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CULTURAL RESOURCES INVESTIGATIONS OF SOUTH PASS OF THE MISSISSIPPI RIVER PLAQUEMINES PARISH, LOUISIANA

PRENTICE THOMAS AND ASSOCIATES, INC.
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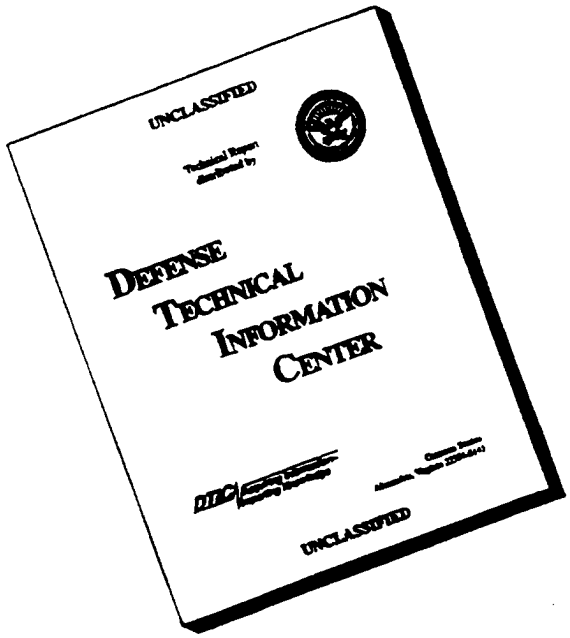
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19. ABSTRACT *(Continue on reverse if necessary and identify by block number)*

This document presents the background research, field investigation and findings from a cultural resources study of 16PL49, 16PL62, 16PL63, 16PL123 and 16PL130 at the South Pass of the Mississippi River. The work was conducted for the New Orleans District Corps of Engineers to identify and evaluate cultural resources in the proposed Corps dredge material disposal areas. Overall, survey was carried out over 943 terrestrial acres. A marine survey was also undertaken to identify anomalies that may represent potentially significant underwater cultural resources. The marine investigations found evidence of wells, possible shipwrecks, possible remains of the outer east jetty, possible remains associated with the Pilot Station and unknown magnetic anomalies. The integrity of these finds could not be evaluated at this stage. The Port Eads community was established when the government contracted with James B. Eads to construct jetties at South Pass to increase navigability of the Mississippi River from the Gulf of Mexico to the port of New Orleans. 16PL49 and 16PL62 are remains from historic Port Eads, a nineteenth and early twentieth century community. 16PL63 consists of five sets of pilings. Four of these are presumed to be associated with World War II gun emplacements, whereas the fifth appears to have been associated with a structure that was destroyed sometime before 1961. 16PL123 is the former location of the Bar Pilots' House and Coast Guard station; both structures are no longer extant. 16PL130 consists of the remains of Eads' jetties as well as later modifications to the historic jetties. 16PL49, 16PL62 and 16PL130 represent the historic occupation of Port Eads and the engineering achievement of the jetties. It is recommended that these three sites be combined into a historic district and nominated for inclusion into the National Register of Historic Places. The remaining two sites, 16PL63 and 16PL123, lack integrity and research potential. Although considered part of the district, they represent non-contributing remains.

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DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
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REPLY TO
ATTENTION OF:

Planning Division
Environmental Analysis Branch

To the Reader:

This cultural resources effort was designed, funded, and guided by the U.S. Army Corps of Engineers, New Orleans District, as part of our cultural resources management program. The multi-disciplinary research documented in this report was intended to identify significant cultural resources which may be affected by the placement of dredged material removed during routine maintenance dredging of South Pass. Based on the results documented in the report, the project was modified to avoid impacts to significant cultural resources identified during the investigations.

We agree with our contractor's recommendations that further investigations are required to determine the integrity of sites 16PL49, 16PL62, and 16PL130, and to verify the location and evaluate the National Register eligibility of possible shipwrecks and marine resources associated with the construction of the South Pass jetties. We also concur that no further work is required at sites 16PL63 and 16PL123.

