a 165-foot (50.23-meter) high lighthouse (Figure 3-06) containing a 1^{st} order Fresnel lens that was built with $45,000 appropriated by Congress for the purpose. When decommissioned in the 1920s, the Barnegat Light replaced the lighthouse 8 miles (12.9 kilometers) off the coast in 1927 and was eventually discontinued in 1944. The tower still stands and was listed on the NRHP in 1971. Barnegat Light now sits at the Pyne Poynt Marina in Camden, New Jersey and is in severe need of maintenance and repair (Anderson 2014a).

Figure 3-06. Barnegat Light taken from the Project Area, Barnegat Inlet North Jetty, looking south.

BARNEGAT INLET

For over three centuries, mariners have known Barnegat as a place of potential disaster. The inlet and shoals of Barnegat have claimed many shipwrecks and lives, with their first known wrecks being in 1705. Originally bound for Boston, three sloops were lost at Barnegat on 30 April, as reported in the *Boston News-Letter*. The news article described:

> "Yesterday came hither the masters of three sloops which were cast away near Barnegat by the late easterly storms, viz: Archibald Morris, who was bound from Pennsylvania for New York and Boston,; one Jones who was bound from Horekill to Boston; and one Saunders, bound from Roanoke to Boston. S Saunders had one man drowned and saved nothing at all, and the others saved very little besides lives" [*Boston News-Letter* 30 April to 7 May 1705, No. 55].

The constantly changing shoals and channels of Barnegat have presented difficult challenges to sailors passing along the way. The first lighthouse in 1835, offered a little assistance navigating along the shore, nonetheless mariners wanted a better and taller light. It is believed that between 400 and 500 lives have been lost on the shoals of Barnegat and an estimated 40 ships per year wrecked on the shoals (Figure 3-07) prior to the introduction of the steamship, easily earning the coast of New Jersey the nickname "Graveyard of the Atlantic" (Barnegat Light State Park display). Local residents often mention stories of the "Barnegat Pirates" that lured and savaged these shipwrecks caught on the shoals and even mention that Captain Kidd himself buried treasure somewhere on the coast of New Jersey (Jahn 2000; Lloyd 1990).

One particular reason for the abundance of maritime activity outside the inlet lies in the fact that, Barnegat rests 1 mile (1.6 kilometers) south of the 40th parallel. This critical spot signaled the change of course for transatlantic vessels. Ships sailing from Europe journeyed south to 40 degrees latitude and then sailed west until land was visible. Once Barnegat Light was in sight, ships bound for New York would sail north following the lights at Sea Grit, Navesink, and Sandy Hook. The lighthouses acted as beacons to guide the vessels toward New York Harbor. A second lighthouse replaced the first after it was lost to erosion. The current light, nicknamed "Old Barney," was first lighted on 1 January 1859 and could be seen on a clear night for 19 nautical miles (35.2 kilometers; Barnegat Light State Park displays).

Historically, and even today, Barnegat Inlet has never been used as a port for larger commercial shipping. The shallow channel was typically between 6 and 8 feet (1.8 and 2.4 meters) deep. Navigating the channel into the bay was not recommended for those unfamiliar with the waterway and they should not attempt to try according to the U.S. Coast Pilots (U.S. Coast Pilot 1916:55). The local shipbuilding tradition focused on smaller sloops and wooden sailing schooners between 50 to 70 feet (15.2 to 21.3 meters) in length (Klebold 2013). A few exceptions in size have been noted with the largest schooner being from Toms River, reportedly 120 feet (36.6 meters) in length (Ferdinand Klebold, personal communication 2014). A number of these ships were built with centerboards in order to navigate the waters of Barnegat Bay and the shallow inlet. These vessels operated between Toms, Waretown, Barnegat, and Forked rivers and only stopped when Barnegat Bay froze. Cargo exporting out of Barnegat Inlet included charcoal, cordwood, and pine principally bound for New York City. These vessels often returned with merchandise for the area shops. During the summer, ships exported produce and seafood.

Figure 3-07. "A Wreck on Barnegat Shoals" was shown as part of a story on the coast of New Jersey illustrated in *Harpers New Monthly Magazine* February of 1878 (Rideing 1878:333).

The northern portion of Long Beach Island, where the Barnegat Light sits, has been reporting erosion since 1835, when the first lighthouse washed into the inlet (Methot 1988; Barnegat Light State Park display). In 1866, the Federal government started placing stone around the base of the second lighthouse (Methot 1988). Nine jetties made from 1,220 tons of stone had been built by 1869 to keep the lighthouse from disappearing into the inlet (Veasey 2000). Attempts to preserve the lighthouse have slowed the erosion on the northern end of Long Beach Island, but have not stopped Island Beach from extending further south. Figures 3-08 and 3-09 illustrate the shoreline movement of the beaches and the inlet prior to the creation of the current jetties. From 1839 to 1932, the inlet has moved approximately 1,600 meters south (Seabergh et al. 1996). In

Mary Karch's book *Under the Lighthouse* (2004), Ted Barber recalls the erosion process happening at the inlet. He noted:

> "This shows you the erosion. You see… the ebb tide would come over and follow the course of the shore and carry the sand out to sea, out to the bar obviously and then the high tide again would pick the sand up, but would deposit it on the other side on north beach (Island Beach) and north beach continued to grow while we [at Barnegat City] continued to shrink" [Karch 2004:49-50].

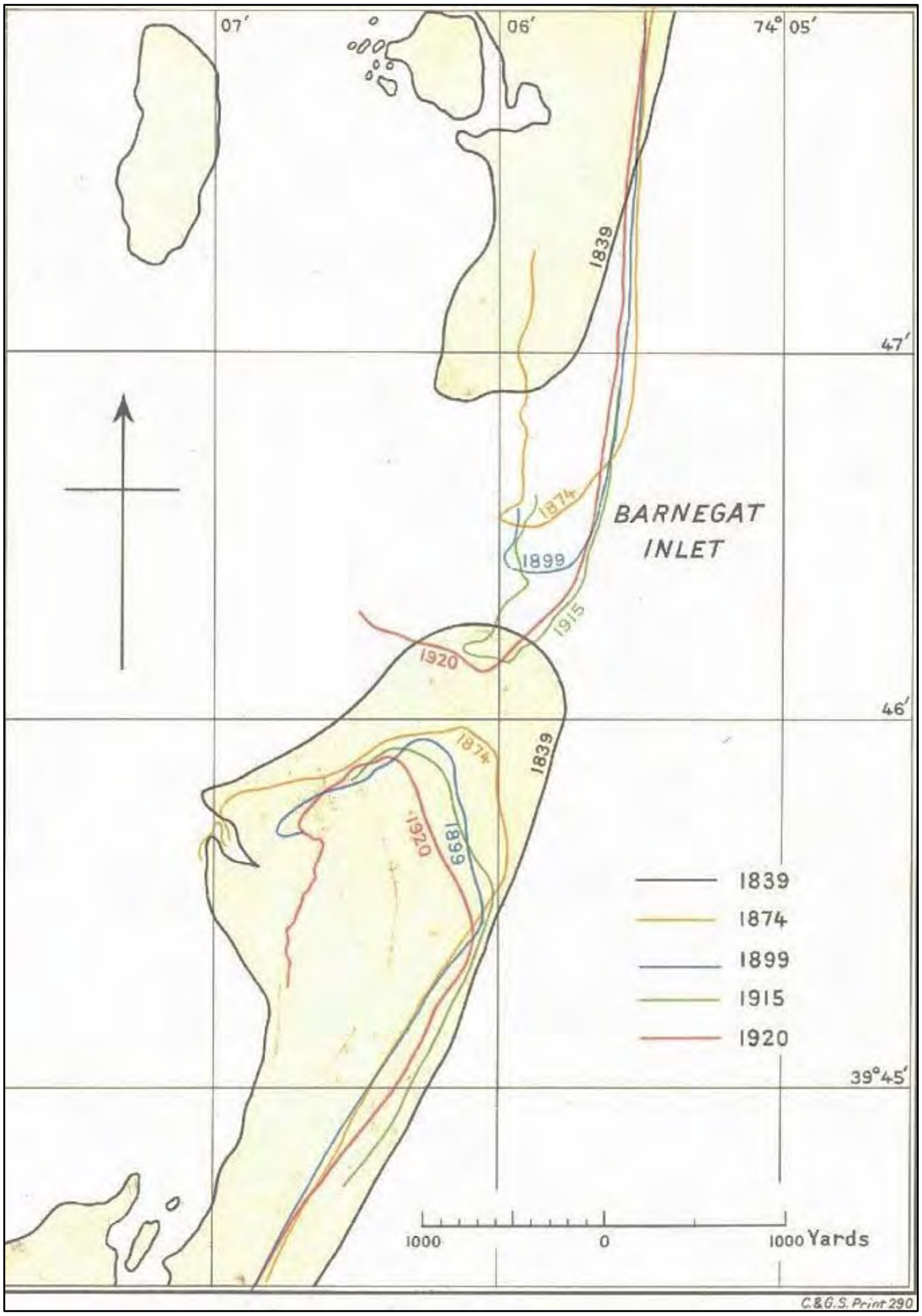


Figure 3-08. Map showing the changing shorelines of Barnegat Inlet from 1839 to 1920, largely noting the southward migration of the inlet (Image 916 from NOAA's Historic Coast & Geodetic Survey Collection Catalog of Images).

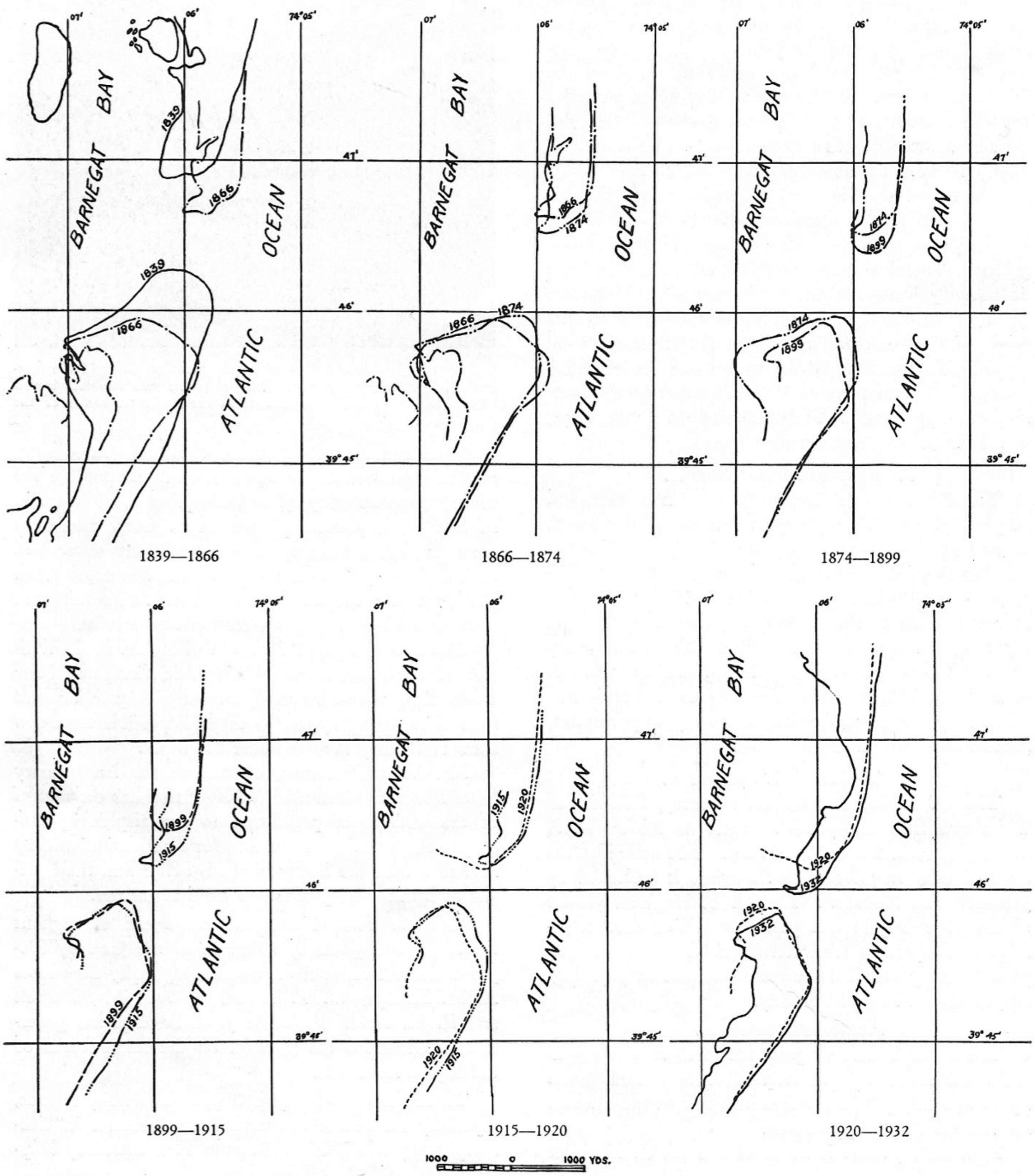


Fig. 2.—Shoreline changes at Barnegat Inlet, New Jersey. *Compiled by U. S. Engineer Office, Wilmington, Del.* Rearranged and traced by J. B. Lucke.

Figure 3-09. Map showing the changing shorelines of Barnegat Inlet from 1839 to 1932 (Lucke 1934:8).

The gradual shifting of sands from Barnegat to the southern end of Island Beach became a larger concern in the 1920s as Barnegat Light was becoming closer to the eroding shore (Figure 3-10). Storms between 1915 and 1920 caused remarkable erosion along the northeastern side of the beach and destroyed the Keeper's House (Methot 1988). On 4 February 1920, after a devastating storm struck Barnegat, the lighthouse was considered doomed by the Lighthouse Service and plans were made to replace the lighthouse with the Barnegat Lightship in 1927. However, Barnegat citizens attempted to prevent the erosion around the lighthouse by building a makeshift jetty with their own funds and materials (Figure 3-11). The Federal government deeded the Barnegat Light to the State of New Jersey on 8 May 1926 (Methot 1988; Veasey 2000).

Figure 3-10. Circa 1920s photograph showing the dangerous erosion at the base of Barnegat Light (Lloyd 1990:17).

Figure 3-11. Derelict cars used as a makeshift jetty piled at the bottom of Barnegat Light in 1933 (Lloyd 2005:101).

Now under the direction of Mayor Charles Bulter, the people of Barnegat "collected derelict cars and dumped them in front of the light to create a jetty. Unfortunately, that was the last local effort; the people had quickly discovered "they had bit off more than they could chew"" (Methot 1988:163). The building of the car jetty occurred in September 1933 and Barnegat City residents believed it would be the cheapest and easiest way to keep the lighthouse from falling into the sea (*Ocean County Sun* 12 September 1933). Acquiring the vehicles was not difficult, but getting them to the site was the chief question. Major Bulter raised $225 for the gas and oil required to get the vehicles to the Barnegat Light. The placement of old cars helped to slow the erosion and a few weeks later "a derelict barge from Atlantic City was towed to the inlet and beached at right angles in front of the tower. It was filled with 2,000 bags of sand. Other hulks were planted along with more old cars" (Lloyd 2005:101).

In 1934, the Federal government rejoined the effort to save the lighthouse and funded a project with $14,000 to secure the towers foundation by building a steel petticoat around the light's base using steel rings and cement (Anderson 2014b; Lloyd 2005). The project was considered a success, as the lighthouse survived the later severe storms of the year. Barnegat Light was officially extinguished on 1 January 1944 and joined the New Jersey State Park system in 1957.

ISLAND BEACH

Opposite Barnegat Light is the current Project Area on southern portion of Island Beach. The closing of Cranberry Inlet in 1812 made Island Beach a promontory, but the name stayed with the stretch of land. Proprietors purchased the area known as Barnegat (from Manasquan River to Little Egg) from Native Americans by 1683. The Proprietors of East Jersey granted Island Beach in 1741 to James Alexander (Methot 1988). His son, William, inherited the island and regrettably lost it due to debt in 1790. Ownership of the land was transferred several times with the acreage contested, resulting in court cases in the early nineteenth century (Miller 1998). By 1828, William Phillips was the owner of 780 acres (315.7 hectares) and built a house 1 mile (1.6 kilometers) below the former New Inlet. A number of houses occupied the area of Island Beach, but most were near the northern end of Island Beach opposite of Toms River.

The Federal government built a number of basic shacks, called "Wrecking Houses," to help aid lifesaving efforts in the 1830s (Miller 1998). The government originally did not see Island Beach as a valuable stretch of land and so they did not set to acquire a title for the properties. As the structure was built on Mr. Phillips' land, the building became "Phillips Station No. 14" and he was announced the Keeper of the shack (Miller 1998:26). Mr. Phillips led local surfmen in rescue efforts and maintained station equipment. By 1849, Congress approved the acquisition of the land and "Phillips Keepers' Shack" was sold (Miller 1998:35). The property, a 100-sq. foot (30.5-sq. meter) tract, then officially became "Island Beach Lifesaving Station No. 14" (Miller 1998).

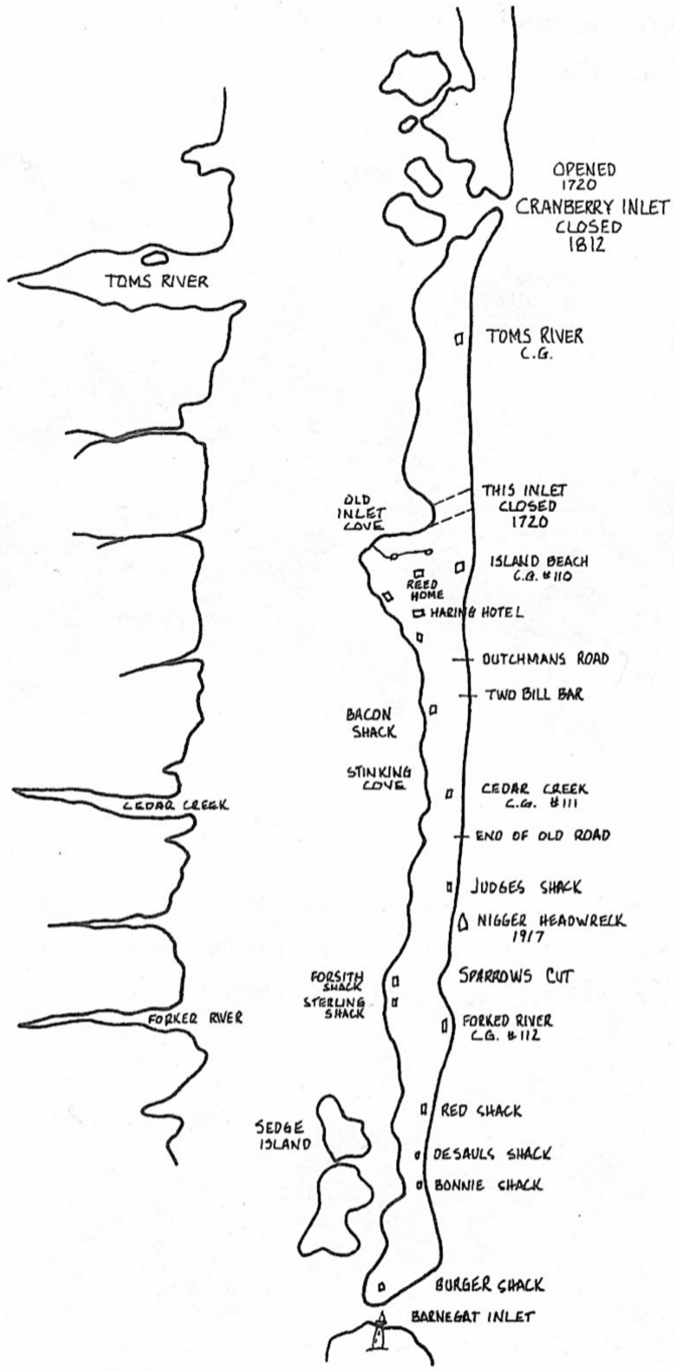
The Reed Hotel was established at the northern end of Island Beach in 1876 (Miller 1998). The small hotel occupied an area on the bayside, with all guests and supplies brought over the bay by boat. The hotel sustained itself with a small farm and local hunting resources. Surfmen from Island Beach LSS Station stayed during the winter months at the hotel instead of enduring the harsh winter at the station. Competition with other seaside hotels eventually caused the Reed Hotel's closure in 1925.

In 1926, Henry Phipps bought the entire peninsula south of Seaside Park (Methot 1988; Miller 1998). A Pittsburg Steel Magnate and a partner of Andrew Carnegie, Mr. Phipps had planned to build the area into an upscale private development complete with a golf course, yacht club, private homes, and even a railroad extension south across Barnegat Bay to the private resort. The Great Depression and Mr. Phipps' death prevented the high-class establishment from being developed. With the exception of a few squatters, fisherman shacks, the Reed Hotel, and the LSS Stations very little else occupied Island Beach.

Locals at Barnegat Light referred to the Island Beach side of the inlet as the “North Point,” “North Beach,” and even the “North Point of the Beach” (Karch 2004; Lloyd 2005; Lucke 1934; Miller 1998). This portion of the beach has largely remained unaltered, and is used as a recreational area for boaters and later beach buggy riders. The natural beach environment and the estuaries of Barnegat Bay attract fishermen, duck hunters, and gatherers of local scallops and oysters. Historian Pauline S. Miller described the area:

> “In the first two decades of [the 20th century], visitors from surrounding communities sailed their boats to the southern end of the island, known as North Point of the Beach, and pitched their tents for a few weeks of camping. These hearty tent dwellers obtained drinking water by sinking a barrel deep enough into the sand to strike a spring of clear fresh water. Houseboat dwellers also camped out on the bay side of the island [Miller 1998:57].

The heirs of the Phipps family appointed a manager for the island in the Barnegat Bay and Beach Company (Miller 1998). Francis Parkman Freeman, an amateur botanist, looked over the property and leased sites to 126 sportsmen. He selected the area of each lease and allowed fishermen to build crude shacks without utilities. Tarpaper nailed to driftwood sufficed as a shack and the sportsmen paid $600 a year for the solitude of Island Beach. Freeman dispersed and “revoked fishing licenses and approved home sites on parcels where the leases were issued” (Miller 1998:66). Eighty-two shacks were recorded in existence by 1953 and by 1980 only 12 remained. The illustration in Figure 3-12 shows a limited number of the shacks that existed on Island Beach, most likely between the late 1930s to the 1950s. The State of New Jersey purchased 9+ miles (14.5+ kilometers) of virgin Island Beach from the Phipps heirs in 1953 for nearly $43,000,000 (Miller 1998). Island Beach State Park opened its doors to visitors officially in 1959. The State Park no longer renews the leases originally offered by Freeman.



Island Beach

Courtesy: F. William Greger

Figure 3-12. Undated sketch of Island Beach showing the placement of sportsman shacks occupying the area (Miller 1998:68).

John B. Lucke performed an examination of the submarine topography of Barnegat Bay for his dissertation at Princeton in 1934 (Lucke 1934). The chart he created for his work, illustrated in Figure 3-13, shows the current project location labeled as “North Point”. Unfortunately, Lucke does not discuss anything about the cultural history of Barnegat Inlet, nor does he include a discussion of any shipwrecks within inlet or bay area; his work is strictly focused on the environmental processes in the bay and inlet.

Lucke’s research concerning the shoreline migration is interesting as he notes that the inlet has migrated 1 mile (1.6 kilometers) southward in the last 100 years and he lists another colleague stating the inlet has moved 0.5 mile (0.8 kilometer) in 50 years. However, Lucke believes that this movement southward has not been consistent for the life of the inlet. He uses his dissertation to explain, “[n]ot only has the inlet shifted more rapidly in the past century than formerly, but it probably has never been far north of the 1839 position nor south of its present position in what may have been a long life” (Lucke 1934:9). He mentions that as Cranberry Inlet closed, “the supply of beach-drifted debris brought to Barnegat Inlet increased, narrowing the inlet by deposition on North Point and causing a corresponding increase in the velocity of the tidal currents” (Lucke 1934:10). This movement, if allowed to continue, would keep the inlet migrating southward with a deep, but shifting channel. The inlet most likely would not close due to the size of Barnegat Bay.

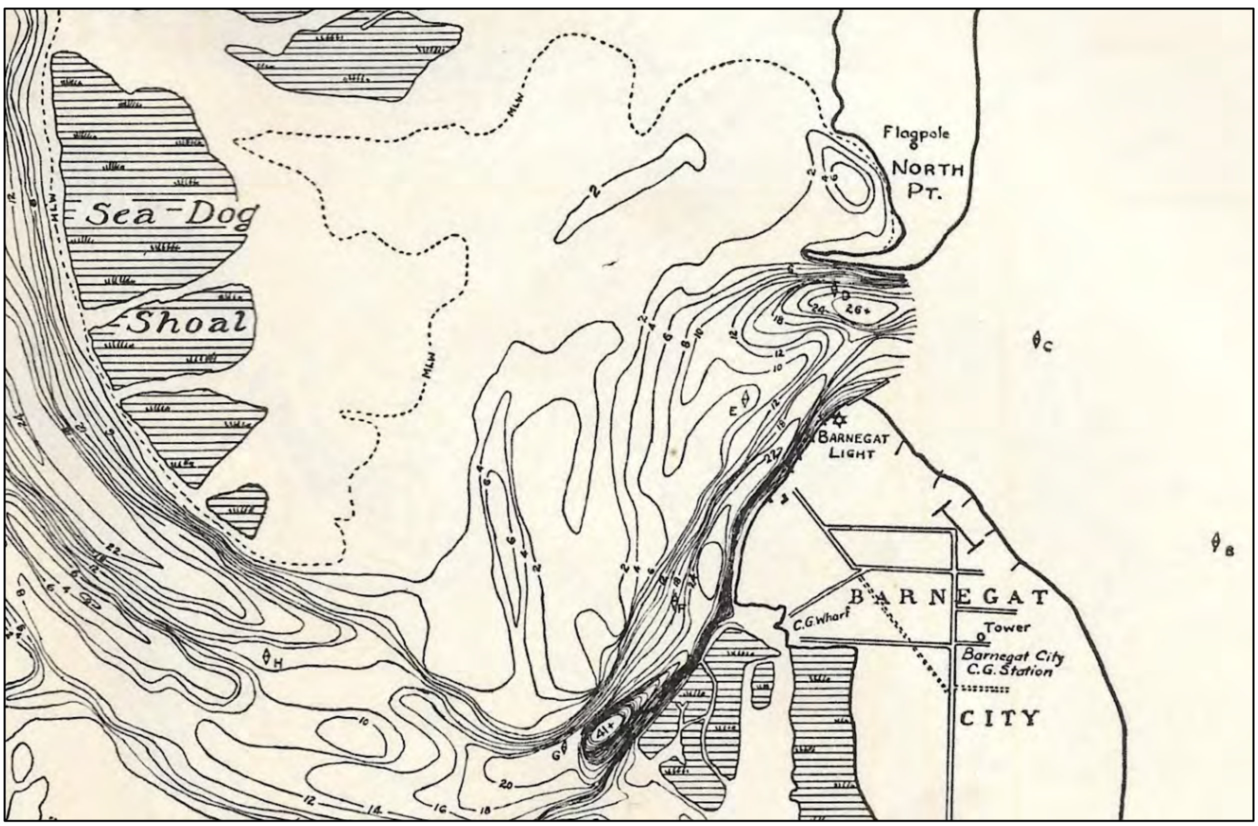


Figure 3-13. Chart excerpt created by John B. Lucke for his dissertation showing submarine topography of Barnegat Bay and the inlet during February 1933. Here, he notes the Project Area as “North Point” (Lucke 1934).

Only with the construction of the northern and southern jetties has the movement of Barnegat Inlet been halted. The aerial images in Figures 3-14 and 3-15 highlight Barnegat Inlet before and after the placement of the jetties (Coastal and Hydraulics Laboratory 2014a, 2014b). The most visible change to the area appears to be the expanding beach along the northern side of the inlet. In addition, the shoals are no longer visible in the area of the northern jetty in the 1944 aerial photograph, but breakers are noted close to the jetties. The following section will discuss the building of the northern jetty on Island Beach.

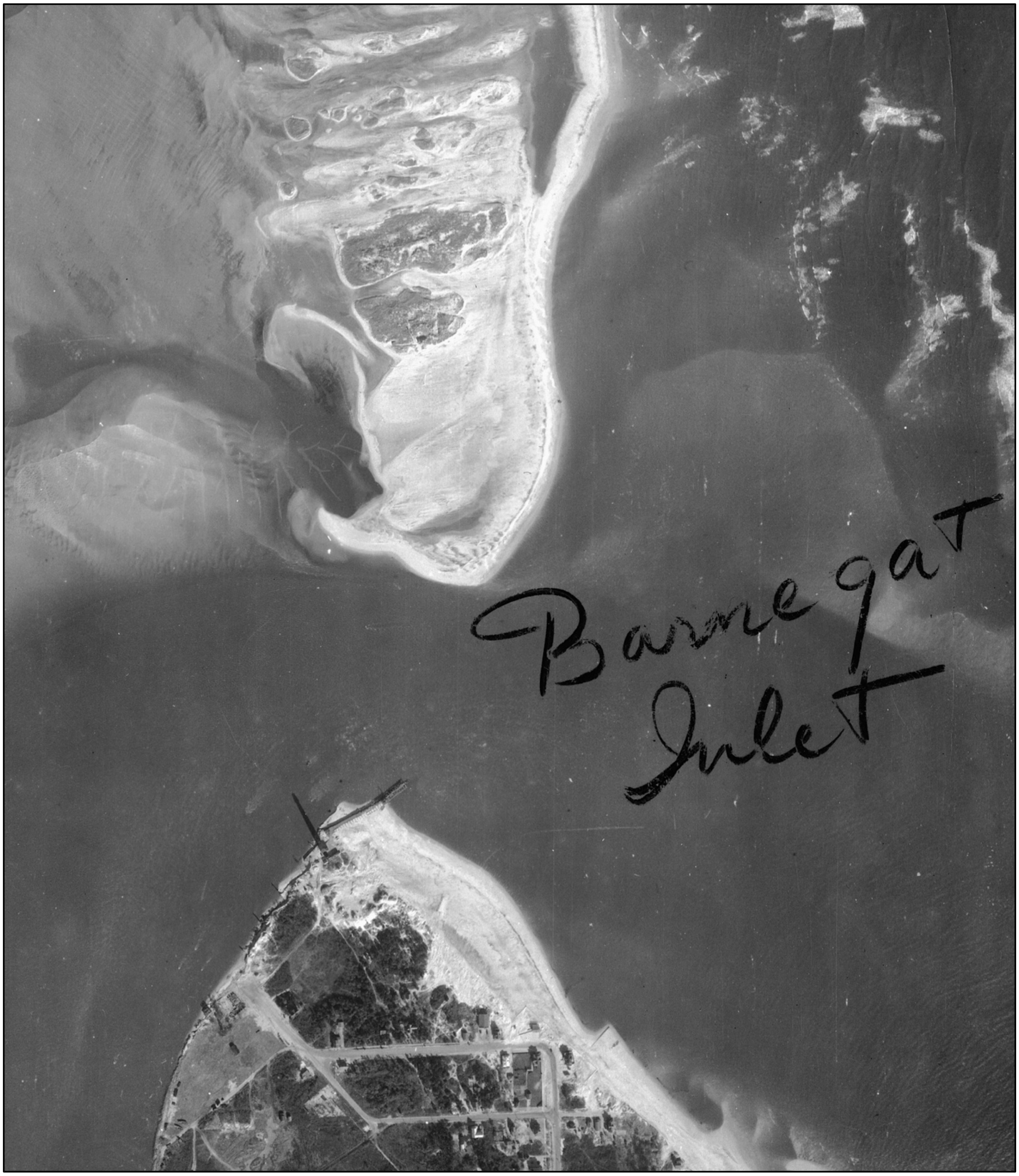


Figure 3-14. 1933 aerial photograph showing Barnegat Inlet prior to the jetty construction. Note Barnegat Light at the tip of Long Beach Island with its shadow extending into the inlet (Coastal and Hydraulics Laboratory 2014a).

Figure 3-15. 1944 aerial photograph showing Barnegat Inlet after the construction of the northern and southern jetties (Coastal and Hydraulics Laboratory 2014b).

BUILDING THE NORTHERN JETTY

Only through small-scale attempts was much of the beach protected from erosion prior to the building of Barnegat Inlet's jetties. Lack of necessary funding kept the inlet unsafe for vessels and posed a danger to the City of Barnegat. In January of 1937, Senator Percy Camp introduced a bill for the appropriation of $275,000 to the State of New Jersey Senate seeking improvements and stabilization of Barnegat Inlet. The bill would ask that, "the State contribute $275,000 as its share with $25,000 to be raised by [Ocean] county to meet the requirements of the Federal government with the understanding that the government will spend upwards of $1,000,000 to improve Barnegat Inlet" (*Ocean County Sun* 22 January 1937).

The Ocean County Board of Freeholders presented the appropriation of the $25,000 for improvements supported by officials of the borough of Barnegat City (*Ocean County Sun* 26 March 1937). The proposed improvement project would provide a third harbor for the safety of offshore crafts, in addition to the inlets at Sharks River and Manasquan. The Federal government endorsed the improvement of Barnegat Inlet and awaited the State of New Jersey's own appropriation of funds (*Ocean County Sun* 30 April 1937).

The local newspaper, *Ocean County Sun*, described the inlet as the "greatest danger trap for men and boats on the Atlantic Coast" (*Ocean County Sun* 12 February 1937). In article in the paper Captain A. A. Fleming, the secretary of Long Beach Fishermen's Association, explained some of the most dangerous events that previously occurred at the inlet:

> "Sometimes, there is as little as three feet of water in the shifting channel. There have been 21 deaths on the bar in 10 years. Last summer the Coast Guard towed 67 disabled boats off the bar and with fishermen rescued 16 drowning men. In 1935, one pound boat struck and dumped 11 men into the water; in 1934 two boats were lost in one morning. I have seen a widow with five children clinging to her skirts, and her sister-in-law with three, standing on the dunes watching while we tried to find their men-folk who drowned together. Three hundred fishing boats work out of that inlet; 289 crossed the bar in one morning last summer; one 26-foot boat yesterday brought in 1900 pounds of cod. We ship out more game fish than any other port on the Atlantic coast. We need $400,000 job of stone petties and the Government money is ready, waiting for the state to vote its share" [*Ocean County Sun* 12 February 1937].

The state senate passed the bill on Monday, 22 March 1937 at the suggestion of Senator Camp. After the bill passed the senate, it passed through the state assembly. The USACE expected the entire improvement project to cost $532,000 initially (*Ocean County Sun* 26 March 1937). This appropriation of funds by the state was the single largest amount made by the 1937 legislative session (*Ocean County Sun* 22 October 1937). The Federal government was expected to fund $232,000 of the project. By June 1937, the Federal government had not yet readied the funds and the State of New Jersey was seeking to start the project (*Ocean County Sun* 11 June 1937). Federal funding kept the start of the project delayed for an additional year, simply awaiting the appropriated funds by Congress, which could only occur with the next session (*Ocean County Sun* 24 September 1937). Ocean County had sent in the $25,000 to the Federal government and New Jersey State forwarded their check on Tuesday, 26 October 1937 (*Ocean County Sun* 29 October 1937).

The *Ocean County Sun* presented a sketch on the front page, shown in Figure 3-16, illustrating the work to be done at the inlet (*Ocean County Sun* 22 October 1937). The work consisted of two stone arrowhead-shaped jetties and dredging a channel between the Sedge Islands and Sunset Shoal to a depth of 8 feet (2.4 meters). The jetty height was believed to be set at a height to prevent erosion and to provide better traffic for small craft passing through.

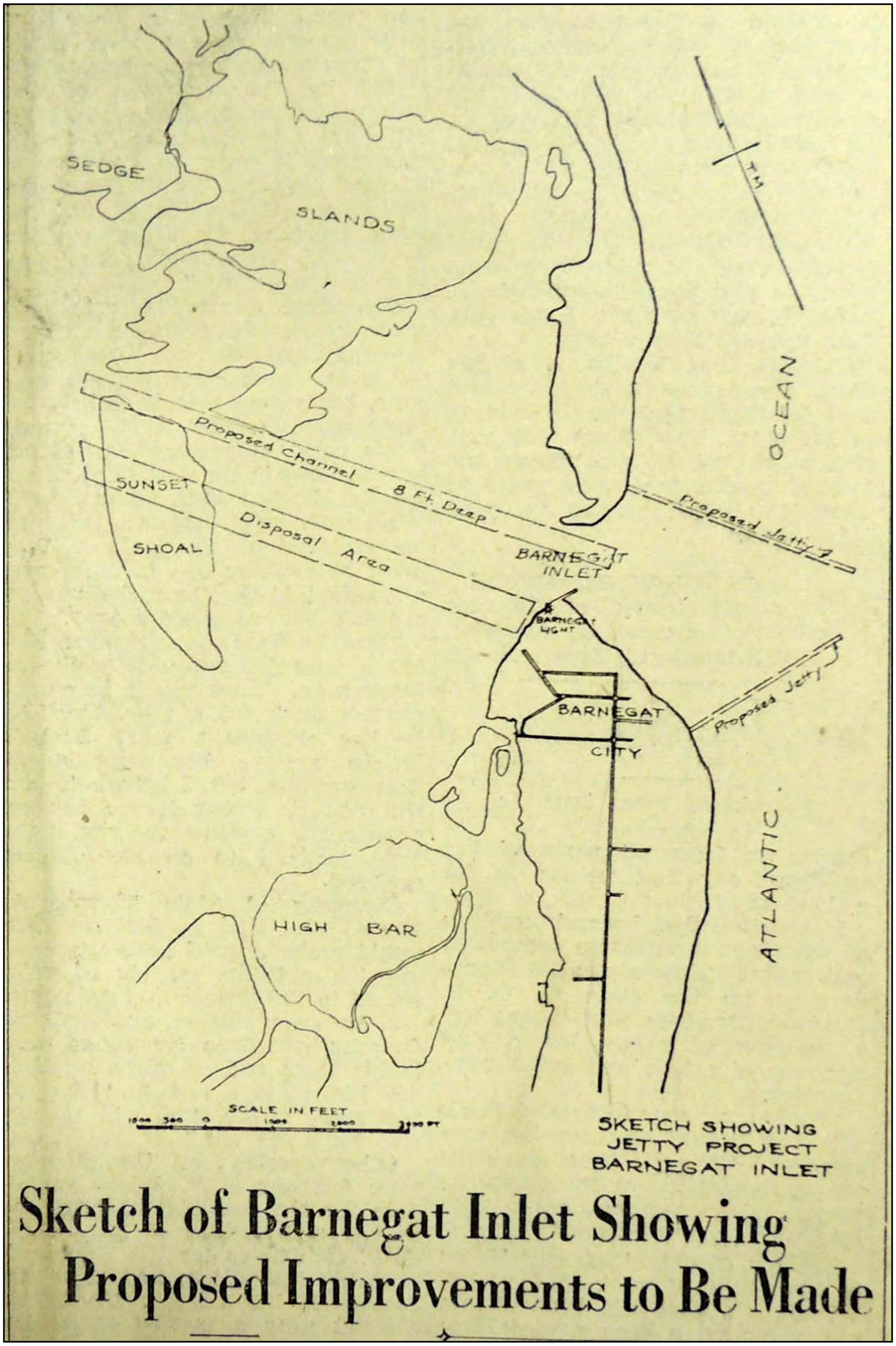


Figure 3-16. Excerpt from the front page of the *Ocean County Sun* showing the proposed arrowhead-shaped jetties at Barnegat Inlet and the area to be dredged for the channel (*Ocean County Sun* 22 October 1937).

The *New Jersey Courier* reported on Friday, 29 July 1938 that work would start on the jetty in two weeks (*New Jersey Courier* 29 July 1938). Construction started before the Federal money came in, using the money appropriated by the State and County. The project would be completed in two tasks, first the building of the jetties followed by the dredging of the channel. Biding on the jetty construction began on 14 June and was awarded to the Eastern Engineering Company of Atlantic City. The company had previously built the bridge over Manasquan River. Original estimates of the northern jetty construction listed the required 75,000 tons of stone to fill a 4,565-foot (1,391.4-meter) structure. The smaller, southern jetty would require 45,000 tons for the length of 2,320 feet (707.1 meters). No roads accessed the northern side of the inlet. In order to transport the rock to the site of the northern jetty, a couple of methods were presented: "[t]he first is to bring the material in by boat or build a railroad through Island Beach down to the tip of the Phipps property" (*New Jersey Courier*, July 29, 1938). Instead, another approach brought the stone over the inlet to the northern jetty's construction site:

> "Two 165-foot towers were erected on either side of the inlet and a heavy cableway was stretched between them. Soon dinky engines, sections of flat cars and all kinds of construction equipment began to travel through the air to the north shore of the inlet. A wooden trestle began to push out into the sea…Soon several twenty-ton Diesel-driven trailers nosed out on to Long Beach Island and headed north to Barnegat Inlet. On some trailers were steel pan were filled with stone, each rock weigh from 15 to 200 pounds. On other trailers two or three great rocks rode with regal individuality. These giants tipped the scales at five to ten tons apiece. At the inlet the rocks and pans were unloaded, whisked across the water on the cableway and deposited gently on flat cars to be pushed out over the trestle. Out there, a steam crane divided its time between placing piles to extend the trestle and dumping rock into the water for the jetty [*Ocean County Sun*, July 12, 1940].

Four cement foundations provided support for both towers (Klebold 2013). The placing of stone on northern jetty started on 16 November 1938 by the Eastern Engineering Company, which had already laid most of the timber pilings for the railway car (*New Jersey Courier* 23 December 1938). By 24 March 1939, work had not yet started on the southern jetty but the labor on the northern jetty had just reached 16.5 percent as reported by the engineers (*New Jersey Courier* 24 March 1939). Construction of the southern jetty would begin in June of 1939 (*New Jersey Courier* 23 June 1939).

By 1 August 1939, the USACE reported that 48 percent of the work on the jetties had been completed. As of the end of July, "1,113 linear feet of timber section had been completed and 120 linear feet of riprap stone (1,186 tons), 4,055 linear feet of mat stone (11,834 tons), 4,055 linear feet of core stone (5,037 tons) and 3,925 linear feet of protective stone (19,293 tons) had been placed in the jetties" (*New Jersey Courier* 1 September 1939). The drawing in Figure 3-17 illustrates the placement of these differing types of stone in the jetty. Mat stones were placed on the seabed with a section of core stones on top and protective stone surrounded both types of stones (U.S. Shore Protection Board 1939). Mat stone weighed between 15 and 200 pounds (6.8 and 90.7 kilograms), core stones between 15 pounds and 1 ton (6.8 and 907.1 kilograms), and protective stone came in between 5 and 10 tons (4,535.9 and 9071.9 kilograms). While talking with construction workers at the Project Area, they noted that some of the larger protective stones weighed more than 10 tons (9071.9 kilograms) and a few as much as 15 tons (13,607.8 kilograms; Joe Pinic, personal communication 2014). These stones were considered a part of the original jetty construction and not added during later improvements. The rock for the jetties came from quarries in Kingston, Pennsylvania, and Lambertville, New Jersey (*Ocean County Sun* 12 July 1940). The drivers hauling the large jetty rock often had to stop twice to check the tire's air pressure. The Eastern Engineering Company paid $100,000 for ten new 20-ton (18,143.7-kilogram) diesel trailers just to haul the rock from the quarry to Barnegat Light.

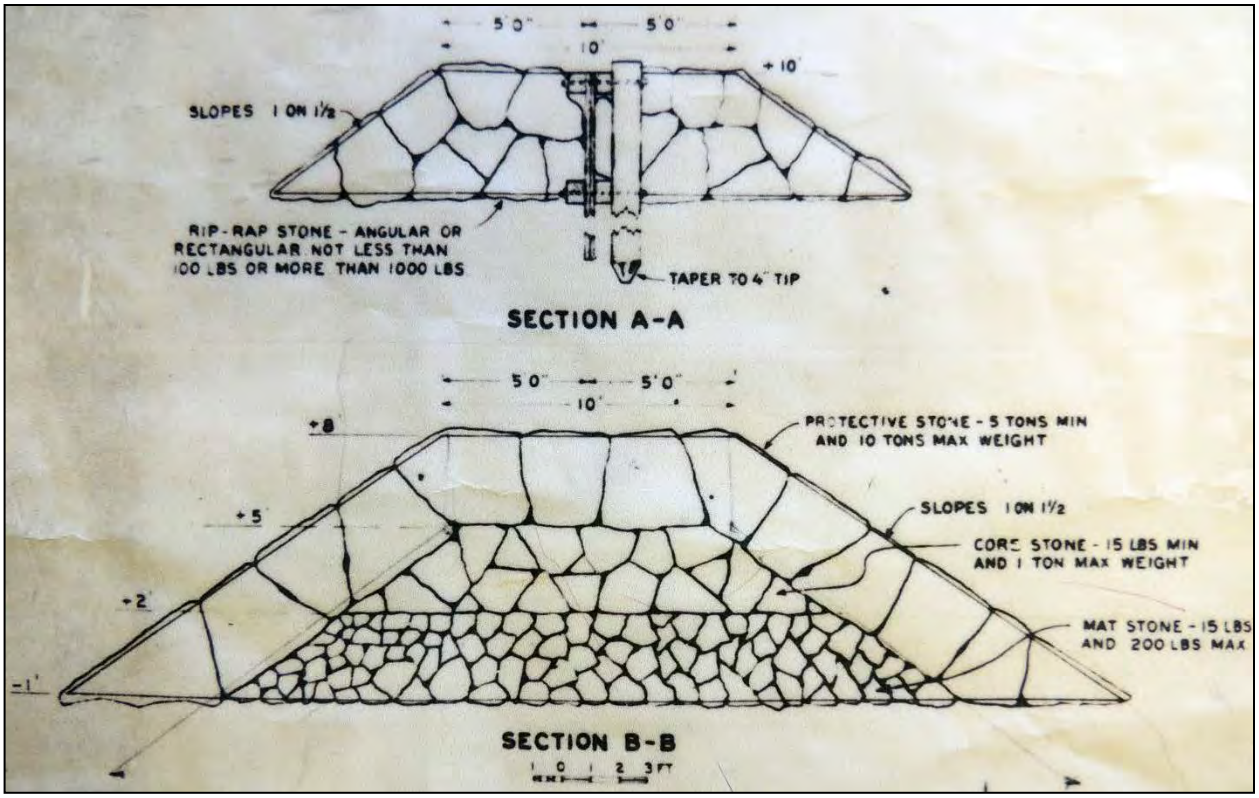


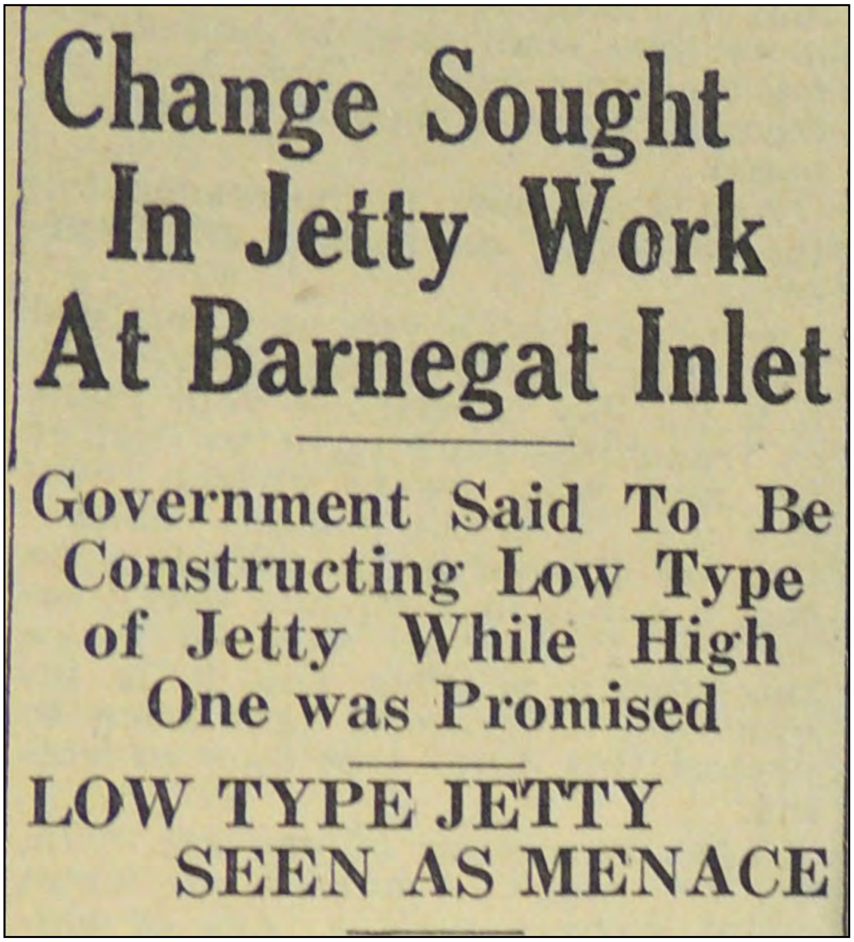
Figure 3-17. Excerpt of the Barnegat Inlet map detailing the plan view of the jetties noting the different rock types (U.S. Shore Protection Board 1939).

When finalized, the entrance of the jetties stood 1,000 feet (304.8 meters) apart at the outer ends with lighted beacons on steel cylinders (*Ocean County Sun* 12 July 1940). The Barnegat Inlet improvement project was completed on 24 September 1940 (Klebold 2013). The northern jetty measured at 4,900 feet (1,493.5 meters) long and the southern jetty listed a length of 2,950 feet (899.16 meters; U.S. Army Corps of Engineers 1941:402). The total cost of permanent work at Barnegat Inlet from the start until 30 June 1941 by the Federal government was $453,816.28 (U.S. Army Corps of Engineers 1941:403; Klebold 2013). Adding the contributed $300,000 by the County and State made the project's total cost $752,816.28 (Klebold 2013). Only $15,000 could be expended for maintenance until 30 June 1943. No other funding was left over, as the project was considered to have no need of constant maintenance.

The equipment, trestle, track, and the towers themselves were removed from the area leaving only the jetty and wooden pilings. The cable towers still stood in 1943, but the remains of the trestle were removed. After the towers were dismantled, the cement foundations of both towers were removed (Ferdinand Klebold, personal communication 2014).

Before the jetties were finished (around October 1938), local fishermen and the State Board of Commerce and Navigation voiced the opinion that the type of jetties being built would be a menace to maritime navigation (Figure 3-18; *Ocean County Sun* 21 October 1938; *New Jersey Courier* 4 November 1938). The USACE proposed the jetties to be low jetties, jetties covered up by 2 feet (0.6 meter) of water at high tide. The State and County believed the jetties would rise 6 feet (1.8 meters) above high water. The USACE drew plans for this originally, but the plans had "…been changed from the original idea and the jetties being constructed will be above high water for a distance close to shore but as soon as deeper water is reached they will be 2 feet below the surface at high tide" (*Ocean County Sun* 21 October 1938). The U.S. Coast Guard at

Barnegat and locals supporting higher jetties asked the State to seek changes to the jetties by making them 6 to 8 feet (1.8 to 2.4 meters) above high tide. The Chief of Army Engineers, Major General Julian L. Schley, remarked that the recommended low-water jetties would allow, "a limited supply of sand [to] be permitted to travel past the structures to supply the leeward shore" (*Ocean County Sun* 10 March 1939). Ocean County contested that the original jetty plans had been altered without consulting the State or the county and that the project was a joint project based on the Federal, State, and County funding.



Change Sought In Jetty Work At Barnegat Inlet

Government Said To Be Constructing Low Type of Jetty While High One was Promised

LOW TYPE JETTY SEEN AS MENACE

Figure 3-18. Excerpt from the front page of the *New Jersey Courier* showing the headlines reporting on the new jetties as a navigation menace (*New Jersey Courier* 4 November 1938).

Senator James K. Allardice voiced his concerns of the jetties' height to the War Department while construction was ongoing and even after the jetty had been completed (*Ocean County Sun* 28 October 1938, 8 March 1940). New Jersey State asked the Board of Engineers for further study of the inlet concerning the height; however, "[t]he district engineer had rejected a proposed project to increase the height of jetties near the Barnegat inlet on the ground the benefit to navigation would be minor in comparison to cost" (*Ocean County Sun* 31 May 1940). As a result of the low-water jetties, the inlet lost the needed hydraulic force caused by out flowing tides and created stagnate silt deposits in the main channel. Furthermore, a new beach formed inside Barnegat Inlet along the Island Beach side (which can be seen in the previous 1944 aerial photograph, Figure 3-15, west of the northern jetty). Boats had to follow an indirect course out of the jetty as the 8-foot (2.4-meter) dredged channel was now too shallow and could not be navigated. Locals considered the inlet worse than before it was originally built (*Ocean County Sun* 16 August 1940).

The low-water jetties stayed in place and the northern jetty's height would only be increased with later inlet improvement projects (1972 to 1974) in the following decades (Seabergh et al. 1996). Fort Mifflin's archives no longer contain records concerning the 1937 to 1941 Barnegat Inlet improvement project. These records reached the necessary retention time and have been destroyed (Richard R. Congleton, personal communication 2014).

Some of the best historical evidence showcasing how the northern jetty was made, comes from a photographic collection taken by Lewis D. Crowell of Island Heights in 1937 (Crowell 2014). Mr. Crowell did not work in conjunction with the USACE or the Eastern Engineering Company; he was an avid photographer who spent a great deal of time at Island Beach, Manasquan, and Barnegat City taking photographs for personal use in the late 1930s. After his death, his daughter, Janice Wheeler, donated the collection to the Ocean County Historical Society (OCHS) in Toms River, New Jersey. Mrs. Wheeler and the staff at OCHS did not understand the subjects of the photographs at first. Only a limited number of the pictures had descriptions on the backside. The collection largely comprises pictures featuring the local beach environment at Island Beach and Manasquan, but also contained pictures of construction at the north Barnegat Inlet jetty, Barnegat Light, pictures of the removal of the shipwreck *Vega* at Manasquan, and a couple photographs of a beached whale carcass being removed by explosion. The collection also contains two sets of slides in color; however, these could not be located by OCHS staff at the time of research. Only three slides show work related to the jetty (Figures 3-19 and 3-20). The missing slide can be seen in a pamphlet on the construction found in *Appendix A: Building The North Jetty On Island Beach Barnegat* Inlet on the bottom of the seventh page which shows the northern jetty tower looking south towards Barnegat Light (Klebold 2013). The images in Figures 3-19 to 3-28 are all on file at OCHS in Toms River, New Jersey.