This report has been reviewed and accepted by the New Orleans District. The Louisiana State Historic Preservation Officer has also reviewed the report and concurs with its recommendations.

James Wojtala
James M. Wojtala
Contracting Officer's
Technical Representative

for Robert A. Bunson Jr.
R. H. Schroeder, Jr.
Chief, Planning Division

Michael E. Stout
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CULTURAL RESOURCES INVESTIGATIONS OF SOUTH PASS OF THE MISSISSIPPI RIVER PLAQUEMINES PARISH, LOUISIANA

CONTRACT DACW29-94-D-0021
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FOR
NEW ORLEANS DISTRICT CORPS OF ENGINEERS

PRENTICE THOMAS AND ASSOCIATES, INC.
REPORT OF INVESTIGATIONS NO. 298

1997

ACKNOWLEDGEMENTS

The South Pass study was challenging physically due to nearly impenetrable stands of roseau cane along with other hostile aspects of the area's environment as will be discussed in the section on procedures. It was, however, among the most intellectually rewarding studies that we have had the pleasure to carry out. James B. Eads, the architect of the South Pass jetties, was an extraordinary man of vision, skill, and determination. Nationally, his story and the story of historic Port Eads personify the spirit of inventiveness and perseverance that underlay a nineteenth-century American ethos of industry and engineering manifest destiny. On a regional level, the construction of the jetties elevated New Orleans from the eleventh to the second largest port city in the United States. The community that developed as a result of jetty construction is every bit as important as the jetty itself, providing housing and sustenance for Eads and his staff, the workers, engineering staff, and commercial pilots. We hope that the documentation and reconstructions derived from this work do justice to the man, his engineering accomplishment, and the community that supported the endeavor.

In compiling this document, we were fortunate to have the consultation and assistance of many people, foremost among them Mr. Michael Stout and Mr. James Wojtala of the New Orleans District Corps of Engineers. We would also like to acknowledge the contributions of several consultants, including Dr. William Adams, Dr. Jack Bergstresser, Dr. Carl Brasseaux, Dr. Joy Jackson, Mr. Allen Saltus, Mr. Bob Solly, and Mr. Ken Shepardson.

Members of the staff who deserve special mention include Mr. James H. Mathews, the field supervisor, and our crew members, Mr. Michael Aitken, Mr. Paul LaHaye, Mr. Thomas Marckese, and Mr. Charles Melançon. These individuals distinguished themselves under some trying circumstances, including a speedy exit out of the project area when threatened by hurricane warnings only to have Hurricane Erin follow them to the northwest Florida coast. In the laboratory and report preparation phases, we were ably assisted by Mr. Mathews, Ms. Pamela Mathews, Ms. Paula Cook, and Ms. Lisa Josemans. Our thanks are extended to all who had input into this project.

In closing, we would like to highlight in particular the contribution of Dr. Joy Jackson. Her father had been a pilot at South Pass and this experience as well as her professional standing as a distinguished historian allowed her to provide us with an insider's historical perspective on Port Eads. Sadly, Dr. Jackson passed away before this document was finalized, but her contribution will be remembered.

Prentice M. Thomas
L. Janice Campbell
Mathilda Cox

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CHAPTER ONE
INTRODUCTION

By
Prentice M. Thomas, Jr.

CHAPTER ONE - INTRODUCTION

In 1994, Prentice Thomas and Associates, Inc. (PTA) was awarded an indefinite quantity contract to conduct various cultural resources investigations for the New Orleans District, U.S. Army Corps of Engineers (NOD). The contract has a one-year base period with an additional option year.

SCOPE OF WORK

Under delivery order 2, PTA was required to conduct cultural resources investigations of South Pass of the Mississippi River in Plaquemines Parish, Louisiana (Figure 1). Specifically, the scope of services called for historical background and records research, remote sensing survey, and site delineation within and near proposed dredge material disposal areas. These disposal areas are to be used during routine maintenance dredging on the South Pass. The material dredged from South Pass will be deposited in shallow open water areas and used to stabilize existing barrier island features and create wetlands.

GOALS

The goals were to identify and evaluate cultural resources within the project area and to provide recommendations for further studies. The study area consists of South Pass from Mile 0 to 14.0 Below Head of Pass (BHP). Fieldwork was restricted to areas between Mile 10.7 and 14.0 BHP. A total of 943 acres was the subject of the investigations. The project was divided into four phases. Phase 1 was the background research stage. Phase 2 was concentrated on a marine survey with remote sensing. Phase 3 included terrestrial investigations of Port Eads-East Bank (16PL49), Port Eads-West Bank (16PL62), World War II Gun Battery (16PL63), South Pass Bar Pilot's House (16PL123), and South Pass East Jetty (16PL130). Phase 4 was data analyses and report preparation.

EXISTING CULTURAL RESOURCES DATA

The primary data regarding these sites was obtained in 1984, when Coastal Environments, Inc. (CEI) conducted a survey along South Pass; the results were reported on by Weinstein (*1984*). This survey and its findings are discussed later in Chapter Five. Essentially, Weinstein reported on the five sites, including standing structures. He recommended that these cultural resources be combined into an historic district.

REPORT ORGANIZATION

Chapter Two summarizes environmental characteristics of the study area. Chapter Three presents an historical overview. Chapter Four presents a discussion of the marine investigations. Chapter Five details the terrestrial investigations. Chapter Six presents background investigations and assessment of the jetties. Chapters Four, Five and Six each contain recommendations at the close of the discussion. However, for ease of reference to overall project recommendations, Chapter Seven combines into the final chapter all three management recommendations—marine signatures, terrestrial remains and the jetty. Appendix I contains the scope of work.