Figure 3-19. One of two known colored slides taken at Barnegat Light looking towards the northern jetty, this slide shows the rock that would be loaded into the metal buckets and sent over the inlet by the tower cables in order to construct the northern jetty (Crowell 2014:8, on file at the Ocean County Historical Society).

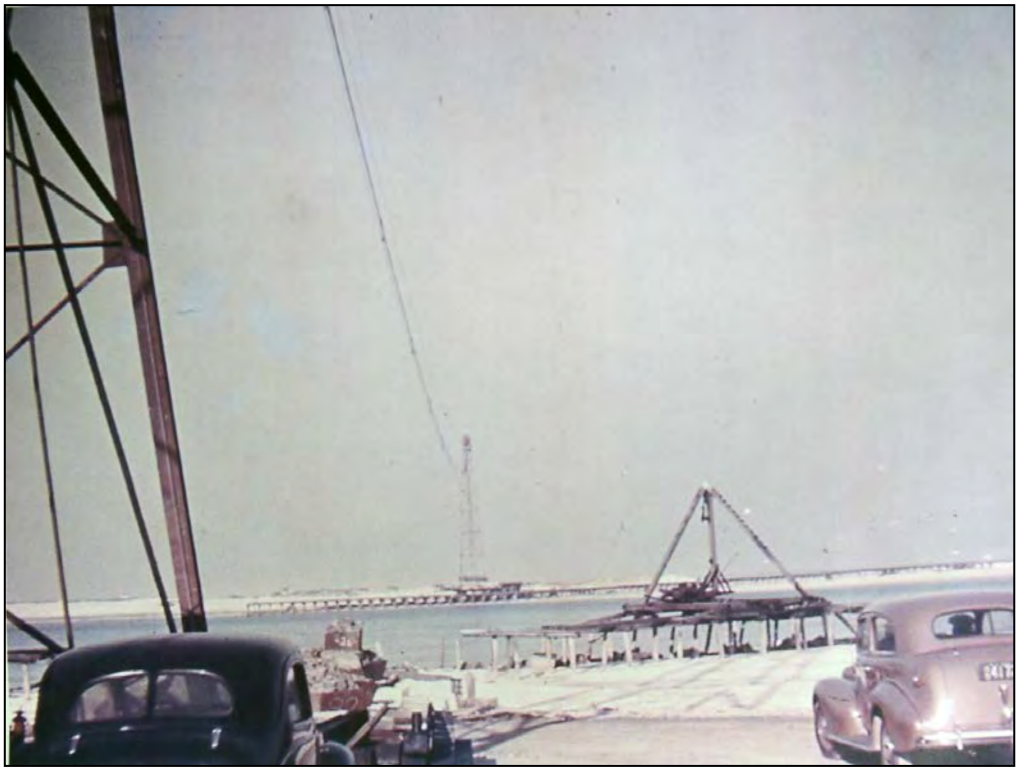


Figure 3-20. The second colored slide taken at Barnegat Light. The photographer is standing by the cable tower looking towards the northern jetty tower. Notice the buckets filled with rock in front of the black car to be sent across the inlet (Crowell 2014:10, on file at the Ocean County Historical Society).

Figure 3-21. The back of this photograph states, "Looking east. Shows Barnegat Light, south tower and edge of north tower and cable across inlet to haul large rocks from R.R. trains in Barnegat City to build northern jetty" (Crowell 2014.2.37.11, on file at the Ocean County Historical Society). Mr. Klebold (2013) believes the photograph was taken from Sea Dog Island.

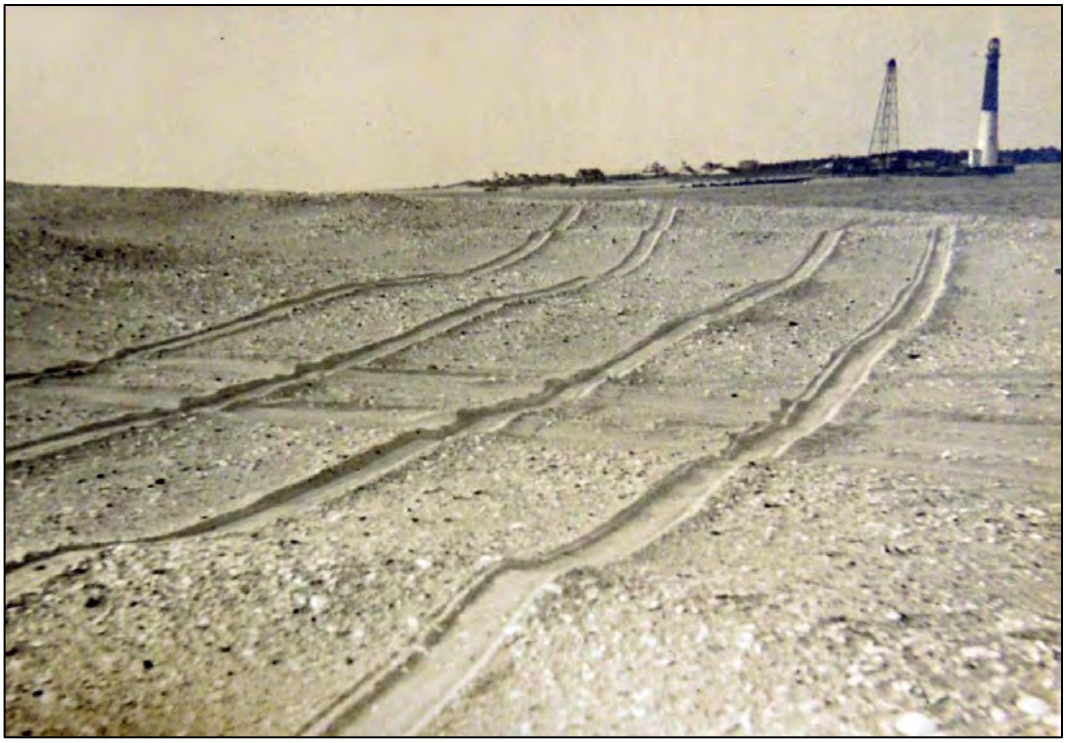


Figure 3-22. The back of this photograph states, "Barnegat Light with south tower for hauling boulders over the inlet to the northern jetty" (Crowell 2014.2.37.29, on file at the Ocean County Historical Society). Mr. Klebold (2013) believes this photograph displays the dredged sand on Island Beach.

Figure 3-23. The back of this photograph states, "N. Jetty Barnegat Inlet, Showing towers" (Crowell 2014.2.37.84, on file at the Ocean County Historical Society). Mr. Klebold (2013) notes that to the right is the sand dredge next to outflow pipes running to the shore at Barnegat City.

Figure 3-24. The back of this photograph states, "Barnegat Inlet, showing tower" next to Barnegat Light (Crowell 2014.2.37.60, on file at the Ocean County Historical Society).

Figure 3-25. The back of this photograph states, "South side of inlet, Barnegat Light 1937" (Crowell 2014.2.37.85, on file at the Ocean County Historical Society). It may be possible that the writing on the back was added later and the incorrect year was used as construction started in 1938.

Figure 3-26. This photograph states, “under N. Jetty looking south, Barnegat Inlet” (Crowell 2014.2.37.82, on file at the Ocean County Historical Society). Here the pilings and large stone can be seen under the railroad trestle and the height of the cable tower looks comparable to Barnegat Light.

Figure 3-27. The back of this photograph simply states, “North Jetty Barnegat Inlet Train” (Crowell 2014.2.37.81, on file at the Ocean County Historical Society). On the railroad flat car boulders can be seen ready for placement by the self-propelled steam derrick. The tide appears to be low in the inlet.

Figure 3-28. Image of the northern jetty looking east at the ocean, track has been removed from the pilings signaling the completion of the jetty (Crowell 2014.2.37.224, on file at the Ocean County Historical Society).

OCHS volunteer and local historian, Ferdinand F. Klebold became interested in the Crowell collection and researched the northern jetty at Barnegat Inlet. For the majority of his research, he examined the photographs and sorted through local newspapers (Ferdinand Klebold, personal communication 2014). His research was then organized into a booklet titled, *Building the North Jetty on Island Beach, Barnegat Inlet* (Klebold 2013; Appendix A) and was dedicated to the late Ocean County Historian, Pauline Miller. The booklet is available for free at Island Beach State Park, OCHS, online, and at many museums and historical societies in the area. Mr. Klebold said that during his research he did not find anything noting a shipwreck in the area of the northern jetty and was surprised to learn about this shipwreck (Ferdinand Klebold, personal communication 2014).

A few other photographs show the building activity of the jetty and the afterward completion of the Barnegat Inlet project. John Bailey Lloyd's (2005) book, *Two Hundred Years of History on Long Beach Island*, gives a great view of the south cable tower next to the Barnegat Light (Figure 3-29). Mary Karch's (2004) book, *Under the Lighthouse,* provides an image (Figure 3-30) of the southern jetty after construction finished, showing locals fishing for flounder. Finally, the image in Figure 3-31 was used in a 1943 *National Geographic* article titled "Aboard a Blimp Hunting U-Boats" and also featured in Lloyd's book (Lloyd 2005:76; Sutherland 1943). Navy blimps patrolled off the New Jersey coast searching for German U-boats who took aim to destroy merchant ships, resulting in New Jersey beaches being covered with oil and tar. During World War II, blackouts were enforced along the coastal cities, including Barnegat.

World War II further affected the area of Island Beach. The U.S. Navy and John Hopkins University's Applied Physics Laboratory developed a top-secret missile and used the property as a testing ground (Klebold 2012). Codenamed Project Bumblebee, a ramjet missile was tested at the inactive Cedar Creek Coast Guard Station on 3 June 1945. A 40-x-80-foot (2.2- x-24.4-meter) concrete pad was built to test the first supersonic ramjet missile. The missile, "propelled by rockets, it took off traveling at [an] approximate speed of 1,300 miles per hour in a southeasterly direction out over the Atlantic Ocean" (Klebold 2012). At the end of the war, Project Bumblebee moved to White Sands Proving Grounds in New Mexico and the U.S. Navy finished all operations on Island Beach. The concrete pad now rests under sand dunes in the State Park.

Figure 3-29. The southern tower next to Barnegat Light in 1943 (Lloyd 2005:77). The building behind the tower housed the donkey engine that powered the cable.

Figure 3-30. Flounder fishing trip at the end of the southern jetty in 1943 with "Sparky" Dickerson as seen in *Under the Lighthouse* (Karch 2004:57). This photograph shows that only the pilings remain on the jetty, but many are missing likely due to storm activity.

Figure 3-31. U.S. Navy patrol blimp convoys two other training ships over Barnegat Inlet heading out towards the sea in 1943. The northern jetty construction site can be seen below with both cable towers still in place and pilings on the northern jetty (Lloyd 2005:76).

The placement of the jetties was to lock down the inlet to keep it from migrating. However, inside the inlet, channel migration and shoaling required additional construction and maintenance since the 1940s:

> "A few years after construction of the arrowhead jetties, it became apparent that the navigation problems had not been completely solved. The channel in the intra-jetty region migrated from a southerly location in 1940 to a position parallel to the northern jetty by 1943. Because the jetties were not providing the desired channel improvements, a sand dike was built from Sunset Shoal across High Bar to the bay side of Long Beach Island. The dike was constructed from dredged material during maintenance of the main channel. It was hoped that the dike would create a permanent straight channel from Oyster Creek to the inlet by blocking off flow through the old channel…" [Seabergh et al. 2003:8].

The sand dike would cause a redirection of the flow through the inlet, but shoaling still caused navigational problem even with the maintenance of dredging (Seabergh et al. 1996). Between 1950 and 1955, the main channels depth had shallowed from 8.9 to 3.0 feet (2.7 to 0.9 meters) causing a dredging program to be initiated. A dredging plant was started, but made no progress in producing a lasting channel and dangerous currents ended the project after removing 475,000 cu. yards (40,351.5 cu. meters) of material (Seabergh et al. 2003:9).

The next large-scale impact on the inlet was done from 1972 to 1974, when the northern jetty's height was increased from 2.0 to 7.9 feet (0.6 to 2.4 meters) over a span of 3,700 feet (1,127.8 meters) on the inner western side (Seabergh et al. 2003). The updated northern jetty was made impermeable to keep sand from shifting between the two jetties. The channel adjusted to the increased height, which amplified the need for dredging at the mouth of the inlet, however a shift of the main channel away from the southern jetty was noted. Slowly over a few years, the main channel shifted parallel and close to the northern jetty by the late 1970s.

In 1991, another southern jetty was added running parallel to the northern jetty and maintained a 1,000-foot (304.8-meter) distance. Seabergh et al. (1996:4531) summarized the total changes (Figure 3-32) at Barnegat for a coastal engineering conference and noted that "these structures have included shoreline revetments, arrowhead jetties with their crest elevation at mean tide level, a sand dike to better align interior channel flow, a raised impermeable jetty, and now parallel jetties. Each of these structures has had significant influence on inlet hydraulics and sedimentation, which in turn has impacted channel location."

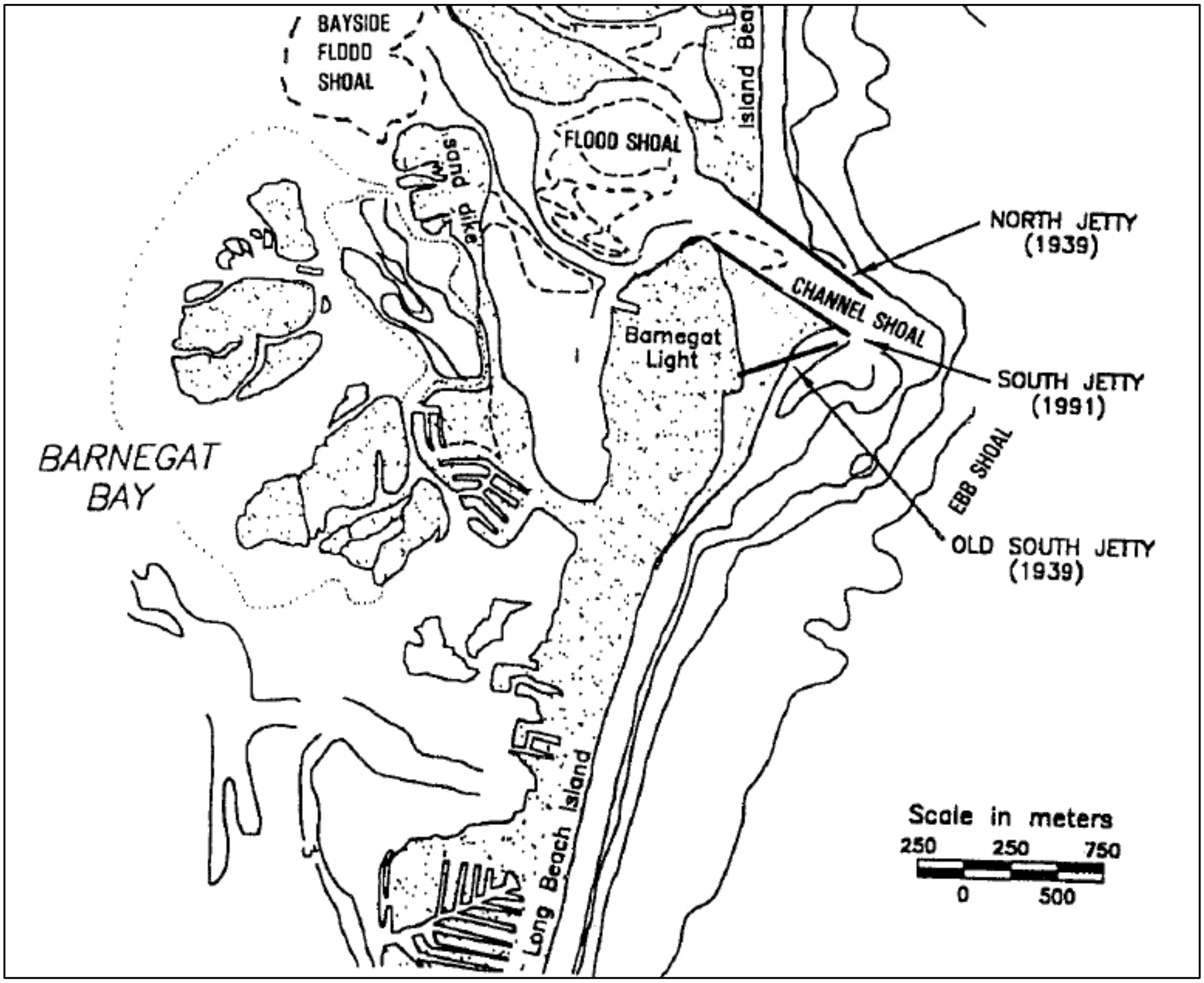


Figure 3-32. 1996 view of Barnegat Inlet after placement of the final southern jetty (Seabergh et al. 1996:4532). The area between the two southern jetties has filled in with sand.

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

One of the best tools for accurately assessing the potential for submerged cultural resources is to compare the Project Area with findings and results of previous investigations, including both remote-sensing and cultural resources surveys, which have been completed in or near the current Project Area. Varying in degree of applicability to our research, these studies allow us to identify potentially significant resources, and help in the recognition of specific problems or aspects inherent in the assessment of survey data and in the identification of potential resources.

The first archaeological investigation on Barnegat Inlet was produced for the USACE by John Kern et al. in 1979 (Kern et al. 1979). This work only identified potential shipwrecks in the area through documentary research. No diving or remote sensing was used during this survey. This cultural reconnaissance project was performed as preparation for the dredging of the inlet, constructing a new jetty, and treating the beach erosion on Island Beach State Park. Terrestrial pedestrian survey was completed for the project area and shovel tests were not required. The survey found no ill effects on prehistoric resources in the area. The report also stated the proposed dredging and jetty would have no effects on any standing historic resources, which includes the Barnegat Light and the old school house in Barnegat City. Kern et al. (1979) reported three historic structures and three shipwrecks within the study area; however, the exact locations of these structures were unknown and coordinates were not provided. These structures were believed to have been washed into the inlet by erosion from Barnegat City. Kern et al. (1979) recommended that the inlet be examined by marine survey equipment. A report following this recommendation could not be found and likely did not occur until the following surveys proceeded.

Three cultural resources surveys have been completed as part of the Manasquan to Barnegat Shore Protection study, including a Phase 1a literature review (Hunter Research, Inc. 1993), a Phase 1a terrestrial survey (Hunter Research, Inc. 1997), and a Phase I marine remote sensing survey (Dolan Research, Inc. 2001). Later projects near the current Project Area included remote sensing survey of a borrow area off the inlet (Dolan Research, Inc., Hunter Research, Inc., and Enviroscan, Inc. 2003) and a Phase I remote sensing survey and a Phase II diving investigation north of Island Beach State Park (Dolan Research, Inc. 2006). Borrow areas outside of Barnegat Inlet have been examined by remote sensing; however, no survey had been performed inside the inlet until 2013 (U.S. Department of Commerce National Oceanic and Atmospheric Administration 2013).

The terrestrial Phase I survey was undertaken for a 25-mile (40.2-kilometer) segment from Manasquan Inlet to Barnegat Inlet (Hunter Research, Inc. 1997). This survey included background and documentary research and a visual survey of the beach at low tide. The survey located numerous historic remains along the shore, including LSS Stations, historic structures, and one potential shipwreck in the Camp Osborn Beach area, but no potentially historic resources in its Area of Potential Effect (APE). The literature review revealed one historic vessel, the remains of a small wooden boat (28OC086), in Ortley Beach.

The underwater component of the survey was undertaken by Dolan Research, Inc. (Dolan Research, Inc. 2001). This survey consisted of marine remote sensing of two borrow areas, Area A and Area B, located offshore of Mantoloking and Island Beach State Park, and a nearshore remote sensing survey of 14 miles (22.5 kilometers) from Manasquan Inlet south to Seaside Park in Ocean County. A pedestrian remote sensing survey was also conducted of the onshore portion of the survey area. The survey located 19 targets, including several that coincided with known wrecks. Avoidance of the 19 targets was recommended. The onshore magnetic survey located 17 anomalies indicative of buried shipwrecks. Since the project involved adding sand to the area (only further burying any wrecks), no further work was recommended.

Dolan Research, Inc., Hunter Research, Inc., and Enviroscan, Inc. undertook further archaeological examination of beach replenishment areas in 2003 for the USACE. This study involved the examination of one proposed sand borrow area off Barnegat Light and four segments of the Atlantic coastline of Long Beach Island, both on the shore and in the nearshore area, totaling 5.75 miles (9.3 kilometers; Dolan Research, Inc., Hunter Research, Inc., and Enviroscan, Inc. 2003). The survey identified six targets of historical interest, including four on the shoreline and two in the nearshore area. One of these targets appeared to be a shipwreck in the sidescan record. Although the targets were not investigated further in order to determine their source, it was concluded that additional sand placed atop the already buried targets would not impact any historic resources in a negative manner and no further work was recommended. A target previously located during another survey was investigated and determined to be the remains of a bell buoy, which were not recommended for further investigation.

One of the most recent archaeological investigations was by Dolan Research, Inc. in 2006. This project focused on Phase I and II underwater investigations from Manasquan Inlet to Barnegat Inlet in Ocean County for the USACE beach renourishment program (Dolan Research, Inc. 2006). This project did not examine Barnegat Inlet it did, however, focus on the nearshore north of Island Beach State Park to Manasquan. The Phase I investigation examined two offshore borrow off Seaside Park and found no significant anomalies. Phase II of the project conducted underwater investigations on ten submerged sites and examined one beach site. Of the ten submerged anomalies: five were confirmed shipwrecks; two were ballast piles with a potential wreck; one contained two boilers with a potentially buried hull; and a final anomaly was considered a submerged sewer pipe. One of the confirmed shipwrecks and the two ballast pile anomalies were considered by Dolan Research, Inc. (2006) to be potentially eligible for the NRHP. A 200-foot (61-meter) buffer was specified for these three resources and a 100-foot (30.5-meter) buffer was advised for the rest of the submerged anomalies. The beach site at Seneca Dunes, which was reportedly exposed pilings in the shore and surf, could not be found and no additional investigation was suggested.

NOAA performed the most recent investigation in the Barnegat Inlet Project Area last year (U.S. Department of Commerce National Oceanic and Atmospheric Administration 2013). David Evans and Associates, Inc. conducted the survey in order to gather accurate hydrographic data in order to update the region's nautical charts. The report of their findings identifies potential shipwrecks, obstructions, sediment changes, and other hydrographic data for Barnegat Inlet, Barnegat Shoals, the main channels, and a little of the bay area (Figure 3-33). NOAA's survey "coverage area totaled 5.7 square miles using a combination of side scan, single beam and multibeam survey methods" (U.S. Department of Commerce National Oceanic and Atmospheric Administration 2013:5). Only three previous Automated Wreck and Obstruction Information System (AWOIS) records were investigated on this survey: AWOIS Nos. 12902, 12903, and 12905 (discussed below in the *Shipwreck Inventory Section* and shown in Figure 3-36).

NOAA's report does not provide any historical insight into the Project Area or on any nearby wrecks. The focus of the report serves only to identify wrecks and obstructions within the survey area. The shipwreck under investigation in this report did not show up during NOAA's survey as a wreck or an obstruction, and no other anomalies were detected immediately nearby in channel. The closest anomalies were identified as four obstructions (1.46, 1.48, 1.49, and 1.50) 0.25 mile (0.4 kilometer) northwest of the current Project Area. Interestingly, the surveyors did spot a shipwreck at the very end of the northern jetty, east of the Project Area. A structure of an unknown vessel (possibly iron frames) can be seen sticking out of the water with jetty rocks alongside (Figures 3-34 and 3-35). The report lists the wreck as "1.64" and is located in position 39° 45' 36.1" N, 074° 05' 29.5" W (U.S. Department of Commerce National Oceanic and Atmospheric Administration 2013:201).

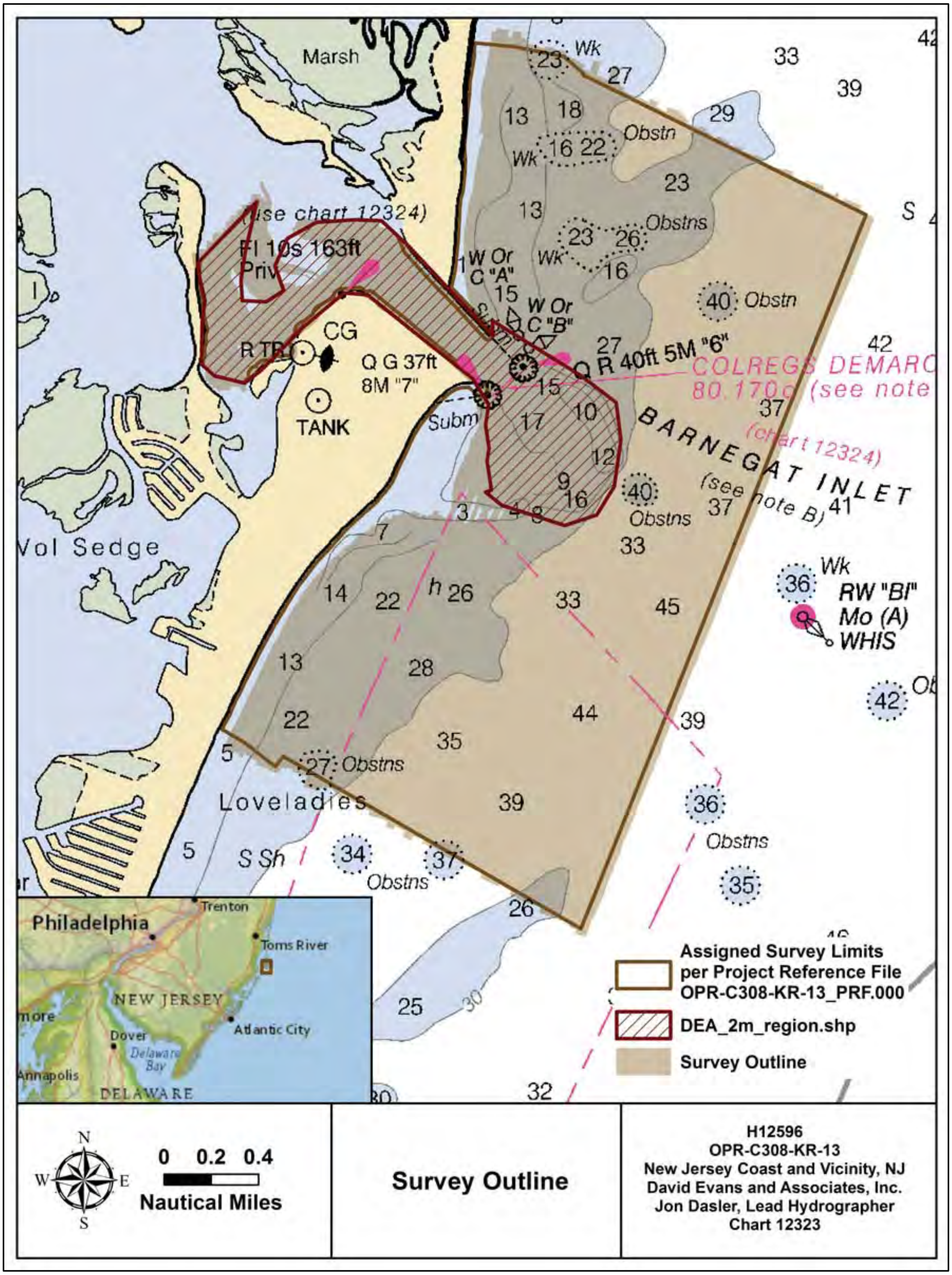


Figure 3-33. NOAA survey area showing the Barnegat Inlet Project Area and the locations examined by NOAA in 2013 for hydrographic information (U.S. Department of Commerce National Oceanic and Atmospheric Administration 2013:4).

Figure 3-34. A visible shipwreck at the end of the northern jetty noted by NOAA's Barnegat Inlet survey in 2013 (U.S. Department of Commerce National Oceanic and Atmospheric Administration 2013:202).

Figure 3-35. Close up of a shipwreck (seen are ship's frames) at the end of the northern jetty noted by NOAA during their in 2013 survey of Barnegat Inlet (U.S. Department of Commerce National Oceanic and Atmospheric Administration 2013:204).

SHIPWRECK INVENTORY OF THE PROJECT AREA

A review of shipwreck losses and a compilation of shipwrecks, which might be located at Barnegat Inlet, are presented here to help determine the potential identity of the North Jetty Shipwreck at Barnegat Inlet. Studies of ship losses have been conducted south along the New Jersey coast and demonstrate that numerous vessels have been lost since the early seventeenth century. A Bureau of Land Management (BLM) study (Borque 1979) characterized the New Jersey coast as an area of moderately heavy predicted shipwreck density. Somewhat more recently, Dolan Research, Inc. and Hunter Research, Inc. (1996) compiled an inventory of shipwreck losses off the New Jersey coast. This study, while not comprehensive, determined that a wide variety of vessel types have been wrecked on the shores of New Jersey beginning in the first half of the eighteenth century. Types of vessels possibly present in the study area include material from the early eighteenth century through World War II, with types ranging from small commercial fishing sloops and coastal vessels (like shallops and piraguas) to larger coastal schooners, sailing packets, and warships. Iron-hulled vessels including barges, tugs, steamers, and merchant vessels may all be found in the study area.

One comprehensive source of shipwrecks for the U.S. is the NOAA AWOIS (accessible at http://www.anchor.ncd.noaa.gov/awois/search.cfm). An interactive page appears and queries the user for information to aid in the search of shipwrecks such as name, navigation chart, or coordinates. An examination of the region encompassing all of the survey areas lists eleven shipwrecks and zero obstructions in or immediately near the survey area. Illustrated in Figure 3-36, are the shipwrecks and obstructions in proximity to Barnegat Inlet Project Area (Table 3-01). AWOIS shipwreck numbers 1418 to 1422 all have the same coordinates and are displayed at the same place as numbers 1418 and 1419. It should be noted that the database contains many non-vessel obstructions, including rocks, sunken buoys, buoys anchors, and sewage outfall pipes, and a great deal of uninvestigated snags and hangs. It may also include vessels that were wire dragged or otherwise salvaged or removed. Accuracy of locational information varies from on-site verified coordinates to very generalized.

No comment information was provided for the unknown AWOIS shipwrecks 12902, 12903, and 12905 in the AWOIS database; however, the recent 2013 investigation by NOAA at Barnegat Inlet reexamined these three records. It was determined that AWOIS 12902 was:

> "…listed in the AWOIS database as a reported 17-foot wreck with a 500-meter search radius and was first charted in 1973. The search radius was surveyed with 200% side scan sonar coverage and followed by multibeam investigations performed on six contacts located within the radius. The multibeam investigations disproved two of the contacts and located two wrecks, one obstruction, and one insignificant contact. One of the investigated wrecks is believed to be AWOIS Item #12902 and was found to be located approximately 5 meters from a charted 16-foot wreck" [U.S. Department of Commerce National Oceanic and Atmospheric Administration 2013:18-19].

Record 12902 will be updated with the correct coordinates for the 16-foot (4.9-meter) shipwreck and other shipwreck was identified as record 12903. The disproved contacts will be recommended for deletion on future nautical charts. For record 12903, use of the multibeam "located an 11-meter long wreck approximately 6 meters from a charted 22-foot obstruction" in which the hydrographer believes are of the same shipwreck (U.S. Department of Commerce National Oceanic and Atmospheric Administration 2013:19). Record 12903 will be updated with the correct information noting the obstruction is actually a wreck. Record 12905 could not be found during the survey and has been recommended for deletion (U.S. Department of Commerce National Oceanic and Atmospheric Administration 2013:19).

Figure 3-36. NOAA Chart map showing the Barnegat Inlet Project Area and the location of shipwreck sites and obstructions that correspond with AWOIS data.

Table 3-01. Vessels and Obstructions in the Barnegat Inlet Project Area.*†

Record	Latitude (Dec Degrees)	Longitude (Dec Degrees)	Description	Comment
1418	39.746231	-74.088467	*Auburn*, Shipwreck	
1419	39.746231	-74.088467	*Black Arrow*, Shipwreck	
1420	39.746231	-74.088467	*Bluefish*, Shipwreck	
1421	39.746231	-74.088467	*Cornelius Hargrove*, Shipwreck	
1422	39.746231	-74.088467	*Peerless*, Shipwreck	Trawler, sunk by Marine Causality. Sunk 1951.
1424	39.747342	-74.104578	Boiler Wreck, Shipwreck	
2864	39.783453	-74.082911	Unknown, Shipwreck	
7711	39.745319	-74.088136	*Sumner*, Shipwreck	
12902	39.775289	-74.084119	Unknown, Shipwreck	
12903	39.773333	-74.083333	Unknown, Shipwreck	
12905	39.741667	-74.076667	Unknown, Shipwreck	

*Source: National Oceanic and Atmospheric Administration Automated Wreck and Obstruction Information System.
†Coordinates presented in WGS84 meters.

In addition to the above-mentioned sources, a number of other minor sources were consulted for wrecks in the Project Area. These included various publications including *Shipwrecks of the New Jersey Coast* (Krotee and Krotee 1965), *Shipwrecks of New Jersey* (North 1963), *Encyclopedia of American Shipwrecks* (Berman 1972), *Shipwrecks of New Jersey* (Gentile 1988), *Shipwrecks of Delaware and New Jersey* (Gentile 1990), and *New Jersey Beach Diver* (Berg et al. 1993), along with various previous archaeological investigations of the Project Area. While a majority can be discounted, the generalized location information serves to outline the potential of the area to contain historic shipwrecks and to pinpoint exact locations. Exact locations of a number of shipwrecks were provided from these books, which also helped to narrow down the list of potential wrecks, proving what shipwrecks are not located at the northern jetty.

Interviews with locals in Barnegat, Island Beach State Park, and Seaside Park were not successful at identifying the shipwreck at Barnegat Inlet's northern jetty. Interviewees did recall the presence of a shipwreck with a mast sticking up at Barnegat Inlet. However, this shipwreck ended up being the *Sea King*. A screw M/V built in 1943; the former sea scalloper was lost on 12 February 1963 and wrecked 100 yards (91.4 meters) south of Barnegat Inlet while towing the *USS Prescott*, a U.S. Navy minesweeper (New Jersey Maritime Museum Database 2014). The *Sea King* stayed in place and when the second, southern jetty was built in 1991, sand filled in the area between the two jetties. The wreck was buried further and only the mast has remained visible. Construction workers also mentioned a New Jersey postcard detailing a wreck and a lighthouse. Examination of postcards on file at the OCHS and the New Jersey Maritime Museum did not identify a lighthouse and/or wreck matching the description of the Barnegat Light or within the Barnegat area. Resources concerning the building of the northern jetty also did not note the presence of a shipwreck at or near the location during construction. Archival research also failed to identify a specific ship known to be under the jetty. Research, however, did identify a large number of vessels known to be wrecked in the Barnegat area.

The OCHS compiled a book focusing strictly on LSS records for Ocean County, New Jersey (Groot 2005). The book contains excerpts and tabular data of the maritime events throughout the county from the annual reports with in the fiscal years of 1876 to 1914. A review of this literature noted relatively few vessels that were complete losses after assistance by the local stations. It should be noted that the majority of the ships responded to by the LSS Stations were refloated and removed from the Barnegat area. Furthermore, many of the vessels recorded in the station's accounts were listed as sloops, catboats, yachts, gas launches, and other schooners measuring smaller than the North Jetty Shipwreck. Other than a schooner named *Dixie*, no other vessels noted as a total loss standout as potential candidates based on the reports, vessel dimensions, and listed locations provided by the local LSS Stations (Table 3-02). *Appendix B: A list of vessels assisted by the LSS Stations in the Barnegat area from 1875 to 1914* contains a listing of the ships that were assisted by the Barnegat and Forked River LSS stations, which has been cross-referenced with the New Jersey Maritime Museum Database (2014). The years accounted for include 1875 to 1914. While some fields are missing data, enough information is present to rule out most ships from being considered the North Jetty Shipwreck.

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Table 3-02. Vessels determined to be a "Total Losses" by the LSS Stations near Barnegat Inlet as listed in the Annual Reports and Groot's (2005) book, and cross referenced with the New Jersey Maritime Museum Database (2014) for vessel size.

Vessel Name	Vessel Type	When Built	Date Lost	Location Lost	Length	Beam	Draft	Gross Tonnage	Net Tonnage	U.S. LSS Station Name	Notes
James W Elwell	Pilot boat	1867	11/5/1875	5 mi N Barnegat			10	74		Island Beach #16	Total loss
John C Bowers	Schooner		12/16/1875	0.5 mi. north Barnegat Inlet				52		Barnegat #17 & Forked River #16	Total loss
David Tolck	Schooner	1873	2/26/1879	Harvey Cedars	132	30	13	445		Barnegat #17	Ship lost; rigging saved & sold in NY
James Jones	Schooner	1858	10/31/1883	Barnegat Shoal	109	29.6	9.6	253		Barnegat #17 & Forked River #16	Total loss
Albertine Meyer	Brig		2/6/1884	1/2 mi SE Barnegat LSS	102.7	25.3	14.5	266		Barnegat #17	Total loss
Deceiver	Schooner	1871	4/29/1884	Barnegat Shoal				23		Barnegat #17	Total loss
Altavela	Schooner	1853	5/2/1884	1 mi ENE Barnegat LSS	102.2	27.6	8.2	183		Barnegat #17	Total loss
Guadaloupe	Iron Steamship	1881	11/19/1884	Barnegat Inlet North side	317.8	39.5	21.4	2839		Barnegat #17 & Forked River #16, and Cedar Creek	Total Loss; Removed Later
Lida Babcock	3-masted schooner	1872	2/15/1885	Barnegat Shoal	118	29.6	9.4	245		Forked River #16	Total loss
Kraljevica	Bark	1870	2/10/1886	South Barnegat Shoal	152.5	29.5	18	719		Barnegat, Loveladies & Ship Bottom	Total loss; Built in Austria
Francis Perkins	Pilot Schooner #13	1866	1/24/1887	Barnegat Shoals				52.24	49.82	Cadwick & Toms River	Total loss
Edwin A Hayes	Steamer	1883	5/22/1888	Barnegat Shoals	69.8	12	3.9	30.8	23.56	Barnegat #17	Total Loss
Erna	Bark	1868	9/13/1889	Barnegat Shoals	141	29.5	15.1	562		Barnegat #17 & Forked River #16, and Cedar Creek	Total loss
Dixie	Schooner - Barge	1890	4/20/1893	North of Barnegat Inlet	160	23.6	11	298.3	283.38	Barnegat #17 & Forked River #16, and Cedar Creek	Total loss

Vessel Name	Vessel Type	When Built	Date Lost	Location Lost	Length	Beam	Draft	Gross Tonnage	Net Tonnage	U.S. LSS Station Name	Notes
Magnolia	Schooner - Barge	1891	4/20/1893	1.5 mi N Barnegat Inlet	140.2	23.8	12	277.4	263.53	Barnegat #17 & Forked River #16, and Cedar Creek	Total loss; AWOIS No. 1432 (potentially incorrect AWOIS)
Alert	Sloop	1880	7/4/1901	2 mi E Barnegat LSS	86.2	18.1	7.4	69	36	Barnegat #17 & Forked River #16	Total Loss; Removed Later
Caterina	Iron Bark	1875	10/23/1912	1 3/4 mi NE Barnegat LSS	201.6	32.8	19.8	949	860	Forked River #16, Loveladies #18, Cedar Creek, Barnegat #17	Total Loss; Removed Later; AWOIS No. 7710, incorrectly called "*Remedios-Pascal"* (the name of another ship carrying bones wrecked off Ship Bottom, NJ in 1903)
A G Ropes	Schooner - Barge	1884	12/26/1913	Island Beach	258.2	44.7	28.4	2438	2328	Forked River #16	Total loss; AWOIS No. 2937. identified as "*A.G. Rapes*"
Undaunted	Schooner - Barge	1869	12/26/1913	1 mi NE Forked River LSS	207.5	41.1	14.3	1768	1729	Forked River #16	Total loss; AWOIS No. 772
Charlemagne Tower Jr	Steam Transport	1886	3/6/1914	6 mi N Barnegat	255	40	21	1825	1543	Cedar Creek	Total loss; AWOIS No. 620

The River and Harbor Act of 1899 gave the Secretary of War the authority to have any sunken watercraft removed providing that the vessel is an obstruction to U.S. waterways or endangers other crafts. The Secretary of War and Secretary of Treasury worked with local Coast Guards and district engineers to execute the removal of these sunken vessels. Prior to the Act of 1899, the removal of such wreckage was dependent upon the authority of Congress. Contracts setup by the War Department and under the direction of district engineers were awarded to bidders whose proposals met the appropriate costs. The removal of shipwrecks from Barnegat Inlet and Shoals occurred between the late nineteenth century and early twentieth century. Table 3-03 represents a number of shipwrecks removed from around the shoals, channels, and inlet from 1870 to 1920, with the exceptions of reports from 1871 to 1873 and 1905, which could not be located by the University of Alabama's research staff (U.S. Army Corps of Engineers 1870–1935). Reports from 1921 to 1935 do not note any wrecks removed from the Barnegat area.

Table 3-03. Vessels removed from Barnegat Inlet through Federal Aid According to Annual Reports of the U.S. Army Corps of Engineers from 1870 to 1920.

Vessel Type	Vessel Name	Date Vessel Wrecked	Cost of Removal	Date of Removal
Steamer	*Mediator*	January 22, 1875	$1,449.00	16 October 1890
Iron Steamship	*Guadaloupe*	November 19, 1884		7 November 1892
Steam-tug	*Starlight*	October 5, 1866	$4,765.00*	7 November 1892
Unknown	Unknown		$145.00	10 September 1893
Bark	*Charles Loring*	February 21, 1907	$525.00	29 April 1910
Steamer	*Alert*	July 4, 1901	$825.00	22 March 1911
Iron Bark	*Caterina*	October 23, 1912	$1,505.00	Fiscal year ending before 30 June 1916
U.S. Army Transport Steamship	*Sumner*	December 12, 1916	$7,223.40	Fiscal year ending before 30 June 1920

*Cost includes the removal of both the ***Guadaloupe*** and ***Starlight***.

In the case of the wrecked steamer *Mediator*, the vessel was originally wrecked off the side of Barnegat Inlet. A change in the position of the channel caused the vessel to become a dangerous obstruction and a menace to navigation. John Townsend of Somers Point, New Jersey, was contracted to remove the steamer and completed the work within a month (U.S. Army Corps of Engineers 1891:1091).

Perhaps one of the largest ships wrecked near the inlet was the iron steamship *Guadaloupe*, measuring 317.8 feet (97 meters) in length. The vessel was stranded in 15 feet (4.6 meters) of water at the eastern outer bar of the inlet in 1884. The steam-tug *Starlight* sunk inside the channel of the inlet in 1866. Considered dangerous to watercraft passing through the inlet, Enoch Townsend, also from Somers Point, removed both vessels at a cost of $4,765 (U.S. Army Corps of Engineers 1893:1184).

A portion of a shipwreck, of unknown name, was removed from the inlet in 1893. The portion came from the North Beach area of Barnegat Inlet, and after a storm was driven into the bay. Later the piece was found in the channel. Considered a menace, Torrance & Idell of Camden, New Jersey, removed the piece, which measured "about 30 feet long and from 12 to 15 feet in width" (U.S. Army Corps of Engineers 1894:861). Similarly, another wreck portion would be removed in 1910. The wooden bark *Charles Loring* was involved in a collision with the steamship *Seneca* off Sandy Hook on 21 February 1907. The bark was described as "cut down by the collision" and a piece of the ship became lodged in Barnegat's channel (U.S. Army Corps of Engineers 1910:1309). Eugene Boehm, of Atlantic City removed the piece by 29 April 1910. The report notes that the removal was completed using dynamite to break the ship into small fragments, which then "floated away" (U.S. Army Corps of Engineers 1910:1310). Examination of the area afterwards revealed that the action apparently left no trace of wreckage. The New Jersey Maritime Museum Database (2014) lists the *Charles Loring*'s length as 144.6 feet (44 meters). Prior to the bark *Charles Loring*, the other previous vessels did not have their means of removal listed. It is unknown what methods were used to break up the shipwrecks and dynamite cannot be discounted. The following shipwrecks (*Alert*, *Caterina*, and the U.S. Army Transport Steamship [UATS] *Sumner*) are clearly noted to be have been disassembled by dynamite.

The 60-ton steamer *Alert* was removed from a channel used by fishing boats 1.5 miles (2.4 kilometers) northeast of the Barnegat LSS Station. When examined by the engineers, all that remained of the 86-foot (26.2-meter) vessel was "the boiler, machinery, shaft, and wheel" in about 8 feet (2.4 meters) of water (U.S. Army Corps of Engineers 1911:1402). After being dynamited by Boehm, he performed sweeps over the bottom of "a radius of at least 500 feet from the late site of the wreck [and] revealed no part of the wreck" (U.S. Army Corps of Engineers 1911:1402). The *Caterina*, further examined below, was simply noted as "Removed by hired labor and use of explosives" (U.S. Army Corps of Engineers 1916:1757).

Shown in Figures 3-37 and 3-38, the UATS *Sumner* was only remarked as "Explosives; hired labor and hired boats used" to remove the massive 3,455-ton vessel off Barnegat shoals (U.S. Army Corps of Engineers 1920:1987). Initially the *Sumner* was called the *S.S. Rhaetia* and built by the Hamburg-America Line at Reiherstiegwerft, Hamburg, Germany in 1882. The steamship would later become the *Cassius* in 1898, before entering service for the U.S. Army in 1899. The *S.S. Rhaetia* originally boasted a "straight stem, 1 funnel, 3 masts; steel construction, screw propulsion, service speed 12 knots; accommodation for 96 passengers in 1st class and 1,100 in steerage; [and] crew of 90" (Palmer 2000). *Sumner* would end her career after running aground at Barnegat shoals on 12 December 1916 and breaking into two pieces. In 1917, a 112-foot (34.1-meter) wooden schooner, *J A Holmes*, struck the *Sumner* and subsequently went to pieces afterward, proving the wreckage to be a dangerous obstruction (New Jersey Maritime Museum Database 2014). Rich Galiano's (2008) website lists the *Sumner* as potentially buried and having a low debris field, 300 yards (274.3 meters) from shore in 25 feet (7.6 meters) of water. It appears some material still exists of this wreck and is visited by divers.

Another set of resources pertaining to shipwrecks near Barnegat comes from the Annual Reports of the Chief Signal Officer (U.S. Army Signal Corps 1873–1881). Signal houses provided a form of communication between ship and shore by use of signal flags or blinking lights. Barnegat LLS Station No. 115, was establish on 10 December 1873 and lasted until shortly after the end of the Spanish-American War in 1898. In New Jersey, three signal houses were setup at Sandy Hook, Barnegat, and Cape May; one station every 40 to 50 miles (64.4 to 80.5 milometers; Lloyd 2005). Each house "was manned by a skilled telegrapher and connected by wire through Western Union to the Navy Department in Washington" (Lloyd 2005:91-92). Barnegat's signal house was constructed about 0.5 mile (0.8 kilometer) below the inlet to allow ships to come close to shore to signal and still avoid the shoals. The office for the signal house was reportedly at Barnegat LLS Station No. 17; however, the signal house itself was separate from the telegraph station near the Barnegat Light.

Annual Reports of the Chief Signal Officer from 1873 to 1881 were examined for a listing of vessels noted as a total loss at Barnegat Inlet and Shoals. Listings also described damages to the telegraph line, severe storms that caused watercraft to seek shelter in the bay, vessels that were stuck on the shoals, and ships refloated by the LSS. Information on shipwrecks from these annual reports basically serves as additional information about events that are generally noted in greater detail in other literature, such as the LSS reports. Between the years 1873 and 1881, only one listing provides new information depicting a previously unknown vessel, *Frances Reyester*, which is discussed below.

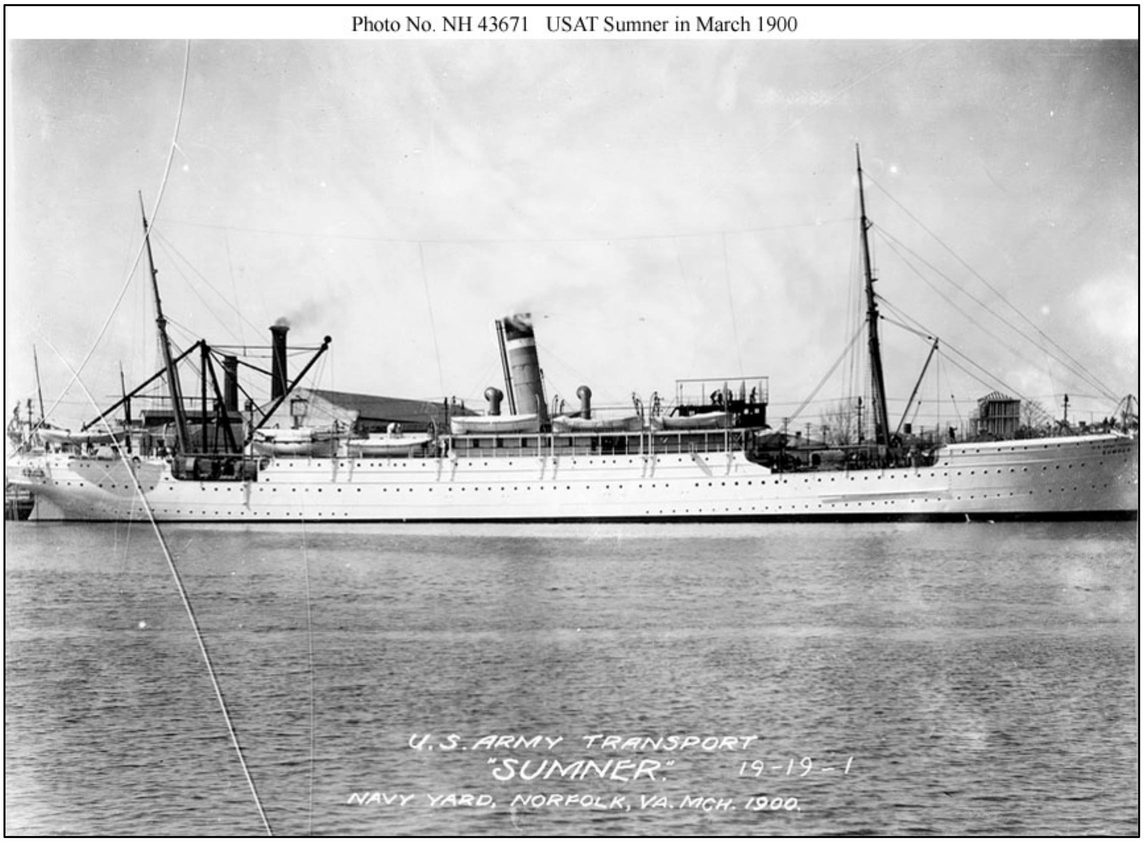

Figure 3-37. The U.S. Army Transport Steamship *Sumner* in Norfolk, Virginia before becoming a total loss off Barnegat City in 1916 (courtesy of the U.S. Naval History and Heritage Command, Photograph NH 43671).

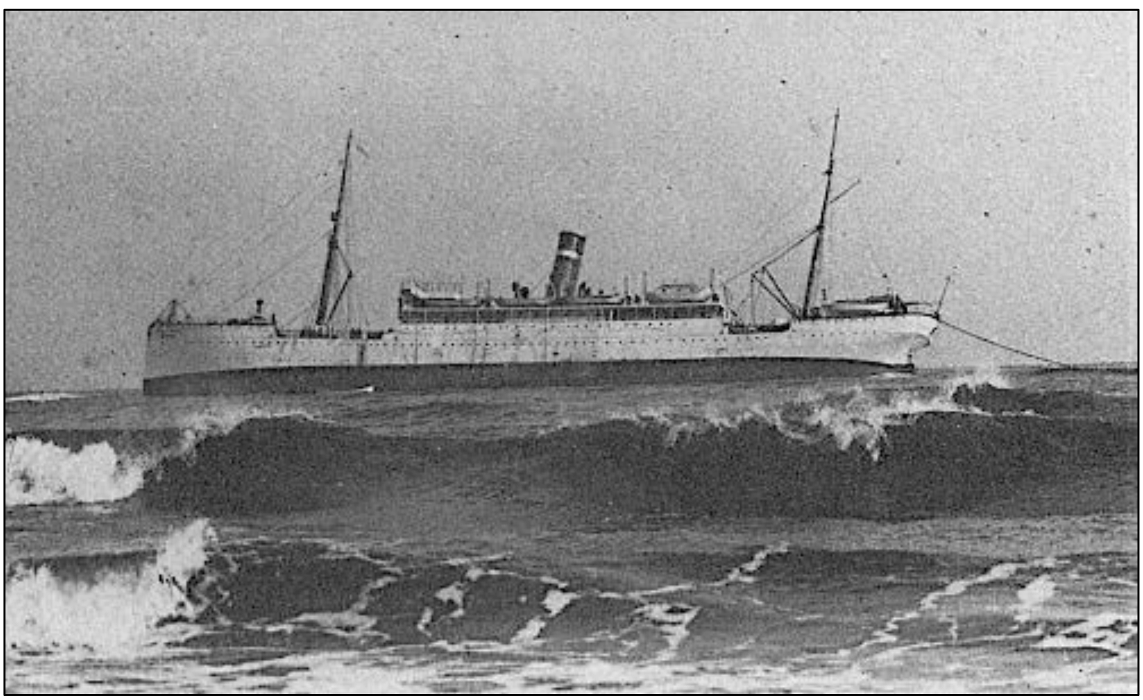

Figure 3-38. The U.S. Army Transport Steamship *Sumner* on Barnegat Shoals before breaking in the middle, which ending the ship's career (courtesy of Galiano 2008).