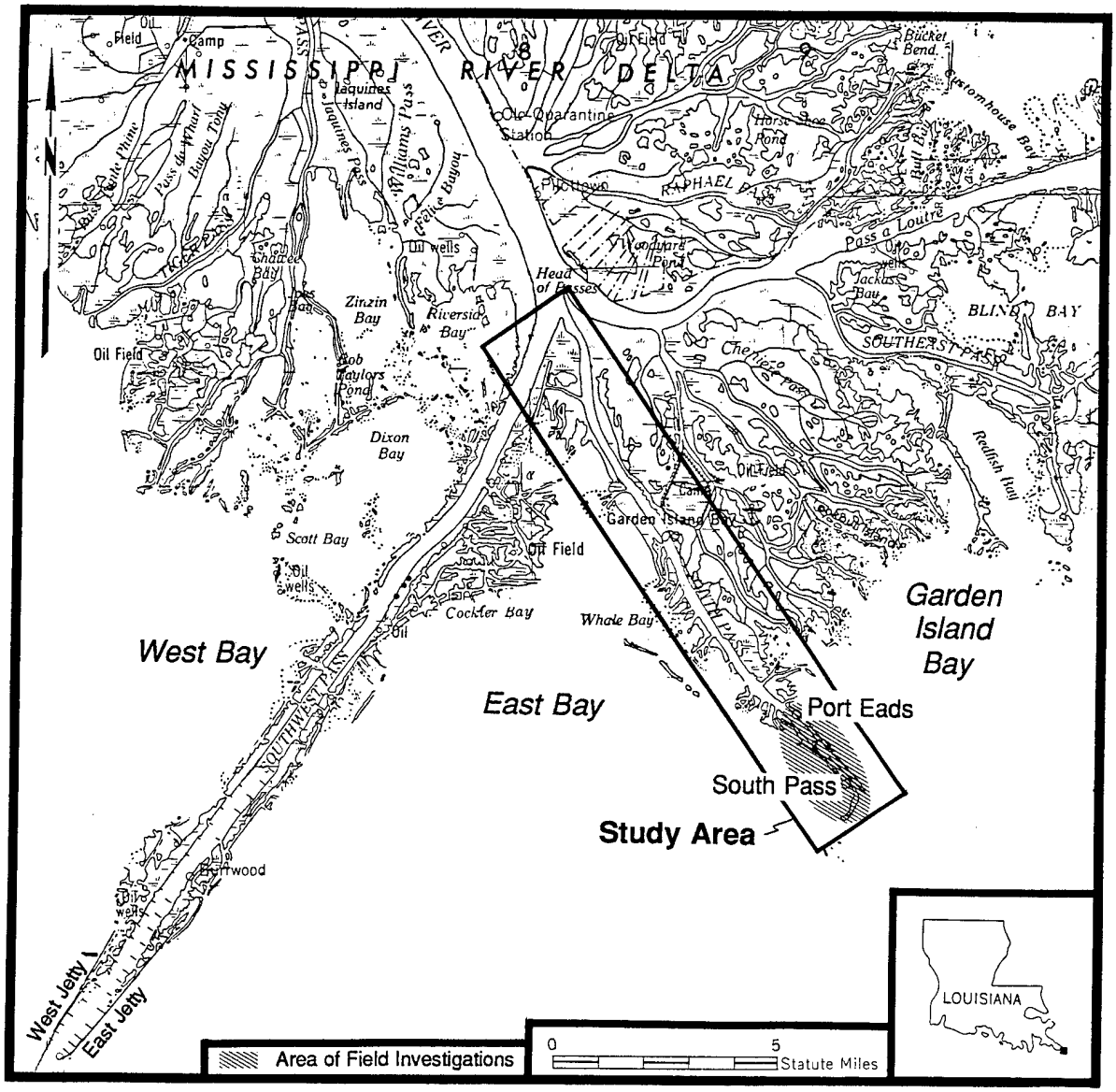


Figure 1. General map of Mississippi Delta showing study area.

CHAPTER TWO
ENVIRONMENTAL OVERVIEW

By
James R. Morehead

GEOMORPHOLOGY OF THE PROJECT AREA

Plaquemines Parish lies on the central Gulf Coastal Plain, a dissected, gently-sloping surface between the Ouachita and Appalachian Mountains and the Gulf of Mexico. The entire project area is situated in the Mississippi River Deltaic Plain, which has been created by the coalescence of several delta lobes built by the Mississippi River. It is, in fact, on the most recent of the Mississippi River's Delta lobes. This feature, the "Birdsfoot" or Balize delta lobe, is geologically very recent (*Coastal Environments, Inc. [CEI] 1977*).

This section is intended to be a brief synthetic review of the features and events with direct bearing on the development of the landscape and soils of southeastern Plaquemines Parish. Sources consulted include, but are not limited to, Saucier (*1974; 1976*), CEI (*1977*), McIntire (*1958*), Wiseman et al. (*1979*), Snead and McCullough (*1984*), Jeter et al. (*1989*), and Goodwin et al. (*1985*).

The Lower Mississippi Valley Deltaic Plain

A detailed reconstruction of the geomorphological history of the Lower Mississippi Valley would be redundant, as several sources deal with those topics in detail *(Fisk 1944; Saucier 1974; CEI 1977; Jeter et al. 1989)*. This is a summary review of the Plaquemines and Balize chronology.

Although the Mississippi is believed to have occupied several belts and to have developed corresponding delta lobes in the last several thousand years *(CEI 1977; Saucier 1981)*, only two of these are directly relevant to the project area: Plaquemines and Balize. The earliest deposits in the general area are thought to have been deposited by the Plaquemines deltaic system, which began to develop about 1000 years ago (*Saucier 1981*). Earlier deltaic systems seem to have had little impact on the study area—any sediments deposited by them would be subaqueous and have contributed mainly to raising the floor of the continental shelf.

On a more general level, not only the project area, but all of Plaquemines and the nearby parishes of St. Bernard, Orleans, Jefferson, St. Charles, Terrebonne, and others have been deposited by one or more in the series of deltaic lobes which have been created by the Mississippi River in the last few thousand years (*Saucier 1974; CEI 1977*). The Plaquemines delta lobe which began to develop about 1000 A.D., laid down most of the landmass of Plaquemines Parish, except for the Balize delta. The history of the Balize delta begins about 1500 A.D. (*Saucier 1974; 1981; CEI 1977).*

The development of the Balize lobe has been reviewed extensively in a recent report on Burrwood Plantation (*Goodwin et al. 1985:19-25, 29-30*). It began with the rapid development of a long, straight channel between Tropical Bend and Head of Passes. Reaching this point, it began to develop a mouth bar followed by a complex series of channel splitting and branching which resulted in the birdsfoot morphology (*CEI 1977; Goodwin et al. 1985*).

Although earlier strata may be present, they are well below mean sea level and are likely to be buried under up to hundreds of meters of more recent alluvium (*CEI 1977:99-110*). Figure 2 illustrates the extent of the Balize and Plaquemines deltas.

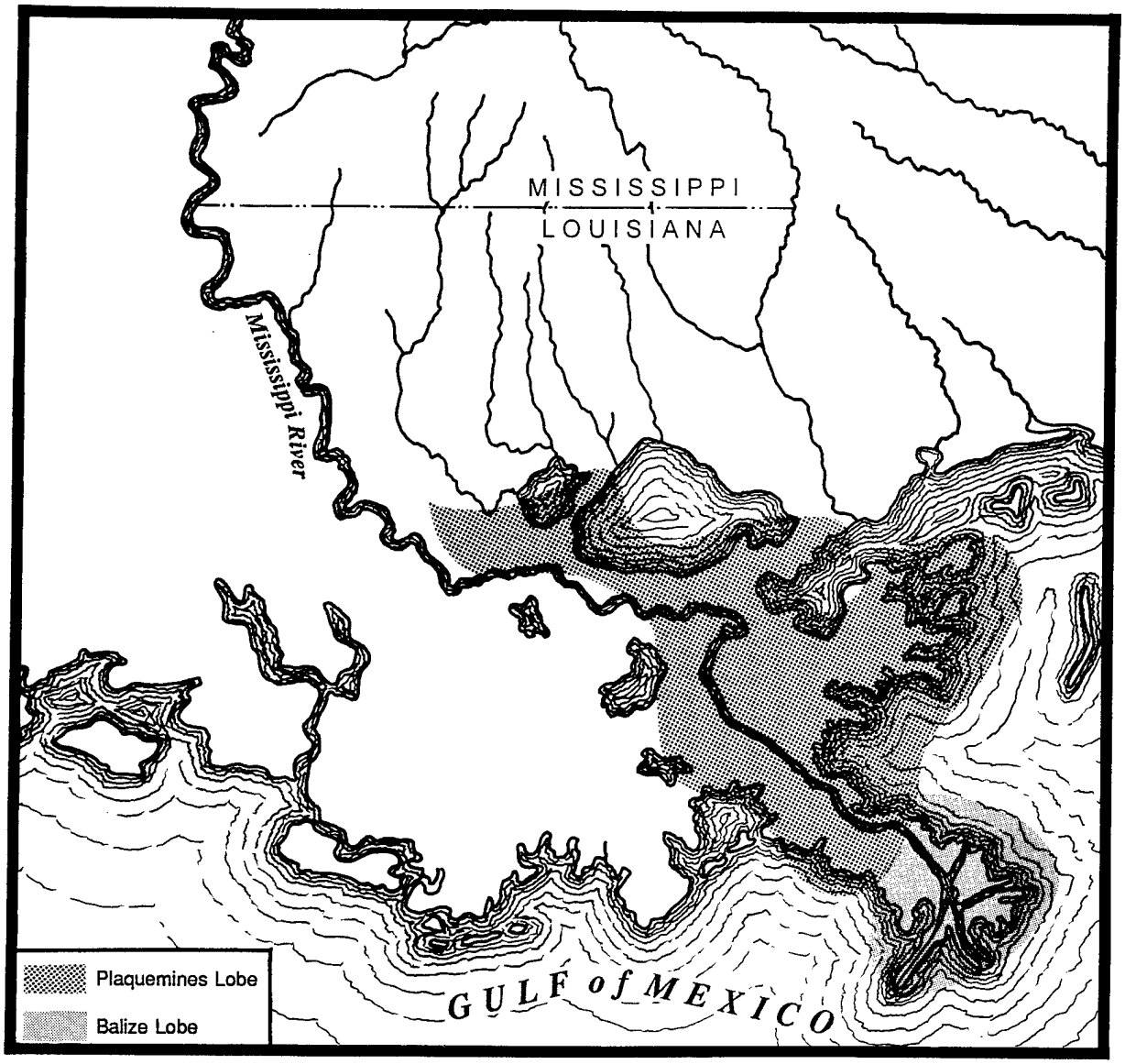


Figure 2. Plaquemines and Balize deltas of the Mississippi River.
(adapted from *Saucier 1974; CEI 1977*)

South Pass runs southeast from Head of Passes about 13.5 miles (22.5km) to the current mouth of the pass. It is believed to have been the major channel of the river at the time of La Salle's expedition in the late 1600s (*Morgan 1977).* South Pass was in serious decline by the late 1700s and "...would be an inconsequential or relict channel had it not been selected as the site of the Eads jetty project in the 1870s" (*Goodwin et al. 1985:20*) due to lack of fresh sediment deposition, subsidence, and marine transgression (*cf. CEI 1977:99-110, 301, et passim*).

ENVIRONMENT

Drainage