The New Jersey Maritime Museum, located in Beach Haven, offers amazing insight into the history and past maritime traditions of the State of New Jersey. In addition to the exhibits and displays, the museum houses documents, photographs, and records pertaining to maritime events from all over the state. Through volunteer efforts, a database listing all known New Jersey maritime losses and events has been created at the museum (New Jersey Maritime Museum Database 2014). This database lists over 4,400 entries by ship name and includes the year and place lost or wrecked. Additional information in the database consists of the vessel type, tonnage, ship owners, ports of departure and destination, the ship's master, dimensions of the ship, construction materials, cargo value, and more. Many of the vessels are noted as refloated or towed; so while the vessel may have wrecked and was recorded at a particular spot, the vessel was refloated later and saved. The New Jersey Maritime Museum has made this database available online for researchers at their website http://www.museumofnjmh.org/shipwreckdatabase.html.

For the Barnegat area, 285 shipwreck entries are found in the database and the full listing can be seen in *Appendix C: All Shipwrecks for the Barnegat Area*. These vessels are not listed as refloated or towed. These shipwrecks are recorded as having been wrecked at or near Barnegat, Barnegat Light, Barnegat Shoals, Barnegat LSS, North Beach, Forked River LSS, and of course Barnegat Inlet. This number was narrowed down by removing vessels that did not meet basic requirements for the North Jetty Shipwreck: vessels that were less than 150 feet (45.7 meters) in length, less than 100 tons, and were constructed of anything other than wood. Ships that were built prior to 1870 and after 1930 were also removed. As were vessels identified as sloops, yachts, catboats, gas launches, tugs, and steamships. A number of ships were mentioned as lost on the shoals or off the light, and with additional research were further concluded to have sunk offshore.

After narrowing down, this left the list at four total shipwrecks (Table 3-04) for Barnegat Inlet, Barnegat Shoals, and Barnegat Light and 18 shipwrecks (Table 3-05) for the general location of "Barnegat." The set of 18 shipwrecks lost at Barnegat have not been identified as wrecking on the shore and were not known to be assisted by the local LLS, leading the researcher to believe these vessels sunk offshore in deeper water. The tables below offer a short list of information listed for these shipwrecks. The full listing of all the fields pertaining to these shipwrecks in maritime database can be seen in *Appendix D: Vessels Listed As Lost In The Vicinity Of The Barnegat Inlet, Shoal, and Light Fitting The Description Of The North Jetty Shipwreck*. The four shipwrecks identified as wrecked near the inlet and nearby were further researched at the New Jersey Maritime Museum and through other maritime resources. What follows is information on a number of specific shipwrecks that stand the closest chance of being the shipwreck found at Barnegat Inlet's northern jetty.

Table 3-04. Vessels listed as lost in the vicinity of the Barnegat Inlet, Shoal, and Light fitting the description of the North Jetty Shipwreck (New Jersey Maritime Museum Database 2014).

Ship's Name	Vessel Type	Year Built	Date Lost	Location Lost	Length	Beam	Draft	Gross Tonnage	Net Tonnage	Nature Of Cargo
Dixie	Schooner - Barge	1890	4/20/1893	North Of Barnegat Inlet	160	23.6	11	298.3	283.38	Pilings
Frances Reyester	2-Masted Schooner		7/31/1876	North Beach / N Of Barnegat Inlet						Wood
Number Twenty-One	Schooner - Barge	1901	2/4/1926	Barnegat Shoals	196	34.3	17.5	905	773	Coal
Number Twenty	Schooner - Barge	1899	2/4/1926	Barnegat Light	190.3	18.3	18.1		940	Coal

Table 3-05. Vessels listed as lost near the Barnegat fitting the description of the North Jetty Shipwreck (New Jersey Maritime Museum Database 2014). These vessels are not known to have come ashore and likely sunk offshore.

Ship's Name	Vessel Type	Year Built	Date Lost	Location Lost	Length	Beam	Draft	Gross Tonnage	Net Tonnage	Nature Of Cargo
Adair F Bonney	Schooner		11/13/1875	Off Barnegat				200.83		Coal
Annie E Embrey	Barge	1906	2/19/1908	Barnegat				431	431	Plaster & Cement
Ardmore	Schooner - Barge	1895	4/16/1913	Off Barnegat	174.3	35.3	16.1	821	762	
Arundel	Barge	1902	4/9/1916	Off Barnegat				418	418	
Bristol	Schooner - Barge	1904	9/4/1910	Off Barnegat	180.8	36.3	12.4	653	550	
Cheaton	Schooner		2/8/1872	Barnegat						
Edwin L Allen	Schooner			Barnegat				301		In Ballast
John N Colby	Schooner		3/22/1877	Barnegat				227.98		
Majestic	Barge	1891	6/10/1910	Off Barnegat	208.6	34.3	18.3	1108	1053	Coal
Martha E Mccabe	Schooner - Barge	1888	3/20/1906	Barnegat	181.5	23.3	9.2	345	342	Lumber & Pilings
No 22	Schooner - Barge	1898	1/17/1909	Barnegat	190.1	35.3	17.1	936	833	Coal
Number Twenty-Eight	Schooner - Barge	1899	2/4/1926	Barnegat	207	35.2	18.4	1035	929	
Orlando V Wooten	4-Masted Schooner	1901	4/8/1922	Barnegat	167.2	36.2	13.6	677	573	
Plymouth	Barge	1870	4/20/1893	Barnegat				618.04	602.77	Coal
Rebecca Shepherd	Schooner	1873	8/18/1879	Barnegat				411		In Ballast
Tunkhannock	Schooner - Barge	1891	10/18/1914	Barnegat	192	35.3	15.3	843	804	
William D Becker	Schooner - Barge	1892	4/7/1907	Off Barnegat	211	35	16.6	1046	994	

DIXIE

Out of all the ships lost in the Barnegat area, one of the best shipwreck candidates for the North Jetty Shipwreck is a schooner barge named *Dixie*. The deciding factors are the vessel's size, time period in which it was constructed, and reported location when lost. Of all the surrounding shipwrecks, this is the largest vessel to have come ashore at North Beach and was responded to by both nearby LSS Stations.

The *Dixie* was built in 1890, at Portsmouth, Virginia and lost on 20 April 1893. A screw steamer tug called *Taurus* towed three vessels from Norfolk, Virginia loaded with oak pilings and coal. The 114-ton *Taurus* worked for the Boston Tow-Boat Company and headed towards Boston with the three ships pulled as barges. Immediately behind the *Taurus* was a former clipper ship, called the *Lizzie H*. Potentially, *Lizzie H.* is also known as *Lizzie H. Brayton*. Pulled behind *Lizzie H.* was the *Magnolia*, a schooner, and following was the final vessel, *Dixie*. According to the newspaper *Norfolk Virginian*, only the *Lizzie H.* is noted as leaving Norfolk on 18 April 1893 headed to Boston with a cargo of coal from William Lamb & Company (*Norfolk Virginian* 19 April 1893). The other schooners and the tug are not mentioned as arrived or having left in the newspaper. A crew of three managed *Dixie* and *Magnolia* each.

Along the way north, the ships encountered a severe storm off the coast of New Jersey. The *New York Times* reported the story, also found in *Appendix E: Seven Lives in Great Peril*, as told by the *Taurus*'s captain:

> "Capt. O'Brien said that good weather was made until Barnegat was abeam. That was on Thursday morning. Then it breezed up from the eastward, and the tug began to pitch miserably in the confused sea. The wind steadily increased in force, and by 8 o'clock it was found necessary to slow the engines, as the tow lines, which were whipping taut with every plunge of the tug, seemed inclined to bid farewell to their fastenings. Two hours later the hawser parted in a heavy squall and the *Magnolia* and *Dixie* went drifting away to leeward.
>
> Capt. O'Brien says he was at a loss what to do. The wind was then blowing a heavy gale from the westward, a coast strewn with wrecks throughout its entire length was close aboard, and two of his charges were drifting helplessly upon it. He circled twice around the barges, hoping that they would launch their boats, which was the only thing that they could have done… Capt. O'Brien ventured as near as he dared and then, seeing that all chances or his rescuing the crew were hopeless, he reluctantly abandoned the barges to their fate and steamed seaward again with [*Lizzie H.*]" [*New York Times* 22 April 1893].

Heading north the tug was still in danger of the heavy seas. Waves as tall as the *Taurus*'s pilothouse broke over the tug and the hawser could have potentially fouled the propeller. Bringing in the hawser was impossible in the storm and a crewman nearly went overboard cutting the hawser. The storm lessened and the *Lizzie H.* anchored 2 miles (3.2 kilometers) off the coast for the night. In the morning, *Taurus* search southward for the barges but found no trace. Returning to the barge it took two difficult hours to reattach the hawser and the two vessels made their way to Boston. The *New York Times* noted that Captain O'Brien, who had been awake for 48 hours during the journey, was glad to hear of the safety of his men who arrived in New York after being saved by the LLS (*New York Times* 22 April 1893).

Both the Forked River and Barnegat LSS stations assisted the *Dixie* and *Magnolia* when they were wrecking on the beach. A copy of the wreck report by Barnegat LSS Station No. 17 was on file at the New Jersey Maritime Museum. The report states that *Dixie*:

> "Wrecked ½ mile N. of Barnegat Inlet, N.N.E. 2 miles from [the Barnegat] station – broke loose from streamer, heavy storm, stranded and sunk 200 yards from shore. Low tide. Wreck occurred at 4:30 p.m. and was discovered by Patrolman Falkinburg. [Barnegat] station crew arrived at scene about 6 p.m. and returned to station from wreck at 7 a.m. April 21st. Surfboat used in rescue; one

> trip made. No crew brought ashore with surfboat. Time of launching boat 4:45 p.m. Lyle gun from Forked River Station used; 4 ounces of powder used, no. 7 shotline used, wreck 150 yards from shore at time shot was fired. One shot fired. Whipline sent on board double. Heavy sea and high tide; surf running to hills – had to wait for tide to fall. Breeches buoy used; 3 trips made with breeches buoy. Lives saved; 3: Capt. Norton and 2 crewmen.
>
> No lives lost – Vessel total loss. No one succored at Barnegat Station; (report says to check with Forked River Station) Note in report: Discovered wreck about 4:30 p.m. and at once started to her assistance and on account of strong east wind and flood tide did not reach wreck until about 6 p.m. Assisted to get apparatus which had been used to land crew of barge Magnolia which had stranded ½ mile further and loaded into cart and hurled it down the beach to barge Dixie by which time the tide was very high and sea running to the hill and nothing could be done but wait for the tide to fall which was about daylight – when we landed crew without any trouble and returned to station about 7 a.m. April 21st. Date of report April 26, 1893 by Joel Ridgeway" [Copy of Wreck Report – LSS Barnegat Station, on file at the New Jersey Maritime Museum].

The 1894 LSS Annual Report lists *Dixie* 1.75 miles (2.8 kilometers) south of the Forked River LLS Station and her tonnage is listed as 298, along with the information on values for the wooden cargo and ship (U.S. Department of the Treasury, U.S. Lifesaving Service 1894:214-215). The *New York Times* reported the story the two shipwrecks on North Beach with the title "Seven Lives in Great Peril would have been lost but for the North Beach Patrol" (*New York Times* 22 April 1893). Additionally, the *New York Times* mentions the condition of the vessels with the *Magnolia* "fast breaking up. The *Dixie* is lying between the bar and the shore, pounding heavily, and probably will go to pieces" (*New York Times* 22 April 1893). *Dixie* and *Magnolia* have not been noted as refloated vessels.

Dixie and *Magnolia*'s home and departure port was Norfolk, Virginia and they were headed to Boston each with a cargo of oak pilings valued at $4,000 (U.S. Department of the Treasury, U.S. Lifesaving Service 1894). Both vessels were value at an estimated $8,000. According to the 1892 list of *Merchant Vessels of the U.S.*, *Dixie* had a length of 160 feet (48.8 meters), a 23.6-foot (7.2-meter) beam, and 11-foot (3.4-meter) draft. She was built in 1890 at Portsmouth, Virginia by D.B. Isham & Son and owned by Frank N. Isham (U.S. Department of the Treasury, Navigation Bureau 1892:98). Gross tonnage was reportedly 298.3 tons and net tonnage was 283.38 tons. *Dixie*'s official number was 157,269 and she listed the signal letters KHBP. *Magnolia* was a slightly shorter vessel with a length of 140.2 feet (43.3 meters), 23.8-foot (7.3-meter) beam, and 12-foot (3.7-meter) draft built by the same company a year later in 1891 (U.S. Department of the Treasury, Navigation Bureau 1892:185). Gross tonnage was listed as 277.4-tons and net tonnage as 263.53-tons. *Magnolia*'s official number was 92,275 and used the signal letters KJHM.

Dixie is not found in any listing of the American Bureau of Shipping's *Record of American and Foreign Shipping* between 1890 and 1893. Both schooner barges are not listed in *Lloyd's Register Wreck Returns* between 1890 and 1894. *Magnolia* is listed in the 1892 *Record of American and Foreign Shipping* and provides a little more insight into the schooner. *Magnolia*'s master in 1892 was George A. Stockley, the ship was built in May 1891, and contained the remarks O, YP, and IF (American Bureau of Shipping 1892:663). These remarks noted the vessel was made of oak (O), yellow or hard or pitch pine (YP), and had iron fastenings (IF). The listing again confirms the owner as Frank N. Isham and that D.B. Isham & Son built *Magnolia* at Portsmouth. In the 1893, *Merchant Vessels of the U.S.* reported that *Magnolia*'s homeport was changed to Boston and the managing or principle owner was now, E.A. Isham (U.S. Department of the Treasury, Navigation Bureau 1893).

A review of U.S. Census Records identifies D.B. Isham as David Bliss Isham, who is identified as the father of Franklin Newton Isham the known owner of both schooners. David Isham is recorded as a lumber dealer in the 1870s and 1880s living in Connecticut with his family (U.S.

Census of the United States 1870:707B; U.S. Census of the United States 1880:177A). In 1880, Frank Isham is identified as a machinist at the age of 18 with an older brother and sister named, Alfrey O. and Eva A. Isham. Eva A. Isham may be the principle owner (E.A. Isham) of *Magnolia* in 1893. By the 1900 census, Frank is recorded as a boat builder at the age of 37, married, and living in New London, Connecticut (U.S. Census of the United States 1900:10A). An examination of Chataigne's City and Business Directory of Norfolk, Portsmouth, and Berkley between 1892 and 1893 lists Frank N. Isham as a shipbroker living as a boarder at the Purcell House (Chataigne 1892–1893:185). The company that built the ships, D.B. Isham & Son, is based in Boston, Massachusetts according to an order for wooden poles on 23 August 1888. The order requested a large number of furnished poles 30 to 40 feet (9.1 to 12.2 meters) long and noted they "must be straight and well trimmed, and first-class in every respect" (Wambaugh 1896:657).

Based on this information, it appears that Frank Isham travelled to Portsmouth to build *Dixie* in 1890 and then *Magnolia* the following year for their company based in Boston. Neither Frank Isham, his father David, nor the company appeared to be listed as local ship builders or having a shipyard in Portsmouth as examined at the Mariner's Museum Library. This family business appears to stay in Boston but does business in Norfolk to acquire materials for the family business in Boston. *Magnolia* and *Dixie* were both built to be schooner barges and loaded with oak pilings to be sent to Boston where David Isham's lumber business was based to sell the materials. The histories of these two ships are nearly same and it is very likely they exhibited similar construction characteristics. Very likely *Dixie* was also made from the same oak, pine and likewise had iron fastenings as her sister ship *Magnolia*.

No photographs are on record for either *Dixie* or *Magnolia* at the Mariner's Museum Library in Newport News, Virginia or online at the Mystic Seaport Museum. Research at the Mariner's Library did not uncover ship plans or designs for the vessels or anything constructed by Frank Isham before the turn of the century. It is unknown if either vessel was masted. Information on shipyards in Portsmouth is predominantly focused on the Portsmouth Naval Shipyard, which has been in operation since beginning of the nineteenth century. While built in Portsmouth, it is possible that these schooner barges may have exhibited construction practices local to either Connecticut or Boston, as Frank Isham may have been trained in different techniques.

In the late nineteenth century, coal and other bulk products transported along the eastern seaboard provided work for a large fleet of multi-masted schooners and a large fleet of towed barges (Brouwer 1990:96). Railroad, coal, and towing companies; independent tug owners; and the like competed against the increasingly larger coastal schooner. The schooner barge had few of the problems associated with larger schooners. The schooner barge, "a vessel that was normally towed from port to port by a tug…differed from other barges in that it carried some sails on masts [smaller than] those found on a normal schooner" (Morris 1984:2). Images of schooner barges, as shown in Figures 3-39 and 3-40, often feature schooners, sometimes with or without masts, being towed a set of three.

Not a sailing vessel per se, the sails "expedited the progress of the tow when the wind was abaft the beam" (Morris 1984). Because of the short rig associated with small sails, crews of three, four, or five manned the vessel. The small crew size obviously cost less to operate than traditional schooner crews. The barges also cost less to build, whether built as a schooner barge or reconstructed from old sailing vessels (Brouwer 1996). Because tugboat pilots could tow four to six barges at a time, the schooner barges proved more reliable than conventional schooners, both in delivery and speed (Morris 1984).

Figure 3-39. Towboat towing three de-masted schooner barges through the Cape Cod Canal in the 1950s (courtesy of Roy Eliaseen and Rich Galiano).

Figure 3-40. Three schooner barges on their way to Philadelphia from Maine were cut loose during a storm and beached at Cape Cod in 1915 (as presented in Morris 1984:86).

Later research on the ship builder Frank Isham identifies him as a builder of smaller-powered watercraft. He is found listed in the *1901 Blue Book of American Shipping* as a builder of yachts, tugs, and other small craft mostly constructed of wood (Blue Book of American Shipping 1901:92). He worked at the Mystic Ship Yard, in Mystic, Connecticut and later moved to New London, Connecticut to build a shop for his motorboat company, The Isham Company; where he served as the superintendent and lead designer (*The Motor Boat* 10 May 1904). Mr. Isham and his company's name often appeared in early motor craft magazines and he even presented ship designs in articles for readers to build themselves (Figure 3-41). There is no indication of Frank Isham building any more wooden ships larger than 90 feet (27.4 meters). The Isham Company's machine shop was "capable of housing a 90-foot steam yacht without striking its smokestack" (*The Motor Boat*, May 10, 1904). However, by November 1904, Frank Isham retired from the company and Mr. Edson B. Schock assumed management (*The Motor Boat* 25 November 1904). Frank Isham still retained stock in the company after retiring. He would go on to develop a patent (US1184242 A and US1187737 A) for an internal–combustion engine likely for small watercraft. He filed the patent in 1913, and it was published in 1916 (Isham 1916). Eventually, Frank Isham and his wife retired to California in the 1930s (U.S. Census of the United States 1930:13A).

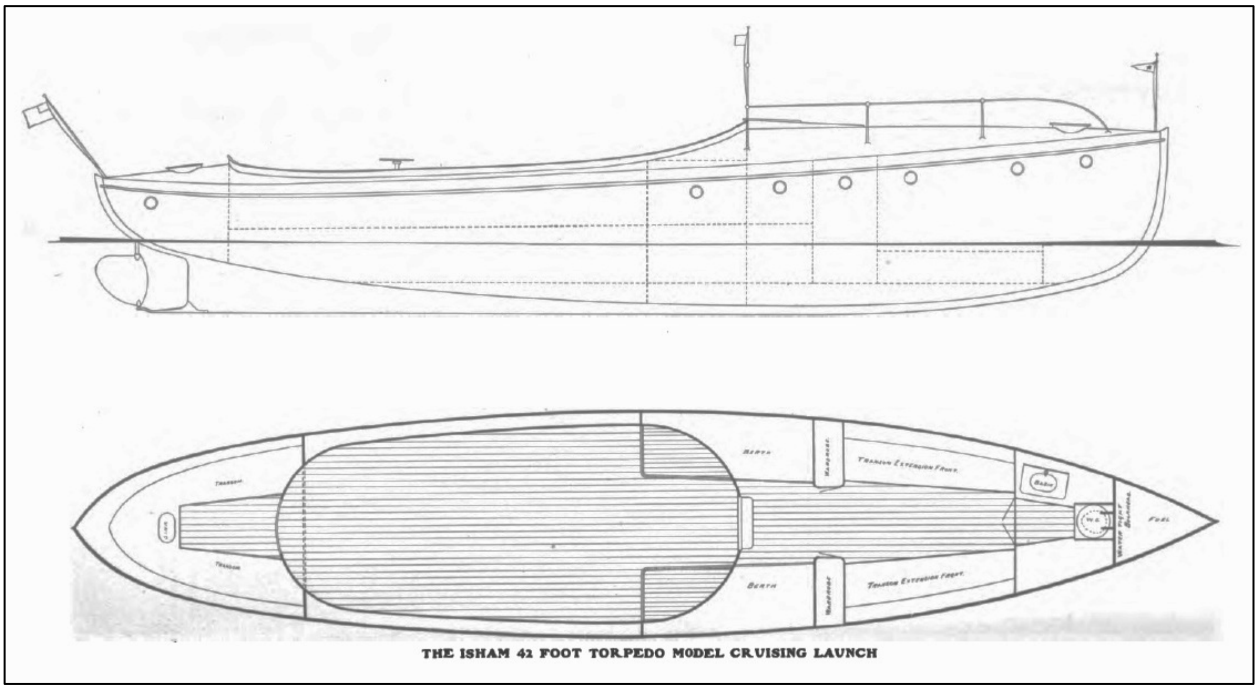

Figure 3-41. Frank Isham's design for his 42-foot rough water launch as it appeared in the 25 July 1904 edition of *The Motor Boat* (25 July 1904:8-9).

FRANCES REYESTER

Concerning the time in which the unidentified North Jetty Shipwreck was potentially built (1870s to 1930s), records of the local LSS stations are quiet helpful as the stations were in service during this time. The records kept by the stations are highly informative to shipwrecking events at the inlet. However, not all of the shipwreck events were responded to by the area stations. One particular case lies in the two-masted schooner, the *Frances Reyester* (or *Frances Register*). This schooner has no record in any of the LSS Annual Reports. Additionally, the schooner, and variations of the vessels name, is not found in any ship register listing including the *American Lloyd's Register of American and Foreign Shipping* from 1865 to 1877 and the

Record of American and Foreign Shipping 1871 to 1877. Accounts of this shipwreck strictly come from the *New York Maritime Register*, the *New York Times*, and the 1877 Annual Report of the Barnegat U.S. Signal Service.

Frances Reyester drifted ashore at the mouth of Barnegat Inlet, abandoned and waterlogged, on 31 July 1876. The Barnegat U.S. Signal Service observed, "a vessel apparently a two-masted schooner with her topmasts broken off…as sunk near the shore on the north beach, near and north of Barnegat Inlet. A part of the vessel is in sight, no men can be seen on board or in the rigging. She was first seen 7 p.m. the 31st. Pine cord wood is drifting ashore" (*New York Maritime Register* 2 August 1876). Joan Charles (1999) and the *New York Times* (2 August 1876) list the vessel as *Frances Register* and that the vessel was from Seaford, Delaware.

A week later, the *New York Maritime Register* reported that the vessel was bound to New York and her "crew left the vessel in the yawl and about one hour subsequently were picked up by the schooner *Nellie H. Benedict*" who landed safely in New York Harbor (*New York Maritime Register* 9 August 1876). The *New York Maritime Register* further includes that the *Frances Reyester* began rapidly filling with water and began breaking into pieces. A look at the actual Annual Report of the Chief Signal Officer only lists an "unknown schooner washed ashore about two miles north of the station" on the dates 2 and 3 August 1876 (U.S. Army Signal Corps 1877:14). The Barnegat signal house station itself lies 0.5 mile (0.8 kilometer) south of the inlet.

No other details have been identified, including the specific dimensions of the vessel. The schooner appears to be a total loss near the correct location, but may be too small (a two-masted schooner) to be the shipwreck under the northern jetty. This vessel may have been constructed earlier than the North Jetty Shipwreck. Because the vessel was abandoned at sea, the ship may have been so old and unfit that the crew preferred to abandon ship.

No. 20, No.21, and No. 28

Schooner barges, No. 20, No.21, and No. 28, all sank on the same day, 4 February 1926, off Barnegat carrying cargos of coal while heading to Boston from Norfolk (New Jersey Maritime Museum Database 2014). Each barge was listed in the database as located in a different area, Barnegat Light, Barnegat Shoal, and Barnegat, respectively. No. 20 and No. 28 had been built in 1899 at Bath, Maine, and No. 21 was built in Baltimore in 1901. The length of all the wooden barges lies between 190.3 and 207 feet (58 and 63 meters). There is no mention of these vessels being near shore. It is likely that the shipwrecks occurred offshore. The *New York Times* only notes that the barge No. 21 was being smashed on a sand bar 0.5 mile (0.8 kilometer) off the coast (*New York Times* 5 February 1926). Three men were saved by the Barnegat surfcrew, but no mention is made of the other barges and their crews.

As noted earlier, the majority of the ships responded to by the LLS Stations were refloated and removed from the Barnegat area. Furthermore, many of vessels recorded in the reported accounts were listed as sloops, catboats, gas launches, and other schooners measuring smaller than the wreck under the northern jetty. Other than *Dixie*, no other vessel stands out as a potential candidate based on the reports from the Forked River LSS Station No. 15 and Barnegat LSS Station No. 17. Based on these records, it is easier to understand which shipwrecks the North Jetty Shipwreck is not, instead of which shipwreck the North Jetty Wreck could be.

Caterina

The Barnegat area has had a high number of schooner barges transporting timber and coal. At least eight vessels are noted as wrecking in the Barnegat area carrying cargos of coal. This has led to the material ending up on the beaches. Coal was consistently found in the area of the northern jetty mixed in the sand sediment. One particular shipwreck stands out among the numbers of other ships wrecked at Barnegat due to its unique cargo. The Italian Bark *Caterina* (previously known as the *Formosa)*, shown in Figures 3-42 and 3-43, wrecked on the northern side of the shoals reportedly 1.75 miles (2.8 kilometers) northeast of Barnegat Station on 23 October 1912. This vessel is not the North Jetty Shipwreck, as the *Caterina* was an iron-hulled ship. While examining the North Jetty Shipwreck, faunal bones were often found in the surrounding sand at the site. Believed to be cow bones, five pieces were collected for analysis. These faunal remains potentially belong to the wrecked Italian bark. The *Caterina* was listed as having a cargo of animal bones bound from Montevideo, South America to New York for a fertilization plant (U.S. Department of the Treasury, U.S. Lifesaving Service 1913). Bones have been found washed on the beach as far down as Ships Bottom on Long Beach Island and were noted to be a part of the wrecked bark (Long Beach Island Historical Association Museum display).

A patrolman from Forked River LSS Station saw the ship in distress at 3 A.M. (U.S. Department of the Treasury, U.S. Lifesaving Service 1913). The *Caterina* had been stuck by a strong tidal current and setup upon Barnegat Shoals. Telephones enabled the Cedar Creek, Barnegat, and Loveladies LSS Stations to get ready for assistance. The four stations set out to assist the *Caterina*. Loveladies and Barnegat surfmen brought the Barnegat LLS Station's open power surfboat and their Beebe-McLellan surfboat. The Cedar Creek LSS surfcrew walked several miles south to the site and arrived later. The 1913 Annual Report of the LSS addresses the event:

> "By 6 A.M. three of the crews were on the beach ready for action. The vessel lay fully 600 yards out. The two Beebe-McLellan surfboats were launched with nine men in each, but so high was the surf and so strong the wind that neither party of boatmen was able to get away from the beach. Time after time they shoved their craft into the ponderous breakers only to be hurled back upon the strand. Efforts made about noon to effect a launching, the tide being low, met with better results. The two boats now got safely away, and after a hard struggle against wind and current, reached the bark. Running in under her lee, they took off the entire crew, six in one boat and seven in the other. The two boats landed safely on the north side of the inlet" [U.S. Department of the Treasury, U.S. Lifesaving Service 1913:96].

Figure 3-42. The iron-hulled *Caterina* stranded out on Barnegat Shoals going to pieces in 1912 (courtesy of the New Jersey Maritime Museum).

Figure 3-43. The *Caterina* when she was previously known as the *Formosa* (Tony 2013).

The *Caterina*'s crew endured 10 hours trapped on the vessel. The ship and her cargo of bones were totally lost. The surfcrew returned to the vessel to collect the 13 sailor's personal effects while the *Caterina*'s crew was housed at both the Barnegat and Forked River stations. The *New Jersey Courier* notes that Captain J. Costa was the last to leave the vessel. On 24 October 1912, the newspaper, incorrectly calling the ship Catherina, further stated "[h]er seams were opened by the incessant pounding of the heavy billows and it is believed she will go to pieces. The vessel sailed from Montevideo July 6 bound for New York. She was built by A. McMillan & Sons, Dumbarton, and was owned by G. Drago. She is 201.6 feet long, 32.8 feet breadth and 19.8 feet deep" (*New Jersey Courier* 24 October 1912). The *Caterina*'s wrecked remains would later be removed by contractors for the U.S. War Department, as it was found to be a menace to navigation. The wreck was dynamited in 1916, but bones can sometimes be found along Island Beach State Park and Barnegat Inlet (U.S. Army Corps of Engineers 1916).

CARTOGRAPHIC REVIEW

A review of historic navigation maps and charts for the region is also another excellent tool for identifying shipwrecks within or adjacent to the Project Area. Often noting shipwrecks, obstructions, and other various hazards for the mariner, many of these maps can be accessed from NOAA's Office of Coast Survey's Historical Map and Chart Collection at http://www.historicalcharts.noaa.gov/historicals/search, while others are found in various repositories, publications, or websites. The NOAA website allows the researcher to specify a region of interest and then review all available maps for that area. A valuable utility provided by this site is the virtual magnification feature, which allows the researcher to zoom in and out of specific areas. Note that shipwreck symbols in the following maps (Figures 3-44 to 3-53) are circled in red to more easily indicate their proximity to the Project Area. These maps and charts were identified as indicating the most relevant information concerning the Project Area and the possibility of submerged cultural resources within close proximity to the area.

Illustrated in Figure 3-44, one of the earliest NOAA maps available relative to the current Project Area dates to 1777. This map illustrates the present inlets during the late eighteenth century near the Project Area. This map illustrates "New Inlet" north of "Barnigat Inlet" which makes Island Beach an actual island. No cultural feature (i.e., shipwrecks) is represented at or near the Project Area on the map.

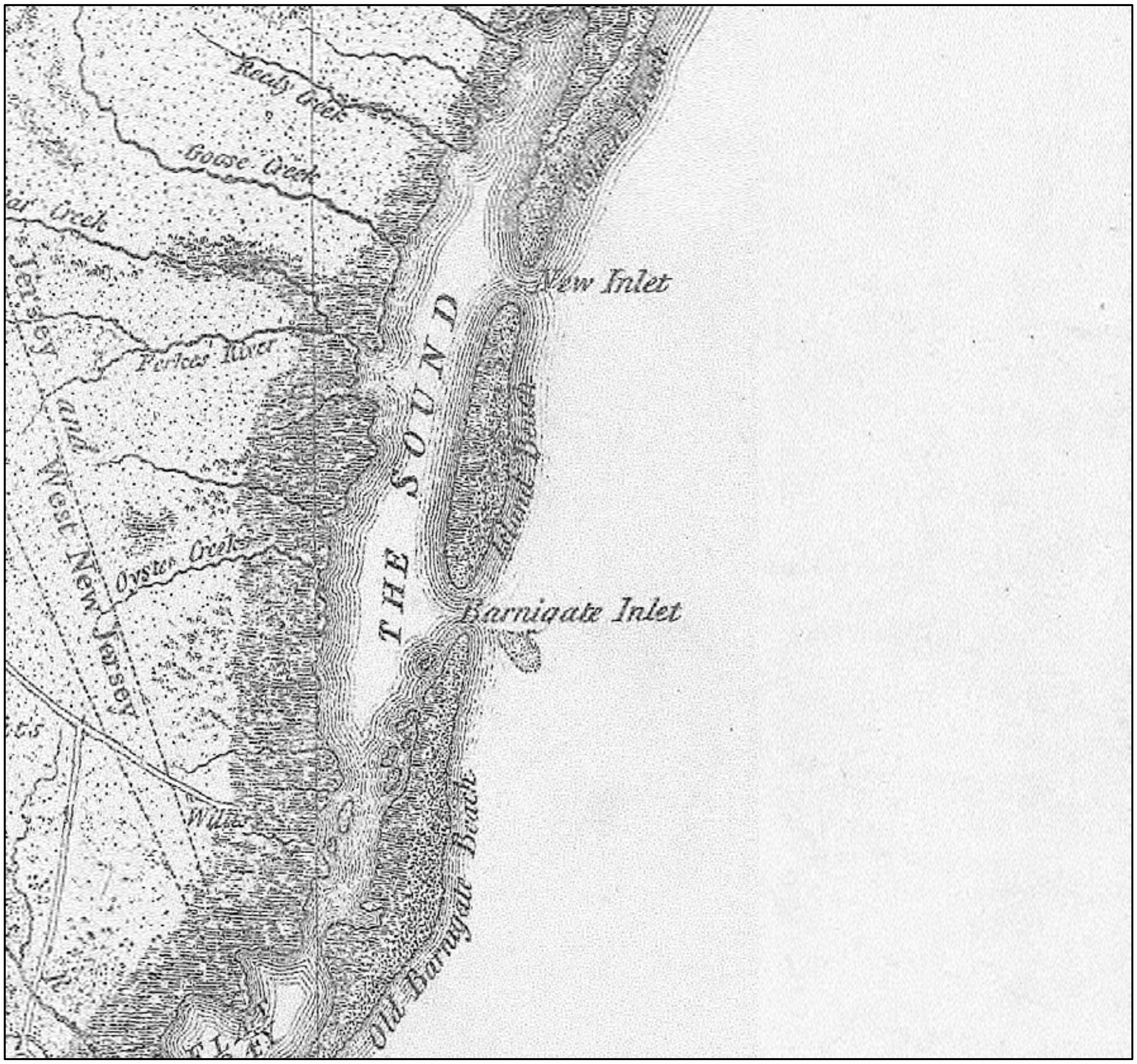

Figure 3-44. 1777 map excerpt showing the Project Area of Barnegat Inlet with the "New Inlet" making Island Beach an actual island (Chart 853 from NOAA's Office of Coast Survey's Historical Map and Chart Collection).

The next available map on the NOAA website shows Barnegat Inlet during the year 1812, illustrated in Figure 3-45, and identifies another inlet as Cranbury Inlet. The previous "New Inlet" was south of the new Cranbury Inlet when it was open. New Inlet and Cranbury Inlet are two different inlets. No cultural feature (i.e., shipwrecks) is represented at or near the Project Area on the map. An 1833 map, shown in Figure 3-46, identifies Cranberry Inlet as closed. Charts following this map illustrate that the inlet is permanently closed making Island Beach officially a promontory.

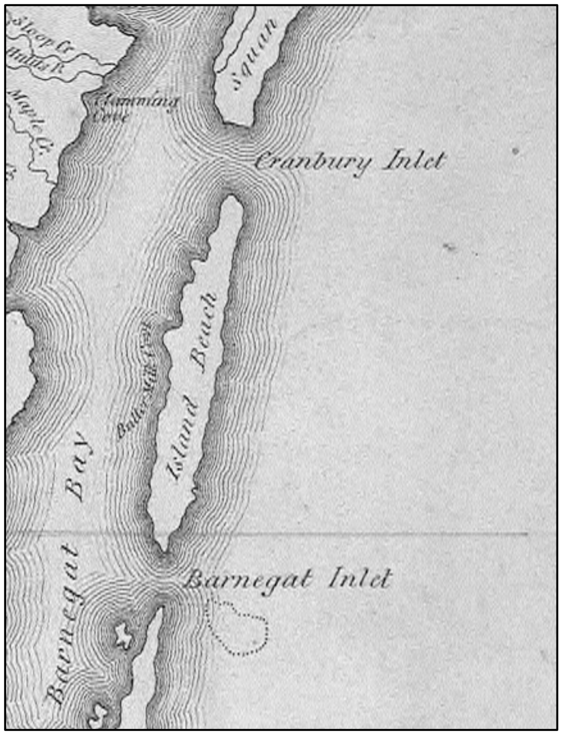

Figure 3-45. 1812 New Jersey map showing the Barnegat Inlet and a new inlet identified as Cranbury Inlet (Chart 853 from NOAA's Office of Coast Survey's Historical Map and Chart Collection).

Figure 3-46. 1833 chart excerpt of Barnegat Inlet showing Cranberry Inlet closed now making Island Beach a promontory (Chart 853 from NOAA's Office of Coast Survey's Historical Map and Chart Collection).

Illustrated in Figure 3-47, the first navigational chart from NOAA dates to 1866. This chart provides the best up close view strictly of Barnegat Inlet. Barnegat Light is shown south of the inlet on Long Beach Island. The chart has five shipwrecks marked: two west in Barnegat Bay; one east of Barnegat Light; and two near the current Project Area. Of these two, one shipwreck lies in the sand of Island Beach and the other is on a connecting sand bar, almost dry at low tide. All shipwreck symbols are illustrated as dangerous. While the two shipwrecks are immediately near the current Project Area, these shipwrecks are considered older than the current Project Area's vessel under the northern jetty.

Figure 3-47. 1866 nautical chart of Barnegat Inlet showing five shipwrecks within the area including two immediately near the contemporary North Jetty and Project Area (Chart 10 from NOAA's Historic Coast & Geodetic Survey Collection Catalog of Images; surveyed in 1866 by C. Fendall; Annual Report 1865).

The next navigational chart from NOAA dates to 1879 (Figure 3-48). Barnegat Light is visible on Long Beach Island along with the Barnegat LLS Station on the beach. The Forked River LLS Station is identified north on Island Beach. An area for Winter Anchorage is found between Sedge Island and Island Beach. Breakers are noted towards the southern area of the inlet. However, unlike the previous 1866 chart, no shipwreck is noted at Barnegat Inlet. A later 1884 chart (not shown), shows the same details as the 1879 chart revealing no change at and near the inlet.

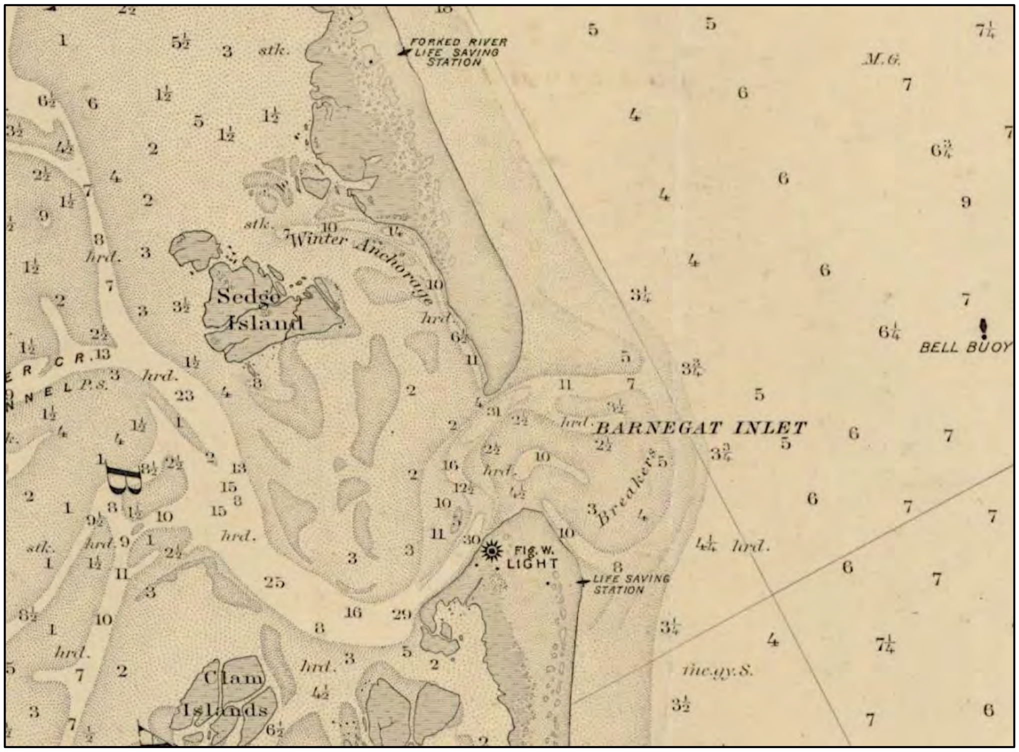

Figure 3-48. 1879 nautical chart excerpts showing the Project Area; however, none of the previously noted shipwrecks are shown on this map (Chart 122 from NOAA's Office of Coast Survey's Historical Map and Chart Collection).

Illustrated in Figure 3-49, the next available navigational chart from NOAA dates to 1928. This map also looks identical to the previous 1879 and 1884 charts. One of the noticeable changes is that now breakers nearly cover the entire opening of Barnegat Inlet. Also both LLS Stations are also now identified as Coast Guard Stations. No cultural feature (i.e., shipwrecks) is represented at or near the Project Area on the map.

The next NOAA navigational chart dates to 1934 (Figure 3-50) and shows essentially the previous view. Two cables are noted between Barnegat Inlet and the breakers are still heavily present outside the inlet. No cultural feature (i.e., shipwrecks) is represented at or near the Project Area on the map.

Figure 3-49. 1928 nautical chart excerpt showing the Barnegat Inlet with no shipwreck noted (Chart 1 of 3 New Jersey Inland Waterways 1928 from Rutgers University Cartography Services http://mapmaker.rutgers.edu/MAPS.html).

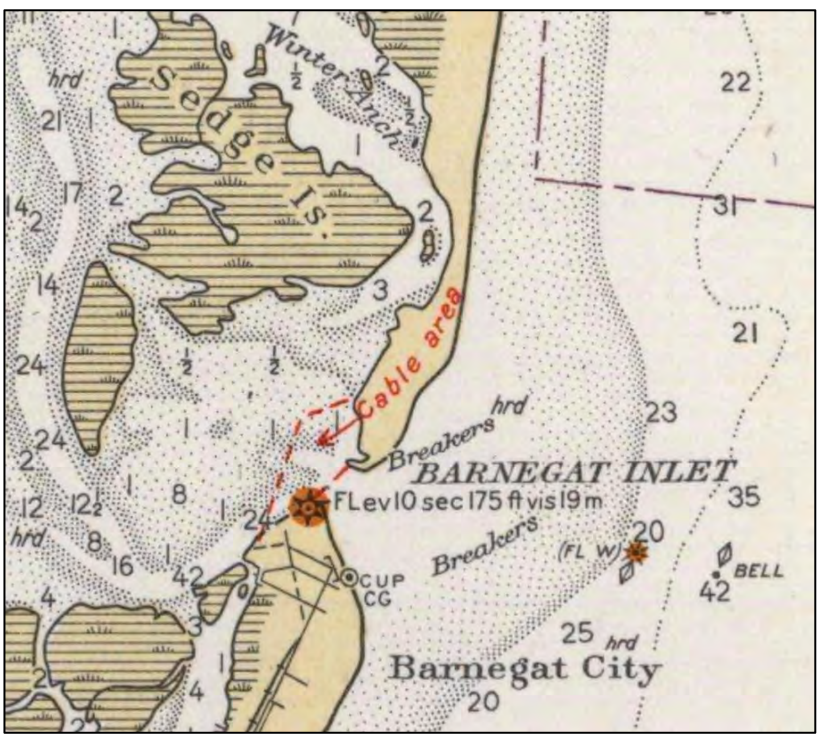

Figure 3-50. 1934 nautical chart excerpt showing the inlet prior to the construction of the north and southern jetty (Chart 1216 from NOAA's Office of Coast Survey's Historical Map and Chart Collection).

NOAA's 1941 navigational chart, illustrated in Figure 3-51, displays the newly built jetties at Barnegat Inlet. One shipwreck with visible superstructure is found southwest of Sunset Shoal outside the inlet towards the bay. No other shipwreck is noted near the Project Area.

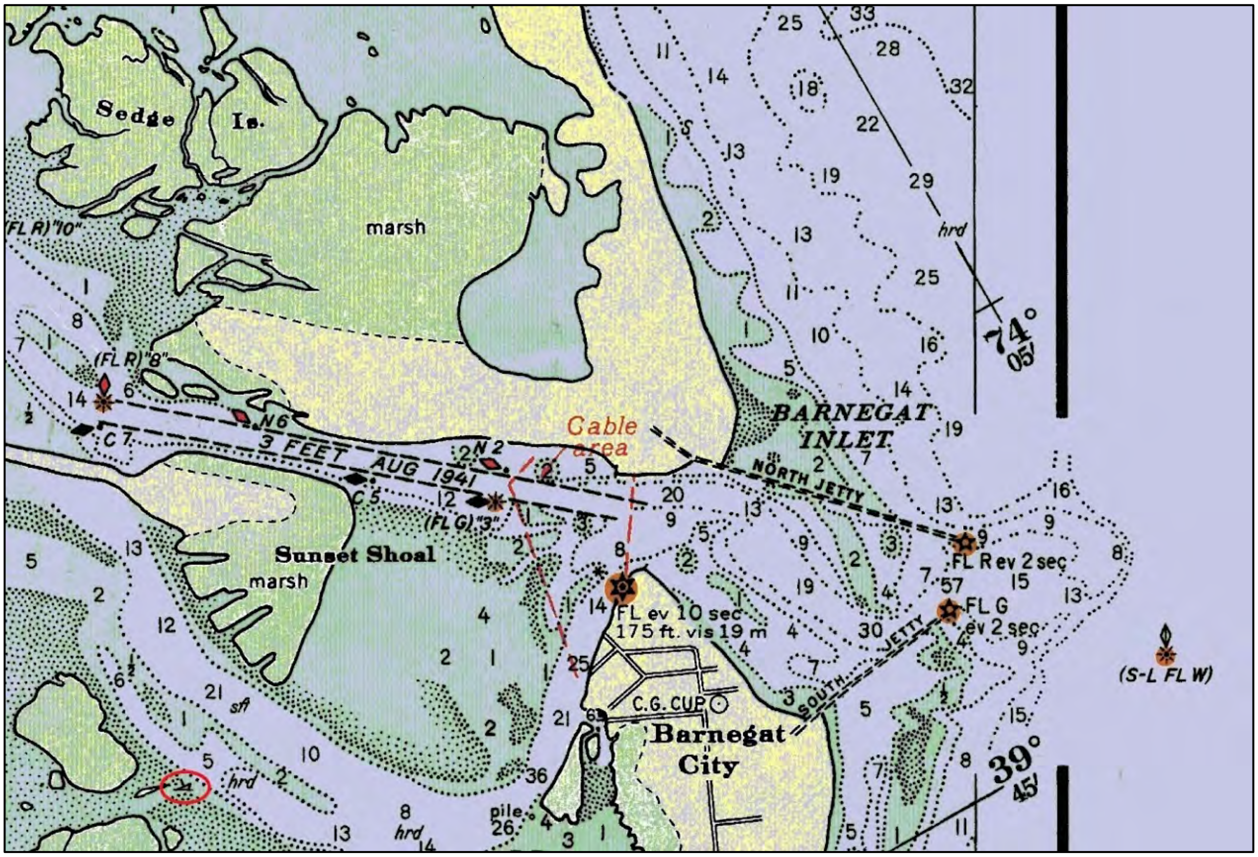

Figure 3-51. 1941 nautical chart excerpt showing Barnegat Inlet after the construction of the northern and southern jetties. One shipwreck is noted west of Barnegat City in the bay area (Chart 825 from NOAA's Office of Coast Survey's Historical Map and Chart Collection).

A more modern navigational chart is illustrated in Figure 3-52. This 1957 chart shows the inlet has changed shape around Island Beach and at Barnegat City. Barnegat Light is noted as abandoned at this time and two shipwrecks with superstructure are found west of the inlet in the sound. The sand dike is shown on this chart west of Barnegat. One other shipwreck is found east of the inlet offshore. Barnegat City is now identified as Barnegat Light.

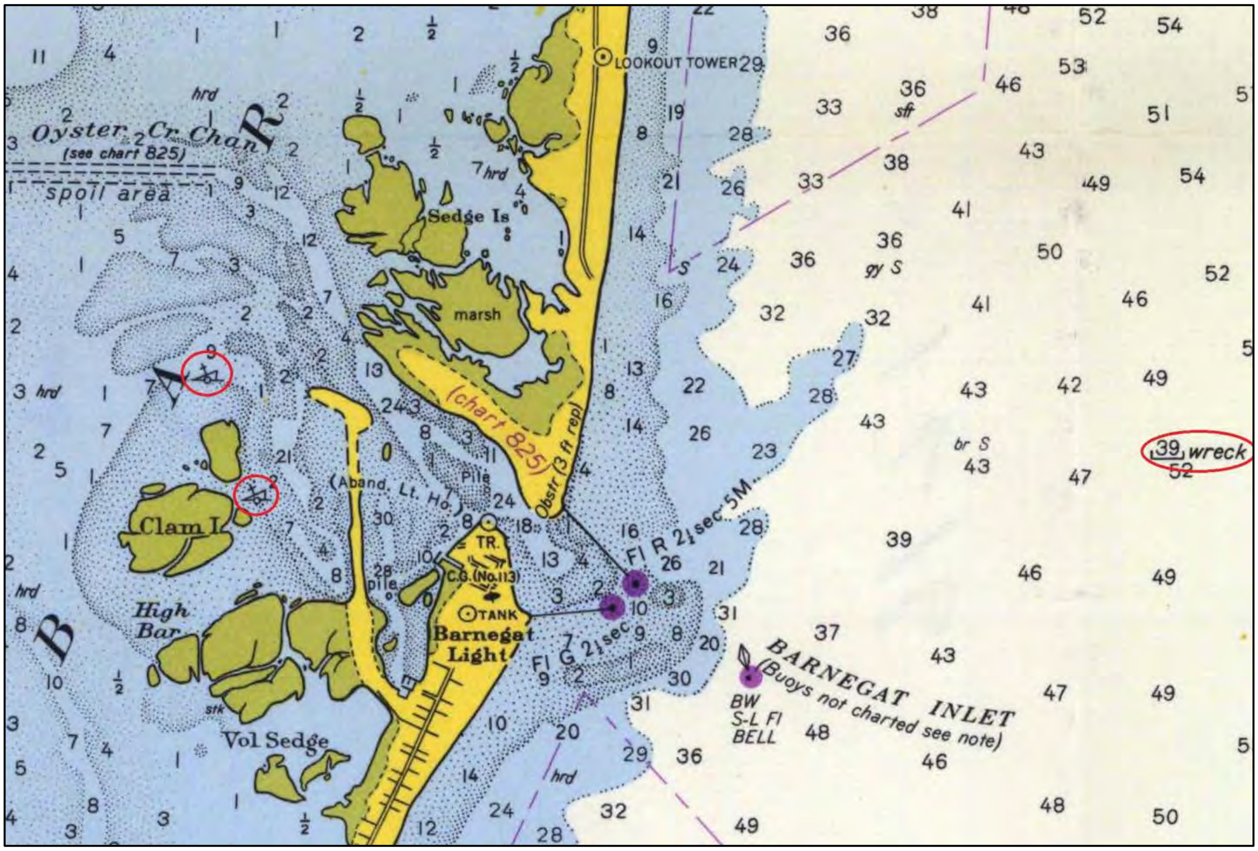

Figure 3-52. 1957 nautical chart excerpts showing Barnegat Inlet with two shipwrecks in Barnegat Bay and one offshore (Chart 1216 from NOAA's Office of Coast Survey's Historical Map and Chart Collection).

The most recent nautical chart from the NOAA website, Chart 12324, dates to 2012 (Figure 3-53). This chart shows new shipwrecks outside the project area and one shipwreck with visible superstructure at the end of the northern jetty in Barnegat Inlet. Four other shipwrecks are shown on the chart around the inlet. Two notes are shown for Barnegat Inlet (Note Z and C). Note Z simply states that the area is a no-discharge zone under the Clean Water Act. Note C states that for Barnegat Inlet and Oyster Creek Channel, "Buoys in these channels are not charted because they are moved frequently. Hydrography in Barnegat Inlet is not shown due to its continually shifting nature. Consult Local Notice to Mariners, 5th Coast Guard District, for the latest positions of aids to navigation." Lastly, the newer 1991 southern jetty is present on this chart, paralleling the northern jetty.