Plaquemines Parish is drained by several streams, including the Mississippi River. The most important drainages in the general area are Southwest Pass, South Pass, East Pass and Pass a'Loutre. These and virtually all of the smaller drainages are distributaries or crevasse channels of the Mississippi River.

Soils in the Project Area

Two major soil types are found in the project area: the Larose Series and aquents. Larose soils have been formed in Mississippi River sediments, while the aquents are dredge spoil. Most of the soils in the area are chronically saturated and "fluid" is often used to describe horizon consistency. Gley colors are common.

The Larose soils consist of deep, very poorly drained sediments deposited in fresh water marsh. They have an upper mucky, organic Oe horizon underlain by a clayey, gleyed Ag horizon, which in turn overlies a series of clayey, gleyed Cg horizons to depths of up to 60 inches (152cm).

The aquents, or dredge spoils, consist largely of sandy to silty sediments which have been pumped onto the banks of the channel. They have considerable channel-wise extension and may extend well inshore. Most of the profiles examined may be diagnosed as aquents. Rock was noted to be present in several units.

A typical aquent profile was examined in test unit 2 (N2280 E1054) at 16PL49, which was excavated to a depth of 70cm below surface.

Stratum I (0-10cm): an Ap horizon of grayish brown (10YR 5/2) sand.

Stratum IIa (10-50cm): a C1 horizon of brown (10YR 5/3) sand.

Stratum IIb (50-70cm): a C2 horizon of dark brown (10YR 3/3) sand.

Climate

The modern climate of southern Louisiana may be described as humid subtropical *(Muller and Willis 1978)*. It is dominated by the presence of the Gulf of Mexico and the warm, humid masses of air which flow off the Gulf. Summers are hot and humid with months of June through November subject to tropical disturbances ranging from depressions to severe hurricanes. Winters are marked by short-lived cold spells during which frigid, high pressure air masses push through to the Gulf, followed quickly by a return to milder conditions.

Temperatures average about 70°F (21°C), year round, with an average minimum of about 62°F (17°C) and an average maximum of about 76°F (24.4°C). January temperatures ranges from an average low of 45°F (20.4°C) to a high of about 61°F (16°C). The July mean low is about 76°F (24.4°C), with the mean high being about 90°F (32°C) *(data supplied by WETS Station, Boothville WSCMO CI, LA1157).*

Precipitation averages about 58" (147cm) per year. Monthly precipitation ranges from less than 1.3" (3.3cm) to over 8" (20cm), but it is fairly evenly spread through the year. Downpours are not uncommon and stalled fronts may drop over one foot (30cm) of rain in as little as 24 hours. Sleet is unusual; hail and snow are also rare (*Muller and Willis 1978*). The Balize delta being very recent, earlier climates are believed to be much the same.

CHAPTER THREE
HISTORICAL OVERVIEW

By
Carl Brasseaux
And
Joy Jackson

PREHISTORIC PERIOD

For nearly sixty years, the consensus of opinion among Louisiana archeologists has been that there were no permanent settlements in the prehistoric Balize district of the Mississippi delta (*Weinstein 1984:17; Gagliano et al. 1978:31*). Cultural geographer Fred B. Kniffen noted that the region was "without a known mound or midden, and the same, with the exception of the Pointe a la Hache site, is true for the banks of the present Mississippi below New Orleans" (*Kniffen 1936:410; Weinstein 1984:17*).

There is also no mention of Native American occupation in the area in the accounts of European explorers of the sixteenth, seventeenth, and eighteenth centuries (*Garcilaso de la Vega 1951:598-600; Margry 1876-1886:560-61; Brasseaux 1979:39-47*). Nor is there archaeological evidence of permanent Native American habitation in historic times (*Goodwin et al. 1990:17*). The nearest Native American village site in historic times was the Chaouacha settlement near English Turn, in present-day St. Bernard Parish.

HISTORICAL PERIOD

Port Eads - A Regional Perspective

Exploration

The South Pass of the Mississippi River, which flows straight down from the Head of Passes into the Gulf of Mexico, was considered by early eighteenth century explorers to be more ancient than the other passes. The mud on its banks was harder and more firmly packed than on the eastern and southwest outlets. At the time the French first visited the mouth of the river in the late seventeenth century, South Pass was navigable, but beginning to experience shoaling. By the 1720s, this condition removed it from consideration as the main pass into the river. It remained a shallow entrance ignored by most maritime commerce for the next 150 years.

While France's René Robert Cavalier de La Salle's brief foray into the Mississippi Delta region constitutes the first verifiable European presence along South Pass, other Europeans, most notably Spanish explorers, are known to have encountered the Mississippi River in the sixteenth and seventeen centuries. Early Spanish navigators who sailed the Gulf of Mexico were aware of the Mississippi River passes, but they did not try to explore them. These explorers may have included Columbus on his last voyage to America and Amerigo Vespucci in 1497 (*Samuel et al. 1955:1*).

The first Spanish map to depict the river was produced by Alvarez de Piñeda. On June 2, 1519, Piñeda observed the mouth of the Mississippi River, which he christened Río del Espirítu Santo, from a distance because the force of the river's mighty current drove his vessels away from the coast (*Weddle 1985:100*). Although its mouth was marked on Alvarez de Piñeda's map of the Gulf Coast, the river attracted no further attention from Spanish military and maritime interests, for, as historian Robert Weddle has noted, "no prudent captain discovering for the first time that maze

of channels, choked with logs and ringed by mud lumps, would go sailing up it unless he were truly desperate" (*Weddle 1985:104*). The Spaniards who would eventually attempt to navigate the Mississippi Delta fit precisely that profile.