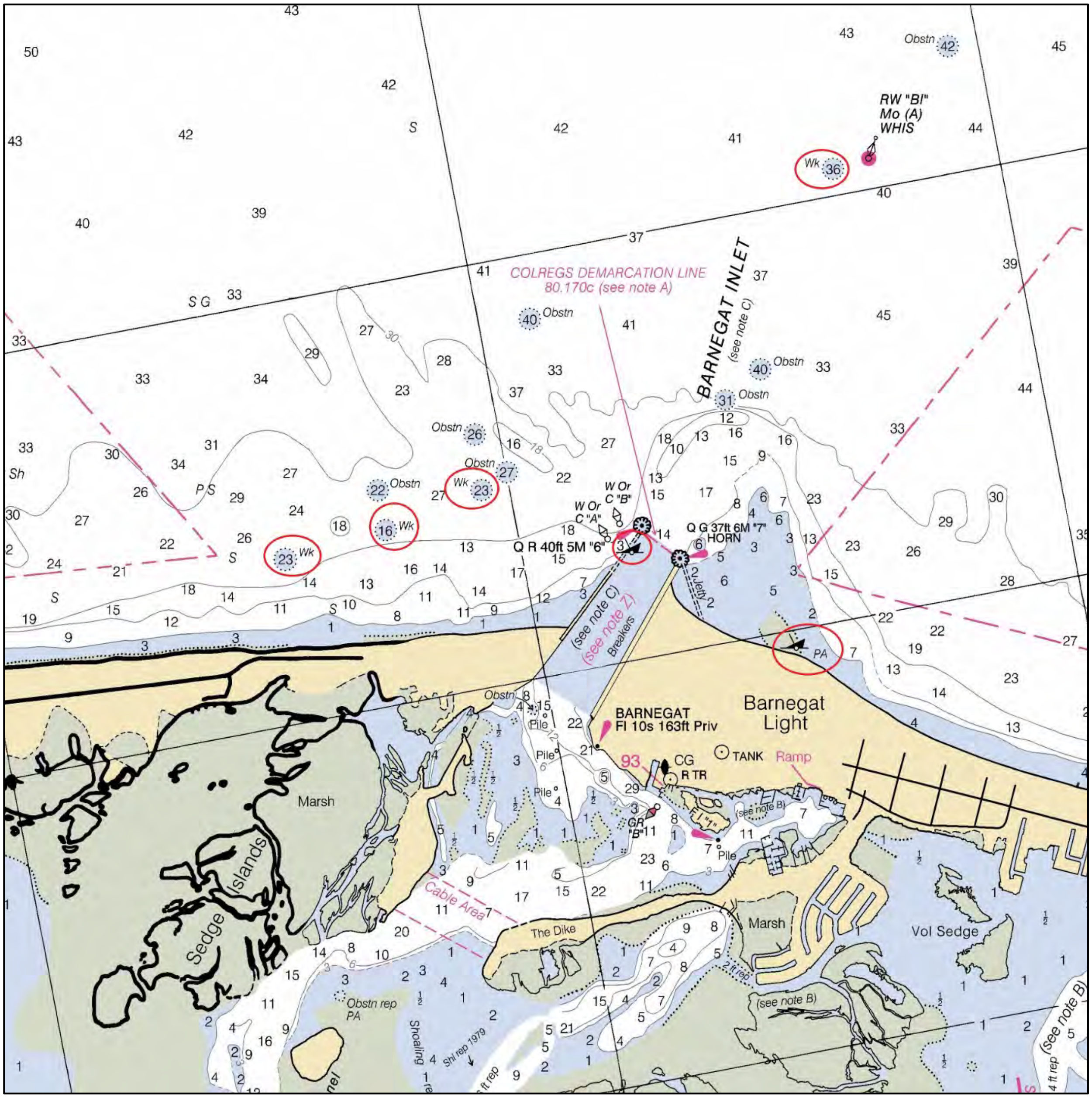

Figure 3-53. 2012 nautical chart excerpts showing the Barnegat Inlet with five shipwrecks outside the inlet and one shipwreck with superstructure visible at the end of the northern jetty. Also note a new southern jetty runs parallel with the northern jetty (Chart 12324 from NOAA's Office of Coast Survey's Historical Map and Chart Collection).

INITIAL DISCOVERY

In the summer of 2014, the USACE, Philadelphia District commenced the process of repairing the Barnegat Inlet North Jetty, damaged during Hurricane Sandy. A section of the northern jetty completed in the late 1930's was breached by the effects of Hurricane Sandy on its western shore end. During repairs, which included removal of the existing damaged jetty, an apparent historic shipwreck was discovered after parts of it had been removed and piled onshore. Specifically, sections of hand-hewn, wooden hull fragments, treenails, and various metal fasteners were observed by the USACE Quality Control officer and reported to the USACE Cultural Resources Specialist on 26 June 2014. In order to get a better understanding of the artifacts, the USACE contacted Panamerican and a maritime archaeologist visited the site on 9 July 2014. The assessment of the site (i.e., based on recovered timbers, fasteners, and other artifacts) indicated the presence of at least one historic vessel with a potential construction period of the late nineteenth century within the existing North Jetty repair footprint.

No additional wreckage was removed after initial impact. However, based on equipment operator reports on where timbers were first encountered, it appeared that between 40 to 50 feet (12.2 to 15.2 meters) of the wooden vessel had been removed, this removed portion constituted the "Debris Pile." Also uncovered at the same time as the initial encounter, a large wooden windlass, unattached to wreckage, was excavated approximately 200 feet (61 meters) to the east of the still intact wreck portion. Other vessel components, such as a chain plate and dead eye were also recovered near—but not on—the site, all of which added to initial confusion surrounding an understanding of the site.

Figures 4-01 to 4-03 illustrate the site during the initial site visit. Figure 4-01 shows the initial cut where the Debris Pile timbers originated, with the timbers visible on the right side of the image. Figure 4-02 is the recovered timber and vessel components pushed into the Debris Pile. Figure 4-03 illustrates the unremoved portion of the *in situ* vessel that was in left place and examined as part of the Data Recovery effort. Lying in line and parallel with the centerline of the jetty, the intact portion measured 55 feet (16.8 meters) from its forward to western edge. Left in place, this intact section was ultimately covered by new jetty construction. Figure 4-04, a map of the vessel component locations, shows all discussed items.

Figure 4-01. The initial cut where the Debris Pile timbers originated, the timbers visible on the right side of the image.

Figure 4-02. The recovered timber and vessel components pushed into the "Debris Pile." This constitutes approximately 40 to 50 feet of intact structure.

Figure 4-03. The recovered timber and vessel components pushed into the "Debris Pile". This constitutes approximately 40 to 50 feet (12.2 to 15.2 meters) of intact structure.

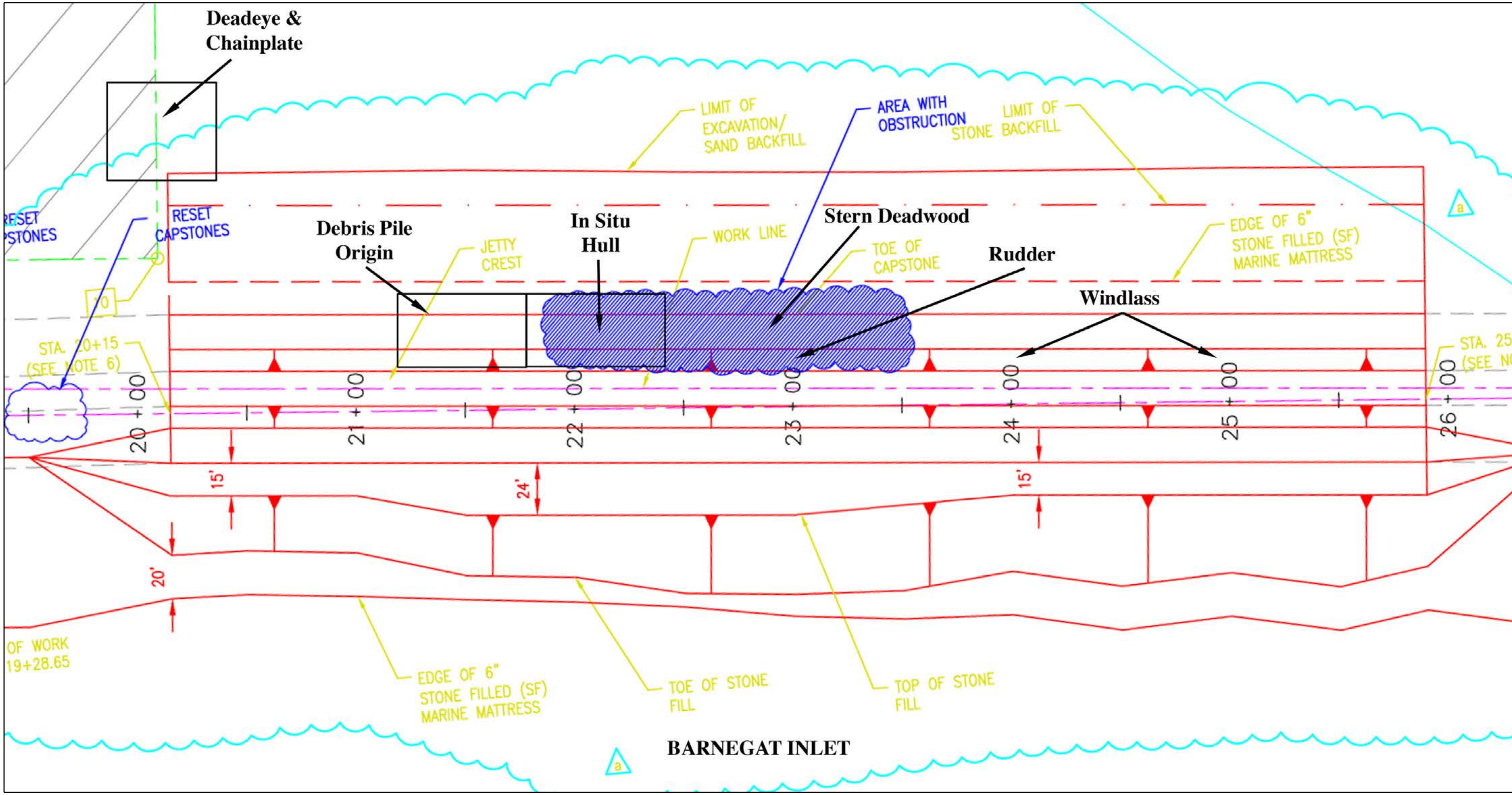

Figure 4-04. Map of the vessel component locations.

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DATA RECOVERY OF THE IN SITU VESSEL

Conducted from 28 July to 20 August 2014, fieldwork was conducted by a research team of fours maritime archaeologists, with one construction monitor, and between one and four people monitoring the uncovering of the site, site delineation, artifact stabilization, and recordation of exposed material and debris.

As illustrated in Figure 4-04, the remaining *in situ* hull covers an area approximately 55 feet (16.8 meters) in length, and is approximately 33 feet (10.1 meters) wide based on observations from excavator operators "falling off" the wreck while excavating adjacent to the hull some 15 feet (4.6 meters) deeper without encountering additional remains. The wreck lies just north of the centerline in an east-west orientation, essentially perpendicular to the jetty. Figure 4-05 is a schematic of postulated vessel orientation showing the removed area of the vessel as based on observed timbers in the Debris Pile and equipment operator observations. Also indicated are exposure and burial extent of the *in situ* remains. Although Figure 4-04 is conjecture in some respects, we know the recovered material comes only from the area of the vessel shown in the figure, and the *in situ* remains represent this area as well. The remaining buried amount of hull shown in the figure is conjecture, but it is likely that at least half of the hull to the keel is intact, and even the entire port side of the vessel could be present as well.

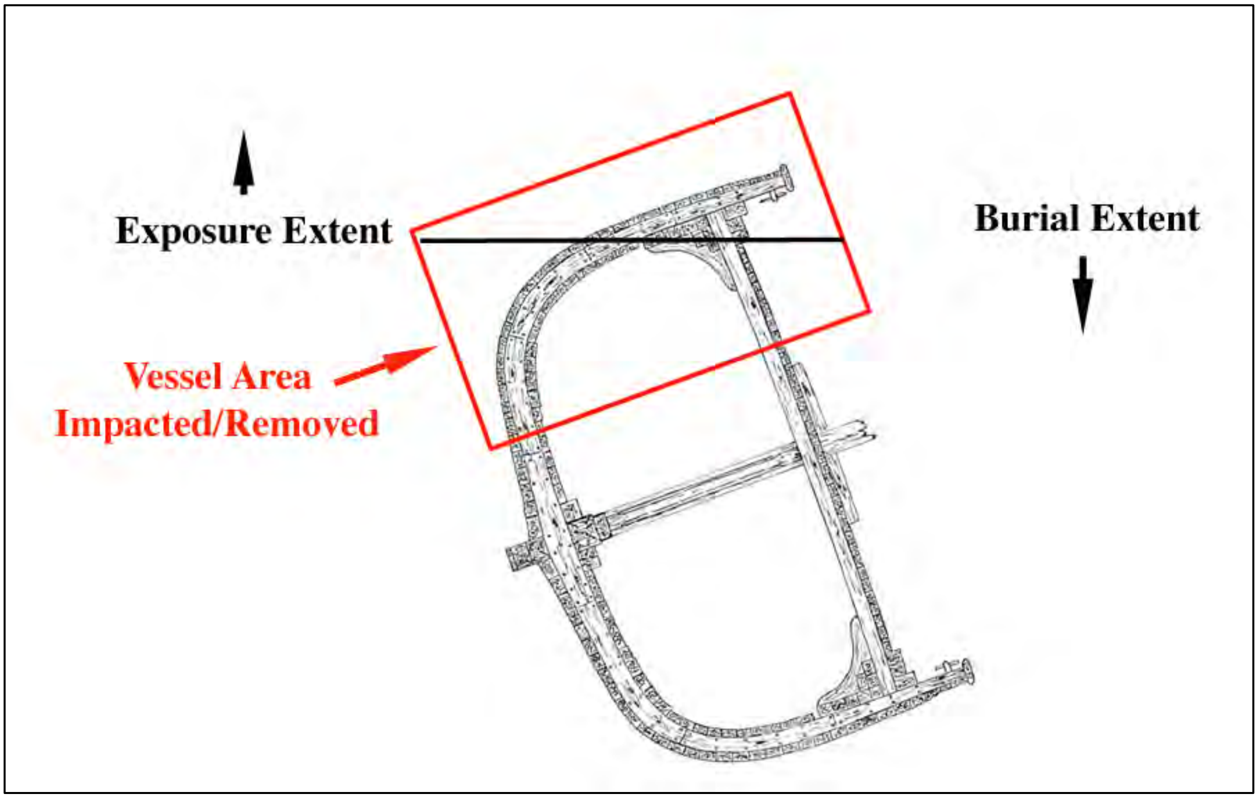


Figure 4-05. Schematic of postulated vessel orientation showing removed area of the vessel as based on observed timbers in the Debris Pile and equipment operator observations. Also indicated are exposure and burial extent (after www.boatnerd.com/digitalshipyard/belliveauships/shipbuilding.htm). Orientation is looking east or offshore down center line of jetty; north is to the left; and the inlet is to the right of the vessel.

Barely above the water table at extreme low tide, and located from Station 21.80 to 22-35, only a small portion of the *in situ* hull remains could be assessed. Representing the upper extent of the hull side (see Figure 4-05), the exposed remaining 55 feet (16.8 meters) of run of hull was somewhat damaged on the upper edge by excavators. As discussed below, if the stern deadwood and rudder, both located east of the intact portion, are in their correct locations, the intact exposed portion would then represent the starboard hull side. Figures 4-06 to 4-16 illustrate the *in situ* remains and its various components.

The *in situ* side of hull is composed of 1-foot (30.5-centimeter) wide by 8-inch (20.3-centimeter) thick frames with 1-foot (30.5-centimeter) wide 3-inch (76.2-centimeter) thick outer hull planking and 6-inch (15.2-entimeter) thick ceiling planks (*Appendix F: Debris Pile Scantling Measurements*). Wood samples were taken of all three components, the frame, outer hull plank and ceiling. Analysis identified all three samples as Larch or Tamarack (American Larch) a northern species that is native to Canada from the Yukon to Newfoundland and south into the northeastern United States (*Appendix G: Wood Sample Analysis*). Hull planks are fastened to the frames with numerous treenails and iron spikes. The treenails are wooden dowels and act as wooden nails. Representing chaffing logs or possible rigging locations, the remains of two vertical timbers are present on the topside of the hull planks (see Figures 4-09 and 4-13).

Figure 4-06. Uncovering the *in situ* portion of the vessel. Note proximity to the inlet and centerline of the jetty.

Figure 4-07. Uncovering the *in situ* portion. Note water table, as well as piling that was from original jetty construction.

Figure 4-08. Approximately 26 feet of exposed *in situ* portion. Note its location relative to inlet and Barnegat Lighthouse.

Figure 4-09. Western edge of *in situ* portion. Perpendicular timber below archaeologist's foot is thought to be a chaffing log or possible rigging location. Archaeologists are standing on outer hull planking.

Figure 4-10. Exposed run of hull. Note the water table at low tide.

Figure 4-11. View of the run of hull showing splintered frame tops.

Figure 4-12. Profile of the hull side showing splintered futtock frames with ceiling planks below and outer hull planks above.

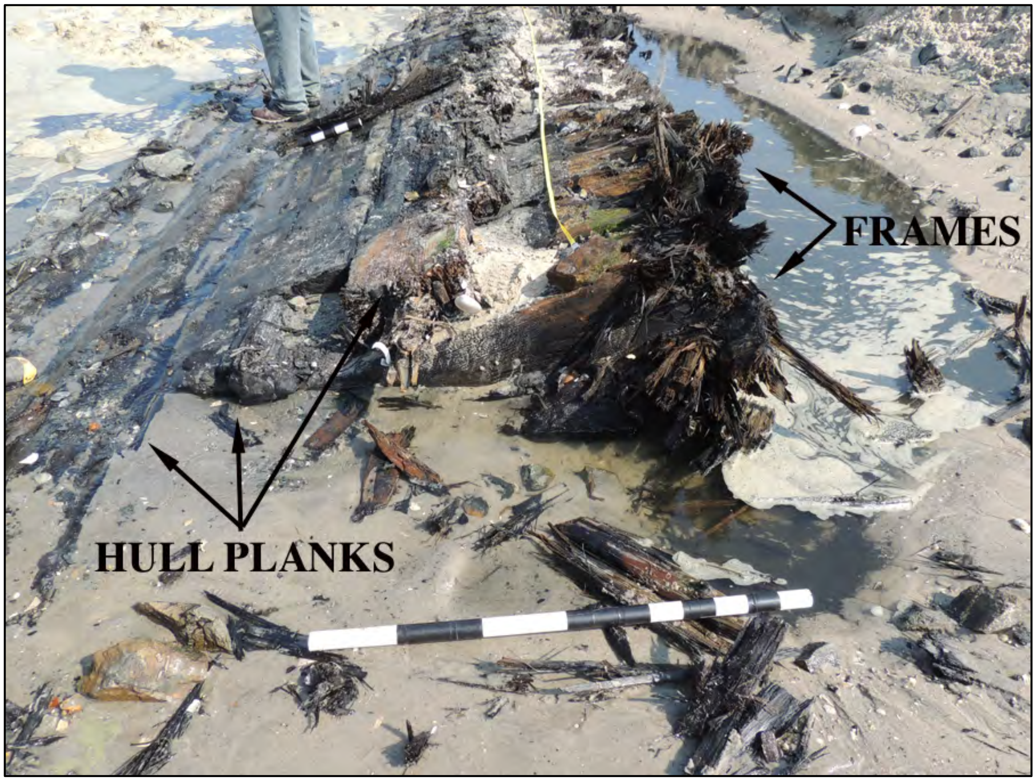


Figure 4-13. Another view of the western edge. Note small scale adjacent to what may be chaffing gear or a rigging component.

Figure 4-14. Splintered futtock frames all approximately 1 foot wide. Scale is 1 foot in 2 tenths of feet increments.

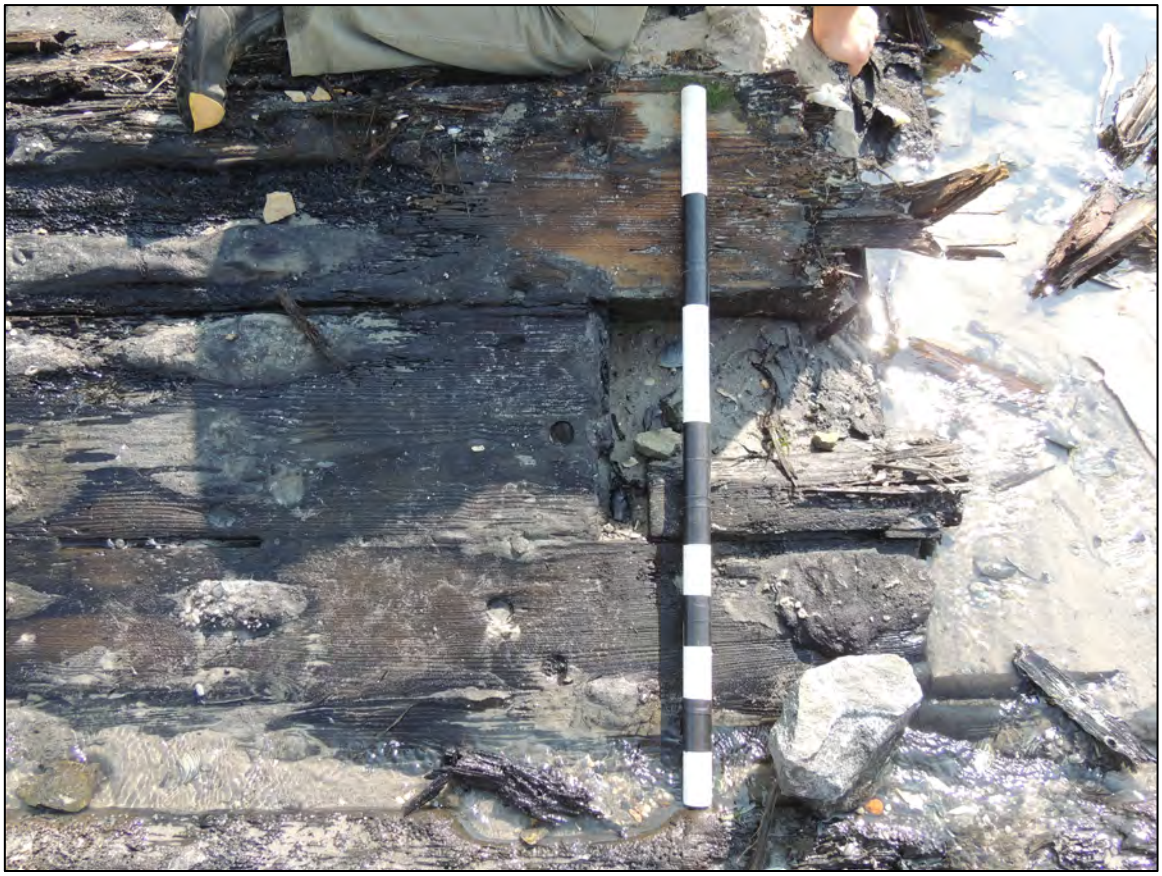


Figure 4-15. Western edge of the *in situ* portion showing the outer hull planking 1 foot wide and 3 inches thick. Scale is 0.5-foot increments (top) and tenths of feet increments (2-inch markers) below.

Figure 4-16. Severe water and sand erosion of the outer hull planking. Vertical timber at right is a second chaffing log or possible rigging location.

DEBRIS DOCUMENTATION

After assessment and recordation of the *in situ* hull remains, archeologists assessed and documented debris/components of the intact vessel removed west of the *in situ* remains. The removed components represented 40 to 50 feet (12.2 to 15.2 meters) of what was then intact hull (see Figure 4-04 above), including frames, planking, and knees, as well as several disarticulated components including the stern deadwood, a windlass, and the rudder. The majority of debris is composed of ships frames and represents the hull side down to and through the turn of the bilge as illustrated in Figure 4-05. The lower hull along with keel and keelson(s) was not apparent in the Debris Pile, nor was any sign of the bow structure, and both areas are therefore thought not to have been impacted or removed. Additionally, no cargo, machinery, or rigging elements were present in the Debris Pile.

Some observations on the recovered fragments include extensive *Teredo navalis* (ship worm) damage on many of the wood components including the windlass. The damage indicates exposure underwater in a post-wrecking environment. Another interesting observation is that a majority of the recovered timbers that comprise the Debris Pile as well as the main wreckage all have a reddish tint, as if covered by iron rust. This may be a result of corrosion from the iron strapping found on the vessel (discussed below), but this is only speculation.

Figure 4-17. The majority of debris is composed of ships frames and represents the hull side down to and through the turn of the bilge. Shown here are several large frames.

Several large components were isolated from the main Debris Pile when originally recovered. These included what at first was thought might be part of the trestle that was employed to build the original jetty. Upon closer observation, it was found to be a side of the vessel's hull and consisted of four 1-foot (30.5-centimeter) thick frames and numerous 10-inch (25.4-centimeter) wide ceiling planks (Figure 4-18). Other isolated components included four large framing members (Figure 4-19). All similar in size and shape, all had curvature indicating they represented turn of the bilge frame. The turn of the bilge is the curved portion of the hull between the flat bottom of the vessel and the flat upward projecting vessel side (see Figure 4-04).

Figure 4-18. Fragment of the vessel's side. Four frames lay on top perpendicular to ceiling planks. Note the treenails projecting from the top faces of the frames. These would have fastened the 3-inch thick hull planking.

Figure 4-19. Isolated components included four large framing members, all with curvature indicating they represented turn of the bilge.

One of the four timbers is shown in Figures 4-20 and 4-21, the latter a schematic of the timber (see also *Appendix H: Barnegat Inlet Schematic Images*). A composite frame, it is 8 feet (2.4 meters) remaining in length and varies in thickness but is 1 foot (30.5 centimeters) wide. Treenails are present on its bottom face, the hull planks they fastened no longer present. It has a "fillet" on its base (i.e., a small timber shaped to complete the curve of the hull). The remains of a third timber is scarphed onto the frame at one end but has been torn away, showing the strength of the scarph.

Figure 4-20. Large composite frame that would have come from the turn of the bilge.

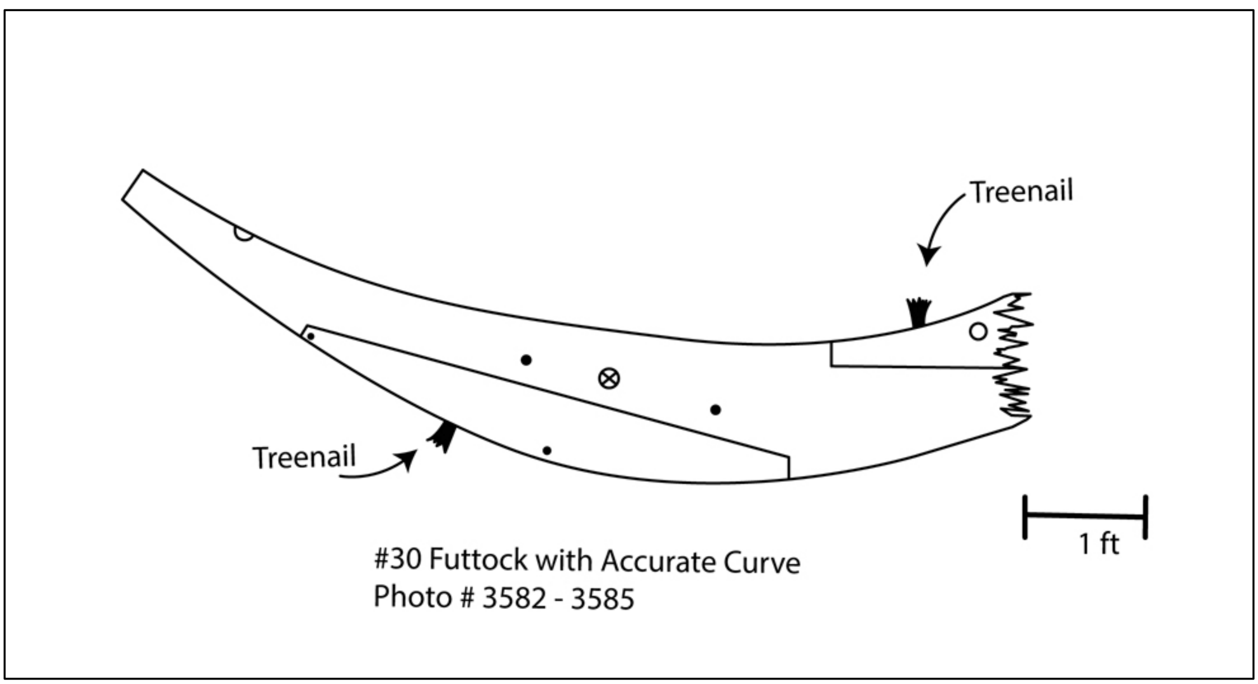


Figure 4-21. Schematic of composite frame indicating curvature of the bilge. Note the "fillet" on its base and scarph at one end.

Many of the frames had evidence of scarphs, several of them shown below (Figures 4-22 and 4-23). They all appear on timbers with curvature of the bilge.

Figure 4-22. One of the many different timber scarphs. Note the curvature on the bottom of the timber.

Figure 4-23. Another view of a different timber scarph. Note the curvature of the hull.

WINDLASS

A wooden windlass was recovered well east of the *in situ* hull remains between Station 24 and 25 (see Figure 4-04). Located east of the rudder, the windlass is a disarticulated artifact found with no other wreckage. Appearing to be the correct size for the *in situ* hull, however, it is in a very deteriorated condition with extensive *Teredo navalis* damage.

Illustrated in Figures 4-24 and 4-25, the remaining length of the highly deteriorated windlass is 5.1 feet (1.5 meters) with a maximum diameter of 1.5 feet (45.7 centimeters). It was originally probably twice that length.

Originally thought to be the remains of a capstan during the field investigation, further study of the component identified it as a windlass. Employed to lift heavy weights such as anchors, or hoisting yards and sails, a windlass is a barrel-shaped drum positioned on two vertical uprights on the main deck near the bow that rotates, and around which a hauling line or chain is wrapped several times to get a purchase. They evolved to consist of a wooden drum or barrel mounted on an iron axle similar to our example (see Figure 4-26).

Figure 4-24. Highly deteriorated windlass found between Station 24 and 25 is a disarticulated artifact found with no other wreckage.

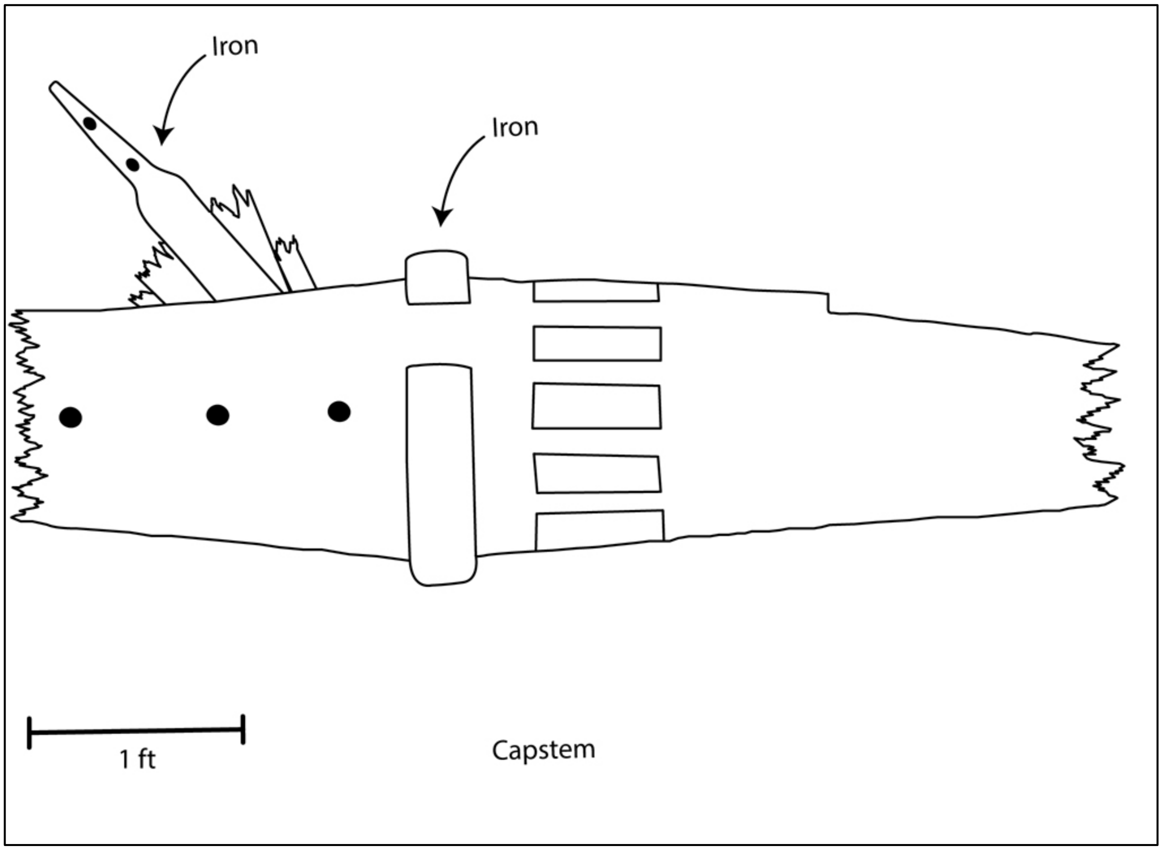


Figure 4-25. The remaining length of the highly deteriorated windlass is 5.1 feet with a maximum diameter of 1.5 feet. It was most likely twice this size.

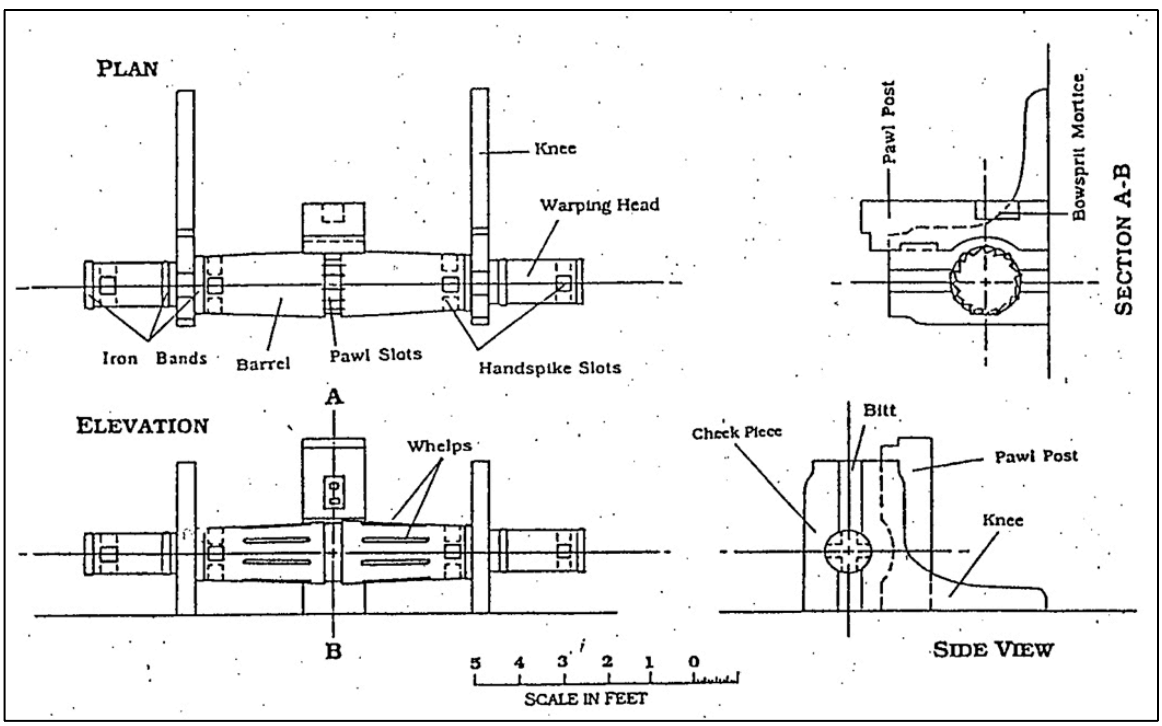


Figure 4-26. Schematic of the windlass on the Bethune Blackwater Schooner (as presented in National Park Service 1991:48). Our barrel windlass would have looked similar to this example.

IRON KNEES

Numerous iron knees were present in the Debris Pile and no two appeared alike. Only two of the knees were intact and Figure 4-27 shows four of the knees, while Figures 4-28 and 4-29 show a fifth well-preserved specimen. Similar to their wooden counterparts, irons knees were employed as internal strengthening members that connected the ends of hold beams, or lower deck beams, to the vessel's sides and could either be positioned as hanging, lodging, or rider knees. Because nineteenth-century American shipbuilders had ample supplies of wood, the use of iron knees did not generally appear in this country until the latter part of the century and was commonplace in the first quarter of the twentieth century (see Figure 4-30). The presence of the knees serves to strengthen the postulated date for the North Jetty Shipwreck as late nineteenth to early twentieth century.

A single knee was collected for conservation and is pictured in Figure 4-28, its drawing shown in Figure 4-29. The knee is 5.4 feet (1.6 meters) in length and its head, which is 1.5 feet (45.7 centimeters) long, is formed to support a large internal beam.

Figure 4-27. Four of the knee fragments. The lower knee is 5 feet in length.

Figure 4-28. Knee that was recovered for conservation. It is 5.4 feet in length.

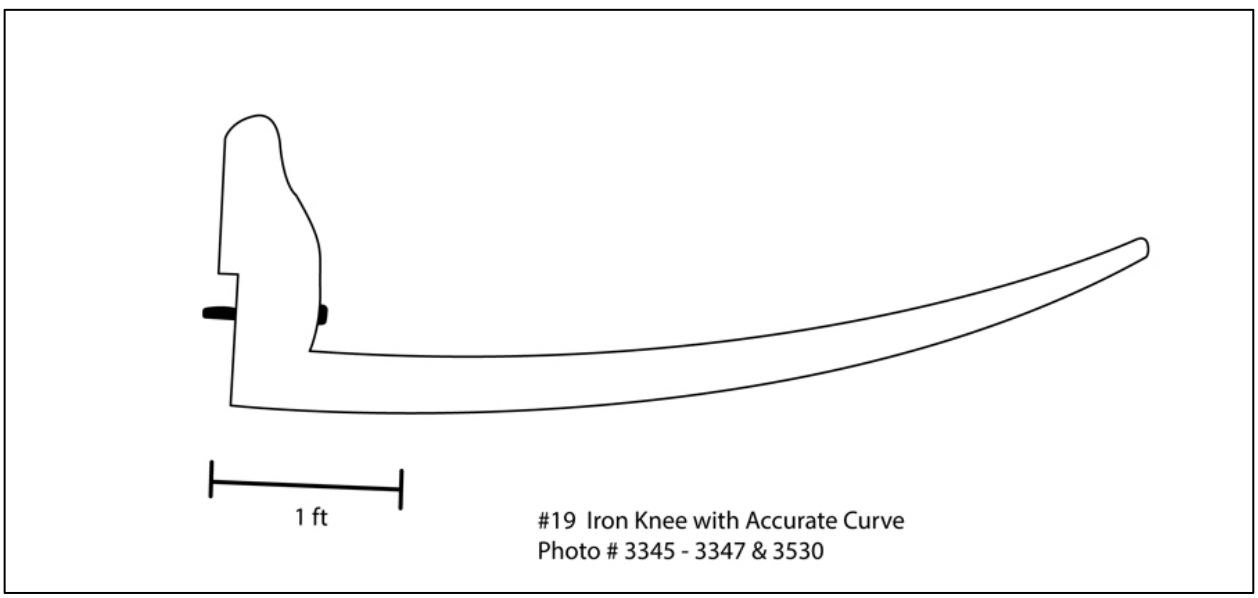


Figure 4-29. Schematic of the above knee. Note the notch at the top (left) that would have been for an interior beam.

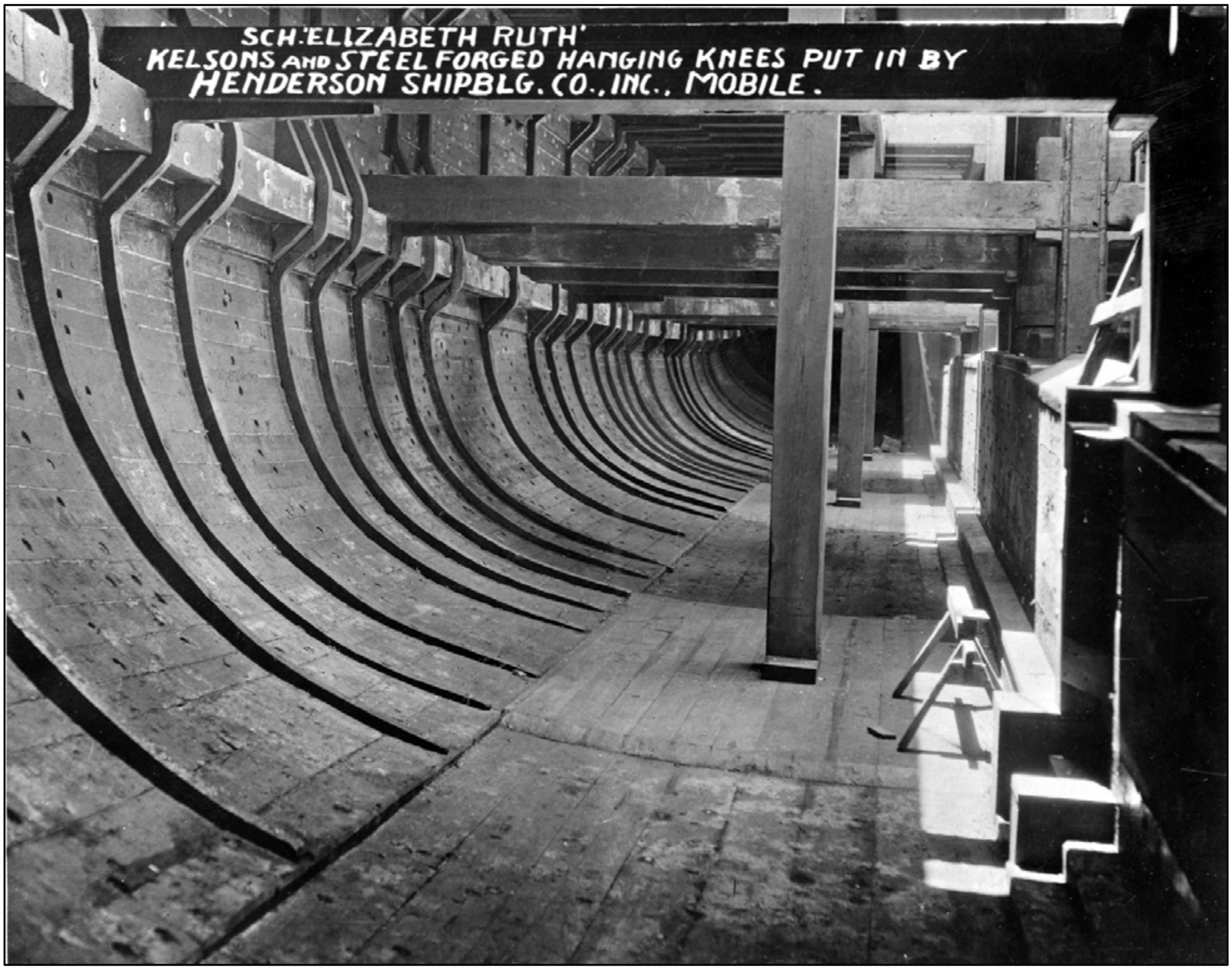


Figure 4-30. Early twentieth-century photograph of the interior of a vessel showing large iron hanging knees. Note the knee directly below the word "Henderson" (from the Overbey Collection, Courtesy of the University of South Alabama Archives).

Wooden Knees

Several wooden knees were present in the Debris Pile; however, they were in very poor condition and sizes could not be accurately determined. Figure 4-31 shows the best representative example. With a remaining length of 3 feet (0.9 meters), it is a compass timber, or naturally curved timber, most likely containing a portion of the trunk and a large branch or just a portion of a curved branch. Similar to their later iron counterparts, wooden knees were employed as internal strengthening members that connected the ends of hold beams, or lower deck beams, to the vessel's sides and could either be positioned as hanging or lodging knees. Figure 4-32 shows their location and function in the interior of a vessel.

Figure 4-31. Wooden hanging or lodging knee. Note that it is a compass timber (i.e., one that has not been cut to shape).

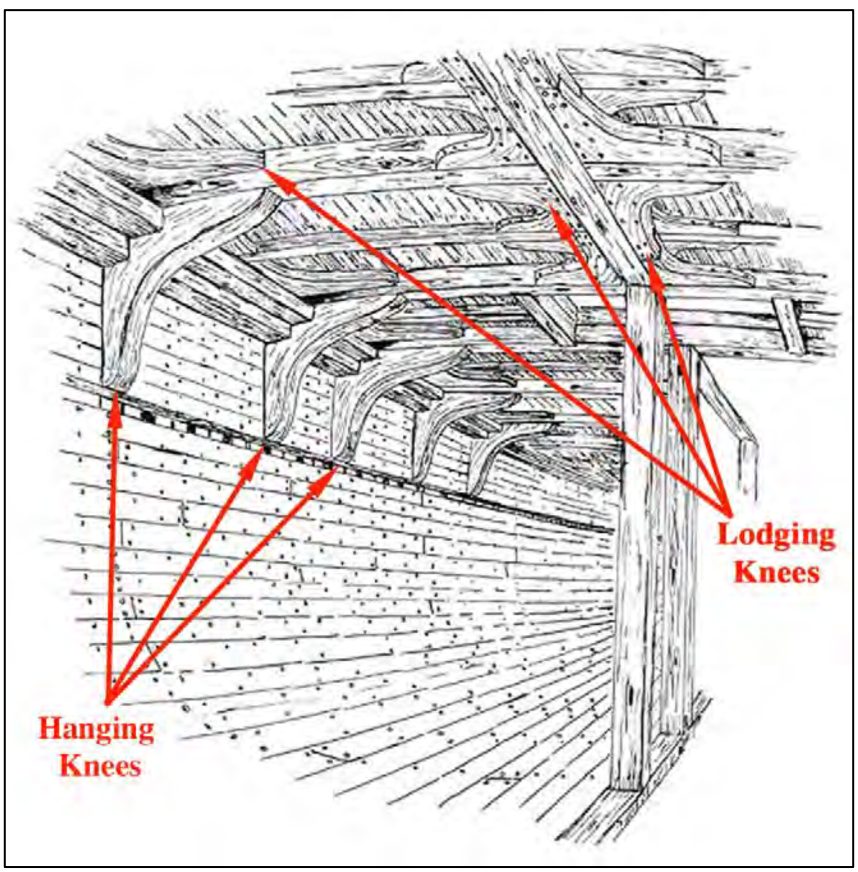


Figure 4-32. Schematic showing location and types of knees. The provenience of ours is unknown; it could represent a lodging or hanging knee (courtesy of www.boatnerd.com/digitalshipyard/belliveauships/shipbuilding.htm).

STERN DEADWOOD

Illustrated in Figure 4-33, a major portion of the stern deadwood was recovered 37 feet (11.23 meters) east of the eastern extent of the site and was disarticulated from the main intact buried wreck section (see Figure 4-04). Although disarticulated, the timber sizes are similar to the main wreck site, so it is quite likely that it originated from the main site. Both the keel and sternpost timbers are 1 foot (30.5 centimeters) wide by 1.2 feet (36.6 centimeters) thick (Appendix F), and both are Birch wood (Appendix G).

Deadwood is comprised of stacked external longitudinal timbers at the extreme bow or stern of a vessel, and has no attached framing members. Figures 4-34 and 4-35 indicate the location of the stern deadwood on a vessel and label some of the major components such as the keel and sternpost.

Shown in Figures 4-36 to 4-40, the bottom longitudinal timber is the keel of the vessel, and on our specimen it has been cut, indicating some form of salvage. Originally the timber would have been as long as possible, as it is a major structural component often referred to as the backbone of a vessel. Also indicating salvage, the sternpost has two notches cut into it, which are assumed to be where the rudder gudgeons would have been located. These gudgeons would have held the rudder on to the sternpost, but they have been removed (Figure 4-38).

The deadwood retains the remains of two hull planks rabbitted into the sternpost fastened with copper spikes and treenails (Figure 4-40). The use of copper spikes would indicate a vessel was copper-sheathed, as opposed to iron-fastened, which would preclude use of copper sheathing. However, very little evidence for sheathing is present on the sternpost or deadwood. There are no extant sheathing tacks and no tack holes, indicating it was not sheathed.

Figure 4-33. A major portion of the stern deadwood was recovered near the eastern or offshore extent of the site and was disarticulated from the main intact buried wreck section.

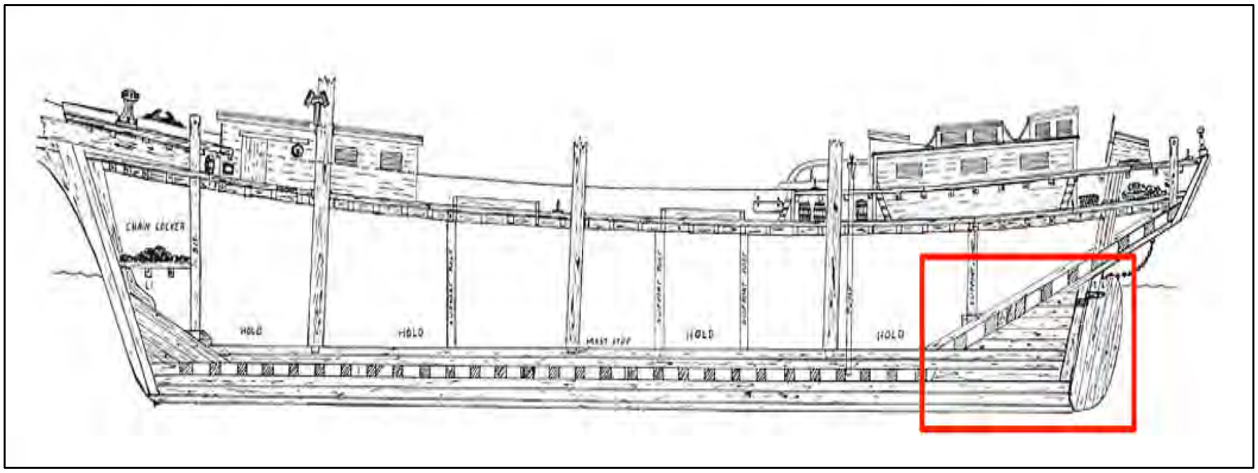


Figure 4-34. Schematic showing location of stern deadwood on a vessel, as well as the rudder (after www.boatnerd.com/digitalshipyard/belliveauships/shipbuilding.htm).

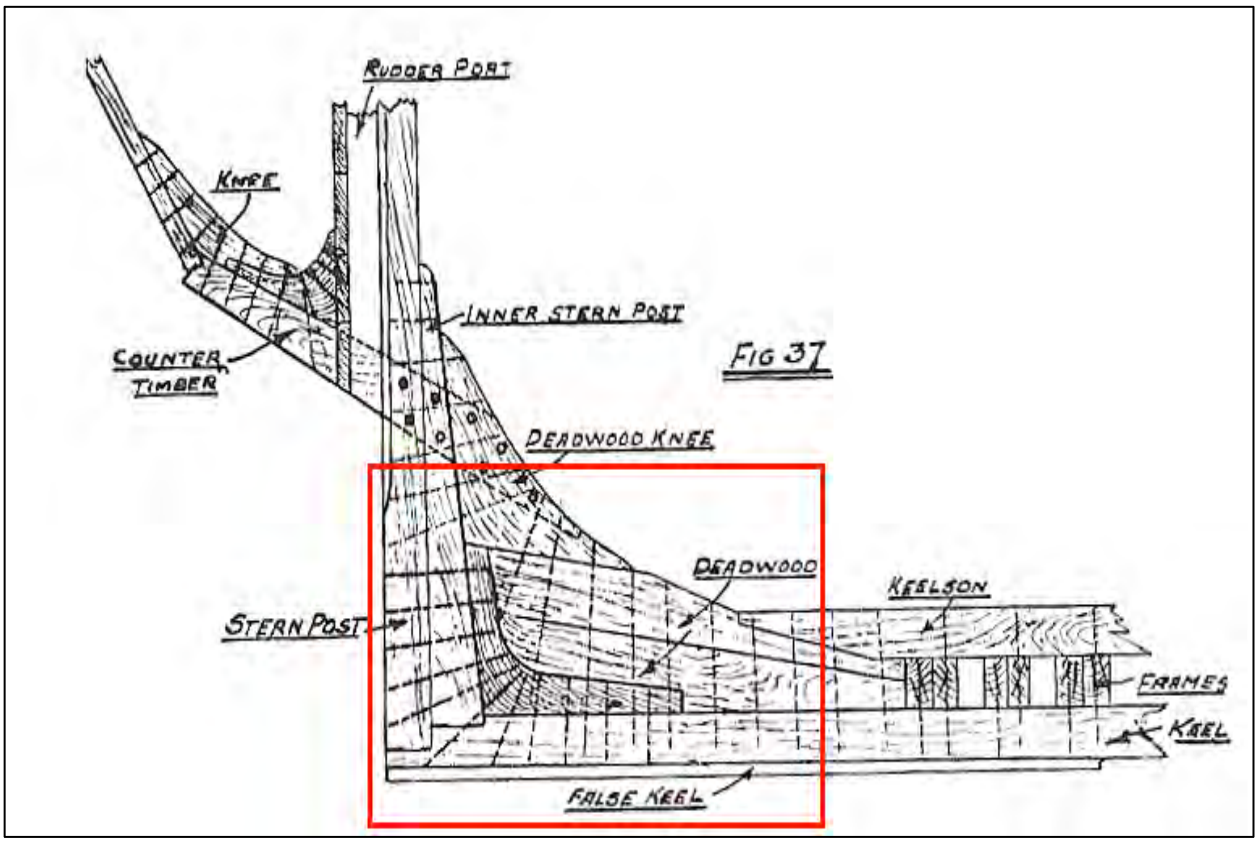


Figure 4-35. Schematic showing components of the stern deadwood. Note that the keel is an unbroken timber as opposed to our specimen that has been cut. Also note sternpost to which rudder gudgeons and rudder would have attached (as presented in Desmond 1919: 51).

Figure 4-36. The stern deadwood. Note the notches in the sternpost (far left) as well as the truncated keel (far right).

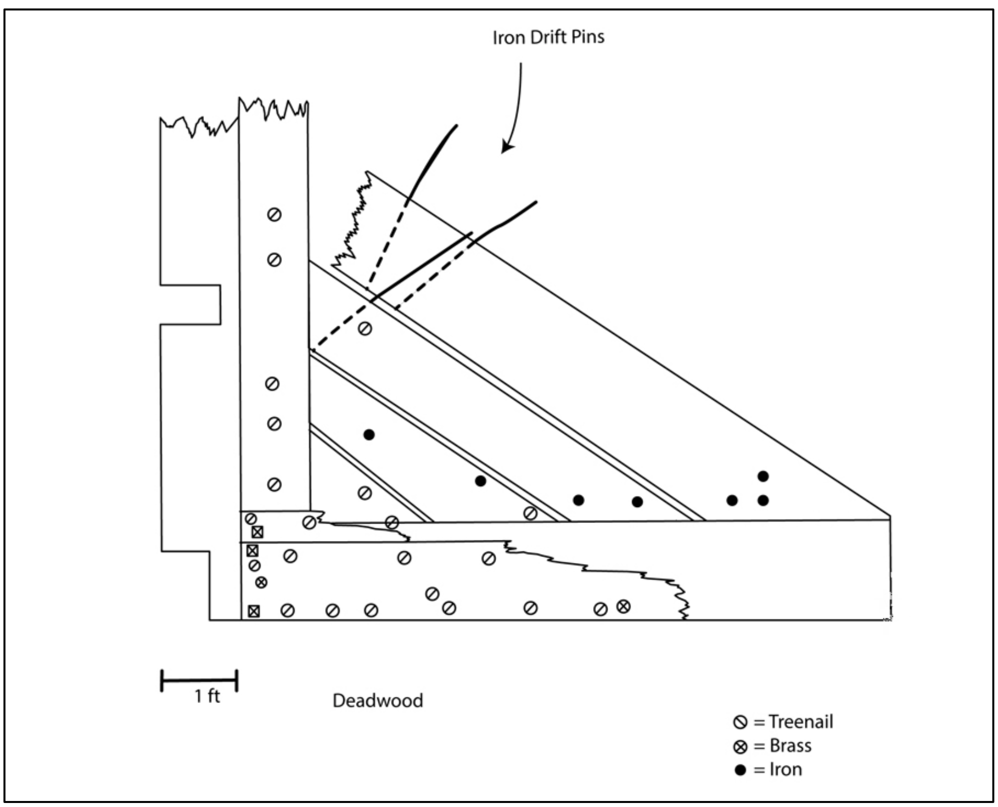


Figure 4-37. Schematic of stern deadwood showing fastener locations. Note the notches in the sternpost (far left) as well as the truncated keel (far right).

Figure 4-38. The sternpost has two notches cut into it at what are assumed to be where the rudder gudgeons would have been located indicating post wreckage salvage.

Figure 4-39. The keel on the deadwood has been cut indicating post wreckage salvage.

Figure 4-40. Hull planks rabbitted into the sternpost were fastened to the deadwood with copper alloy spikes and treenails with wedges. There are no extant sheathing tacks and no tack holes, indicating it was not sheathed.

RUDDER

A disarticulated rudder fragment was recovered 27 feet (8.2 meters) east from the stern deadwood. The remaining or extant length of the rudder is 8 feet (2.4 meters) long and 2 feet (61 centimeters) wide (Appendix F). Figures 4-41 and 4-42 represent the aft face of the rudder, and numerous large iron drift pins indicate at least another 3 feet (0.9 meters) of wood, for a rudder width of at least 5 feet (1.5 meters; Appendix F). The rudder is built of both White Oak and Southern Pine (Appendix G; see Figure 4-34 above for rudder location on vessel in relation to stern deadwood).

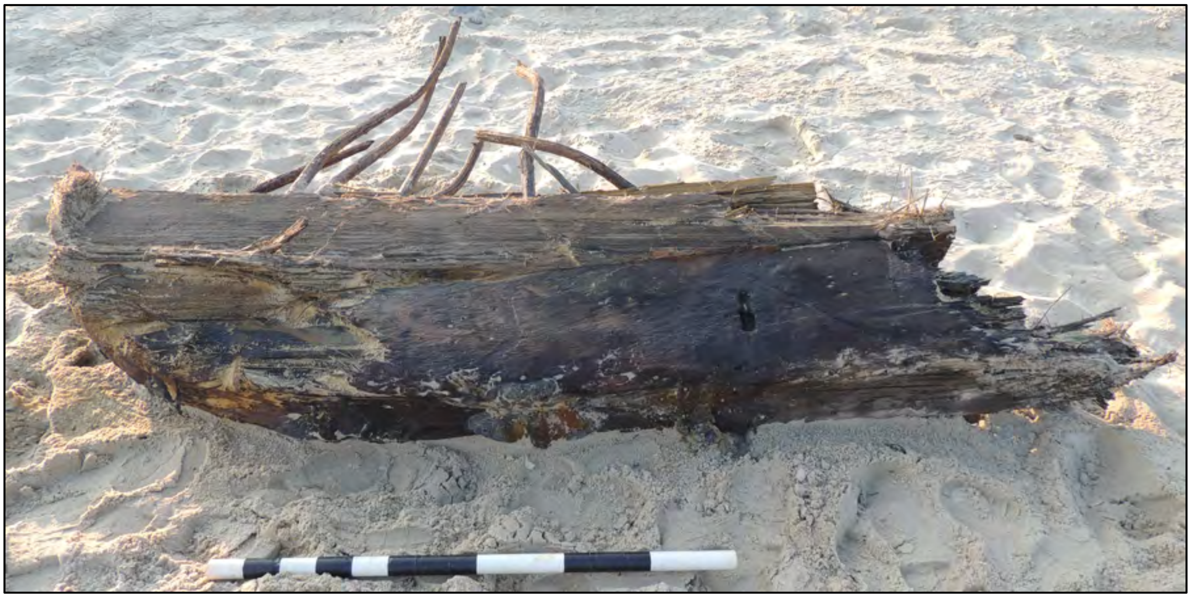


Figure 4-41. Hull planks rabbitted.

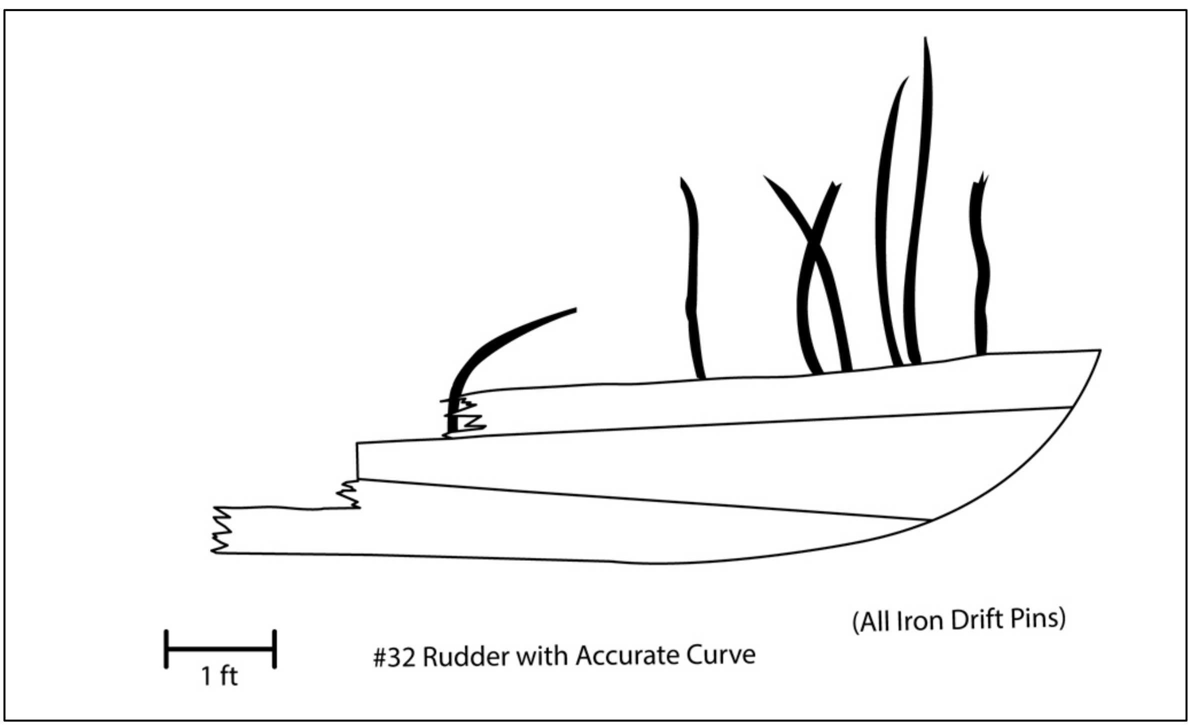


Figure 4-42. Schematic of rudder.

IRON HULL STRAPPING

Numerous fragments of iron strapping were recovered from the wreck (Figures 4-43 and 4-44). Of varying remaining lengths, the strapping width was 7 inches (17.8 centimeters), with the ends of the straps clearly broken or ripped. Employed for interior and exterior strengthening support, channels are present on some of the frames indicating where straps were fastened with the depth of the channels allowing for the flush placement of interior ceiling or exterior hull planks.

Figure 4-43. One example of the numerous fragments of iron strapping in the Debris Pile.

Figure 4-44. Hull frame with channel for the iron strapping.

The use of iron reinforcing straps became common in late nineteenth- and early twentieth-century ship construction. Illustrated in Figures 4-45 and 4-46, this method of construction helps to indicate the time frame for our vessel.

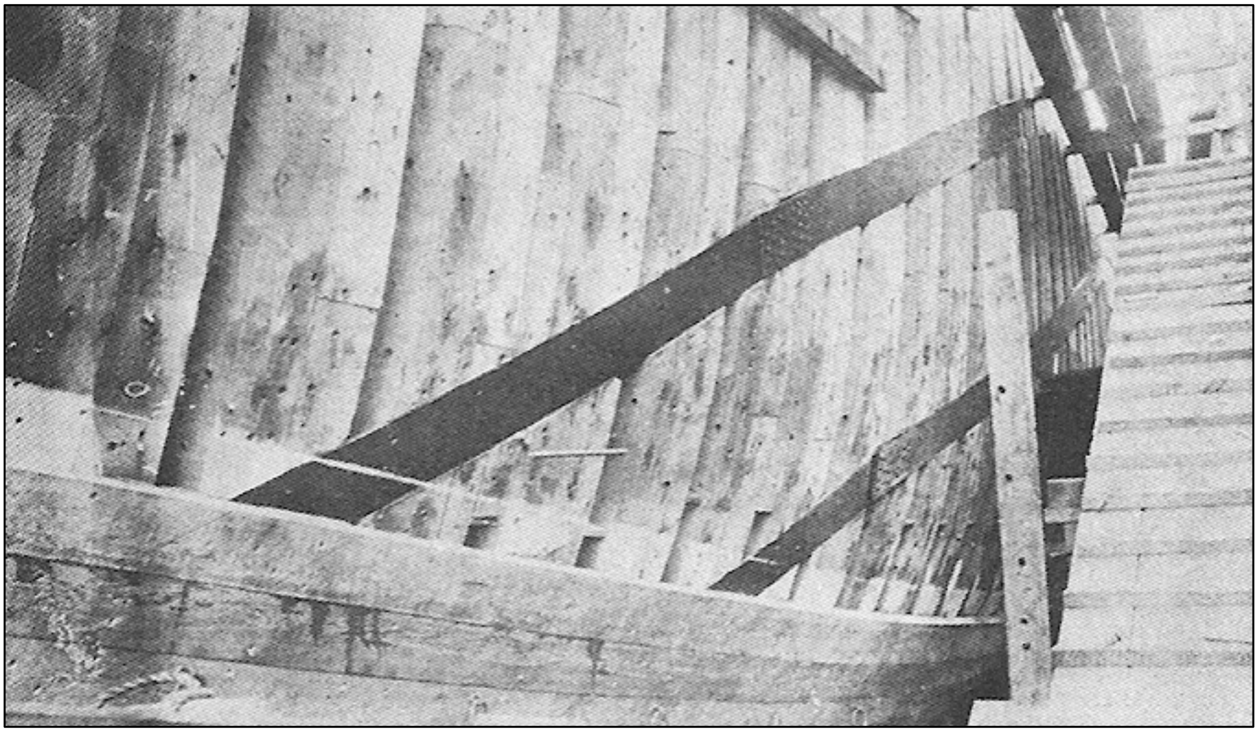


Figure 4-45. 1918 photograph showing iron reinforcing straps on the exterior of the hull. The frames have been channeled to accept the strap (as presented in Estep 1918:41).

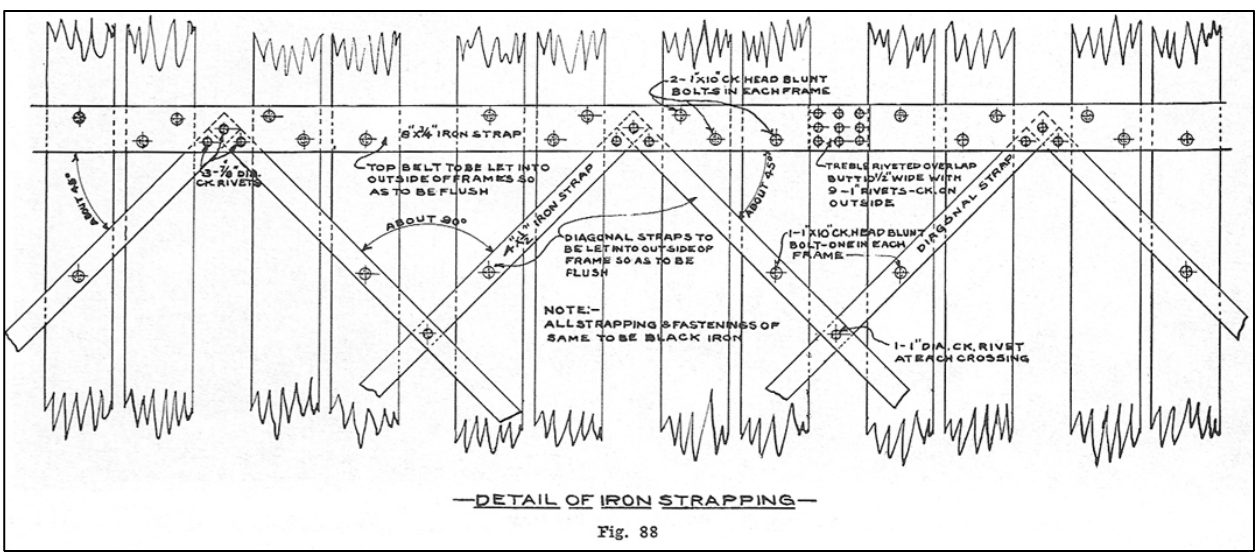


Figure 4-46. Schematic showing iron reinforcing on the frames of an early twentieth-century vessel (as presented in Desmond 1919:99).

COPPER SHEATHING

Very little sheathing was present, although several small sections were recovered (Figure 4-47). While the sheathing is no longer extant on any of the timbers, several outer hull planks have evidence of multiple sheathing episodes, as demonstrated by the number of sheathing tack holes (Figure 4-48). These are sacrificial outer planks, and many are coated on their underside with tarred felt, the felt most likely made of horsehair (Figure 4-49). At 3 inches (7.6 centimeters) wide, these are much thinner than the main outer hull planks that are 6 inches (15.2 centimeters) in thickness (Appendix F).

A variety of fasteners were present in the collections recovered during dredging operations. Those associated with hull construction included yellow metal/copper alloy sheathing nails, hull plank spikes, and drift pins or bolts. Iron fasteners were not present. The drift pins or bolts would have been used primarily in fastening together large wooden components such as keel, keelson, stem, stern, frame, and floor or deck timbers, or for attaching hull planking to these timbers. Figure 4-50 illustrates numerous round-headed sheathing tacks that would have been employed to attach the copper sheathing to the outer hull planks.

Figure 4-47. One of the rare examples of copper sheathing located on the site.

Figure 4-48. Outer sacrificial hull plank showing numerous copper tack holes indicating previous location of copper sheathing. The number of holes indicates several sheathing episodes. The cut of the plank indicates it fit into a rabbit, most likely on the stern deadwood; however, a bow location cannot be ruled out.

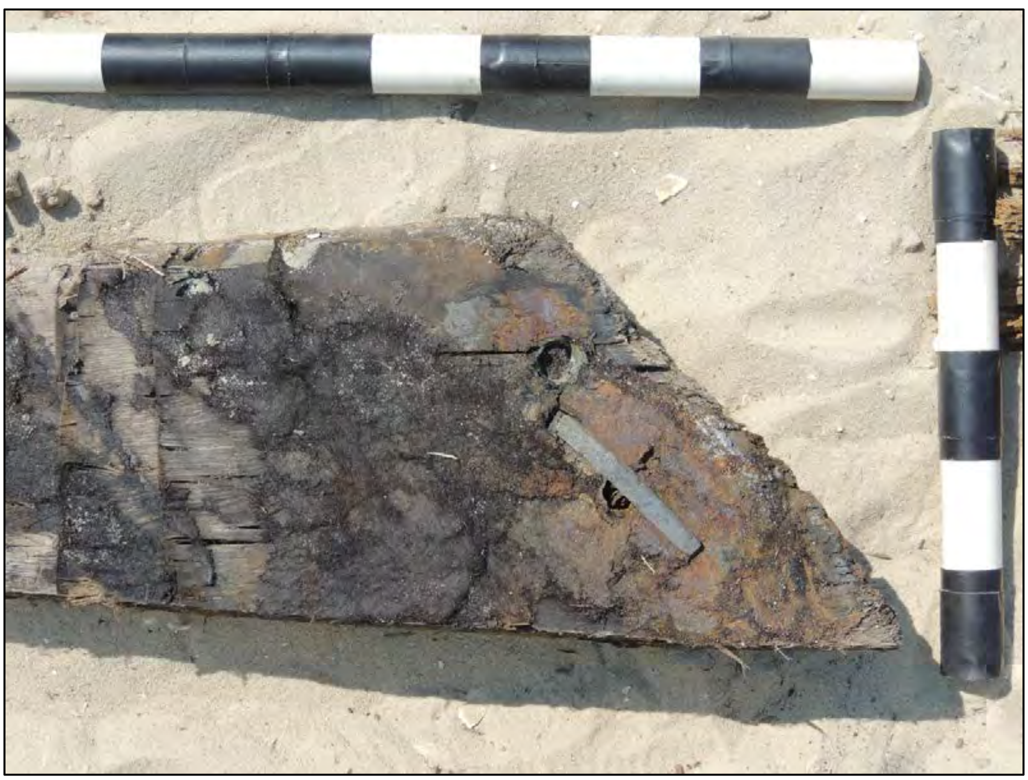


Figure 4-49. Flip side of the plank above. Like this plank, several are coated on their underside with tarred felt (black matting). The felt was most likely made of horsehair.

Figure 4-50. Numerous sheathing tacks that would have been employed to attach the copper sheathing to the outer hull planks.

Copper sheathing of ships came about during the evolution of various attempts to protect ship hulls from damage and complete destruction by *Teredo navalis*, a wood-boring marine bivalve given the name "shipworm" because of its worm-like appearance. The British Navy first experimented with it in the early to mid-1700s; by the time of the American Revolution the practice of protecting wooden hulls with copper sheathing and the necessary copper fasteners was perfected, and subsequently employed by the entire Royal Navy. The practice of sheathing a ship with copper plates was slowly adopted by merchant vessels, but was the accepted practice by the early to mid-nineteenth century after the use of "Muntz" (also called "yellow metal," a form of brass with copper, zinc, and iron) was introduced. Muntz metal was stronger, had a much slower corrosion rate, and was much cheaper than copper to manufacture because of its large zinc content, thus making it more affordable and more widely employed (Staniforth 1985:27). Its ability to protect hulls and lengthen the life of a ship also resulted in the use of copper sheathing being tied to insurance premiums for vessels. Before attaching the copper or Muntz metal plates, which averaged 14-x-48 inches (35.6-x-121.9 centimeters), with small sheathing nails, it was common practice to first "sheath" or fasten to the hull planks various materials in order to provide added protection from the *Teredo navalis*. The materials applied to the hull planks and then covered by the copper or Muntz plates included thin, wooden sheathing planks (as seen above), felt (matted horsehair), assorted vegetal fibers, canvas, etc., as well as any combination of these, that were normally mixed or coated with tar or pine pitch (James 1986; Ronnberg 1980). Additionally, a copper-sheathed or -clad hull had to be constructed with non-ferrous fasteners where they would contact the copper plates as iron caused a destructive corrosive action between the fasteners and plates.

The use of copper or copper alloy fasteners (i.e., hull plank spikes, drift bolts, sheathing nails) was standard on copper-clad vessels, and both the presence of copper sheathing and fasteners at a wreck site is therefore a temporal indicator for nineteenth-century ship construction. However, while most common in the mid-nineteenth century and waning in use in the latter part of the century, copper and copper alloy sheathing was still employed on wooden hulls in the last years of the nineteenth century and into the first quarter of the twentieth century (James et al. 1991). Furthermore, and as illustrated on the schooner barge that wrecked at Barnegat in Figure 4-51, in order to be economical, it was employed in only certain locations on the hull. This might help explain the lack of sheathing that was observed on the Barnegat Jetty Wreck assemblage.

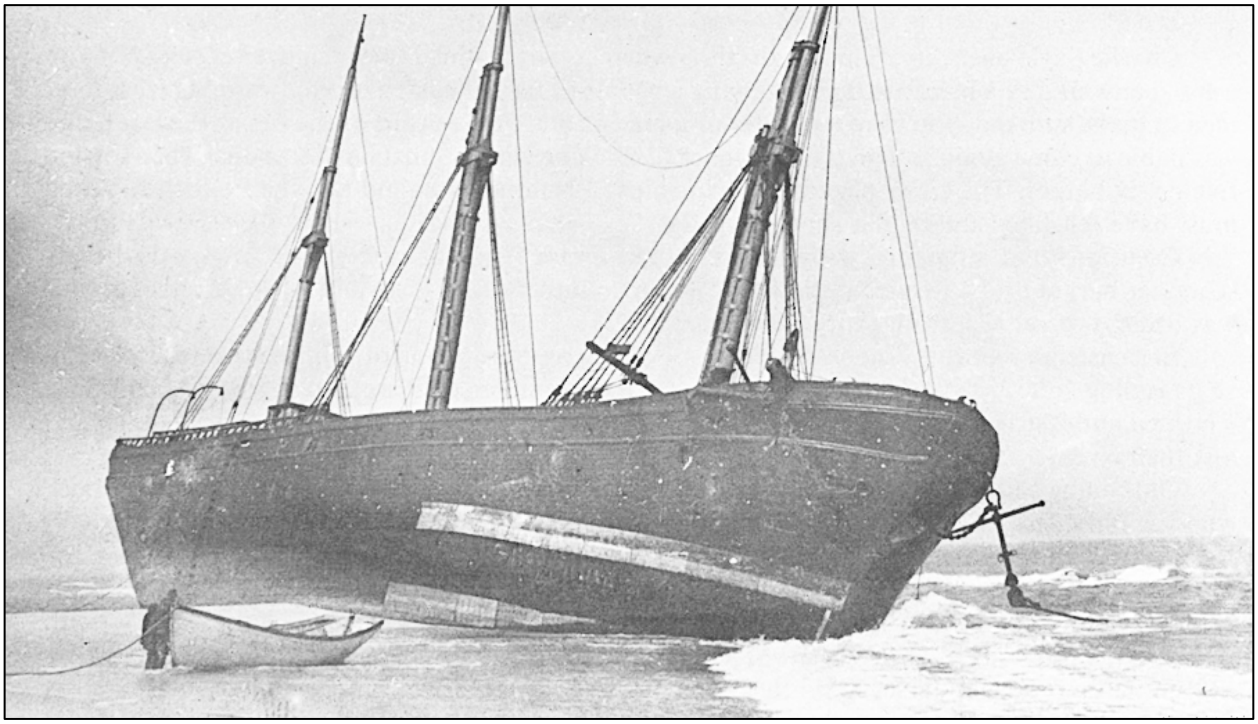


Figure 4-51. For economical reasons, schooner barges were not completed coppered sheathed. The *Imperial*, a schooner barge shown here ashore at Barnegat in 1896 has two light-colored sheathing strips to protect the vessel from ice during winter months (as presented in Morris 1984:13). The lack of sheathing on much of the Barnegat North Jetty Shipwreck indicates a possible similar scenario.

TREENAILS

As stated, a variety of fasteners were present in the collections recovered during dredging operations. Those associated with hull construction included copper alloy sheathing nails, hull plank spikes, and drift pins or bolts. However, the most prolific fastener was the treenail (pronounced "trunnel"), employed mainly to fasten planks to frames. Treenails are wooden dowels, either circular or hexagonal in shape, that are driven into pre-drilled holes and that have extremely high holding strength. Figure 4-52 illustrates numerous treenails in a frame that would have held a no-longer-extant outer hull plank. Figure 4-53 shows both a circular and hexagonal example of recovered treenails. Analysis of one treenail indicated it was Hickory while others were Larch, Douglas Fir, and Southern Pine (Appendix G).

Figure 4-52. Numerous treenails in a frame that would have held a no-longer-extant outer hull plank.

Figure 4-53. Both a circular and hexagonal treenail example (bottom).

MISCELLANEOUS ARTIFACTS

As stated, on-site activity consisted of archaeological monitoring of jetty construction, in place documentation of vessel remains, assessment and documentation of debris, and on-site artifact recovery. Several artifacts were recovered that had no provenience or that had a provenience well away from the wreck site. One interesting artifact recovered early on was a chain plate with an intact dead eye. Consisting of a 4-inch (10.2-centimeter) wide iron strap, with a triple dead eye on one end and through-hull fasteners at the other end of its 7.6-foot (2.3-meter) total length, as indicted in Figure 4-04, the chain plate was found well to the north of the site. An anachronistic term as the early versions were made of chain, the chain plate in more recent versions such as ours, is a metal strap or rod that fastens to the outer hull with a dead eye on its upper end to hold either standing or running rigging of a sailing ship (Figure 4-54). The "dead eye" received its name owing to its skull-like appearance and was usually made of *Lignum vitae* or ironwood.

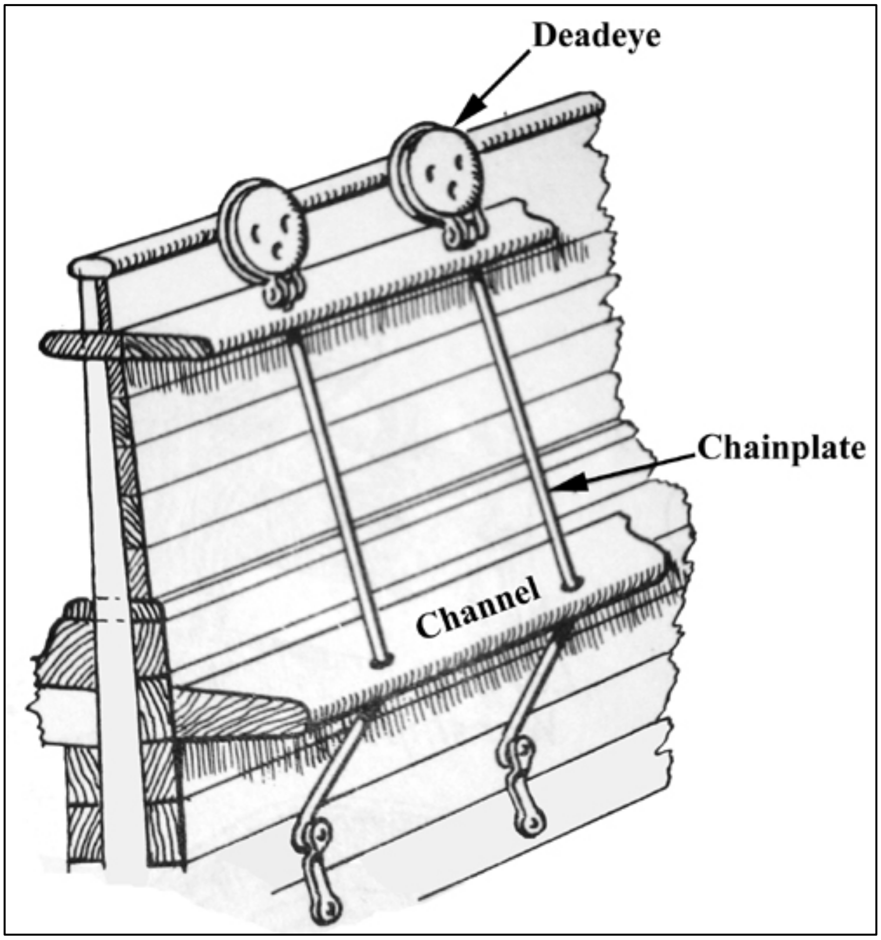


Figure 4-54. Schematic showing location of the chain plate and dead eye on the upper hull and bulwark of a sailing vessel (as presented at www.blogstaugustinelighthouse.org/blog/lamposts/).

Figures 4-55 and 4-56 illustrate two views of the dead eye, and Figure 4-57 shows the through-hull fasteners. These fasteners, just over 1 foot (0.3 meters) in length, indicate a much thinner or smaller hull thickness for the chain plate. The hull thickness would have been too small for the main site hull, which approached 2 feet (0.6 meters), and represents another, much smaller wrecked vessel.

Figure 4-55. Dead eye; most likely composed of *Lignum vitae*, an extremely hard wood.

Figure 4-56. The chain plate iron (upper left) is forge-welded, which most likely predates the North Jetty Shipwreck. That it was located some distance from the actual wreck site also lends credence to the assessment that it belongs to a different wrecked vessel.

Figure 4-57. The through-hull fittings indicate a hull thickness of about 1 foot (scale is 1 foot), where as the Barnegat North Jetty Shipwreck has a hull thickness of approximately 2 feet. This indicates this artifact could not have originated from our wreck, but represents another vessel altogether.

Figure 4-58 illustrates another interesting artifact: a single sheave block, which would have been associated with rigging or lifting tackle. The artifact has no real provenience, as it was recovered during the sifting of reburial sand.

Figure 4-58. Sheave block with a single sheave most likely of *Lignum vitae*.

Another class of artifact that was present and recovered during sand sifting was cow bones, several of which showed butchering evidence (Figure 4-59). These faunal remains potentially originated from the Italian bark the *Caterina* that wrecked on the northern side of the shoals reportedly 1.75 miles (2.7 kilometers) northeast of Barnegat Station on 23 October 1912 (see *Caterina* section in *Chapter III: Historical Context*). The *Caterina* was listed as having a cargo of animal bones bound from Montevideo, South America to New York for a fertilization plant. Bones have been found washed on the beach as far down as Ships Bottom on Long Beach Island and were noted to be a part of the wrecked bark.

Figure 4-59. Cow bones thought to have originated from the Italian bark the *Caterina* that wrecked on the northern side of the shoals reportedly 1.75 miles northeast of Barnegat Station on 23 October 1912.

REBURIAL

Upon completion of the data recovery of the *in situ* main area of wreck, as well as the recordation of the stern deadwood and rudder, the wreck area, along with the redeposited deadwood and rudder at the main wreck area, were reburied beneath the jetty. Figure 4-60 shows the *in situ* wreck area being readied for reburial.

The area was dug out to sand with all rock removed. Then rock mats were placed over the top of the wreck area and formed the base for subsequent jetty rock. This method was employed for the entire repaired area and not just at the wreck location. Figures 4-61 through 4-64 show the mats and their composition along with shots of the mats being placed atop the wreck site. Figure 4-65 shows the mats on the wreck site with the rock being put into place atop the wreck.

Figure 4-60. *In situ* wreck area being readied for reburial. The total station sits on the centerline of the jetty.

Figure 4-61. Rock-filled mats that form the base of the repaired jetty area and that were placed atop the wreck.

Figure 4-62. Close-up of the rock-filled mats showing construction and matrix material.

Figure 4-63. Rock-filled mat being swung into place atop the wreck site.

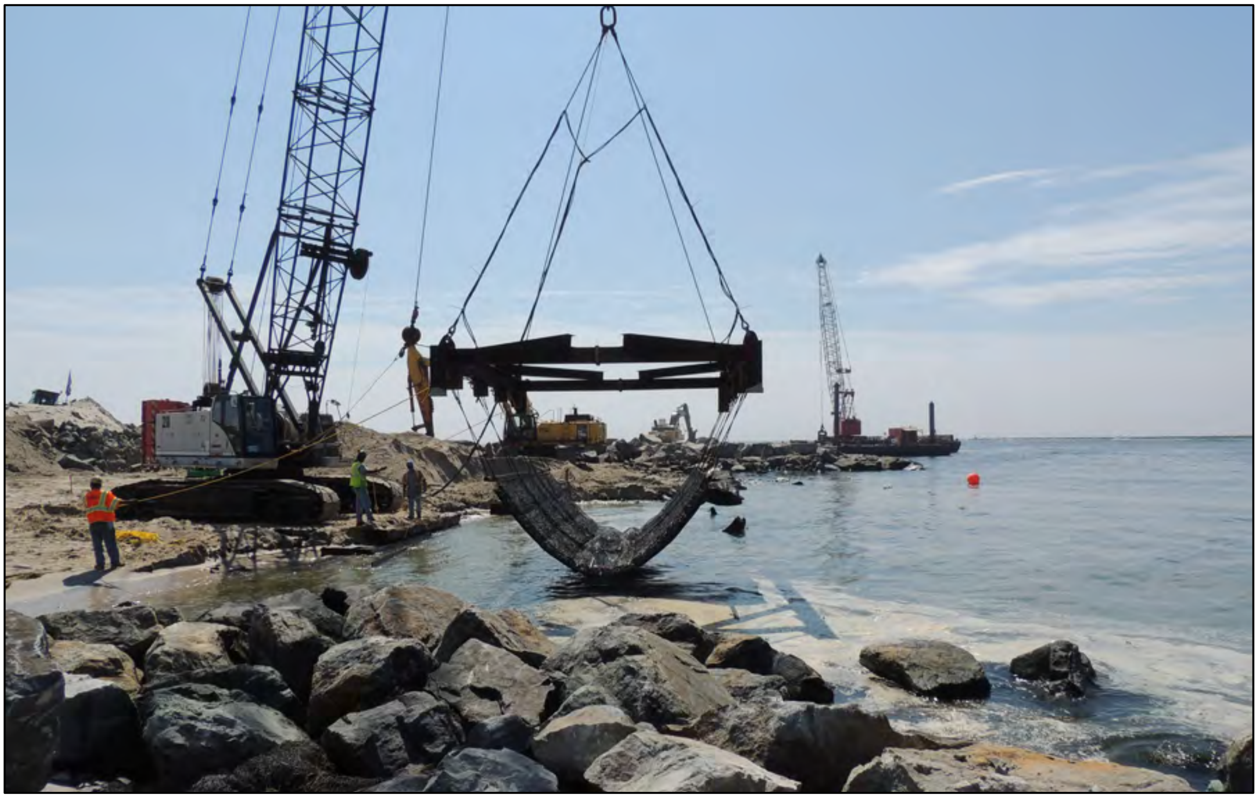
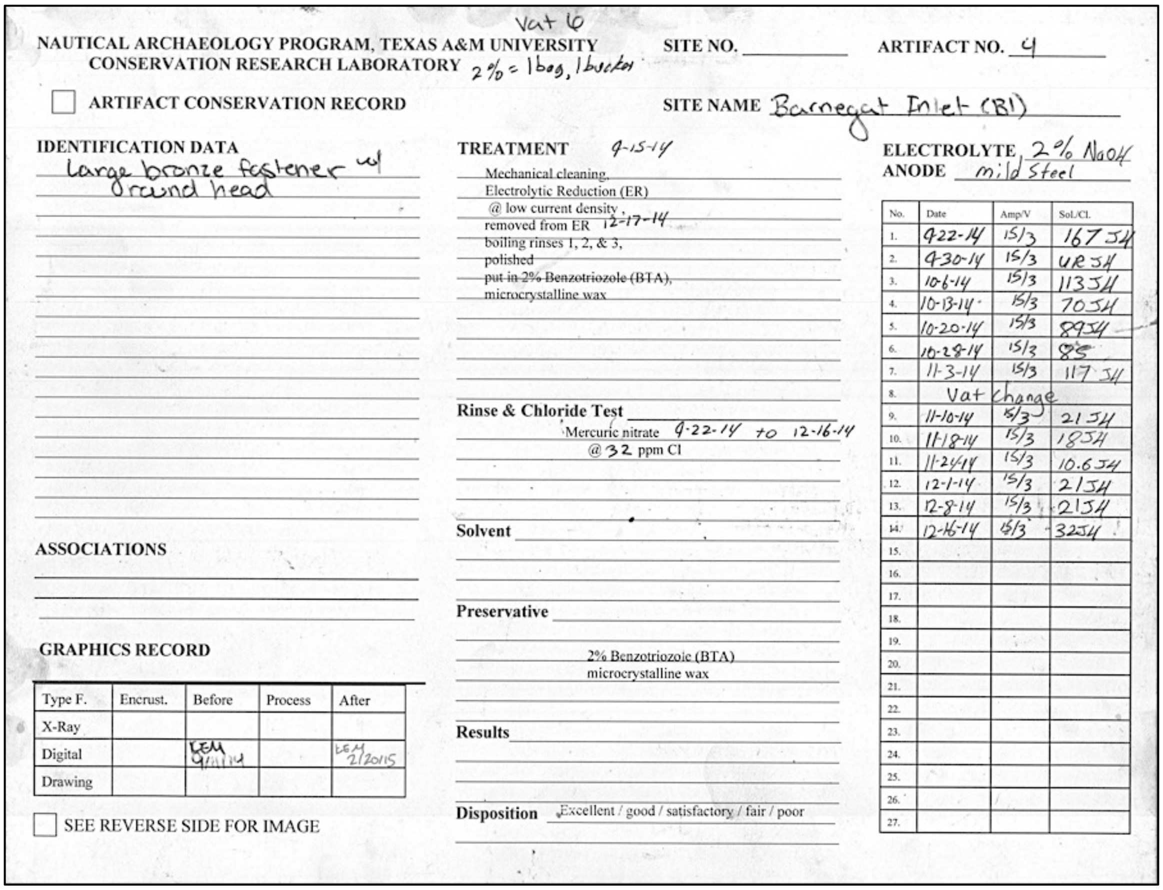


Figure 4-64. Another angle of the rock-filled mat being placed on the wreck.

Figure 4-65. Mats in place atop the wreck and cover by rock has begun.

ARTIFACT CONSERVATION

Numerous artifacts were collected, recorded, inventoried in the field, and shipped to Panamerican's home office for further analysis, cataloging, and subsequent conservation at the CRL at Texas A&M University, College Station, Texas. Once at CRL they were further catalogued, photographed before and after conservation, and then put through various conservation methods depending on the artifact type (Figures 4-66 to 4-68). The recovered artifacts were diagnostic, interesting, or representative of the assessed in-field assemblage, and an inventory is presented in *Appendix I: Artifact Catalog*. The completed artifact conservation record cards are presented in *Appendix J: Artifact Conservation Cards*.



Vat 6

NAUTICAL ARCHAEOLOGY PROGRAM, TEXAS A&M UNIVERSITY
CONSERVATION RESEARCH LABORATORY 2% = 1 bag, 1 bucket

SITE NO. ____ ARTIFACT NO. 4

☐ ARTIFACT CONSERVATION RECORD

SITE NAME Barnegat Inlet (BI)

IDENTIFICATION DATA
Large bronze fastener w/ round head

TREATMENT 9-15-14
Mechanical cleaning,
Electrolytic Reduction (ER)
@ low current density,
removed from ER 12-17-14
boiling rinses 1, 2, & 3,
polished
~~put in 2% Benzotriozole (BTA),~~
~~microcrystalline wax~~

ELECTROLYTE 2% NaOH
ANODE mild Steel

No.	Date	Amp/V	Sol./Cl.
1.	9-22-14	15/3	167 JH
2.	9-30-14	15/3	UR JH
3.	10-6-14	15/3	113 JH
4.	10-13-14	15/3	70 JH
5.	10-20-14	15/3	89 JH
6.	10-28-14	15/3	85
7.	11-3-14	15/3	117 JH
8.	Vat change		
9.	11-10-14	15/3	21 JH
10.	11-18-14	15/3	18 JH
11.	11-24-14	15/3	10.6 JH
12.	12-1-14	15/3	21 JH
13.	12-8-14	15/3	21 JH
14.	12-16-14	15/3	32 JH
15.			
16.			
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27.			

Rinse & Chloride Test
Mercuric nitrate 9-22-14 to 12-16-14
@ 32 ppm Cl

Solvent

ASSOCIATIONS

Preservative
2% Benzotriozole (BTA)
microcrystalline wax

GRAPHICS RECORD

Type F.	Encrust.	Before	Process	After
X-Ray				
Digital		LEM 9/11/14		LEM 2/2015
Drawing				

Results

Disposition Excellent / good / satisfactory / fair / poor

☐ SEE REVERSE SIDE FOR IMAGE

Figure 4-66. Conservation record card for Artifact BI.04.

Figure 4-67. Pre-conservation photograph of Artifact BI.04 that is on the back of the above record card.

Figure 4-68. Post-conservation photograph of Artifact BI.04 that is part of the conservation record.

WOOD ANALYSIS

During the data recovery and debris recordation, wood samples were obtained from representative hull components (i.e., futtocks, treenails, hull and ceiling planking) for wood identification/analysis.

Illustrated in Table 4-01 and presented in Appendix G, 38 samples were submitted to Dr. Amy Mitchell-Cook at the University of West Florida for analysis. The wood samples underwent basic microscopic identification with each sample thin-sectioned with a razor blade and the sections placed under a microscope for visual identification. Each sample was identified using keys for identification found Panshin and de Zeeuw's (1980) *Textbook of Wood Technology*. The textbook is a standard for identifying samples.

The wood types are from all parts of North American, making vessel construction location somewhat speculative. Several of the samples are northern species including Larch/Tamarack and Birch, and interestingly they are from major structural elements including the stern deadwood keel, frames, ceiling and outer hull planks. The use of birch in the keel however, is seemingly incongruous, as it is not usually associated with large structural timbers. Other wood types such as Southern Pine, Red Pine, and Elm are found in more southern latitudes. Interestingly, one wood type from a treenail, Douglas Fir, is a West Coast wood type found along coastal California, British Columbia, and into Southern Alaska.

Table 4-01. Wood Analysis.

Provenience	Description	Wood Identification
Wreck	Complete loose treenail with wreck	Douglas Fir
Wreck	Clamp/Shelf	Larch/Tamarack
Wreck	Outer Hull	Southern pine
Wreck	Frame	Probably Larch/Tamarack
Wreck	Outer Hull	Larch/Tamarack
Wreck	Frame	Larch/Tamarack
Wreck	Ceiling	Larch/Tamarack
Wreck	Possible Chafing Gear	?
Wreck	Drift bolt plug	Softwood, unable to determine further
Wreck	Three wedges from between outer hull planking	Southern pine. *Pinus spp*.
Stern Deadwood	#1. Keel	Birch. *Betula spp*.
Stern Deadwood	#2. Rudder post	Birch. *Betula spp*.
Stern Deadwood	#7. Outer most deadwood	Sycamore?
Stern Deadwood	"Hull Plank"	Red pine/Scotch pine. *Pinus resinosa* or *Pinus sylvestris*. (basically the same wood but one is Old world and one is new world)
Rudder	Outer frame of rudder	White Oak. *Quercus alba*
Rudder	Second frame from outer rudder	Southern pine. *Pinus spp*.
Rudder	Rudder	White Oak. *Quercus alba*
Capstan	Capstan Sample	White Oak. *Quercus alba*
Debris Pile	Possible Keel/Keelson	Southern pine
Debris Pile	Anomaly Frame	White Oak. *Quercus alba*
Debris Pile	First sacrificial plank, horse hair felt and wood sample	Elm *Ulmus*
Debris Pile	Exotic timbers, worked, 2 samples from different pieces	Unknown tropical species
Debris Pile	Outer hull sacrificial planking with felt sample	Elm *Ulmus*
Debris Pile	Sacrificial hull planking with rabbited edge	probably southern pine
Debris Pile	1. First large main plank	Elm *Ulmus*
Debris Pile	2. Second large plank	probably southern pine
Debris Pile	Wood sample and sealant	Southern pine
Debris Pile	Treenail from frame	Possibly Hickory
Debris Pile	Wooden fastener plug	Southern pine. *Pinus spp.*
Debris Pile	Wooden handle north of wreck	Hickory *Carya spp*.
Debris Pile	Miscellaneous Treenails	a. Larch
		b. Hardwood, too much iron/metal to get a good sample
		c. Diffuse porous hardwood. Hard to get a good sample.
		d. Southern pine
		e. diffuse porous hardwood

Provenience	Description	Wood Identification
		f. diffuse porous hardwood
		g. diffuse porous hardwood
		h. Douglas fir (*Pseudotsuga menziesii*)

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Represented by a mostly buried *in situ* run of hull, a "debris pile" comprised of various ships timbers and several disarticulated components including stern deadwood, a rudder, and a windlass, the North Jetty Shipwreck was a complex site to understand. However, several aspects of what we think the vessel material represents are apparent. First, we know the recovered material comes only from one side of the hull from about the deck down to and through the turn of the bilge. Although disarticulated, if the stern deadwood (and rudder?) is in the correct location at what is presumed to be the stern area of the wreck, then the side both removed and *in situ* represents the starboard side of the vessel as shown in Figure 5-01. The remaining buried amount of hull shown in the figure is conjecture, but it is likely that at least half the hull to the keel is intact, and even the entire port side of the vessel could be present as well.

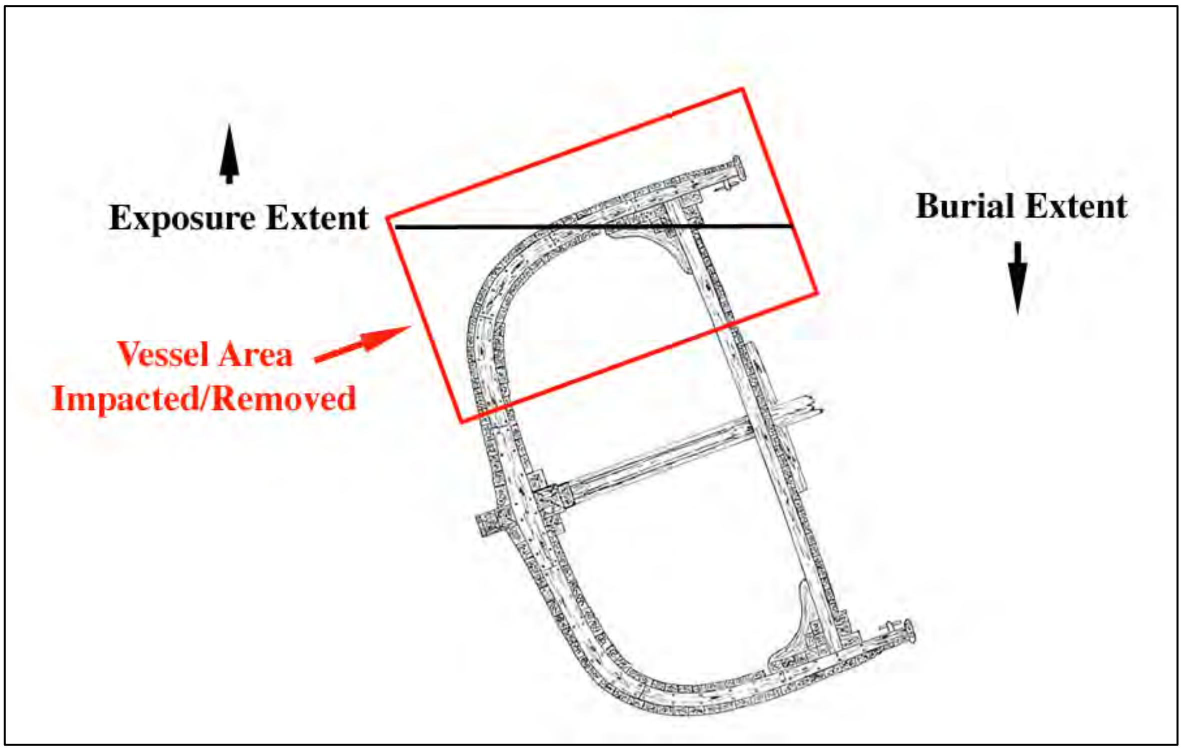

Figure 5-01. Schematic of postulated vessel orientation showing removed area of the "starboard" side of the vessel as based on observed timbers in the Debris Pile and equipment operator observations. Also indicated are exposure and burial extent (after www.boatnerd.com/digitalshipyard/belliveauships/shipbuilding.htm). Orientation is looking east or offshore down centerline of jetty; north is to the left; and the inlet is to the right of the vessel.

A second aspect of the vessel material is associated with the presence of both iron knees and strapping. The use of these components indicates a construction date of last quarter of the nineteenth century through the first quarter of the twentieth century. Third, the vessel was fairly large, as the large frame sizes and a hull side that is approximately 2 feet (0.6 meters) thick indicate a vessel well over 100 feet (30.5 meters) in length and probably approached the 200-foot (61-meter) range. We know that the remaining *in situ* hull covers an area at least 55 feet (16.8 meters) in length, and the removed intact hull components represent an additional 40 to 50 feet (12.2 to 15.2 meters). The removed components did not contain any evidence of the bow, suggesting additional buried hull to the west of what was removed.

Additional aspects of the wreck site include an absence of any type of cargo or machinery. Material from the hull was the only artifact group observed with the exception of cow bones that were most likely cargo from the 1912 wreck of the iron-hulled Italian bark, *Caterina*. No steam machinery or piping to indicate how the vessel was powered was recovered, nor was any ground tackle (i.e., anchor, chain, etc.). A windlass was recovered in the correct alignment with the hull, in what is postulated to be the stern area of the vessel, given the presence of the stern deadwood and rudder between it and the *in situ* hull section. While it is most likely associated with the wreck and would be the correct size, the windlass would have been located at the bow, and its recovery location in the stern must bring into question its association.

Other items are also questionable and these include several blocks and a chain plate with dead eye. Found well to the north of the wreck, the chain plate's through-hull fasteners indicate a vessel with a hull only half as thick as the North Jetty Wreck. The other two blocks were found when equipment operators were sifting sand, so their provenience and association with the wreck must remain in question.

Associated with construction location and relative to vessel identity, wood analysis of the frames of the vessel show they are comprised of Larch or Tamarack. The construction of the hull of the vessel with these northern species of wood indicates she was constructed in a northeastern shipyard. The fact that the stern deadwood was made with Birch and Sycamore also argues for a northeastern origin. The rudder being comprised of Southern pine and White oak indicates a southern origin, and was a replacement on the vessel, the original rudder composed of imported lumber, or not associated with the vessel. It is felt the rudder is most likely associated with the vessel, so the first two scenarios are most probable.

That the wood analysis indicates construction of the vessel in a northeast shipyard goes directly to the vessel's identity. Conducted prior to the wood analysis, archival research identified several valid candidates for the North Jetty Wreck. But, as stated in the Chapter III, based on archival records, it is easier to understand which shipwrecks the North Jetty Shipwreck is not, instead of which shipwreck it is or could be. Archival research indicated one of the best shipwreck candidates for the Barnegat Jetty Shipwreck was a schooner barge named *Dixie*. The deciding factors were the vessel's size, time period in which it was constructed, and reported location when lost. Of all the surrounding shipwrecks, this was the largest vessel to have come ashore at North Beach and was responded to by both nearby LSS Stations. Lost on 20 April 1893, *Dixie* had a length of 160 feet (48.7 meters), a 23.6-foot (7.2-meter) beam, and 11-foot (3.4-meter) draft. She was built as a schooner barge in 1890 at Portsmouth, Virginia by D.B. Isham & Son and was owned by Frank N. Isham. She was constructed from oak and pine, and had iron fastenings. Although one of the best candidates for our wreck, the use of oak and pine for vessel construction is at direct odds with our analysis of Larch, Tamarack, and Birch, all northern species.

While the *Dixie* is ruled out as a candidate, three others then came to the forefront owing to their size, construction location and date, and vessel type. These include schooner barges No. 20, No. 21, and No. 28, which all sank off Barnegat on the same day, 4 February 1926, carrying cargos of coal heading to Boston from Norfolk. Each barge was listed in the database as located in a different area, Barnegat Light, Barnegat Shoal, and Barnegat, respectively. No. 20 and No. 28 had been built in 1899 at Bath, Maine, and No. 21 was built in Baltimore in 1901. The length of all the wooden barges lies between 190.3 and 207 feet (58 and 63.1 meters).

The construction time period for these vessels is correct, and built in northeastern yards, our identified wood types were readily available especially for No. 20 and No. 28 built in Bath. Their sizes are also in line with our wreck being up to 200 feet (61 meters) in length. As schooner barges, the use of copper sheathing would have been minimal, as found on our wreck, and the construction of our wreck is suggestive of an as-built schooner barge, the type of vessel mentioned as a best-possible candidate when the debris was first witnessed by archaeologists.

In summation, while we will never be absolutely certain of the North Jetty Wreck's identity, we do know it was constructed somewhere in the Northeast between the last quarter of the nineteenth century through the first quarter of the twentieth century, it was a fairly large vessel probably approaching the 200-foot (61-meter) range, and the best candidates for our wreck are the Schooner Barges No. 20, No.21, and No. 28. This is not surprising given the fact that the schooner barge was an uncelebrated, ubiquitous workhorse of the period, hauling mundane cargos of coal and lumber, with untold numbers passing just offshore Barnegat Inlet during any given year. That many of them wrecked at the inlet is known, that one of them represents the North Jetty Wreck is likely.

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APPENDIX A: BUILDING THE NORTH JETTY ON ISLAND BEACH BARNEGAT INLET

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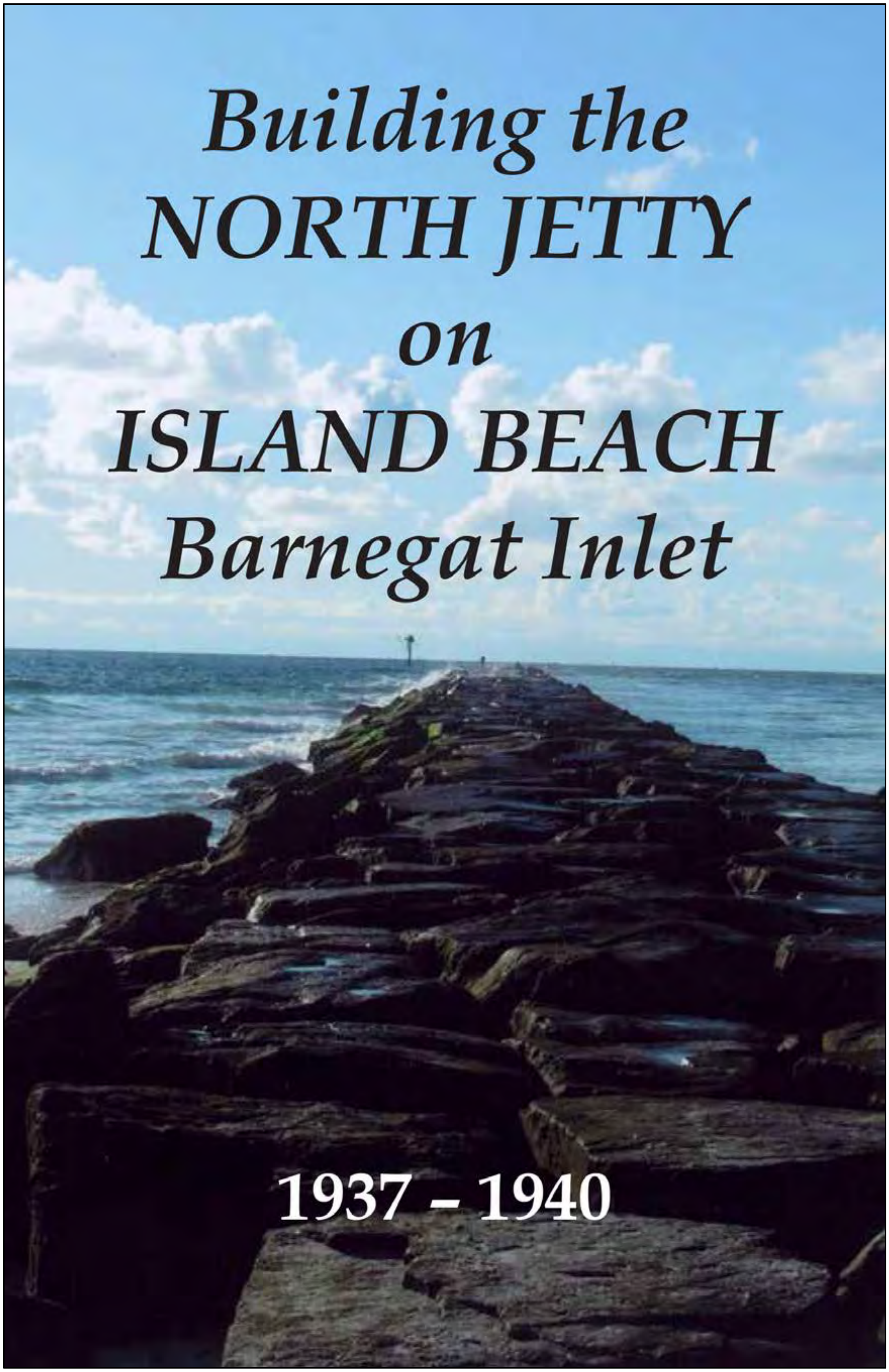
Building the
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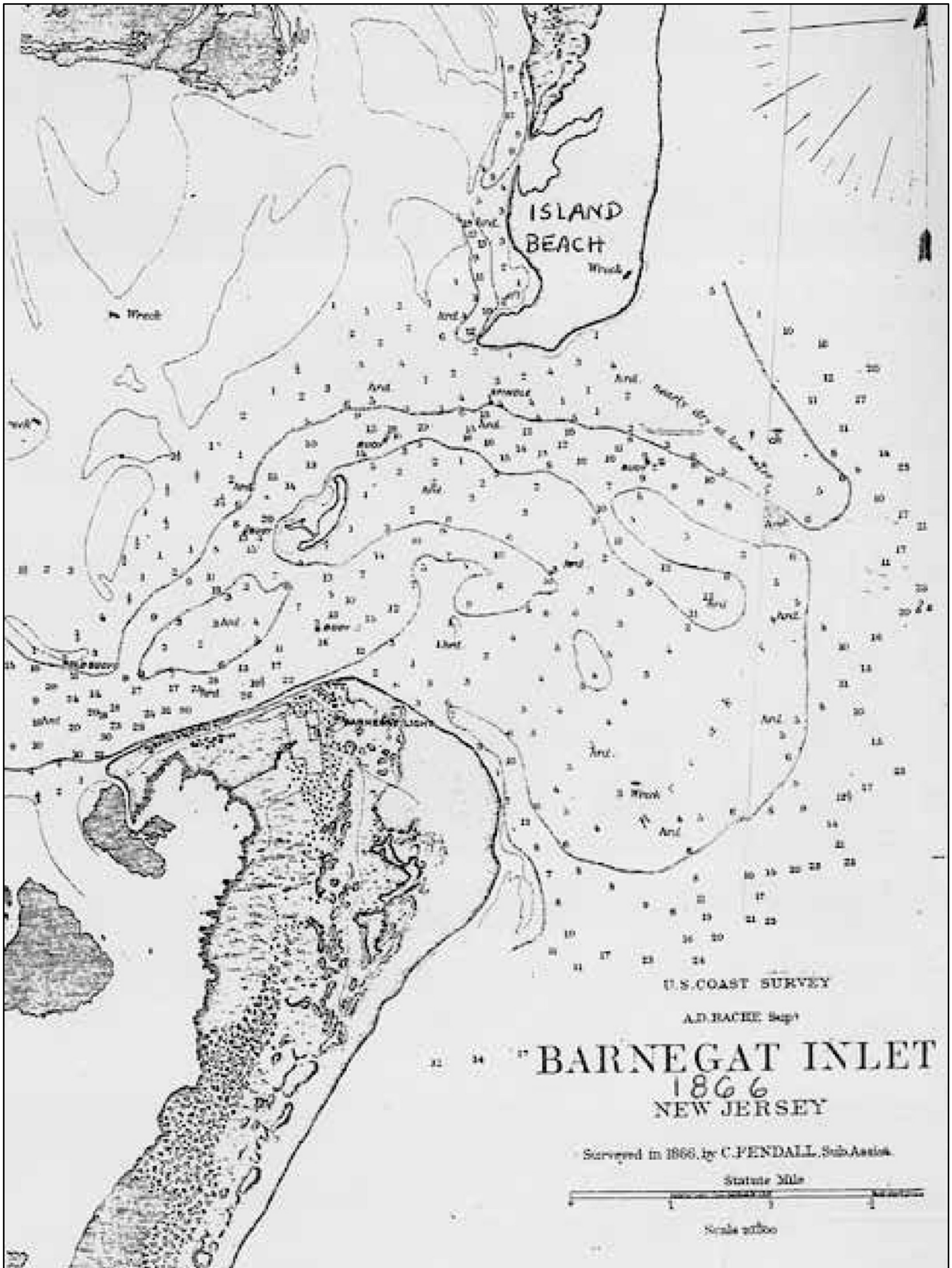
Barnegat Inlet
1937 – 1940



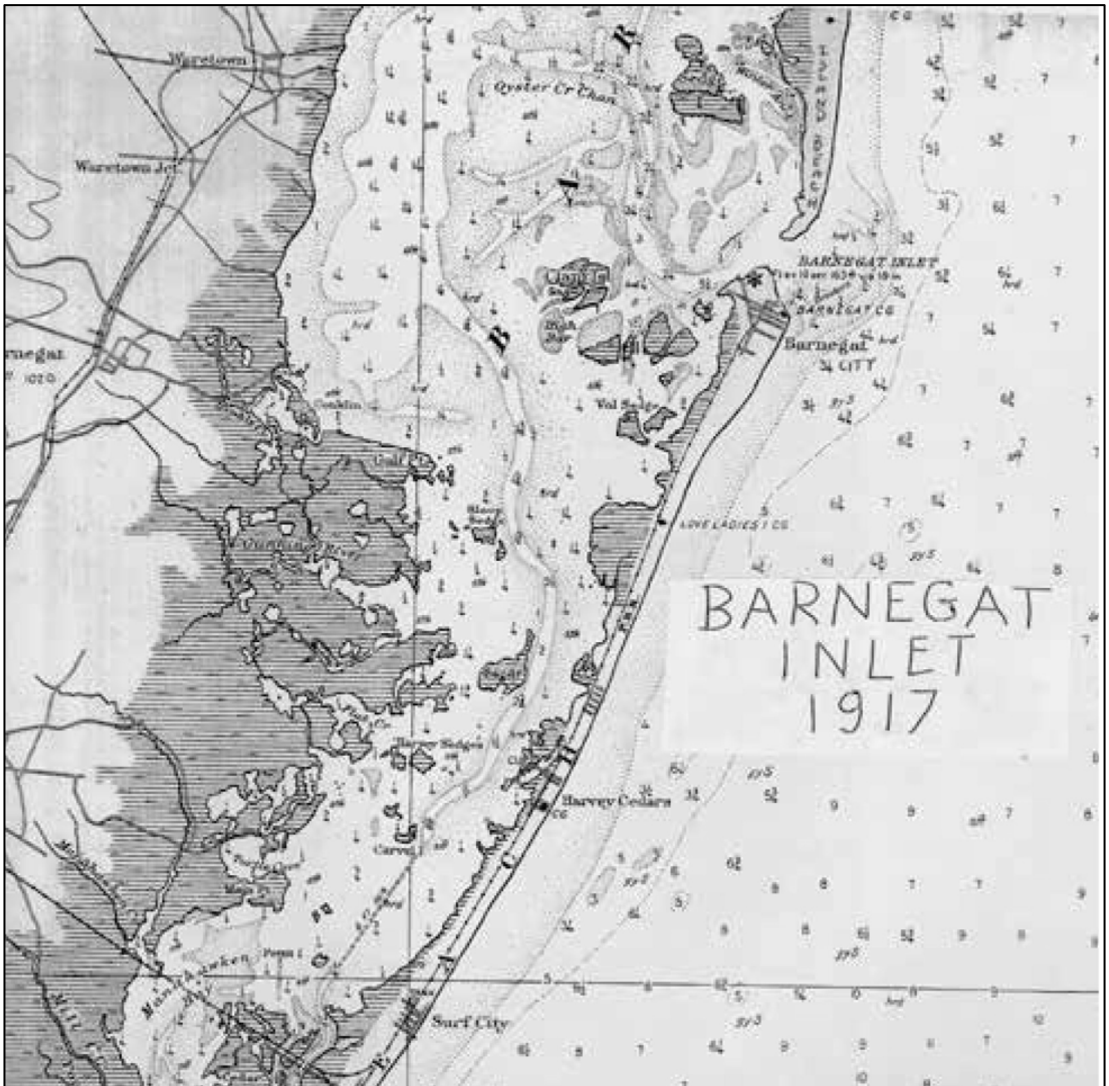
Map of Barnegat Inlet 1866

Building the
NORTH JETTY
on
ISLAND BEACH
Barnegat Inlet
1937 – 1940

Ferdinand F. Klebold
Researched & Written

Dedicated to
Pauline Miller
Ocean County Historian

Photos by
Lewis D. Crowell, Island Heights, NJ
Janice Wheeler, Collection
Ocean County Historical Society
Cover Photos - Kenneth Hollins, Seaside Park



Map of Barnegat Inlet 1917.
Note how far channel has moved in 51 years.

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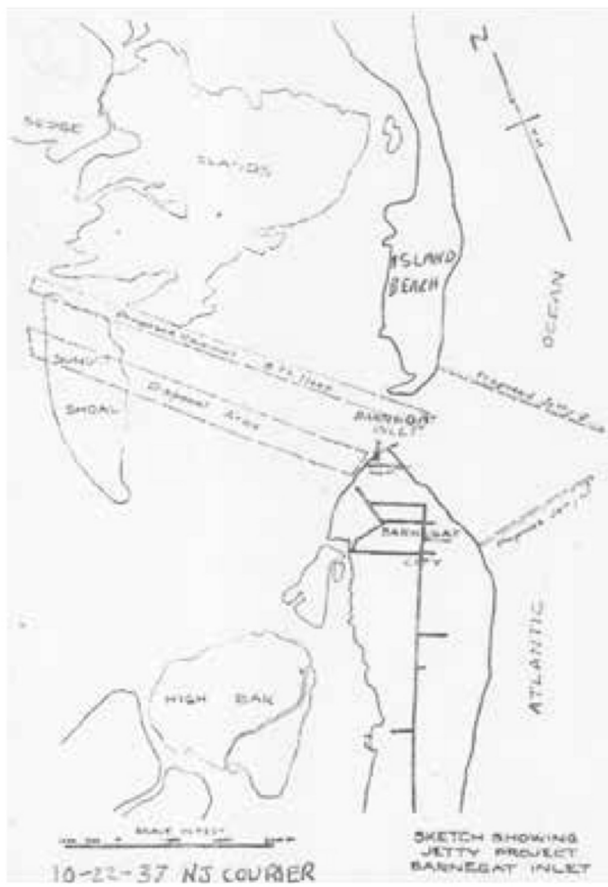
Ocean County Library Main Branch

BUILDING THE NORTH JETTY ON BARNEGAT INLET

In the early 1600's, Barnegat Inlet was discovered and named "Baren-gat" by Dutch explorers. It was one of the most dangerous inlets to navigate along the Atlantic Ocean coast of New Jersey. The locally built wooden sailing schooners, fifty to seventy feet long and smaller sloops using the inlet in the 1800's were built with centerboards and keels so they could navigate the shallow waters of the inlet and Barnegat Bay. These vessels sailed from the ports of Toms River, Waretown, Barnegat and Forked River year round except when the bay was frozen. Cargos were mainly charcoal, wood splints and cord wood destined for New York City tenement housing. The faster-sailing sloops in summer and fall carried produce, huckleberries, cranberries, clams and other seafood. In 1852 eleven or more schooners left the port of Toms River bound for New York in a week. They returned with merchandise and other supplies for the shops in the area.



1937 map of proposed improvements ro be made to Barnegat Inlet

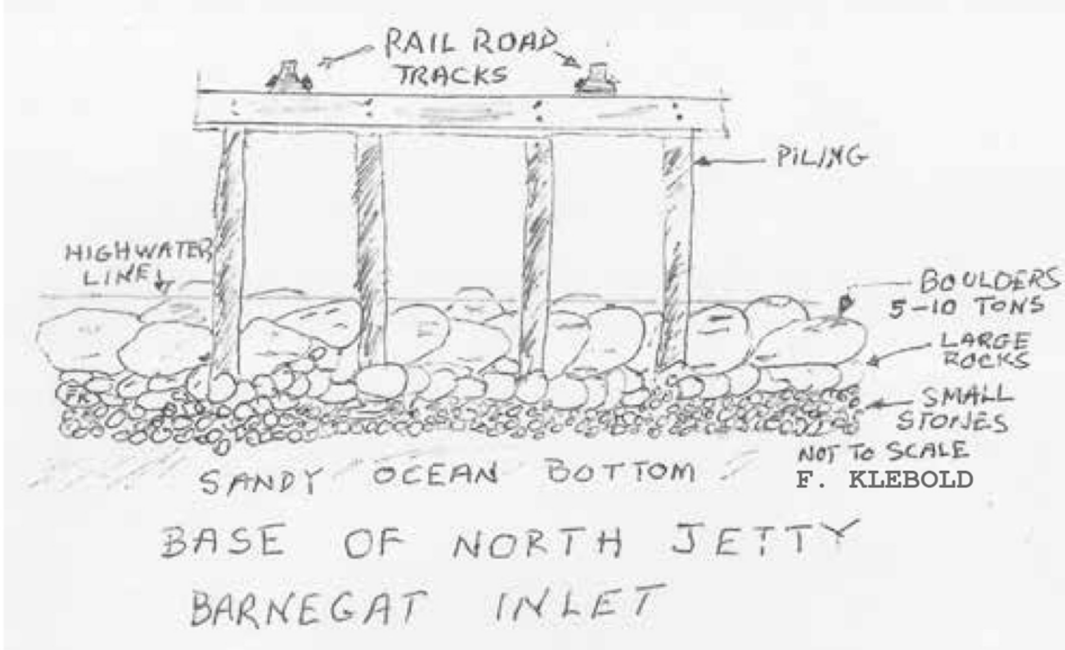
In January 1937, after many years of trying, New Jersey Secretary of State, Thomas A. Mathis, a former sea captain, and the Ocean County Freeholders finally were able to have a bill introduced by State Senator Percy Camp to the State Legislative body to improve Barnegat Inlet. The bill authorized the spending of $270,000

View of the cable tower, railroad trestle from the cove on the north side of the inlet runs to the edge of the ocean. Looking south is the cable tower in Barnegat City and light house. To the right is the sand dredge in the inlet with the outflow pipes running to the shore in Barnegat City.

to dredge the inlet deeper and construct two stone jetties north and south of the inlet. This was the first effort to make this waterway safe for small craft since its discovery.

In February 1937 Captain A.A. Fleming, Secretary of Long Beach Island Fisherman's Association stated "Sometimes there was only three foot of water, shifting channels causing twenty-one deaths in ten years. The summer of 1936 the U.S. Coast Guard towed 67 disabled boats, rescued 16 drowning men; about 300 pleasure, party boats and commercial boats use the inlet a day."

The Inlet bill was passed by both houses of the N.J. Legislature in April, 1937, and towards the end of May the Ocean County Freeholders appropriated an additional $252,000. Then there was a need for Federal money to start the project.



Cross section of Railroad track design to build the jetty.

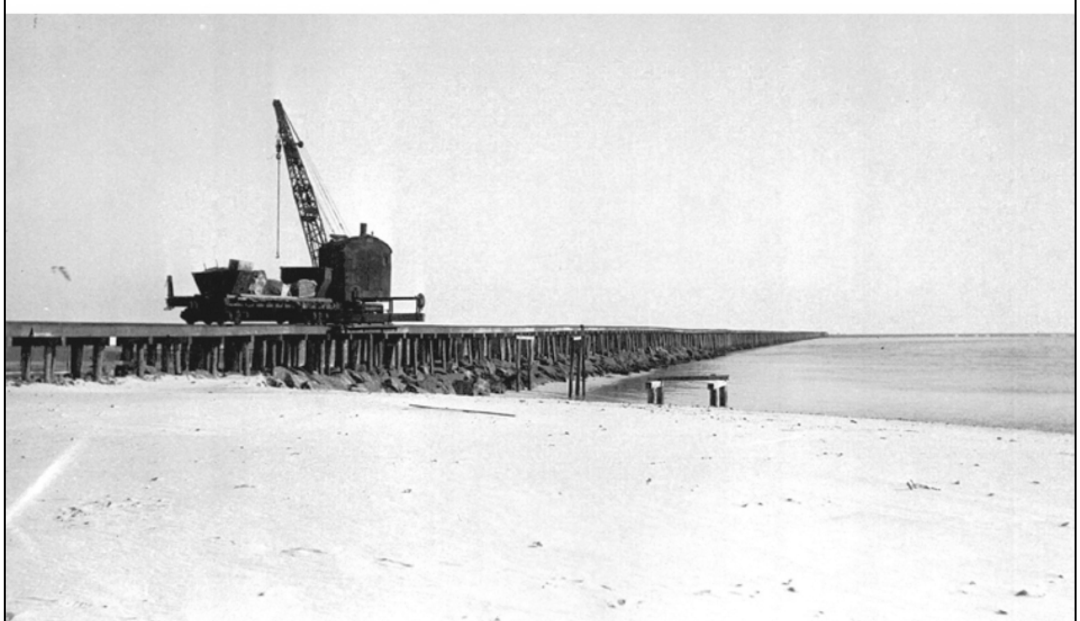
The cable tower and railroad trestle on Island Beach with a south view of Barnegat City over the inlet. Note the sand dredge.

Large Boulders under the railroad trestle on Island Beach looking south towards Barnegat City. Note how high the cable tower is compared to Barnegat Light.

Federal funds became available in 1938, and a contract in December was awarded by the Army Corps of Engineers to the Eastern Engineering Company in Atlantic City, N.J. They started dredging the inlet and prepared to build the much needed north jetty first and the south jetty later. This plan provided for a channel 300 feet wide, and 8 feet deep through the inlet and 10 feet deep through the outer bar. The two stone jetties, north and south, were spaced 1000 feet apart. This plan was intended to calm the rough waters.

Island Beach was privately owned by the Phipps Estate, and there was no road to Barnegat Inlet. To construct the north jetty, all the building material, workmen and tools had to be brought over the inlet from Barnegat City (now Barnegat Light). First a wharf was built in the cove at Island Beach to moor the barges that were loaded with railroad

Empty cable containers for stones and small rocks stacked on boulders at Barnegat City. Ocean County Historical Society photo



Railroad flat car loaded with boulders to be placed on north jetty by self propelled steam derrick. Note how low the tide is in the inlet.

A view from Barnegat City across the inlet to the cable tower, railroad trestle and north jetty that is under construction on Island Beach. To the left at the bottom of the photo are the empty containers for shipping the stones and small rocks. Ocean County Historical Society photo.

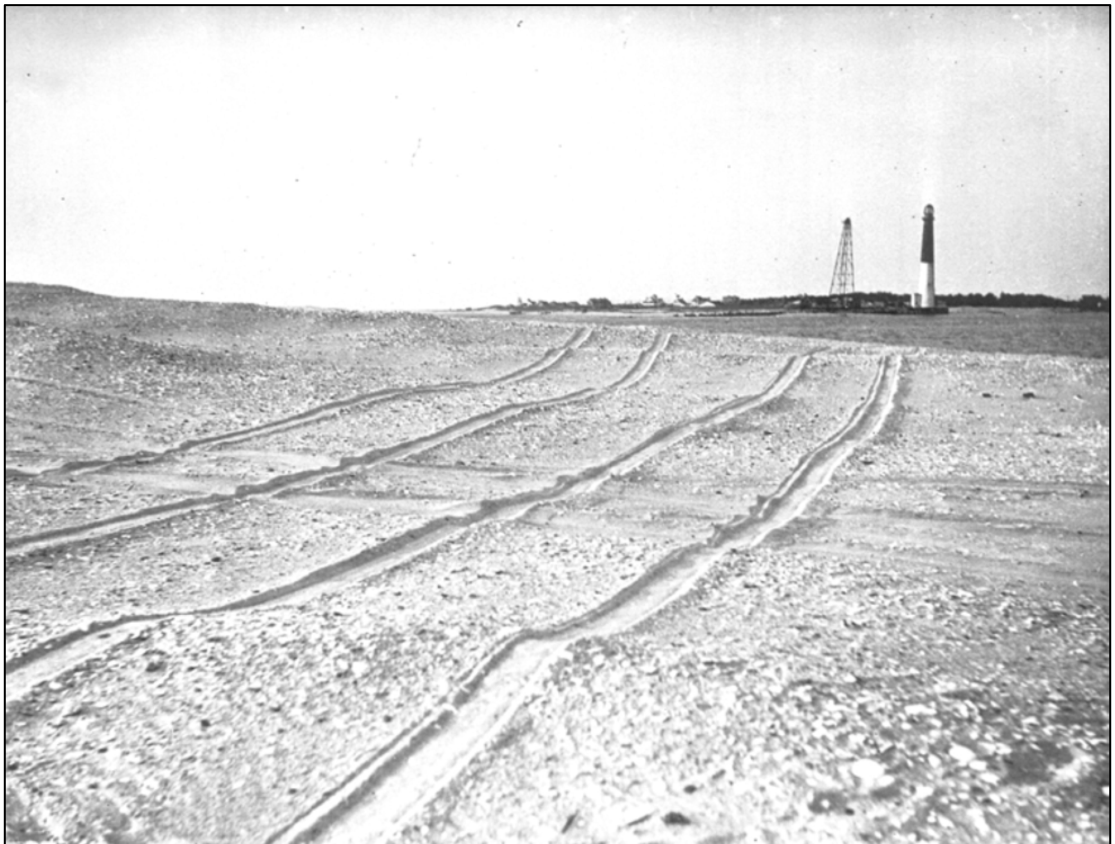
track, railroad ties that had been creosoted, coal for the steam derrick, spikes, pilings and other equipment to build a railroad trestle. When this dock was long enough, a self propelled railroad steam derrick and pile-driver were ferried over, along with a railroad flat car. More supplies were ferried over, a cement mixer, outhouses, and a building to house the donkey engine that would power the cable way. Also the steel frame for the cable tower, cement and coarse sand for the foundations.

Before the jetty work could start, four foundations had to be poured to erect the 165-foot steel framed cable towers on both sides of the inlet. When the towers were finished,

L to R Island Beach cable tower, Barnegat Lighthouse and the cable tower in Barnegat City. Note building at the foot of the tower that houses the donkey engine that powers the cable.

a heavy duty wire cable was strung across the inlet. It was powered by two donkey diesel engines. Fastened to the cable was an iron chain with a large, leather sling that would carry the stones, rocks and boulders over the water.

The railroad trestle was extended to the ocean to begin constructing the rock jetty 4900 feet into the ocean (380 ft. short of a mile). In October 1938, before the contract was issued, the Army Corps of Engineers proposed that the under water jetties would only be seen at low tide. This caused an uproar with the local, county and state governments. Underwater jetties would be a menace to navigation. There were hearings at the Court House in Toms River in March 1939. In May 1940 the District Army Engineer rejected the proposed jetty height increase.



A view S.E. from the dredged sand on Island Beach over the inlet to Barnegat City showing cottages, cable tower and Barnegat Light.

In order to cart about 78,000 tons of rock from quarries in Lambertville and Kingston, NJ, the contractor purchased several new twenty ton diesel-driven trailer trucks at a cost of $100,000. Some trailers had pans made of steel to fill with stones and rocks weighing fifteen to two hundred pounds. Large boulders five to ten tons a piece were strapped on flat bed trailers. During the eighty-mile trip through the Pine Barrens from Lambertville, the load was so great that the trucks had to stop several times to check the air pressure and let the tires cool.

When all basic construction equipment was in place, cable towers, the dock in the cove, and the railroad trestle at the ocean water's edge, the building of the north jetty could start. The piling to support the railroad had to be sunk into the sand, cross beams fastened in place, the ties to hold the

Another view from the Sea-dog-island area on Island Beach S.E. to Barnegat City showing the cable tower and light house and pumped sand fill from the inlet.

rails bolted, and the rails spiked. When this was done, the small stones were sent over by cable and emptied on the railroad flat car. The small stones were placed on the seabed first. Then the medium rocks were sent over, and the jetty was topped off with the huge boulders. It would be built to a height that the boulders would be just covered by high tide. It was tedious and dangerous work in all kinds of weather, including northeast storms, rain, snow, heat of summer, etc. When the end of the jetty was reached, the contractors reversed the operation, removing everything but the jetty piling on the way back, including the wharf and railroad trestle. The cable towers were dismantled and the foundations destroyed.

The east end of the jetty was marked with beacons mounted on steel cylinders. They were felled by Tropical

The remains of the railroad track trestle pilings after the north jetty had been completed.

storm Sandy in October 2012, and now have been replaced. The jetties were completed on September 24, 1940. The total amount expended for the construction of the Barnegat Inlet jetties as of June 30, 1941 is $752,816.28, which included $300,000 contributed by county and state governments.

Ferdinand F. Klebold,
August 30, 2013, Toms River, NJ

Printed by Central Printing
Toms River, NJ

MAP OF BARNEGAT INLET AREA 2012

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APPENDIX B: A LIST OF VESSELS ASSISTED BY THE LSS STATIONS IN THE BARNEGAT AREA FROM 1875 TO 1914

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Vessel Name	Vessel Type	Built	Date Lost	Location Lost	Length (feet)	Beam (feet)	Draft (feet)	Gross Tonnage	Net Tonnage	LSS Station Name	Notes
James Nelson	Sloop		3/24/1875	1 mi N Barnegat Inlet				50		Barnegat #17	Refloated
Angie Predmore	Schooner	1869	3/28/1875	East from light-house on the beach				94			Refloated
James W Elwell	Pilot boat	1867	11/5/1875	5 mi N Barnegat			10	74		Island Beach #16	Total loss
John C Bowers	Schooner		12/16/1875	Half-mile north Barnegat Inlet				52			Total loss
Glide	Schooner		3/15/1876	North side Barnegat Channel				28		Island Beach #16	Refloated
Mary Louisa	Schooner		3/26/1878	1 mi ENE Barnegat LSS				99		Barnegat #17	Refloated
Samuel Carlton	Schooner		10/22/1878	Barnegat Inlet				144		Barnegat #17	Refloated
Mary A Mott	Sloop		10/23/1878	Short Beach				20.8		Sta #30	Refloated
Lady Ellen	Schooner	1856	11/1/1878	Barnegat Shoal South point				218.24	207.33	Barnegat & Loveladies	Refloated
S E Dunn	Sloop		11/24/1878	0.75 mi E Barnegat LSS						Barnegat #17	Refloated
Stephen Barnes	Schooner	1875	12/25/1878	0.5 mi E Barnegat LSS	86	24.4	8.1	91.93		Barnegat & Loveladies	Refloated
David Tolck	Schooner	1873	2/26/1879	Harvey Cedars	132	30	13	445		Barnegat #17	Ship lost; rigging saved & sold in NY
Mary Emma	Schooner		4/10/1879	0.5 mi E Barnegat						Barnegat #17	Refloated
Julia A Berkele	Schooner	1866	5/3/1879	1 mi ENE Barnegat LSS	105.5	25	7.9	169	160	Barnegat #17	Refloated
William Thompson	Schooner	1865	10/10/1879	1 mi E Barnegat LSS	86.8	21.9	8	92		Barnegat #17	Refloated
Flash	Sloop	1878	1/3/1880	Barnegat Inlet	31	11.6	3.9	9	8.36	Barnegat #17	Refloated

Vessel Name	Vessel Type	Built	Date Lost	Location Lost	Length (feet)	Beam (feet)	Draft (feet)	Gross Tonnage	Net Tonnage	LSS Station Name	Notes
C H Foster	3 masted schooner	1872	9/28/1880	1.5 mi NE Barnegat Inlet	126	30.2	14.6	385		Forked River, Island Beach, Barnegat, Loveladies	Refloated
Hattie S Collins	Schooner	1867	3/28/1881	Barnegat Inlet North side	97	26	7	122.77	116.63		Refloated
Sprite	Steam yacht		3/30/1881	Barnegat Inlet				12		Barnegat #17	Refloated
Julia	Schooner		2/4/1882	Barnegat Inlet				11		Barnegat #17	Refloated
Jefferson	3 masted Schooner	1874	12/14/1882	Barnegat Shoals	124.6	30	11.5	325		Barnegat #17	Refloated
Margaret A Amelia	Schooner	1871	1/11/1883	Barnegat Inlet	45.6	17.3	4.6	24	22.66	Barnegat #17	Refloated
Sans Souci	Schooner fishing yacht	1876	9/18/1883					117			Refloated
James Jones	Schooner	1858	10/31/1883	Barnegat Shoal	109	29.6	9.6	253		Barnegat & Forked River	Total loss
Merrimac	Sidewheel steamer		1/13/1884	0.5 mi ESE Barnegat LSS				170			Refloated
Albertine Meyer	Brig		2/6/1884	0.5 mi SE Barnegat LSS	102.7	25.3	14.5	266		Barnegat #17	Total loss
Deceiver	Schooner	1871	4/29/1884	Barnegat Shoal				23			Total loss
Altavela	Schooner	1853	5/2/1884	1 mi ENE Barnegat LSS	102.2	27.6	8.2	183		Barnegat #17	Total loss
Katy Did	Sloop	1876	11/12/1884	N side Barnegat Inlet	37.5	13.5	3.6	10	9.5	Barnegat #17	Refloated
Lenox	cat-rigged yacht		11/25/1884	Barnegat Inlet							Refloated
Gussie	Sloop		12/27/1884	Barnegat Bay							Refloated
Guadaloupe	Steamship	1881	11/19/1884	Barnegat Inlet North side	317.8	39.5	21.4	2839		Barnegat #17 & Forked River #16	Total Loss; Removed Later
Lida Babcock	3 masted schooner	1872	2/15/1885	Barnegat Shoal	118	29.6	9.4	245		Forked River, NJ	Total loss

Vessel Name	Vessel Type	Built	Date Lost	Location Lost	Length (feet)	Beam (feet)	Draft (feet)	Gross Tonnage	Net Tonnage	LSS Station Name	Notes
Everhard H Preston	Sloop		4/3/1885	Barnegat Inlet							Refloated
Mascotte	Schooner - yacht		9/17/1885	Barnegat Inlet				24		Forked River	Refloated
Kraljevica	Bark	1870	2/10/1886	S Barnegat Shoal	152.5	29.5	18	719		Barnegat, Loveladies & Ship Bottom	Total loss
Farmer	Schooner	1839	3/21/1886	Barnegat Shoal	50.6	19.2	4.7	31.97	30.38	Barnegat	Refloated
Louisa B Robinson	Schooner	1884	3/21/1886	1 mi NNE Barnegat Shoal	54	18.8	5.8	30	28.72		Refloated
A L & M Townsend	Schooner		12/11/1886								Refloated
Francis Perkins	Pilot Schooner #13	1866	1/24/1887	Barnegat Shoals				52.24	49.82	Cadwick & Toms River	Total loss
Mascotte	Schooner - yacht		10/5/1887	Barnegat Shoal				24		Forked River, Barnegat	Refloated
Jordan	Sloop	1868	10/23/1887	Barnegat Light	45	17.5	5	25.92	24.62		Refloated
Annie S Carll	Schooner	1871	10/26/1887	Barnegat Inlet North shoal	67	20.4	5.3	48.06	45.66		Refloated
Menuncatuck	Schooner	1880	11/19/1887	0.75 mi NNE Barnegat Inlet	73	23	6.6	67	63.57		Refloated
James W Lee	Schooner		12/6/1887	Barnegat Shoal				21		Barnegat #17	Refloated
La' Rena Reed	Schooner		1/13/1888								Refloated
Whim	Schooner	1885	3/10/1888	Barnegat Inlet	54.7	16	4.9	30.65	29.12	Barnegat & Forked River	Refloated
Edwin A Hayes	Steamer	1883	5/22/1888	Barnegat Shoals	69.8	12	3.9	30.8	23.56	Barnegat #17	Total Loss
Erna	Bark	1868	9/13/1889	Barnegat Shoals	141	29.5	15.1	562		Barnegat #17	Total loss
Ann Cooley	Schooner	1853	10/11/1889	Barnegat Inlet	52.1	19.8	5	27.7	26.31	Barnegat	Refloated

Vessel Name	Vessel Type	Built	Date Lost	Location Lost	Length (feet)	Beam (feet)	Draft (feet)	Gross Tonnage	Net Tonnage	LSS Station Name	Notes
Naturalist	Sloop yacht		10/15/1889								Refloated
James B Johnson	Schooner	1858	1/24/1890	0.5 mi S Forked River LSS	91.9	27.3	8.2	147.82	140.43	Forked River 15, 16, 17	Refloated
C S Parnell	Sloop		3/16/1890	Barnegat Inlet Shoal					10	Barnegat #17	Refloated
Minnie King	Catboat		6/21/1890								Refloated
Kitty Kelly	American yacht		9/17/1891								Refloated
Ariel	Catboat		9/20/1891								Refloated
Charles A Briggs	Schooner		10/28/1891	Barnegat Shoal				758		Barnegat #17	Refloated
Asher S Parker	Schooner		1/22/1892	Barnegat Shoals				41			Refloated
Mist	American sloop yacht		10/17/1892								Refloated
Madgie	Sloop		11/7/1892	Barnegat Shoals						Barnegat #17	Refloated
Mary Wood	Schooner		11/14/1892	Barnegat Shoal				35			Refloated
Pauline	Sloop		12/18/1892								Refloated
Dixie	Schooner	1890	4/20/1893	Barnegat Inlet North jetty	160	23.6	11	298.3	283.38	Forked River; Barnegat	Total loss
Magnolia	Schooner	1891	4/20/1893	1.5 mi N Barnegat Inlet	140.2	23.8	12	277.4	263.53	Forked River, Barnegat, Cedar Run	Total loss
Eveline/ Evaline	Sloop		4/22/1893	Barnegat Shoal				23		Barnegat #17	Refloated
Gracie	Yacht		9/25/1893								Refloated
Young America	Steamer	1891	9/4/1894	0.25 mi N Barnegat LSS	49.5	13.5	5	24.96	18.01	Barnegat #17	Refloated
P.H.Z.	Sloop		8/20/1895								Refloated
D B Mayhew	Schooner	1871	5/17/1895	Barnegat Inlet	49.5	15.5	6.6	23.51	22.33	Barnegat & Forked River	Refloated

Vessel Name	Vessel Type	Built	Date Lost	Location Lost	Length (feet)	Beam (feet)	Draft (feet)	Gross Tonnage	Net Tonnage	LSS Station Name	Notes
Federalist	Sloop - Yacht	1880	8/28/1895	Barnegat Inlet North side	45	15.3	4.7	20.32	19.31		Refloated
Kitty K	Catboat		8/24/1895								Refloated
Ethel	Catboat		9/19/1895								Refloated
D M Anthony	Schooner	1873	10/10/1895	1.75 mi N Forked River LSS	146.7	36.7	15.5	555.91	528.12	Cedar Creek	Refloated
John F Kranz	Schooner	1871	3/21/1896	Barnegat outer shoal	140.9	32	16.8	546.89	519.54	Barnegat & Forked River	Refloated
Isolde	Catboat		10/24/1896								Refloated
C C Lane	3 masted schooner	1873	1/7/1897	Barnegat Shoal	130	32	11	321.62	305.54		Refloated
Jennie R Tomlinson	Schooner	1891	12/24/1897	1.25 mi NE Barnegat Shoal	117	28	7	167	158.4	Forked River, NJ	Refloated
Dreadnaught	Sloop	1889	4/19/1898	Barnegat Inlet	36	14.6	3.8	11	11	Forked River, NJ	Refloated
Climax	Steamer	1872	4/29/1898								Refloated
Mattie W Porter	Schooner	1897	3/31/1899	Barnegat Shoal	62.8	17	4.7	28	26		Refloated
Olivia	Yawl		5/9/00								Refloated
Connetquot	Steamer		8/12/00								Refloated
B.C. Pennington	Catboat		8/12/00								Refloated
Carrie	Sloop		9/28/00								Refloated
Alert	Sloop	1880	7/4/1901	2 mi E Barnegat LSS	86.2	18.1	7.4	69	36	Barnegat & Forked River	Total loss
Wildwood	Steamer	1895	5/8/1902	1.75 mi NE Barnegat LSS	39.1	10	3.6	7	6	Barnegat #17	Refloated
C R Bennett	Schooner	1883	7/26/1904	Barnegat Inlet	63.5	17.8	4.5	32	31	Barnegat #17	Refloated
Mary L.	Sloop - Yacht		9/24/1905	Barnegat Inlet							Refloated
Custus W Wright	Schooner	1871	10/15/1905	0.75 mi NNE Barnegat Inlet	80.1	26	6	113	107	Barnegat #17	Refloated
Unidentified	Gas launch		9/30/1906								Refloated

Vessel Name	Vessel Type	Built	Date Lost	Location Lost	Length (feet)	Beam (feet)	Draft (feet)	Gross Tonnage	Net Tonnage	LSS Station Name	Notes
Sheila	Gas screw yacht	1906	1/6/1907	1.25 mi NE Barnegat LSS	56.9	17.9	7.1	47	39	Barnegat & Forked River	Refloated
Lizzie Bell	Schooner	1884	4/10/1908	1.25 mi NNE Barnegat LSS	56	20.3	5.6	44	41	Barnegat & Forked River	Refloated
Raena	Gas launch		7/31/1908	1.5 mi E Barnegat LSS						Barnegat & Loveladies LSS	Engine salvaged
Edna H	Gas Lch.		2/8/09								Refloated
Molly	Yacht		9/3/09								Refloated
Mabel	Gas Lch.		9/14/09								Refloated
Rowena	Gas Lch.		12/4/09								Refloated
Fred Gilbert	Gas Lch.		1/9/10								Refloated
Goldy Budd	Gas Lch.		2/4/10								Refloated
Guyasuta	Gas Lch.		2/6/10					9			Refloated
Neptune	Gas Lch.		2/7/10								Refloated
Harold B Cousens	Schooner	1882	1/9/1911	Barnegat Shoal	139	34	11.6	379	360	Barnegat, Loveladies, Forked River	Refloated
D J Whealton	Schooner	1875	4/7/1911	1 mi N Barnegat LSS	63.5	19.8	6	48	35	Barnegat #17	Refloated
Belmar	Houseboat		8/15/1911								Refloated
Emma R. L.	Lch.		9/22/1911	Near Forked River LSS							Refloated
Caterina	Bark	1875	10/23/1912	1.75 mi NE Barnegat LSS	201.6	32.8	19.8	949	860	Forked River, Loveladies, Cedar Creek, Barnegat	Total loss
Chalmette	Steam Passenger	1879	7/28/1913	1.25 mi SW Barnegat LSS	321.2	42.2	21.3	3205	2043	Barnegat & Loveladies	Refloated
Mercy	Schooner		9/22/13								Refloated
Ermine	Lch.		10/4/13								Refloated
A G Ropes	Schooner - Barge	1884	12/26/1913	Island Beach	258.2	44.7	28.4	2438	2328		Total loss
Undaunted	Schooner - Barge	1869	12/26/1913	1 mi NE Forked River Sta	207.5	41.1	14.3	1768	1729	Forked River, NJ	Total loss

Vessel Name	Vessel Type	Built	Date Lost	Location Lost	Length (feet)	Beam (feet)	Draft (feet)	Gross Tonnage	Net Tonnage	LSS Station Name	Notes
Hildur Mabel	Schooner	1910	2/3/1914	1.25 mi NNE Barnegat LSS	52	16.5	5	19	14	Barnegat #17	All saved
Charlemagne Tower Jr.	Steam Transport	1886	3/6/1914	6 mi N Barnegat	255	40	21	1825	1543	Cedar Creek	Total loss

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APPENDIX C: ALL SHIPWRECKS FOR THE BARNEGAT AREA

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Vessel Name	Vessel Type	Built	Date Lost	Location Lost	Length (feet)	Beam (feet)	Draft (feet)	Gross Tonnage	Net Tonnage	LSS Station Name	Notes
James Nelson	Sloop		3/24/1875	1 mi N Barnegat Inlet				50		Barnegat #17	Refloated
Angie Predmore	Schooner	1869	3/28/1875	East from light-house on the beach				94			Refloated
James W Elwell	Pilot boat	1867	11/5/1875	5 mi N Barnegat			10	74		Island Beach #16	Total loss
John C Bowers	Schooner		12/16/1875	Half-mile north Barnegat Inlet				52			Total loss
Glide	Schooner		3/15/1876	North side Barnegat Channel				28		Island Beach #16	Refloated
Mary Louisa	Schooner		3/26/1878	1 mi ENE Barnegat LSS				99		Barnegat #17	Refloated
Samuel Carlton	Schooner		10/22/1878	Barnegat Inlet				144		Barnegat #17	Refloated
Mary A Mott	Sloop		10/23/1878	Short Beach				20.8		Sta #30	Refloated
Lady Ellen	Schooner	1856	11/1/1878	Barnegat Shoal South point				218.24	207.33	Barnegat & Loveladies	Refloated
S E Dunn	Sloop		11/24/1878	0.75 mi E Barnegat LSS						Barnegat #17	Refloated
Stephen Barnes	Schooner	1875	12/25/1878	0.5 mi E Barnegat LSS	86	24.4	8.1	91.93		Barnegat & Loveladies	Refloated
David Tolck	Schooner	1873	2/26/1879	Harvey Cedars	132	30	13	445		Barnegat #17	Ship lost; rigging saved & sold in NY
Mary Emma	Schooner		4/10/1879	0.5 mi E Barnegat						Barnegat #17	Refloated
Julia A Berkele	Schooner	1866	5/3/1879	1 mi ENE Barnegat LSS	105.5	25	7.9	169	160	Barnegat #17	Refloated
William Thompson	Schooner	1865	10/10/1879	1 mi E Barnegat LSS	86.8	21.9	8	92		Barnegat #17	Refloated
Flash	Sloop	1878	1/3/1880	Barnegat Inlet	31	11.6	3.9	9	8.36	Barnegat #17	Refloated

Vessel Name	Vessel Type	Built	Date Lost	Location Lost	Length (feet)	Beam (feet)	Draft (feet)	Gross Tonnage	Net Tonnage	LSS Station Name	Notes
C H Foster	3 masted schooner	1872	9/28/1880	1.5 mi NE Barnegat Inlet	126	30.2	14.6	385		Forked River, Island Beach, Barnegat, Loveladies	Refloated
Hattie S Collins	Schooner	1867	3/28/1881	Barnegat Inlet North side	97	26	7	122.77	116.63		Refloated
Sprite	Steam yacht		3/30/1881	Barnegat Inlet				12		Barnegat #17	Refloated
Julia	Schooner		2/4/1882	Barnegat Inlet				11		Barnegat #17	Refloated
Jefferson	3 masted Schooner	1874	12/14/1882	Barnegat Shoals	124.6	30	11.5	325		Barnegat #17	Refloated
Margaret A Amelia	Schooner	1871	1/11/1883	Barnegat Inlet	45.6	17.3	4.6	24	22.66	Barnegat #17	Refloated
Sans Souci	Schooner fishing yacht	1876	9/18/1883					117			Refloated
James Jones	Schooner	1858	10/31/1883	Barnegat Shoal	109	29.6	9.6	253		Barnegat & Forked River	Total loss
Merrimac	Sidewheel steamer		1/13/1884	0.5 mi ESE Barnegat LSS				170			Refloated
Albertine Meyer	Brig		2/6/1884	0.5 mi SE Barnegat LSS	102.7	25.3	14.5	266		Barnegat #17	Total loss
Deceiver	Schooner	1871	4/29/1884	Barnegat Shoal				23			Total loss
Altavela	Schooner	1853	5/2/1884	1 mi ENE Barnegat LSS	102.2	27.6	8.2	183		Barnegat #17	Total loss
Katy Did	Sloop	1876	11/12/1884	N side Barnegat Inlet	37.5	13.5	3.6	10	9.5	Barnegat #17	Refloated
Lenox	cat-rigged yacht		11/25/1884	Barnegat Inlet							Refloated
Gussie	Sloop		12/27/1884	Barnegat Bay							Refloated
Guadaloupe	Steamship	1881	11/19/1884	Barnegat Inlet North side	317.8	39.5	21.4	2839		Barnegat #17 & Forked River #16	Total Loss; Removed Later
Lida Babcock	3 masted schooner	1872	2/15/1885	Barnegat Shoal	118	29.6	9.4	245		Forked River, NJ	Total loss

Vessel Name	Vessel Type	Built	Date Lost	Location Lost	Length (feet)	Beam (feet)	Draft (feet)	Gross Tonnage	Net Tonnage	LSS Station Name	Notes
Everhard H Preston	Sloop		4/3/1885	Barnegat Inlet							Refloated
Mascotte	Schooner - yacht		9/17/1885	Barnegat Inlet				24		Forked River	Refloated
Kraljevica	Bark	1870	2/10/1886	S Barnegat Shoal	152.5	29.5	18	719		Barnegat, Loveladies & Ship Bottom	Total loss
Farmer	Schooner	1839	3/21/1886	Barnegat Shoal	50.6	19.2	4.7	31.97	30.38	Barnegat	Refloated
Louisa B Robinson	Schooner	1884	3/21/1886	1 mi NNE Barnegat Shoal	54	18.8	5.8	30	28.72		Refloated
A L & M Townsend	Schooner		12/11/1886								Refloated
Francis Perkins	Pilot Schooner #13	1866	1/24/1887	Barnegat Shoals				52.24	49.82	Cadwick & Toms River	Total loss
Mascotte	Schooner - yacht		10/5/1887	Barnegat Shoal				24		Forked River, Barnegat	Refloated
Jordan	Sloop	1868	10/23/1887	Barnegat Light	45	17.5	5	25.92	24.62		Refloated
Annie S Carll	Schooner	1871	10/26/1887	Barnegat Inlet North shoal	67	20.4	5.3	48.06	45.66		Refloated
Menuncatuck	Schooner	1880	11/19/1887	0.75 mi NNE Barnegat Inlet	73	23	6.6	67	63.57		Refloated
James W Lee	Schooner		12/6/1887	Barnegat Shoal				21		Barnegat #17	Refloated
La' Rena Reed	Schooner		1/13/1888								Refloated
Whim	Schooner	1885	3/10/1888	Barnegat Inlet	54.7	16	4.9	30.65	29.12	Barnegat & Forked River	Refloated
Edwin A Hayes	Steamer	1883	5/22/1888	Barnegat Shoals	69.8	12	3.9	30.8	23.56	Barnegat #17	Total Loss
Erna	Bark	1868	9/13/1889	Barnegat Shoals	141	29.5	15.1	562		Barnegat #17	Total loss
Ann Cooley	Schooner	1853	10/11/1889	Barnegat Inlet	52.1	19.8	5	27.7	26.31	Barnegat	Refloated
Naturalist	Sloop yacht		10/15/1889								Refloated

Vessel Name	Vessel Type	Built	Date Lost	Location Lost	Length (feet)	Beam (feet)	Draft (feet)	Gross Tonnage	Net Tonnage	LSS Station Name	Notes
James B Johnson	Schooner	1858	1/24/1890	0.5 mi S Forked River LSS	91.9	27.3	8.2	147.82	140.43	Forked River 15, 16, 17	Refloated
C S Parnell	Sloop		3/16/1890	Barnegat Inlet Shoal					10	Barnegat #17	Refloated
Minnie King	Catboat		6/21/1890								Refloated
Kitty Kelly	American yacht		9/17/1891								Refloated
Ariel	Catboat		9/20/1891								Refloated
Charles A Briggs	Schooner		10/28/1891	Barnegat Shoal				758		Barnegat #17	Refloated
Asher S Parker	Schooner		1/22/1892	Barnegat Shoals				41			Refloated
Mist	American sloop yacht		10/17/1892								Refloated
Madgie	Sloop		11/7/1892	Barnegat Shoals						Barnegat #17	Refloated
Mary Wood	Schooner		11/14/1892	Barnegat Shoal				35			Refloated
Pauline	Sloop		12/18/1892								Refloated
Dixie	Schooner	1890	4/20/1893	Barnegat Inlet North jetty	160	23.6	11	298.3	283.38	Forked River; Barnegat	Total loss
Magnolia	Schooner	1891	4/20/1893	1.5 mi N Barnegat Inlet	140.2	23.8	12	277.4	263.53	Forked River, Barnegat, Cedar Run	Total loss
Eveline/Evaline	Sloop		4/22/1893	Barnegat Shoal				23		Barnegat #17	Refloated
Gracie	Yacht		9/25/1893								Refloated
Young America	Steamer	1891	9/4/1894	0.25 mi N Barnegat LSS	49.5	13.5	5	24.96	18.01	Barnegat #17	Refloated
P.H.Z.	Sloop		8/20/1895								Refloated
D B Mayhew	Schooner	1871	5/17/1895	Barnegat Inlet	49.5	15.5	6.6	23.51	22.33	Barnegat & Forked River	Refloated
Federalist	Sloop - Yacht	1880	8/28/1895	Barnegat Inlet North side	45	15.3	4.7	20.32	19.31		Refloated
Kitty K	Catboat		8/24/1895								Refloated

Vessel Name	Vessel Type	Built	Date Lost	Location Lost	Length (feet)	Beam (feet)	Draft (feet)	Gross Tonnage	Net Tonnage	LSS Station Name	Notes
Ethel	Catboat		9/19/1895								Refloated
D M Anthony	Schooner	1873	10/10/1895	1.75 mi N Forked River LSS	146.7	36.7	15.5	555.91	528.12	Cedar Creek	Refloated
John F Kranz	Schooner	1871	3/21/1896	Barnegat outer shoal	140.9	32	16.8	546.89	519.54	Barnegat & Forked River	Refloated
Isolde	Catboat		10/24/1896								Refloated
C C Lane	3 masted schooner	1873	1/7/1897	Barnegat Shoal	130	32	11	321.62	305.54		Refloated
Jennie R Tomlinson	Schooner	1891	12/24/1897	1.25 mi NE Barnegat Shoal	117	28	7	167	158.4	Forked River, NJ	Refloated
Dreadnaught	Sloop	1889	4/19/1898	Barnegat Inlet	36	14.6	3.8	11	11	Forked River, NJ	Refloated
Climax	Steamer	1872	4/29/1898								Refloated
Mattie W Porter	Schooner	1897	3/31/1899	Barnegat Shoal	62.8	17	4.7	28	26		Refloated
Olivia	Yawl		5/9/00								Refloated
Connetquot	Steamer		8/12/00								Refloated
B.C. Pennington	Catboat		8/12/00								Refloated
Carrie	Sloop		9/28/00								Refloated
Alert	Sloop	1880	7/4/1901	2 mi E Barnegat LSS	86.2	18.1	7.4	69	36	Barnegat & Forked River	Total loss
Wildwood	Steamer	1895	5/8/1902	1.75 mi NE Barnegat LSS	39.1	10	3.6	7	6	Barnegat #17	Refloated
C R Bennett	Schooner	1883	7/26/1904	Barnegat Inlet	63.5	17.8	4.5	32	31	Barnegat #17	Refloated
Mary L.	Sloop - Yacht		9/24/1905	Barnegat Inlet							Refloated
Custus W Wright	Schooner	1871	10/15/1905	0.75 mi NNE Barnegat Inlet	80.1	26	6	113	107	Barnegat #17	Refloated
Unidentified	Gas launch		9/30/1906								Refloated
Sheila	Gas screw yacht	1906	1/6/1907	1.25 mi NE Barnegat LSS	56.9	17.9	7.1	47	39	Barnegat & Forked River	Refloated
Lizzie Bell	Schooner	1884	4/10/1908	1.25 mi NNE Barnegat LSS	56	20.3	5.6	44	41	Barnegat & Forked River	Refloated

Vessel Name	Vessel Type	Built	Date Lost	Location Lost	Length (feet)	Beam (feet)	Draft (feet)	Gross Tonnage	Net Tonnage	LSS Station Name	Notes
Raena	Gas launch		7/31/1908	1.5 mi E Barnegat LSS						Barnegat & Loveladies LSS	Engine salvaged
Edna H	Gas Lch.		2/8/09								Refloated
Molly	Yacht		9/3/09								Refloated
Mabel	Gas Lch.		9/14/09								Refloated
Rowena	Gas Lch.		12/4/09								Refloated
Fred Gilbert	Gas Lch.		1/9/10								Refloated
Goldy Budd	Gas Lch.		2/4/10								Refloated
Guyasuta	Gas Lch.		2/6/10					9			Refloated
Neptune	Gas Lch.		2/7/10								Refloated
Harold B Cousens	Schooner	1882	1/9/1911	Barnegat Shoal	139	34	11.6	379	360	Barnegat, Loveladies, Forked River	Refloated
D J Whealton	Schooner	1875	4/7/1911	1 mi N Barnegat LSS	63.5	19.8	6	48	35	Barnegat #17	Refloated
Belmar	Houseboat		8/15/1911								Refloated
Emma R. L.	Lch.		9/22/1911	Near Forked River LSS							Refloated
Caterina	Bark	1875	10/23/1912	1.75 mi NE Barnegat LSS	201.6	32.8	19.8	949	860	Forked River, Loveladies, Cedar Creek, Barnegat	Total loss
Chalmette	Steam Passenger	1879	7/28/1913	1.25 mi SW Barnegat LSS	321.2	42.2	21.3	3205	2043	Barnegat & Loveladies	Refloated
Mercy	Schooner		9/22/13								Refloated
Ermine	Lch.		10/4/13								Refloated
A G Ropes	Schooner - Barge	1884	12/26/1913	Island Beach	258.2	44.7	28.4	2438	2328		Total loss
Undaunted	Schooner - Barge	1869	12/26/1913	1 mi NE Forked River Sta	207.5	41.1	14.3	1768	1729	Forked River, NJ	Total loss
Hildur Mabel	Schooner	1910	2/3/1914	1.25 mi NNE Barnegat LSS	52	16.5	5	19	14	Barnegat #17	All saved
Charlemagne Tower Jr	Steam Transport	1886	3/6/1914	6 mi N Barnegat	255	40	21	1825	1543	Cedar Creek	Total loss

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APPENDIX D: VESSELS LISTED AS LOST IN THE VICINITY OF THE BARNEGAT INLET, SHOAL, AND LIGHT FITTING THE DESCRIPTION OF THE NORTH JETTY SHIPWRECK

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Vessels Listed As Lost In The Vicinity Of The Barnegat Inlet, Shoal, And Light Fitting The Description Of The North Jetty Shipwreck (New Jersey Maritime Museum Database 2014).

Barnegat Inlet, Light, Shoals

Ship's Name	Ship's Owner	Vessel Type	Built	Where Built	Date Lost	Location Lost	Cause Of Loss	Construction	Flag	Length (feet)	Beam (feet)	Draft (fet)	Gross Tonnage	Net Tonnage	Home (Hailing) Port	Departure Port	Destination Port	Master	No. of Crew	No. of Pass	Lives Lost	Ship Value	Cargo Value	Nature of Cargo	LLS Station Name	Miscellaneous Information
Dixie		Schooner - Barge	1890	Portsmouth, VA	4/20/1893	Barnegat Inlet North Jetty	Wrecked	Wood		160	23.6	11	298.3	283.38	Norfolk, VA	Norfolk, VA	Boston, MA	Norton	3		0	$8,000	$4,000	Pilings	Forked River; Barnegat	Total Loss
Frances Reyester		Schooner			7/31/1876	North Beach / N Of Barnegat Inlet	Abandoned/ Drifted Ashore								Seaford, DE									Wood		Total Loss
Number Twenty-One		Schooner - Barge	1901	Baltimore, MD	2/4/1926	Barnegat Shoals	Foundered	Wood	US	196	34.3	17.5	905	773	Boston, MA	Norfolk, VA	Boston, MA		5		2			Coal		Twenty & Twenty-Eight Sank Same Day
Number Twenty		Schooner - Barge	1899	Bath, ME	2/4/1926	Barnegat Light	Foundered	Wood		190.3	18.3	18.1		940	Baltimore, MD				3		3					Twenty-One & Twenty-Eight Sank Same Day

Vessels Listed As Lost Near The Barnegat Fitting The Description Of The North Jetty Shipwreck (New Jersey Maritime Museum Database 2014). These Vessels Are Not Known To Have Come Ashore And Likely Sunk Offshore.

Barnegat

Ship's Name	Ship's Owner	Vessel Type	Built	Where Built	Date Lost	Location Lost	Cause Of Loss	Construction	Flag	Length	Beam	Draft	Gross Tonnage	Net Tonnage	Home (Hailing) Port	Departure Port	Destination Port	Master	No. of Crew	No. of Pass	Lives Lost	Ship Value	Cargo Value	Nature Of Cargo	LLS Station Name	Miscellaneous Information
Adair F Bonney		Schooner			11/13/1875	Off Barnegat	Lost At Sea		US				200.83			Perth Amboy, NJ	Richmond, VA		7	0	7			Coal		Total Loss
Annie E Embrey	Lovett Jennings & Co.	Barge	1906	Elkton, MD	2/19/1908	Barnegat	Stranded	Wood	US				431	431	Philadelphia PA	New York, NY	Chester, PA	William Currin	3	0	0	$10,000	$7,363	Plaster & Cement		
Ardmore		Schooner - Barge	1895	Bath, ME	4/16/1913	Off Barnegat	Foundered			174.3	35.3	16.1	821	762	Perth Amboy, NJ				2							
Arundel		Barge	1902	Elkton, MD	4/9/1916	Off Barnegat	Foundered						418	418	Baltimore, MD				3		0					Total Loss
Bristol		Schooner - Barge	1904	Bath, ME	9/4/1910	Off Barnegat	Collision W/ "Dinnamare"			180.8	36.3	12.4	653	550	Fall River, MA				2	3	0					Total Loss
Cheaton		Schooner			2/8/1872	Barnegat	Lost Sails									Port Morant, Jamaica	New York, NY									
Edwin L Allen		Schooner				Barnegat	Foundered						301		Philadelphia PA	Boston, MA	Georgetown DC							In Ballast		
John N Colby		Schooner			3/22/1877	Barnegat	Damaged In Gale						227.98		Noank, CT	Key West, FL	New York, NY	Wilcox								
Majestic		Barge	1891	New London, CT	6/10/1910	Barnegat	Foundered	Wood	US	208.6	34.3	18.3	1108	1053	New London, CT	Norfolk, VA	New Bedford, MA		3					Coal		
Martha E Mccabe	Asher J Hudson	Schooner - Barge	1888	Milton, DE	3/20/1906	Barnegat	Foundered In Storm	Wood		181.5	23.3	9.2	345	342	Philadelphia PA	Norfolk, VA	New York, NY	Willard Massey	6		0	$10,000	$3,000	Lumber & Pilings		Total Loss
No 22		Schooner - Barge	1898	Bath, ME	1/17/1909	Barnegat	Foundered	Wood	US	190.1	35.3	17.1	936	833	Baltimore, MD	Baltimore, MD	Boston, MA		5		5			Coal		
Number Twenty-Eight		Schooner - Barge	1899	Bath, ME	2/4/1926	Barnegat	Foundered	Wood		207	35.2	18.4	1035	929	Boston, MA				4		3					Twenty & Twenty-One Sank Same Day
Orlando V Wooten		4 Masted Schooner	1901	Bath, ME	4/8/1922	Barnegat	Stranded			167.2	36.2	13.6	677	573	New York, NY			A J Huston	8		0					Total Loss
Plymouth		Barge	1870	Quebec PQ	4/20/1893	Barnegat	Foundered		US				618.04	602.77	New York, NY	Newport News, VA	New York, NY		5		3			Coal		Formerly British "Verona"
Rebecca Shepherd	George W Shepherd	Schooner	1873	Milford, DE	8/18/1879	Barnegat	Foundered In Gale	Wood	US				411		Philadelphia PA	Providence RI	Philadelphia PA	L C Lake	7		0	$12,000		In Ballast		
Tunkhannock		Schooner - Barge	1891	Noank, CT	10/18/1914	Barnegat	Foundered			192	35.3	15.3	843	804	New York, NY				4		0				Barnegat	
William D Becker		Schooner - Barge	1892	West Bay City, MI	4/7/1907	Off Barnegat	Foundered			211	35	16.6	1046	994	New York, NY				4		0					

APPENDIX E: SEVEN LIVES IN GREAT PERIL

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SEVEN LIVES IN GREAT PERIL

WOULD HAVE BEEN LOST BUT FOR THE NORTH BEACH PATROL.

They Belonged to the Crews of Two Barges that Broke Loose from the Tug Taurus—Capt. O'Brien Tells of Many Anxious and Perilous Hours Spent in a Vain Attempt to Get His Tow Again—Glad to Hear on Arriving in New-York of the Safety of the Men.

BARNEGAT DEPOT, N. J., April 21.—Yesterday afternoon Capt. Ridgeway of Station 17 discovered two barges drifting ashore on North Beach. He managed to board the first barge that struck and brought the crew of three persons ashore, but the tide changed and he could not land the crew of the second barge until this morning. The barges were part of a tow of three.

One man, Engineer Hartley of the Magnolia, had his leg badly injured. The others who were taken from that vessel were Capt. John McLeod and Steward Frederick Appleby. Capt. J. S. Norton and his crew of three men were rescued from the Dixie by the life savers. They were cared for by the crew of the Forked River

Life-Saving Station. The Magnolia is fast breaking up. The Dixie is lying between the bar and the shore, pounding heavily, and probably will go to pieces.

The two barges referred to in the dispatch from Barnegat Station are doubtless the Magnolia and Dixie, which left Norfolk last Tuesday in tow of the Dalzell tug Taurus. The Taurus had three barges in tow when she started from Norfolk bound for Boston. She reached this port last night with only one, having been forced to abandon the other two when the helpless vessels were most in need of aid.

Capt. O'Brien of the Taurus, heavy-eyed from a forty eight-hours' vigil, told to a reporter of THE NEW-YORK TIMES last night the story of how the barges had gone adrift in a heavy easterly gale and the brave effort that was made to rescue the crew. The barges, he said, were lumber-laden and carried a heavy deckload of oak-pilings. They were towed tandem fashion with a long hawser between each. The Lizzie H., which was formerly a clipper ship, was nearest the tug, with the Magnolia and Dixie following in the order named.

Capt. O'Brien said that good weather was made until Barnegat was abeam. That was on Thursday morning. Then it breezed up from the eastward, and the tug began to pitch miserably in the confused sea. The wind steadily increased in force, and by 8 o'clock it was found necessary to slow the engines, as the tow lines, which were whipping taut with every plunge of the tug, seemed inclined to bid farewell to their fastenings. Two hours later the hawser parted in a heavy squall and the Magnolia and Dixie went drifting away to leeward.

Capt. O'Brien says he was at a loss what to do. The wind was then blowing a heavy gale from the eastward, a coast strewn with wrecks throughout its entire length was close aboard, and two of his charges were drifting helplessly upon it. He circled twice around the barges, hoping that they would launch their boats, which was the only thing that they could have done.

As they showed no disposition to do anything of the sort, and as he could not approach near enough to make a hail intelligible, he concluded to steam seaward with the other barge, cast off the towline, and make an effort to get a hawser on board the other two before the Lizzie H. had drifted on the beach. It did not take him very long to discover that that was impracticable, and he brought the tug again in the vicinity of the imperiled craft.

The storm had increased to a hurricane and a tremendous sea was running. A driving rain squall obscured the two barges, and when it passed their outlines were barely discernible in the thickness. A signal of distress, blown almost into ribbons by the gale, was fluttering from each of the barges.

Soundings were taken from the tug, and it was discovered that the water was shoaling fast. When seven fathoms was reached the barges were still some distance inshore, and a momentary rift in the thickness showed that they had grounded and that the surf was breaking around them.

Capt. O'Brien ventured as near as he dared, and then, seeing that all chances of his rescuing the crew were hopeless, he reluctantly abandoned the barges to their fate and steamed seaward again with the Lillie H.

His troubles were not over yet. The heavy seas that were encountered brought a fearful strain on the towing hawser, and at 8 o'clock Thursday night it parted. The waves were

Thursday night it parted. The waves were breaking over the tug as high as her pilothouse, and as the engines could not be stopped without swamping the vessel outright, there was imminent danger of the hawser fouling the propeller.

It was out of the question to think of hauling it in, as the seas were boiling waist deep over the stern of the low freeboard craft. It was finally cut, but the man who severed it came very near being swept overboard.

The barge drifted rapidly toward the beach. followed by the tug. When about two miles off the coast the weather moderated slightly and the anchor of the barge was let go. It was good holding ground and the anchor held. The tug lay by all night, and when daylight came she ran off to the southward, but could see no trace of the other barges.

The sea was still running high when she returned and it was with the utmost difficulty that a hawser could be got on board the barge. After a two hours' effort the hawser was made fast and the Taurus resumed her interrupted journey. Off Atlantic City another tug was sighted. It was made out to be the Morse of this port. The Morse indicated by signal that she had lost two barges of her tow.

The New York Times

Published: April 22, 1893

APPENDIX F: DEBRIS PILE SCANTLING MEASUREMENTS

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Sketch No.	Photo No.	Description	Length (feet)	Width (feet)	Thickness (feet)	Notes
1	2882	Frame	10.6*	1		
2	2885	Frame	7*	1		
3	2895	Frame	6.8*	0.9		
4	2924	Floor	9*	0.9	0.9	
5	2936	Knee	4.8*	1.15		
6	2947	Scarf Joint	4	1.05	0.7	
7	2989	Frame	6.55*	0.7*		
8	2997	Planking	4.8*	0.9		
9	3022	Scarf	3.1	1		
10	3045	Outer Hull Planking	4.4	0.3		
11	3070	Frame fragment with strap marking	7*	.6*		
12	3076	Scarf Joint	3.8*	1	1	
13	3081	Scarf	4.6	1		
14	3114	Frame	4.1	0.8	1	
15	3327	Iron Knee	3.65*	0.7		
16	3330	Iron Knee	5.3*	0.3		
17	3334	Iron Knee	4.9*	0.5		
18	3337	Iron Knee	5.2*	0.5		
19	3345	Iron Knee	5.4	4	1.5	
20	3351	Iron Knee	4.6*	0.45		
21	3361	Floor with articulated hull	4.5*	1	1	
22	3381	Bow/Stern Scarfed floor	6.1*	1	1	
23	3451	Large first futtock	6.1*	1	1	
24	3468	Large Futtock	8.5*	0.9	0.9	
25	3489	Futtock Fragment, possible turn of bilge, curve drawing	4.5*	1	1	previously mapped as #21
26	3496	Large Floor, curve drawing	9*	1	1	previously mapped as #4
27	3499	Scarfed Timber	4.6*	1		
28	3520	Large scarfed timber, curve drawing	6.1*	1	1	previously mapped #22
29	3530	Iron Knee #19, curve drawing	5.4	1.5		previously mapped as #19
30	3582	Large curved futtock #1 with filler piece	8.5*	1.1		
31	3586	Large curved futtock #2	8.5*	1.1	1.1	
32	3613	Small iron knee	2.45*	0.55	0.3	
33	3692	Wooden knee in USACE trailer, not from wreck	3.9	1.7		
34	3696	Iron knee in USACE trailer	2.55	0.5	0.3	
35	3700	Chain plate from USACE trailer, discarded	7.6	0.34		
	2421	Capstem, badly deteriorated	5.1*	1	0.9	
	3164	Deadwood	9.8	7*		
	3164	Keel on deadwood	9.8	1	1.2	
	3164	Sternpost on deadwood	7*	2		
	3818	Rudder fragment	8.3*	2*	1	
†	3567	Very Large Timber, poss. Keel/keelson		1.3	0.8	

Sketch No.	Photo No.	Description	Length (feet)	Width (feet)	Thickness (feet)	Notes
†	3348	First plank sacrificial with felt	8*	0.7	0.3	
†	3355	First Large main outer hull plank		1.1	0.6	
†	3376	Second Large main outer hull plank		1	0.5	
†	3395	Second sacrificial plank	2*	0.8	0.3	
†	3509	Large timber, poss. Keelson		1.1	0.9	
†	3462	Possible ceiling, deck clamp	8*	1.45	0.66	

*Fragmented piece, remaining measurement
† No Drawings only notes

APPENDIX G: WOOD ANALYSIS

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Provenience	Date	Description	Wood Identification	Notes
Wreck	7/30/14	Complete loose treenail with wreck	Douglas Fir	
Wreck	8/1/14	Clamp/Shelf	Larch/Tamarack	
Wreck	7/30/14	Outer Hull	Southern pine	
Wreck	7/30/14	Frame	Probably Larch/Tamarack	
Wreck	8/1/14	Outer Hull	Larch/Tamarack	
Wreck	8/1/14	Frame	Larch/Tamarack	
Wreck	8/1/14	Ceiling	Larch/Tamarack	
Wreck	8/1/14	Possible Chafing Gear	?	
Wreck	8/1/14	Drift bolt plug	Softwood, unable to determine further	Photo No. 3129
Wreck	7/30/14	Three wedges from between outer hull planking	Southern pine. Pinus spp.	Photo No. 3861-3880
Stern Deadwood	8/3/14	No.1. Keel	Birch. Betula spp.	Number corresponds to drawing.
Stern Deadwood	8/3/14	No.2. Rudder post	Birch. Betula spp.	Number corresponds to drawing.
Stern Deadwood	8/3/14	No.7. Outer most deadwood	Sycamore?	Number corresponds to drawing.
Stern Deadwood	8/3/14	"Hull Plank"	Red pine/Scotch pine. Pinus resinosa or Pinus sylvestris. (basically the same wood but one is Old world and one is new world)	
Rudder	8/7/14	Outer frame of rudder	White Oak. Quercus alba	Rudder photo No.3818
Rudder	8/7/14	Second frame from outer rudder	Southern pine. Pinus spp.	Rudder photo No.3818
Rudder	8/7/14	Rudder	White Oak. Quercus alba	Rudder photo No.3818
Capstan	8/3/14	Capstan Sample	White Oak. Quercus alba	Capstan Photo No.s 2421-2435, 2479-2519
Debris Pile	8/4/14	Possible Keel/Keelson	Southern pine	Photo No. 3567-3574
Debris Pile	8/4/14	Anomaly Frame	White Oak. Quercus alba	Photo No. 3424-3432
Debris Pile	8/3/14	First sacrificial plank, horse hair felt and wood sample	Elm Ulmus	Photo No. 3348-3350, 3354
Debris Pile	8/4/14	Exotic timbers, worked, 2 samples from different pieces	??	Photo No. 3433-3437
Debris Pile	8/3/14	Outer hull sacrificial planking with felt sample	Elm Ulmus	Photo No. 3395-3397

Provenience	Date	Description	Wood Identification	Notes
Debris Pile	8/4/14	Sacrificial hull planking with rabbited edge	Probably southern pine	Photo No. 3604-3612
Debris Pile	8/3/14	1. First large main plank	Elm Ulmus	Photo No. 3350-3360
Debris Pile	8/3/14	2. Second large plank	Probably southern pine	Photo No. 3376-3378
Debris Pile	7/31/14	Wood sample and sealant	Southern pine	Photo No. 2917-2923
Debris Pile	7/31/14	Treenail from frame	Possibly Hickory	Photo No. 2885-2889, 2890-2894
Debris Pile	8/8/14	Wooden fastener plug	Southern pine. Pinus spp.	Photo No. 4014-4015
Debris Pile	8/12/14	Wooden handle north of wreck	Hickory Carya spp.	Photo No. 4031
Debris Pile		Miscellaneous Treenails	a. Larch b. Hardwood, too much iron/metal to get a good sample c. Diffuse porous hardwood. Hard to get a good sample. d. Southern pine e. diffuse porous hardwood f. diffuse porous hardwood g. diffuse porous hardwood h. Douglas fir (Pseudotsuga menziesii)	Count of 9 with 8 examined, gather on multiple days from debris pile area. Photo No.3858-3860

APPENDIX H: BARNEGAT INLET SCHEMATIC IMAGES

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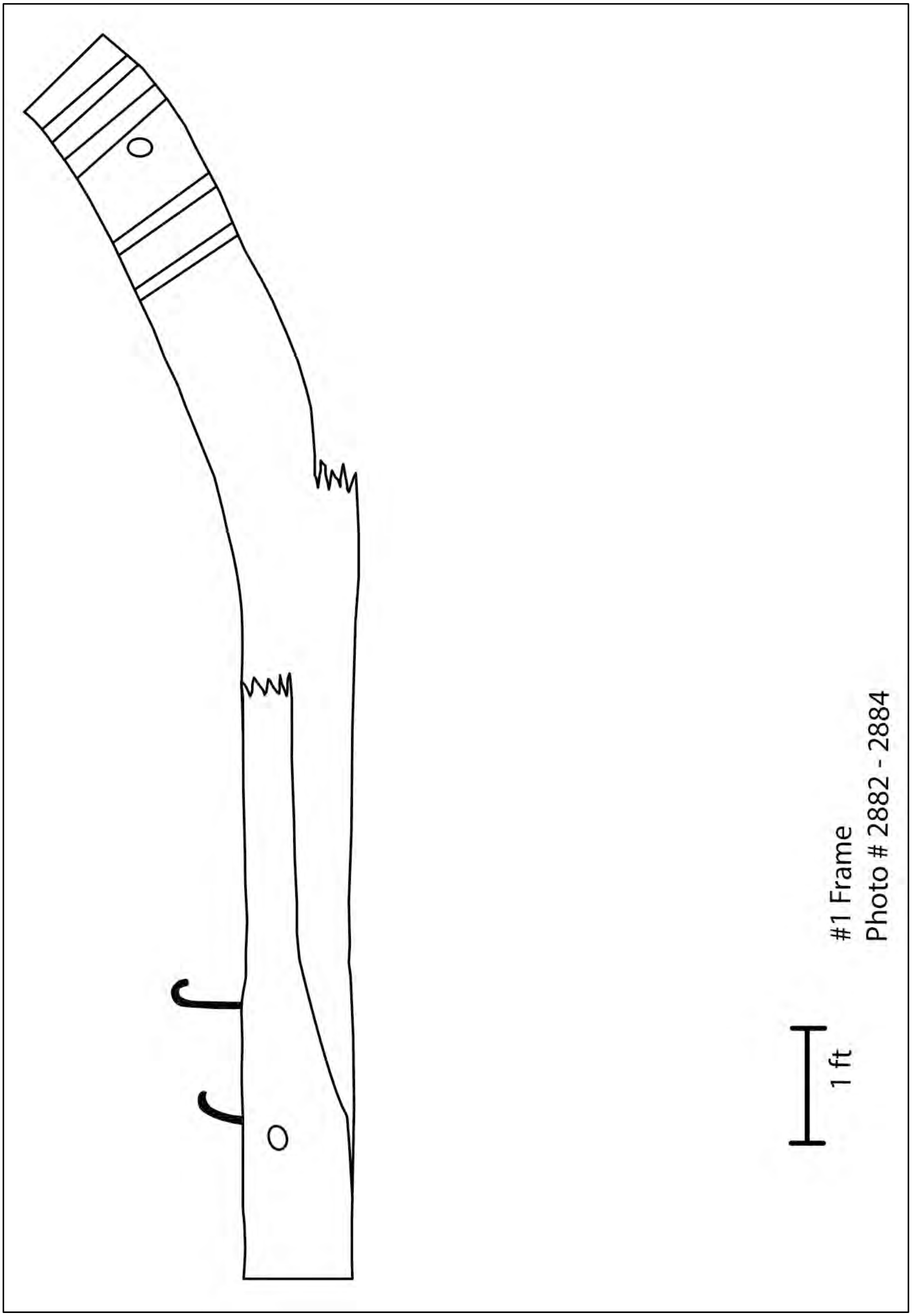
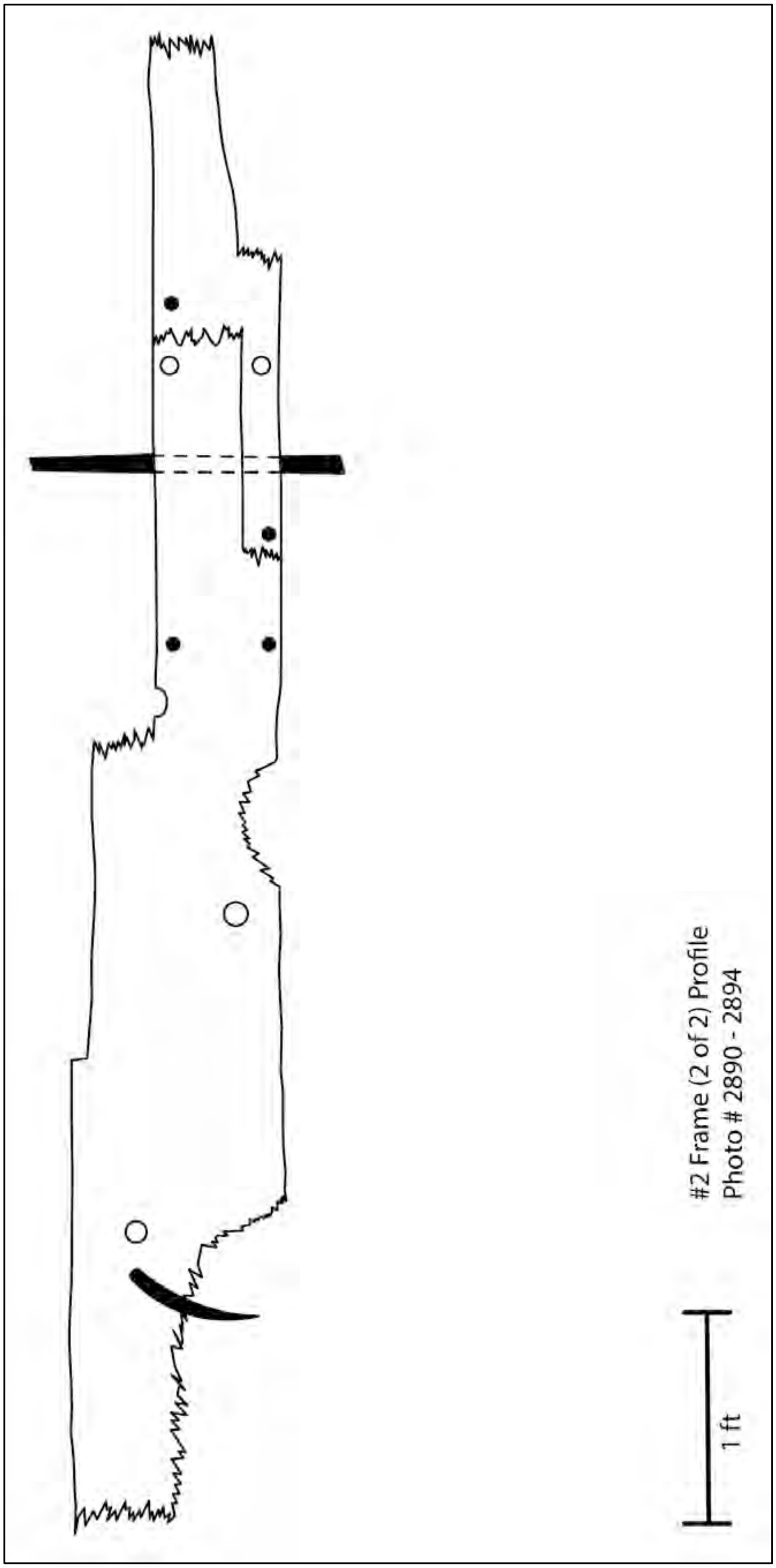
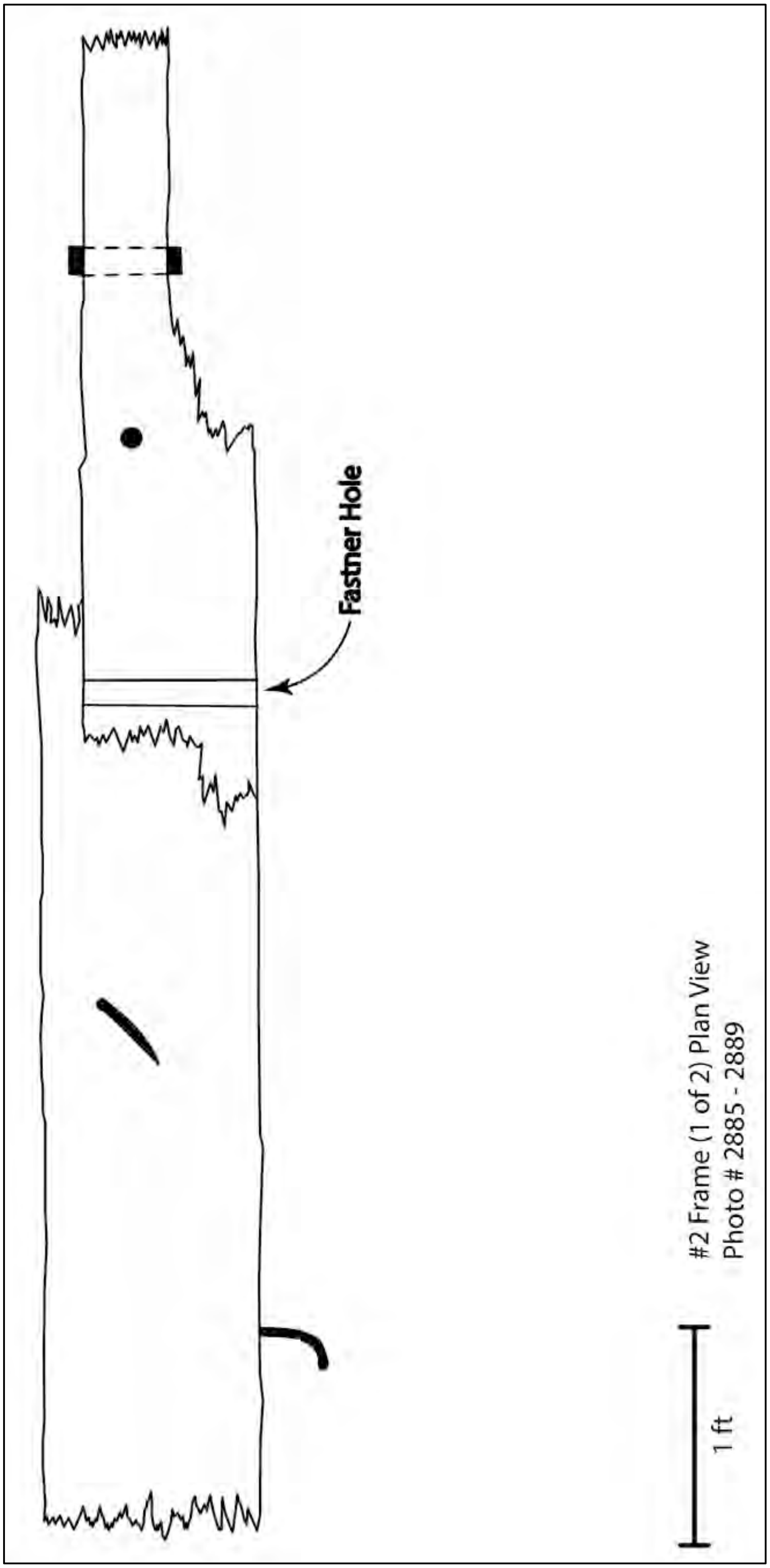
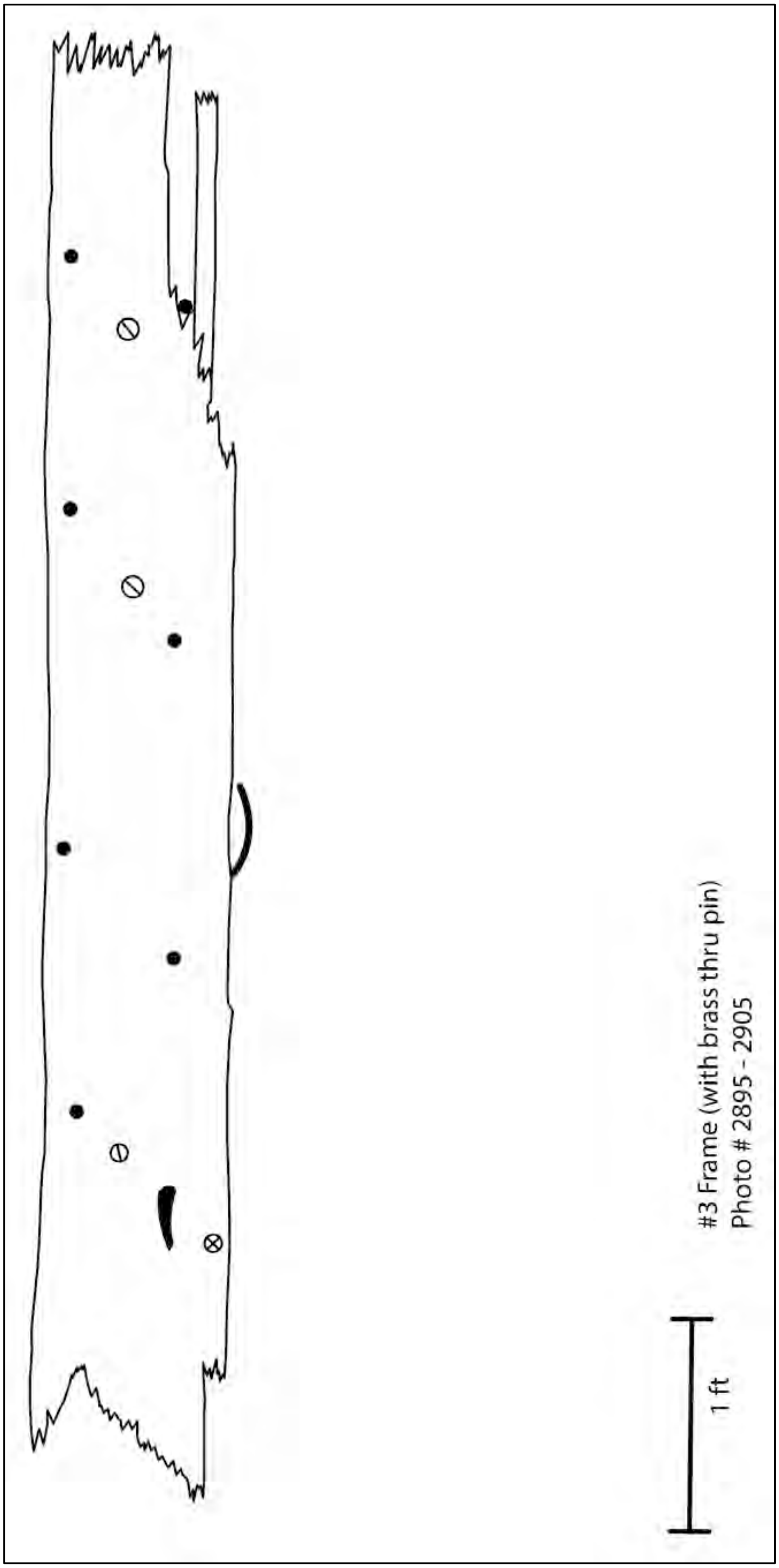
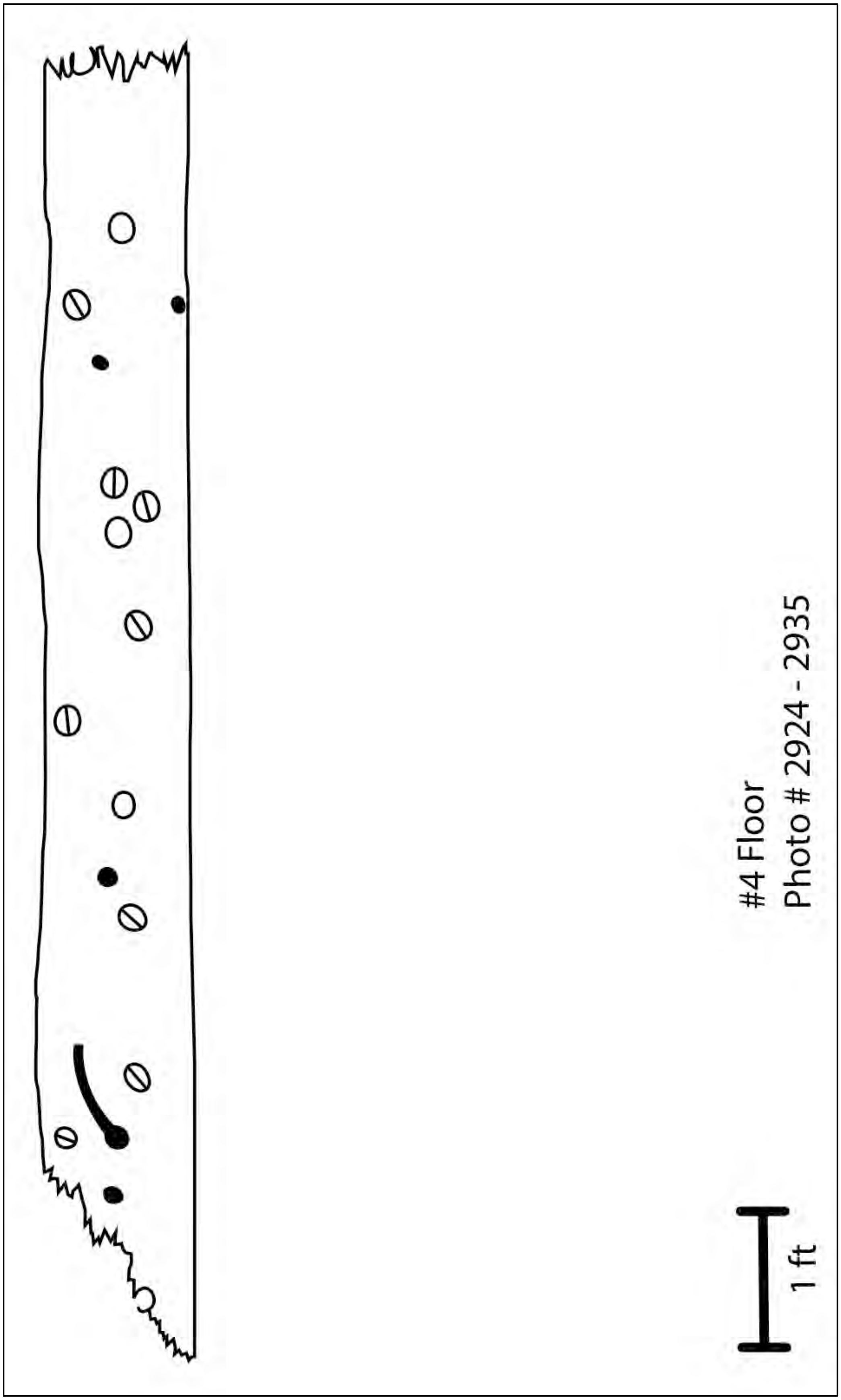

#1 Frame
Photo # 2882 - 2884
1 ft

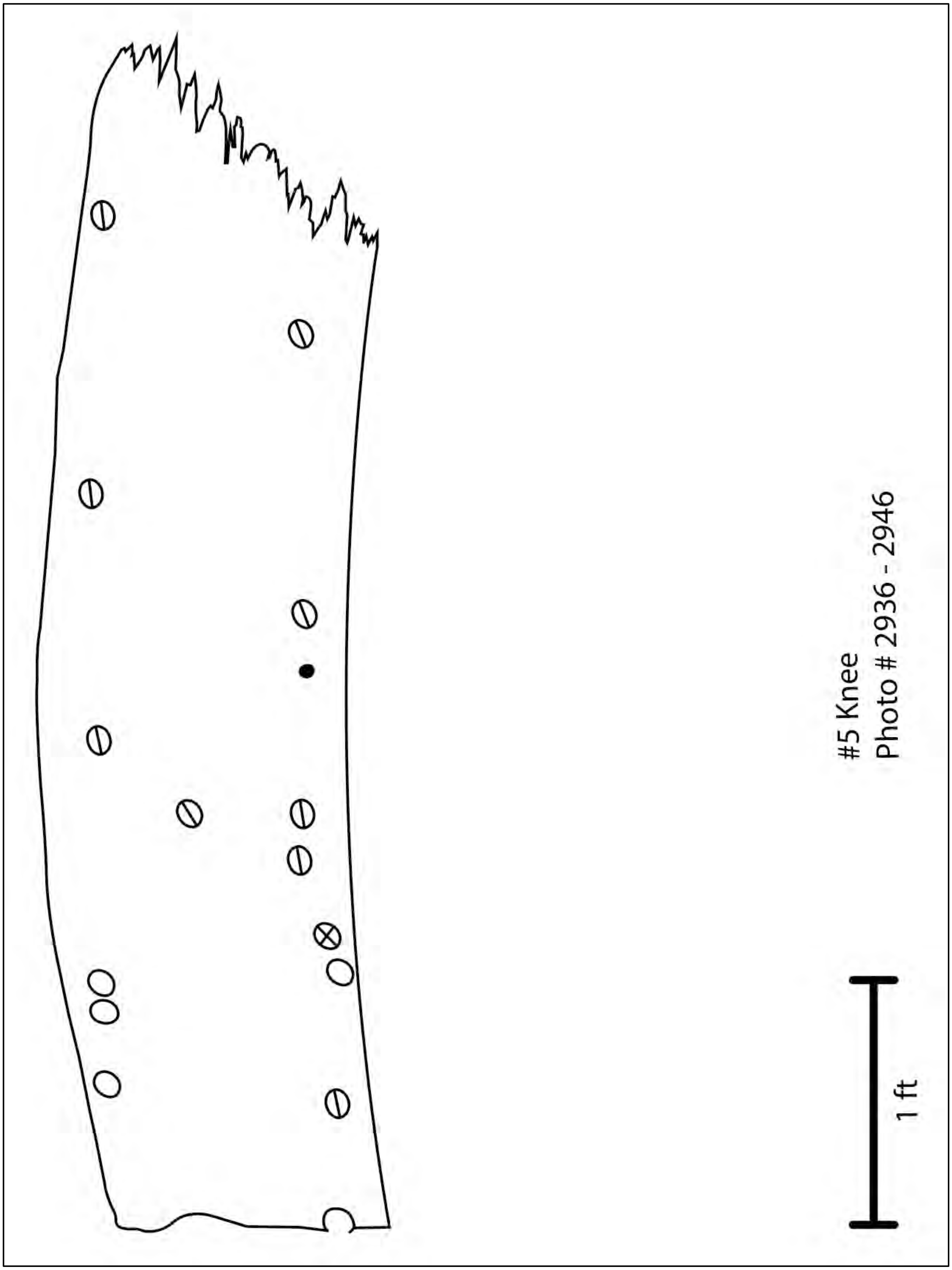

#2 Frame (2 of 2) Profile
Photo # 2890 - 2894
1 ft

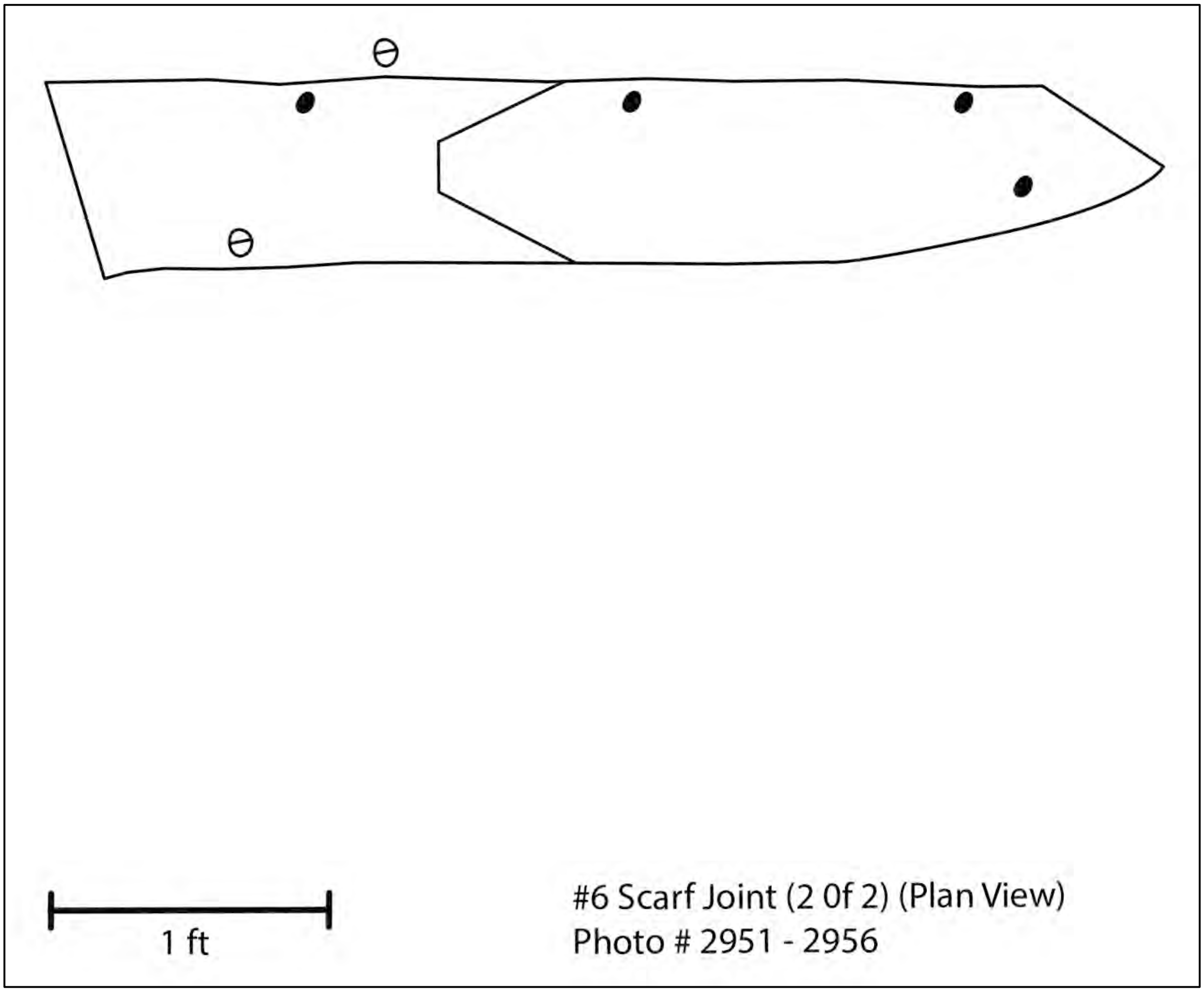

Fastner Hole
1 ft
#2 Frame (1 of 2) Plan View
Photo # 2885 - 2889

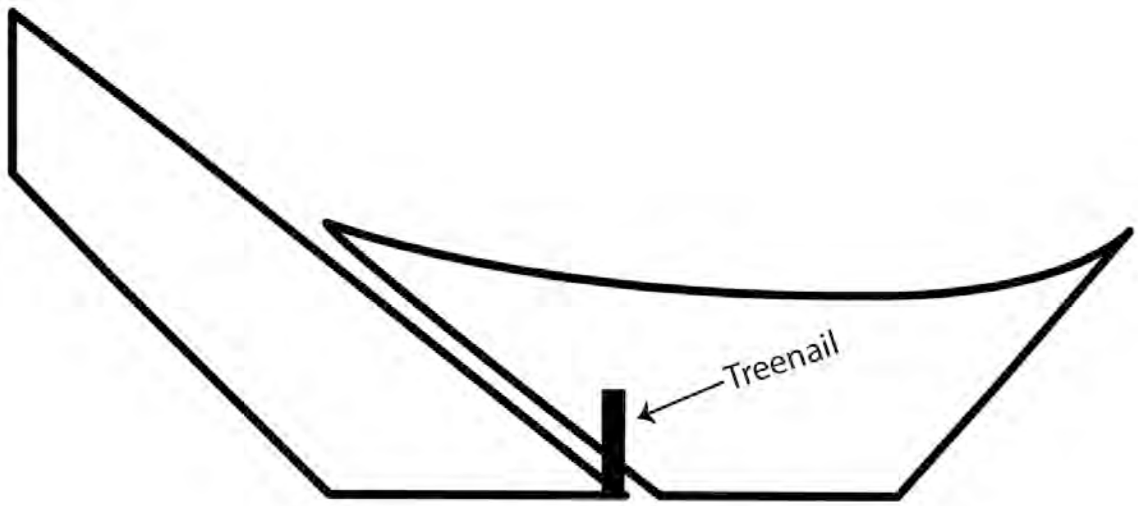


#3 Frame (with brass thru pin)
Photo # 2895 - 2905


#4 Floor
Photo # 2924 - 2935
1 ft

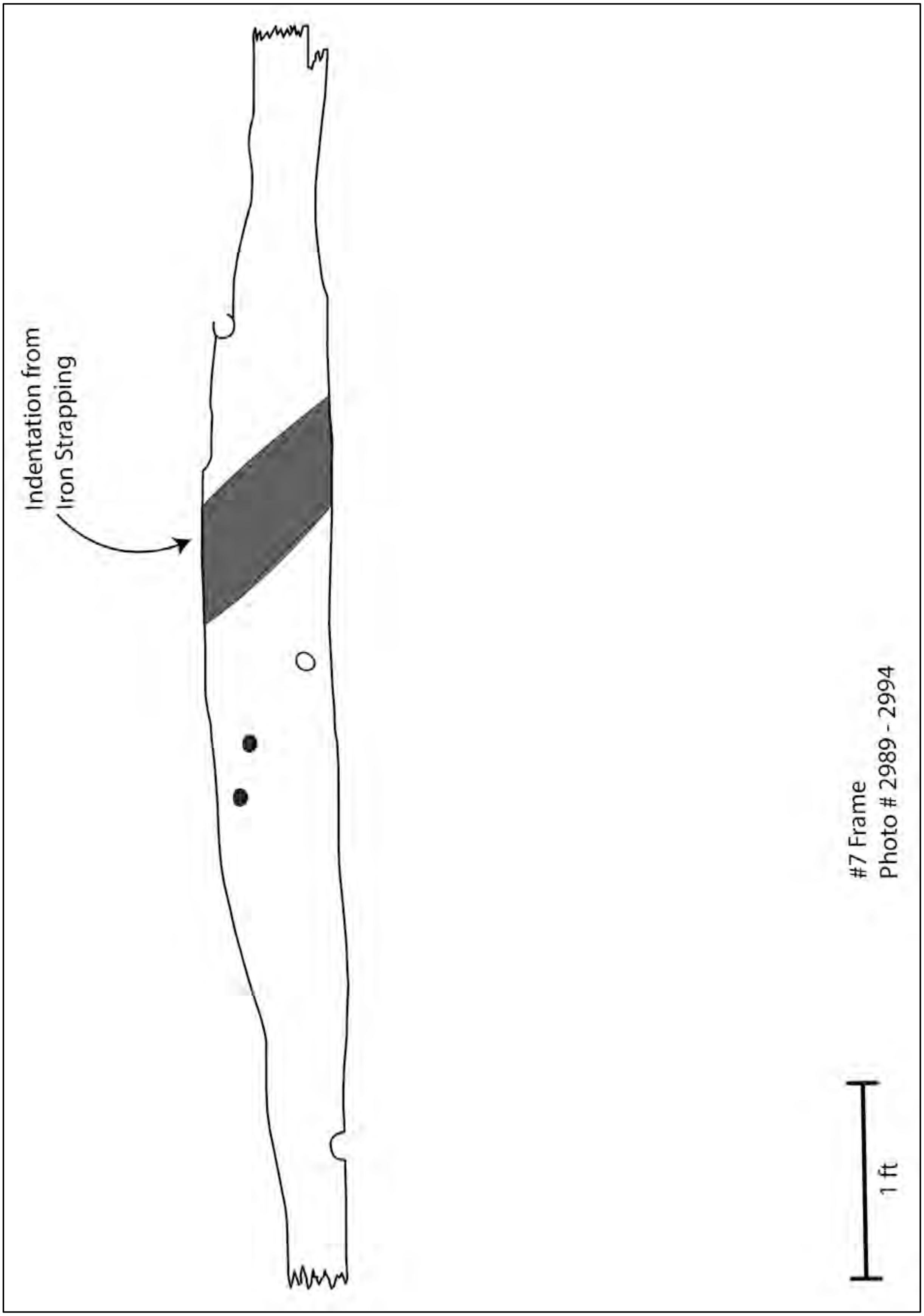

#5 Knee
Photo # 2936 - 2946
1 ft

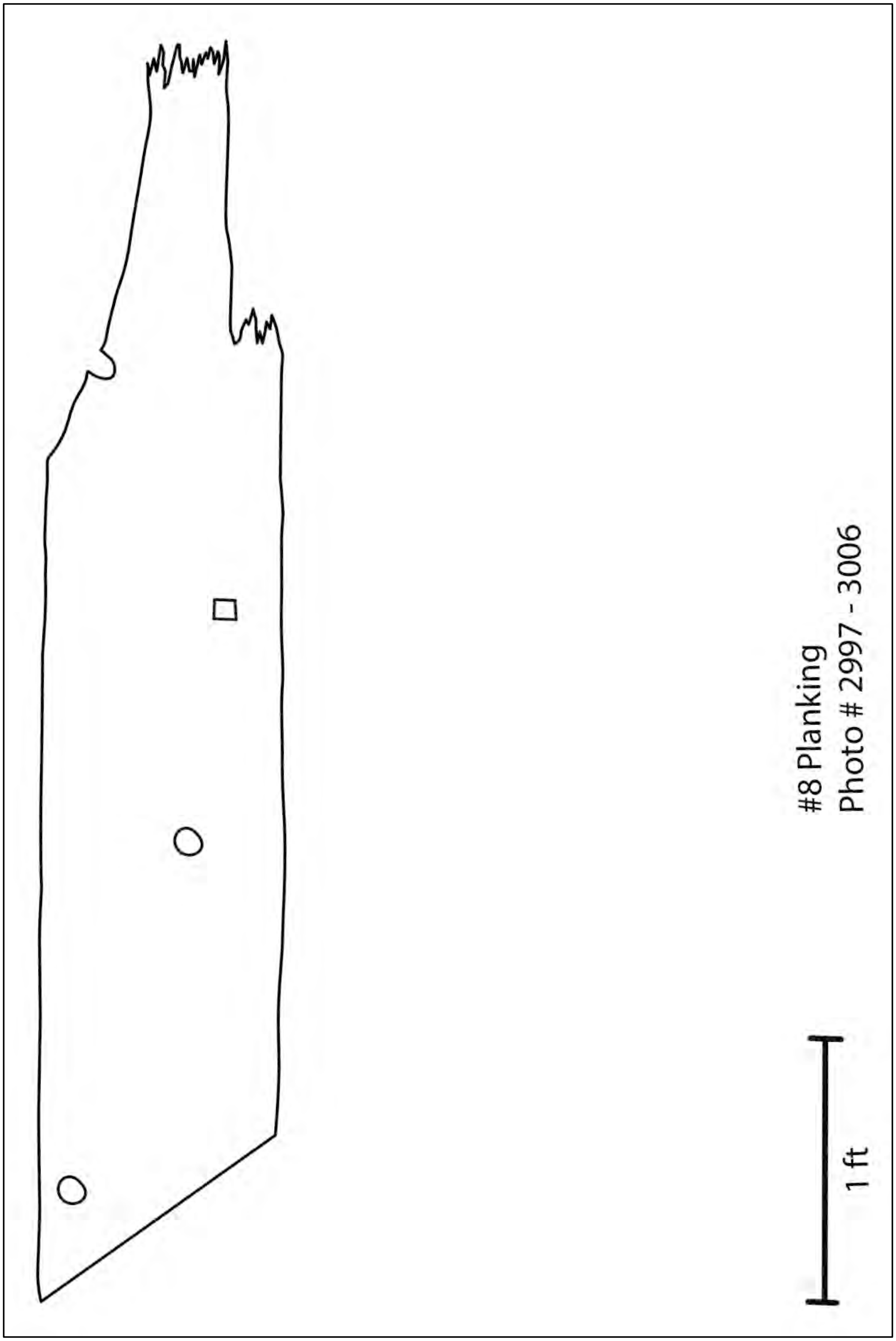

1 ft
#6 Scarf Joint (2 0f 2) (Plan View)
Photo # 2951 - 2956

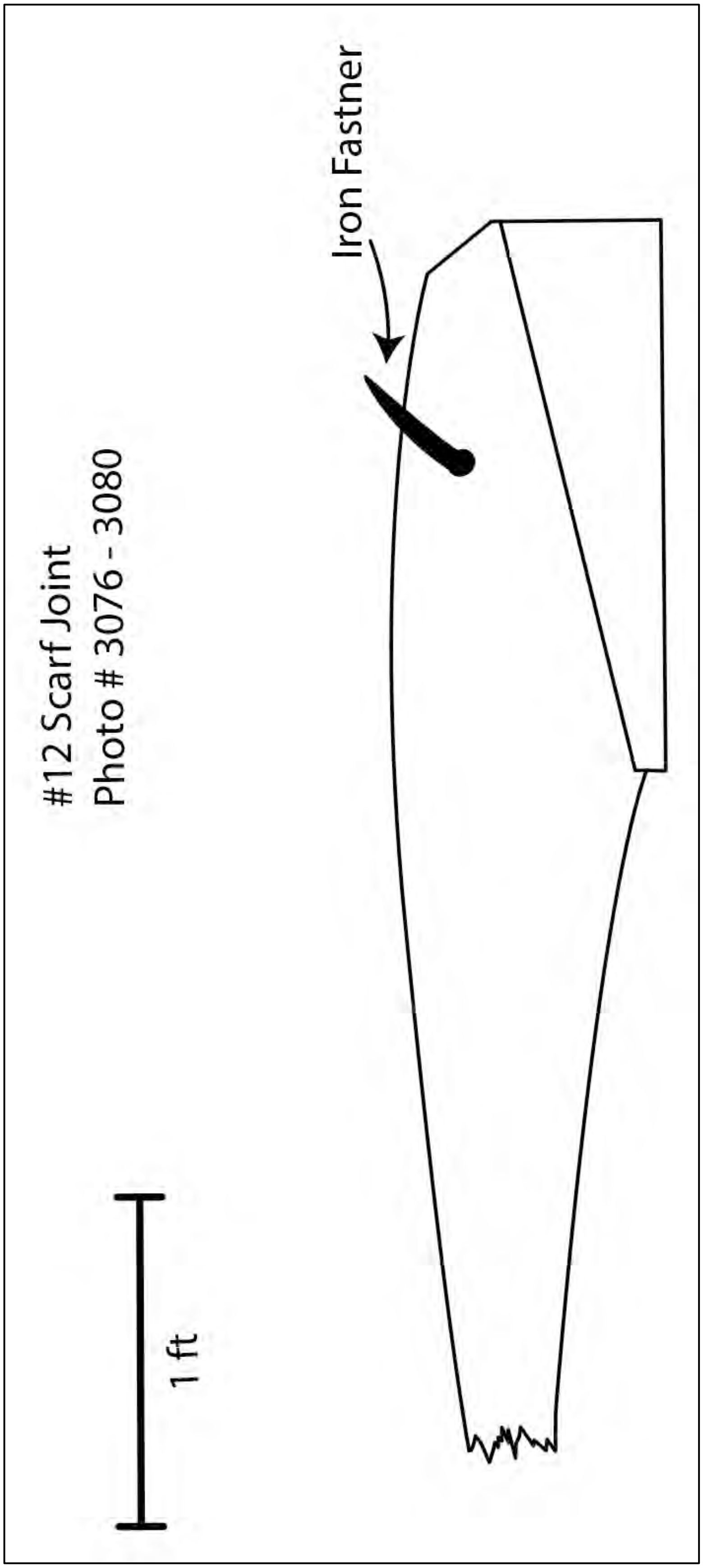


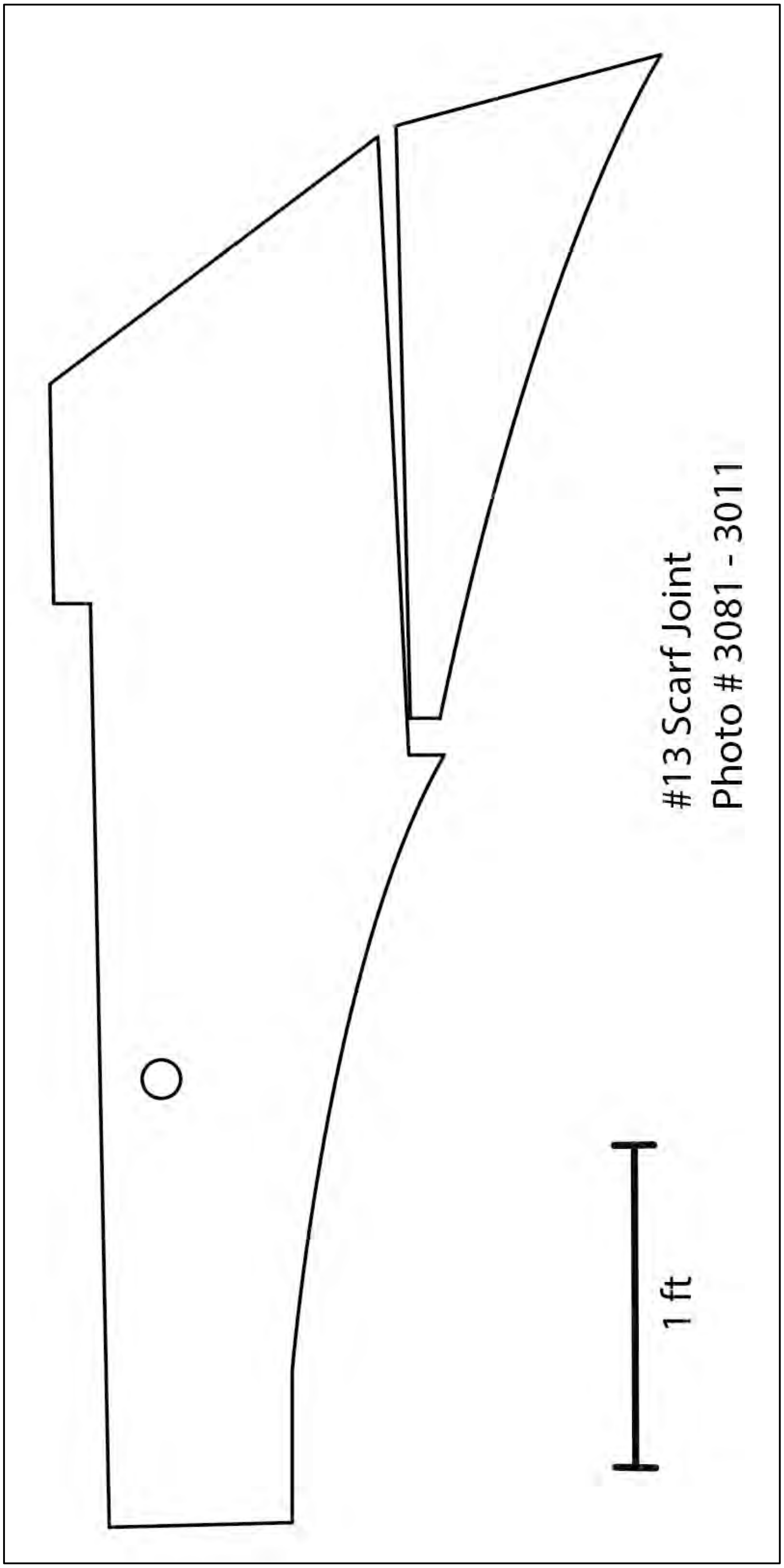
1 ft

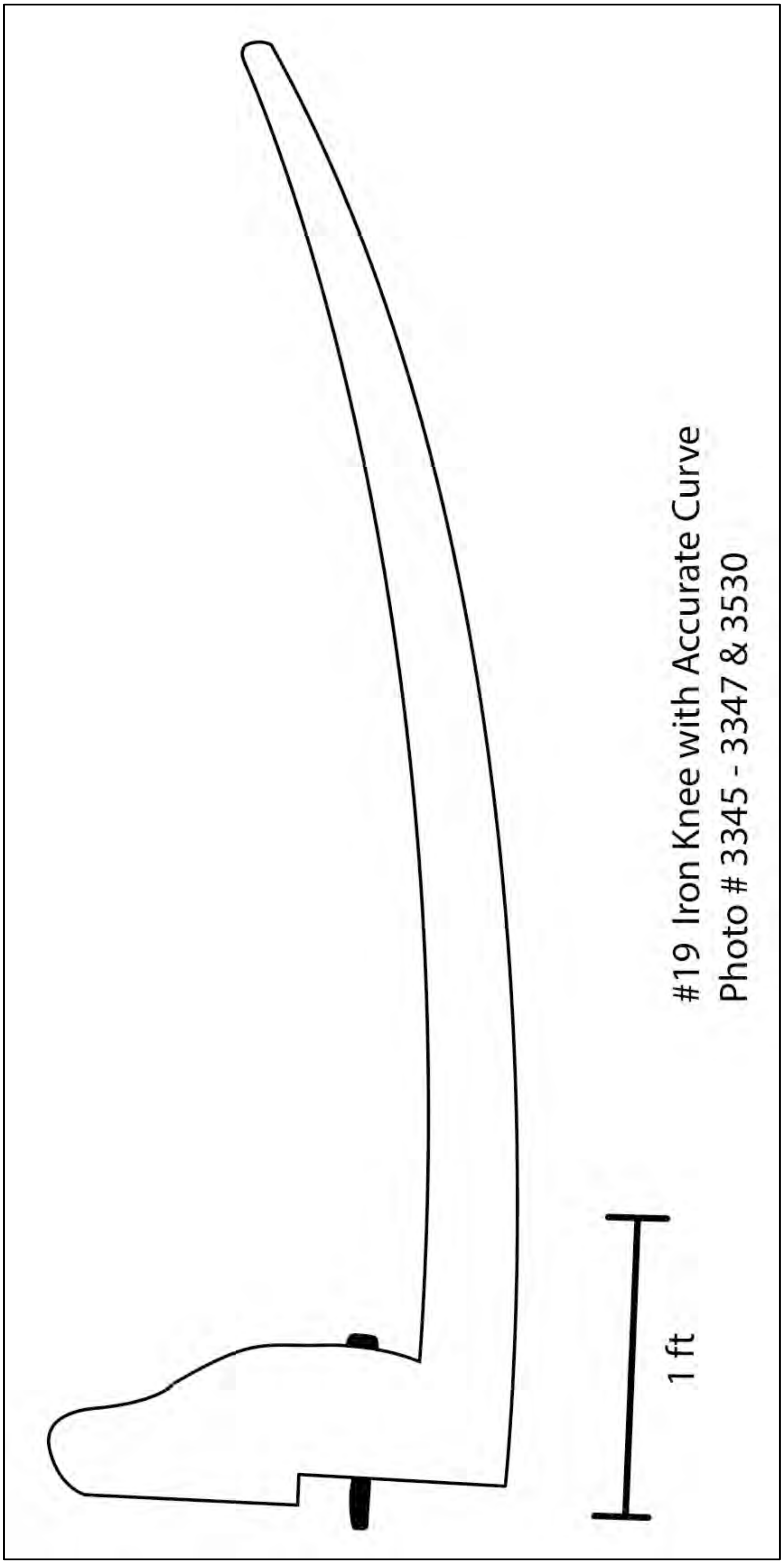
#6 Scarf Joint (1 of 2) (Profile View)
Photo # 2947 - 2948


Indentation from
Iron Strapping
#7 Frame
Photo # 2989 - 2994
1 ft

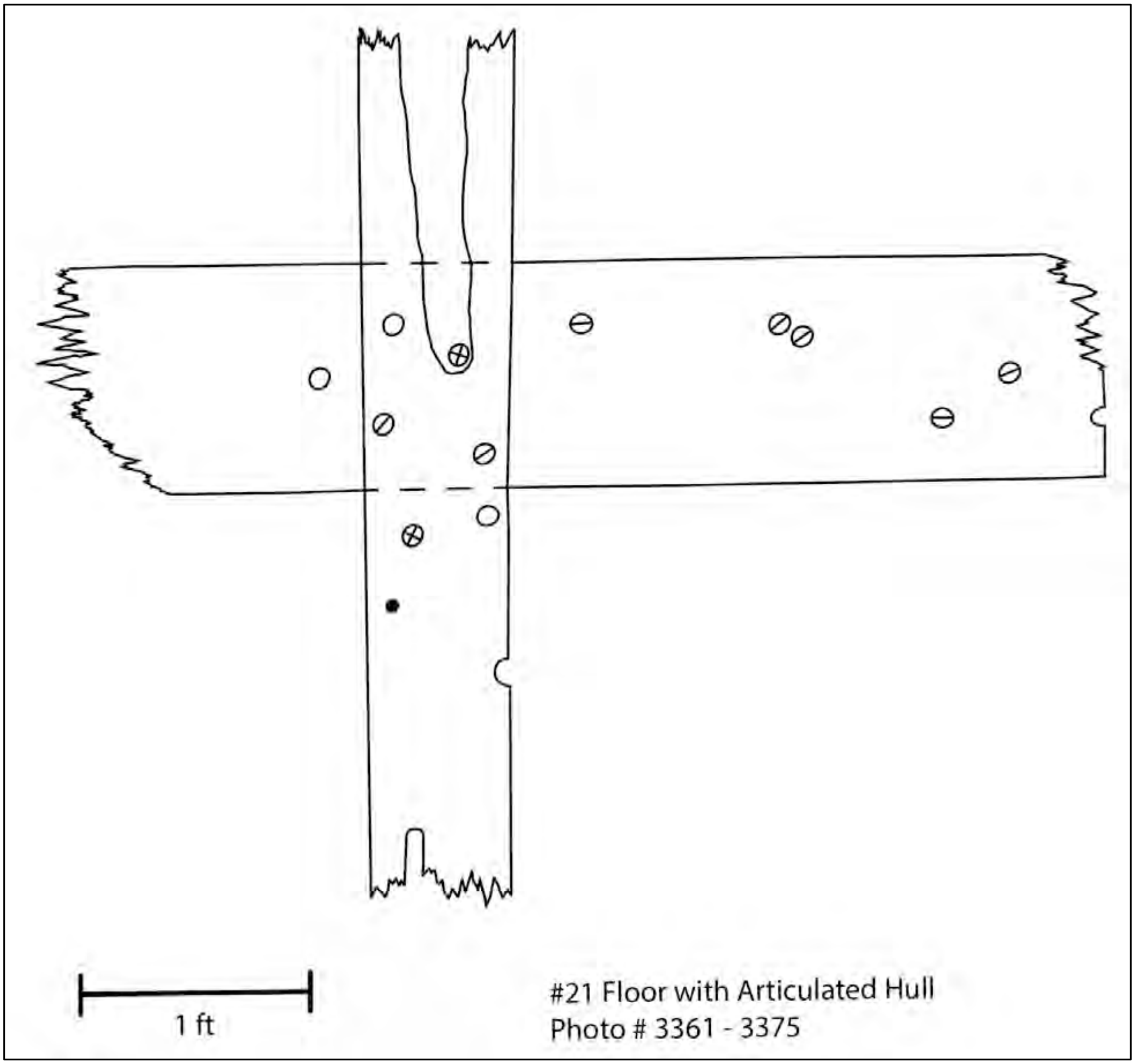

#8 Planking
Photo # 2997 - 3006
1 ft

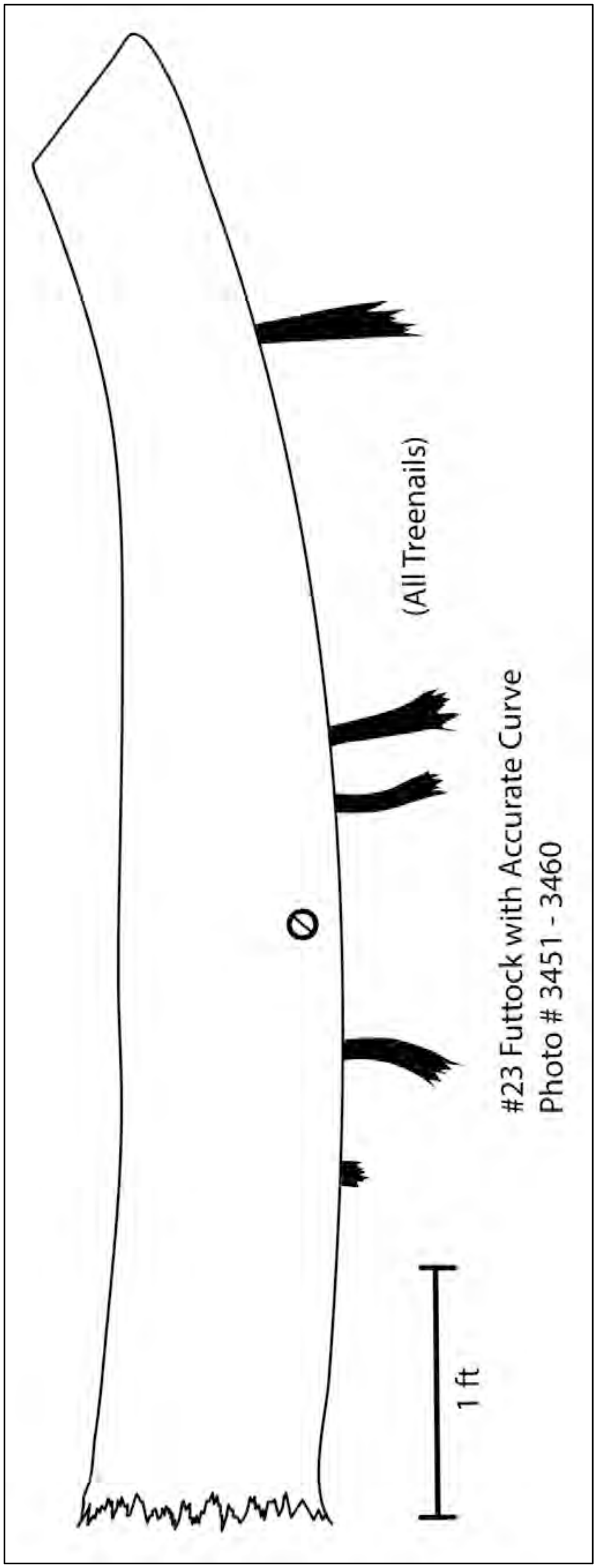

#12 Scarf Joint
Photo # 3076 - 3080
Iron Fastner
1 ft

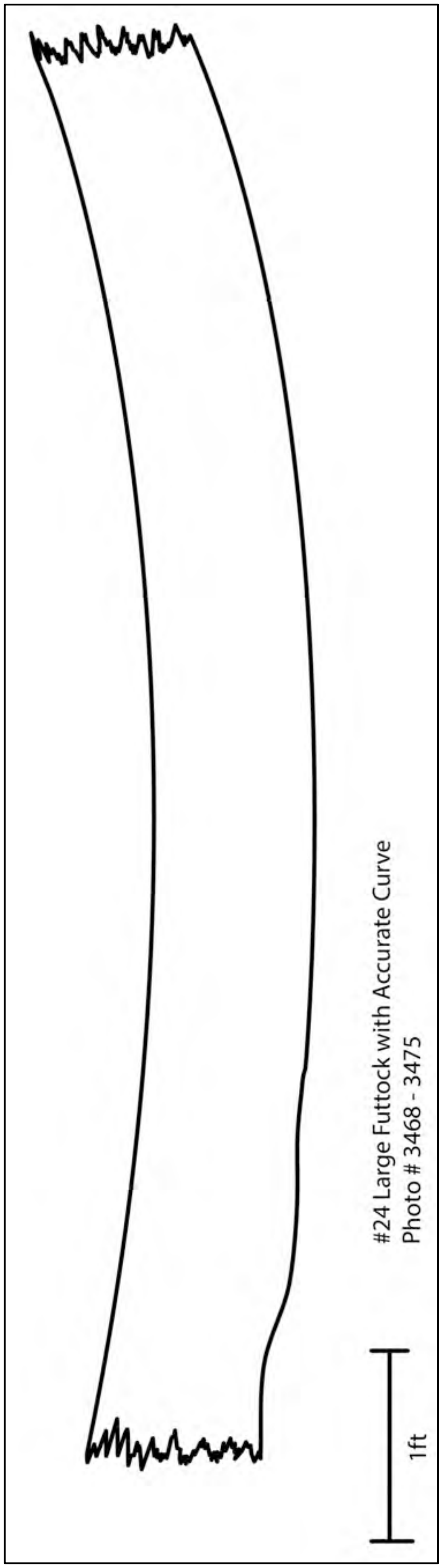

#13 Scarf Joint
Photo # 3081 - 3011
1 ft



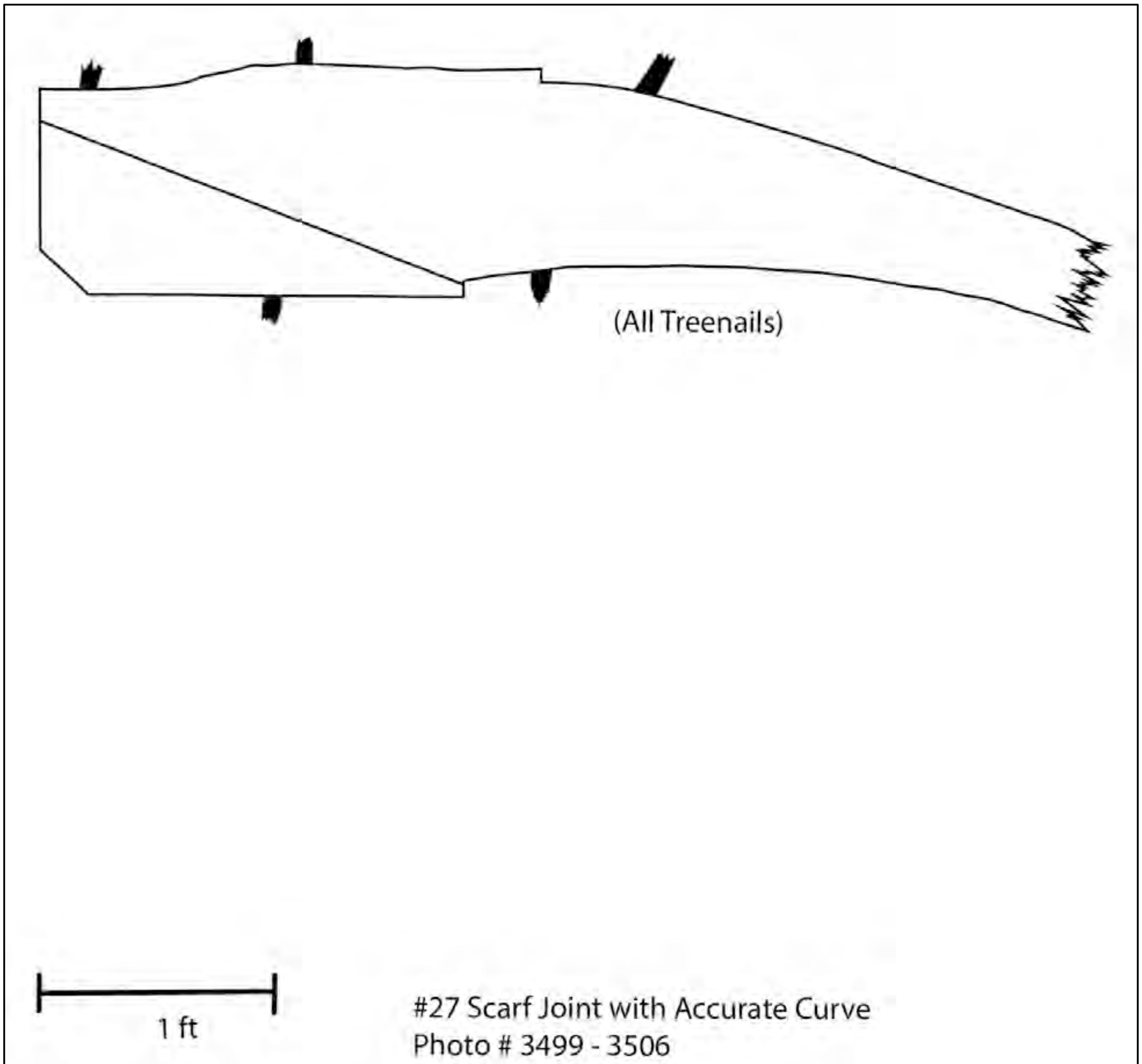
#19 Iron Knee with Accurate Curve
Photo # 3345 - 3347 & 3530


1 ft
#21 Floor with Articulated Hull
Photo # 3361 - 3375

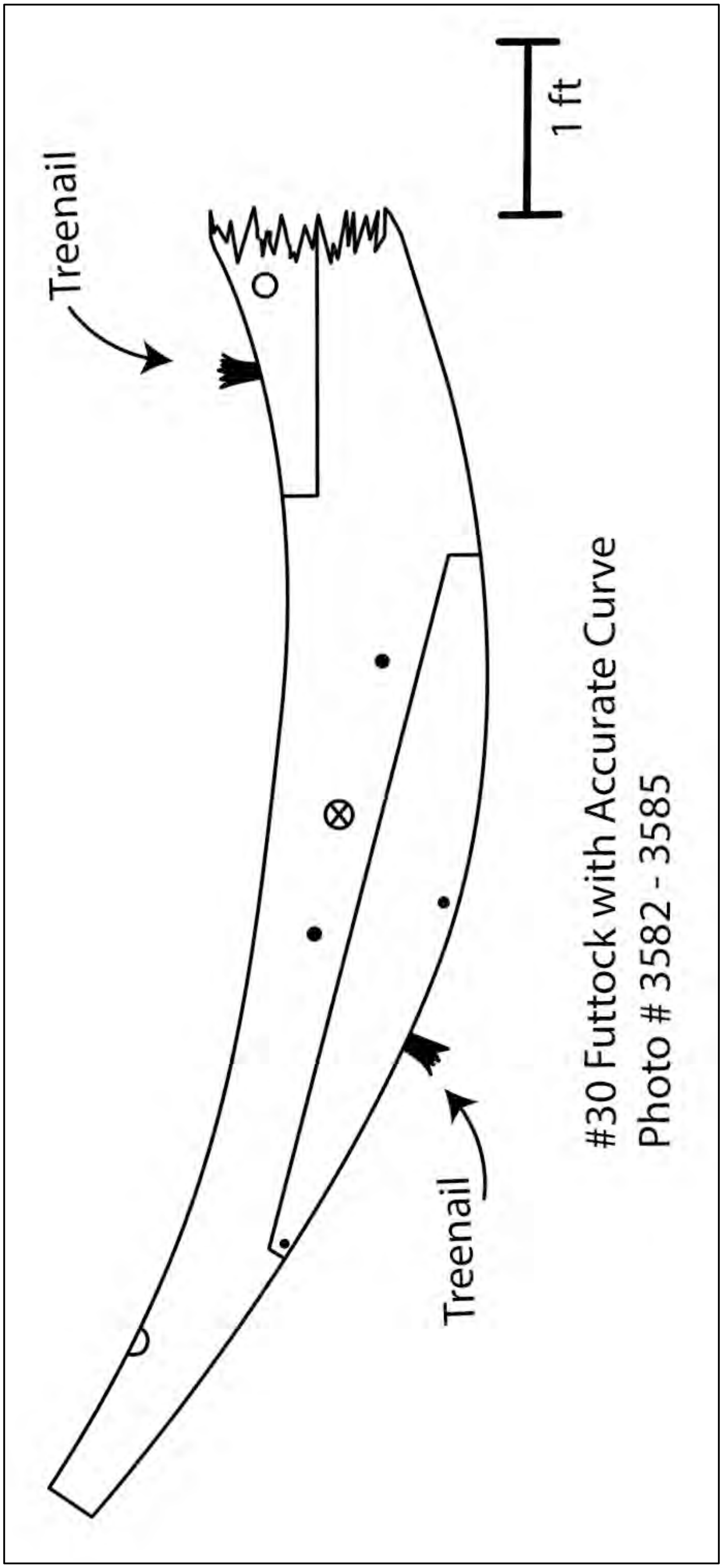

(All Treenails)
#23 Futtock with Accurate Curve
Photo # 3451 - 3460
1 ft



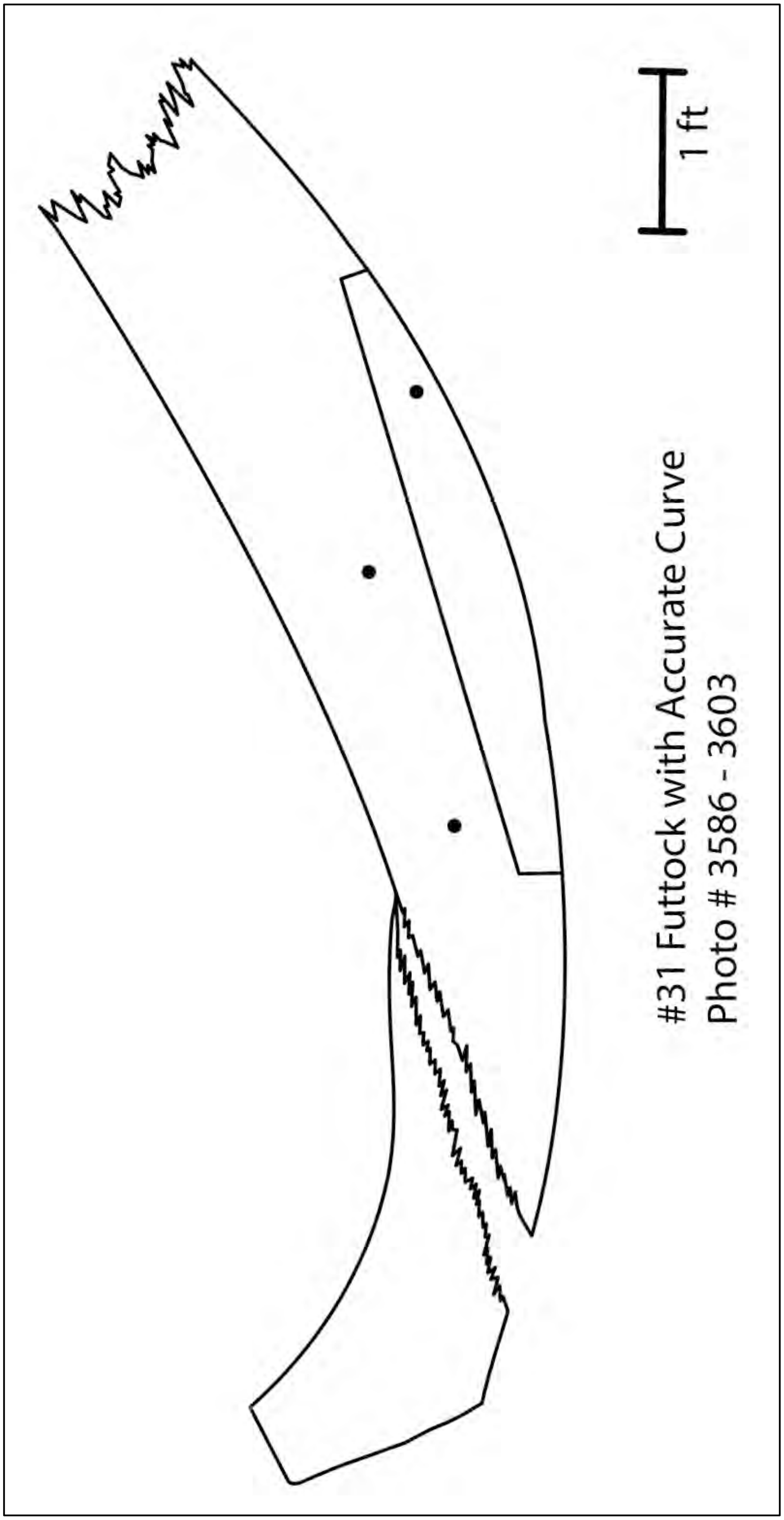
#24 Large Futtock with Accurate Curve
Photo # 3468 - 3475

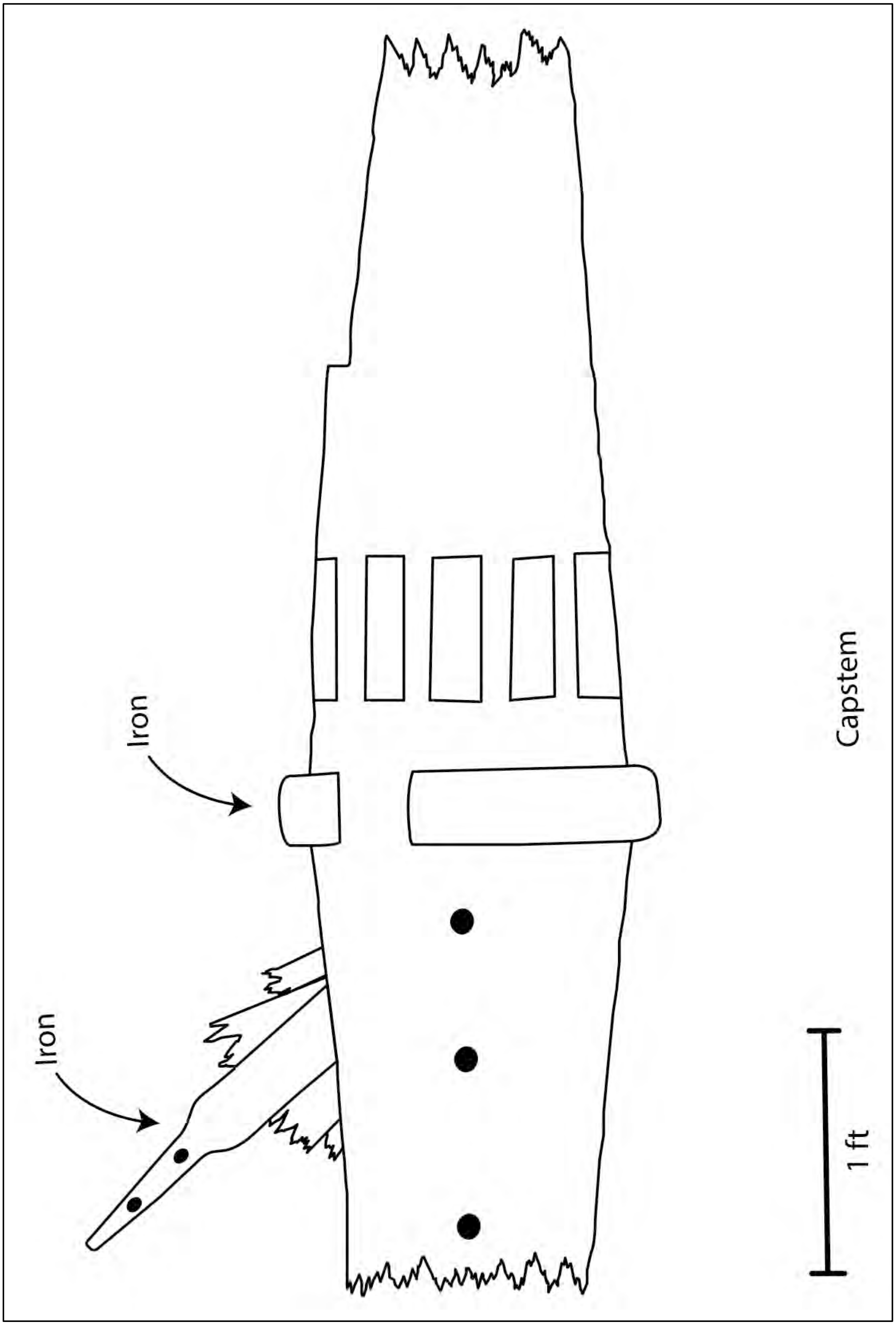


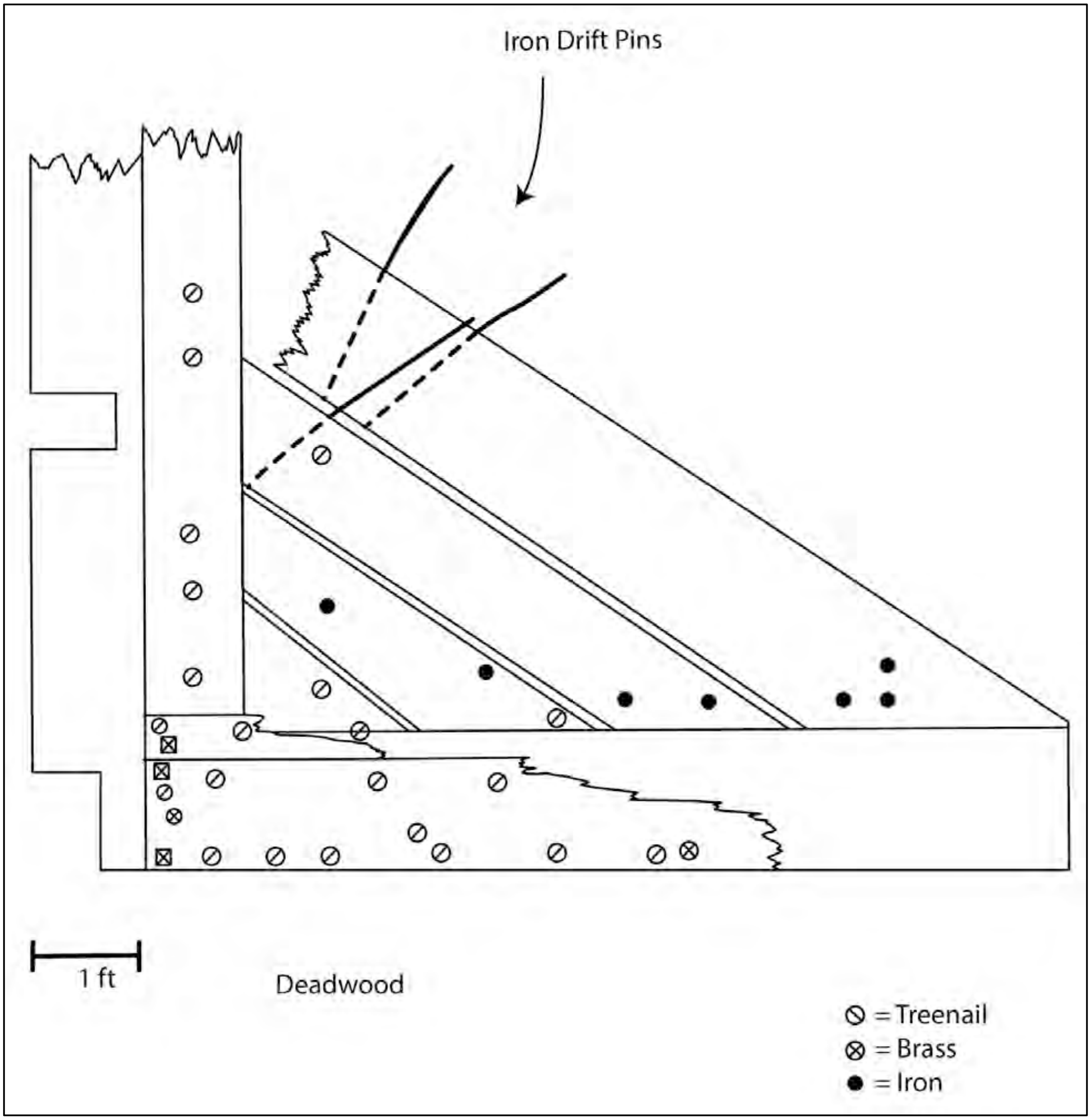
#27 Scarf Joint with Accurate Curve
Photo # 3499 - 3506



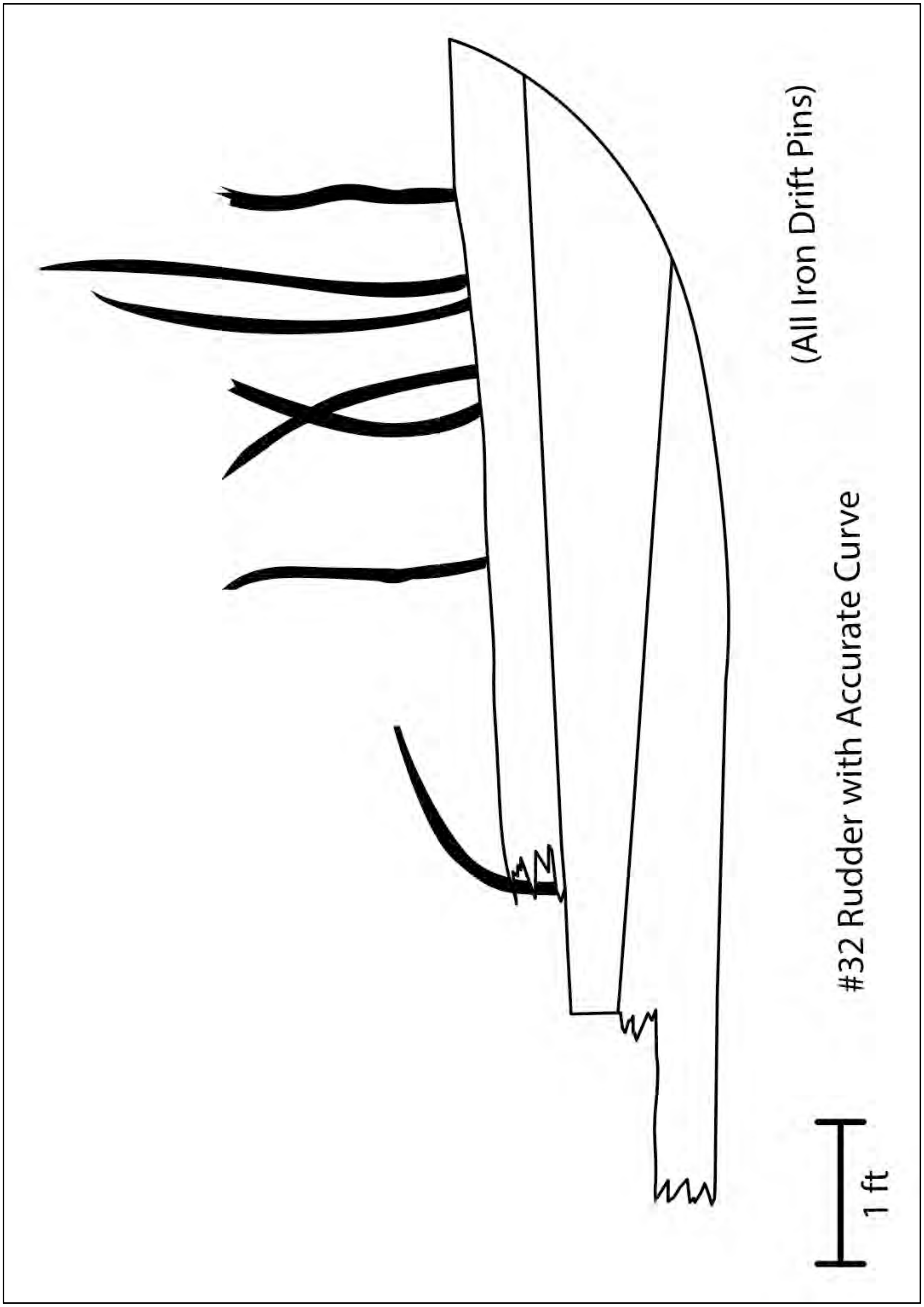
#30 Futtock with Accurate Curve
Photo # 3582 - 3585

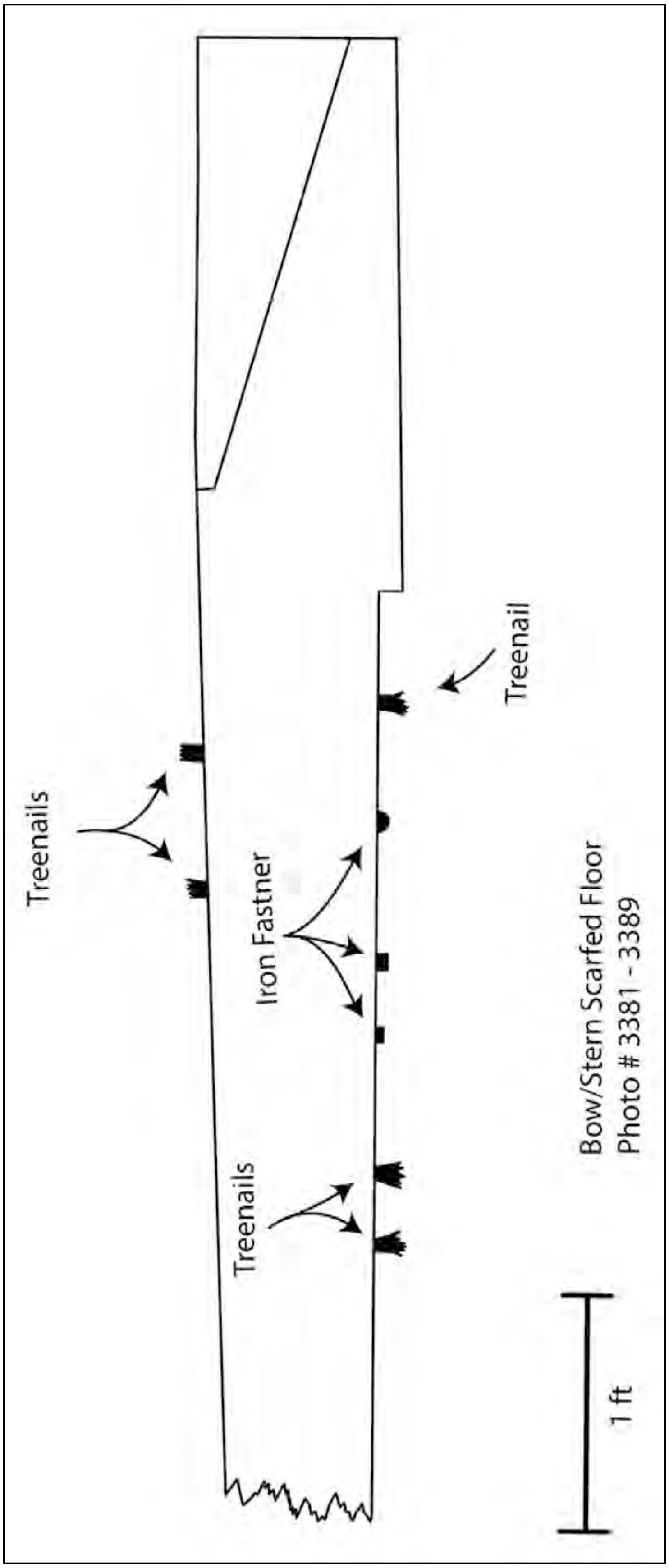

1 ft
#31 Futtock with Accurate Curve
Photo # 3586 - 3603


Iron
Iron
Capstem
1 ft



Iron Drift Pins
1 ft
Deadwood
= Treenail
= Brass
= Iron


#32 Rudder with Accurate Curve
(All Iron Drift Pins)
1 ft


Treenail
Treenails
Iron Fastner
Treenails
Bow/Stern Scarfed Floor
Photo # 3381 - 3389
1 ft

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APPENDIX I: ARTIFACT CATALOG

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No.	Description	Frag/ Complete	Material	Length	Diameter	Width	Photo No.	Notes
1	Block	Complete	Wood and Iron				3687-3691	Sent for conservation on 8/16/2014
2	Wooden Sheave with concretion	Complete	Wood and Iron	4.4" x 4.8"		1" for wood	3770-3773, 3782	Sent for conservation on 8/16/2014
3	Double Pulley with concretion	Complete	Wood and Iron				4028-4030	Sent for conservation on 8/16/2014
4	Large bronze fastener, with round head	Fragment	Bronze	2' 7"	1.5"		3751-3752	
5	Large bronze fastener, with round head	Complete	Bronze	1' 6"	1"		3755-3756	
6	Bronze fastener through wood, round head	Complete	Bronze	1' 1"	1"		3757-3758	
7	Bronze fastener, bent, solid with round head	Fragment	Bronze	1' 9"	1.7"		3759-3760	
8	Small bronze fastener with round head	Fragment	Bronze	4.4"	1"		3761	
9	Small bronze fastener	Fragment	Bronze	7.5"			3762	No head present
10	Bronze fasteners, round head	Fragment	Bronze	1' 3"	1"		3766-3767	
11	Bronze fastener, round head	Complete	Bronze	1' 7"	1.3"		3768-3769	
12	Large Bronze Fastener with round head	Fragment	Bronze	9.4"	1.4"		3774	Broken on both ends
13	Small Bronze fastener, round head	Fragment	Bronze	2.8"	0.9"		3775	

No.	Description	Frag/ Complete	Material	Length	Diameter	Width	Photo No.	Notes
14	Long Bronze fastener, round head	Fragment	Bronze	2'	1"		3776	
15	Large Bronze fastener, with round head	Fragment	Bronze	1' 9"	1.5"		3777	
16	Large Bronze fastener	Fragment	Bronze	1' 5"	1.5"		3778	Broken on both ends
17	Large Bronze fastener, head shaped and tapered slightly	Fragment	Bronze	1' 9.2"	1.2"		3779-3781	Body thickness different from head/end at 1.4". Tapered end/head image 3780-3781
18	Bronze fastener with round head	Fragment	Bronze	8.7"	1.2"		3786	
19	Bronze fastener with round head	Fragment	Bronze	5' 5"	1.5"		3787	
20	Iron fastener with round head	Complete	Iron	1' 7.5"	1"		3788	
21	Iron fastener with round head	Complete	Iron	2' 6"	1.5"		3789-3790	
22	Square head Iron nail, bent	Complete	Iron	6.5"	1"		3763-3764	
23	Square head Iron nail	Complete	Iron	5"	0.8"		3765	
24	Sheathing	Fragment	Copper	1' 2"		7"	4027	
25	Sheathing	Fragment	Muntz Metal?	1' 2"		8"	3748-3750	
26	Five small bronze tacks	Complete	Bronze				3883-3884	Taken from smaller sacrificial outer hull planking with a rabbited edge
27	Five faunal bones	Complete	Bone				3881-3882, 4026	Two bones have been cut/sawed off

No.	Description	Frag/ Complete	Material	Length	Diameter	Width	Photo No.	Notes
28	Iron strap with 2.5 holes, folded over	Fragment	Iron	4' 7"		4"	3782-3785	Thickness: 0.5"; Distance between holes: 1' 3"; Hole diameter about 1.3"
29	Smaller Iron Knee with 2 iron fasteners	Fragment	Iron	2' 6"		3"	4011-4013	Heavy. One hole between iron fasteners
30	Large Iron Knee	Fragment	Iron	5' 4"			3226-3234, 3345-3347	Very Heavy. 1'5 tall on one end; 3" thick thinning to 1"

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APPENDIX J: ARTIFACT CONSERVATION CARDS

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Barnegat Inlet 4


Barnegat Inlet 4


Barnegat Inlet 5


Barnegat Inlet 5


IN
Barnegat Inlet 6


IN
Barnegat Inlet 6


Barnegat Inlet 7


Barnegat Inlet 7


Barnegat Inlet 7


Barnegat Inlet 7


Barnegat Inlet 8


Barnegat Inlet 8


Barnegat Inlet 8


Barnegat Inlet 8


Barnegat Inlet 9


Barnegat Inlet 9


Barnegat Inlet 9


Barnegat Inlet 9


Barnegat Inlet 10


Barnegat Inlet 10


Barnegat Inlet 11


Barnegat Inlet 11


Barnegat Inlet 12


Barnegat Inlet 12


Barnegat Inlet 13


Barnegat Inlet 13


Barnegat Inlet 13


Barnegat Inlet 13


Barnegat Inlet 14


Barnegat Inlet 14


Barnegat Inlet 15
IN


Barnegat Inlet 15


Barnegat Inlet 16


Barnegat Inlet 16


Barnegat Inlet 16


Barnegat Inlet 16


Barnegat Inlet 17
IN


Barnegat Inlet 17


Barnegat Inlet 18


Barnegat Inlet 18


Barnegat Inlet 18


Barnegat Inlet 19


Barnegat Inlet 19


Barnegat Inlet 20


Barnegat Inlet 20


Barnegat Inlet 21


Barnegat Inlet 21


Barnegat Inlet 22


Barnegat Inlet 22


Barnegat Inlet 22


Barnegat Inlet 23


Barnegat Inlet 23


Barnegat Inlet 23


Barnegat Inlet 23


Barnegat Inlet 24
IN


IN
Barnegat Inlet 24


Barnegat Inlet 25
IN


IN
Barnegat Inlet 25


Barnegat Inlet 25
IN


Barnegat Inlet 26


Barnegat Inlet 26


Barnegat Inlet 28


Barnegat Inlet 29


Barnegat Inlet 29


Barnegat Inlet 29


Barnegat Inlet 29


Barnegat Inlet
30


IN
Barnegat Inlet 30


IN
Barnegat Inlet 30

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