The first Spanish adventurer to encounter one of the passes and make an effort to explore it was Pánfilo de Narváez's and the remnant of his 300-man party traveling along the northern Gulf Coast after a disastrous expedition into Florida. In October of 1528, sick and dangerously short of food and water, they attempted to enter the easternmost pass of the Mississippi (North Pass) in order to regroup before continuing their desperate journey to Mexico. The Mississippi's powerful current, however, drove the five fragile Spanish boats out to sea (*Weddle 1985:193-196*).

The scattered survivors of Narváez's expedition found temporary shelter amidst a group of islands off the coast (probably Chandeleur islands), but had no energy or resources to study or record a map of the area. After futile attempts to enter one of the eastern Mississippi passes, they headed out to sea and sailed westward. Only four or five men from one boat on this expedition made it back to Spanish settlement. After wrecking their boat in the vicinity of modern Galveston, they walked westward overland for two thousand miles to Culiacan in Mexico on the Pacific Ocean (*Ogg 1968*:22-26). One of these men, Cabeza de Vaca, has left one of the greatest chronicles of exploration in New World history.

Fifteen years later, another Spanish party was driven by desperate circumstances to venture into the Mississippi Delta. The legends of wealth told to De Vaca and his companions while living among Indians inspired other Spanish explorers, including Hernando de Soto. He and his expedition landed in Florida in 1539 and marched westward, discovering the Mississippi River near Memphis. Impressed by its majesty and possibilities for settlement and commerce, De Soto nevertheless let himself be deceived by the legends of gold in North America which he tried in vain to find. At his death and burial in the Mississippi River in 1542, Luis de Moscoso took over command.

After more wandering on land, the Spaniards led by De Moscoso built seven small vessels to carry the approximately 350 men who remained in their party down the river to the Gulf. On July 2, 1543, they boarded these vessels somewhere north of the mouth of the Red River and began a descent of the Mississippi River (*Weddle 1985:220-225*). After seventeen days on the river pursued by hostile Indians, they reached the passes of the Mississippi, traveling into the Gulf of Mexico and, ultimately, to safety at Pánuco, Mexico, in September (*Chambers 1968:24-26; Ogg 1968: 38-41; Samuel et al. 1955:8-9*).

The route taken by the Spanish survivors through the mouth of the Mississippi River is the subject of some scholarly debate. The most recent historical study of the exodus maintains that the Spaniards sailed into the Gulf of Mexico via Southwest Pass (*Weddle 1985:223*). While it is not known which of the passes they used, the Spanish now had a much better idea of the size of the Mississippi, its importance to the North American continent, and the passes at its mouth than the Narváez party who had skirted the passes in the 1520s.

Widely circulated stories of the hardships endured by the De Soto party survivors discouraged further Spanish exploration of the lower Mississippi Valley. No more expeditions were sent to explore the Mississippi River by Spanish authorities, but the mouth and its passes could appear on their maps with more accuracy. In eastern North America, colonization in Florida would take up their time and attention until reports of La Salle's ill-starred attempt to colonize the area galvanized Spanish authorities into action (*Weddle 1985:350-370*).

It was more than a century after De Soto's failed expedition that the French became interested in the mid-continent and its mammoth Mississippi River. French explorers came from Canada and the Great Lakes down into territory bordering the Mississippi and moved downstream in their explorations. In 1681-82, René Robert Cavalier de La Salle led a party down the Mississippi to the mouth and the passes. Riding the surging floodtide, La Salle probed the low Mississippi for its outlet to the sea.

According to Nicolas de La Salle, who maintained a journal throughout the voyage of discovery, the French explorers encountered coastal mashes resembling "large prairies," on April 6. At day's end, the Frenchmen camped at a grove of "trembling poplars," which they ascended to find, in the far distance, "a large bay" (*Margry 1876-1886:560-61*). They had come to the Head of Passes.

La Salle's party divided into three detachments to explore the three main passes of the river. La Salle and some of his men went down Southwest Pass, while Sieur d'Autray (Jacques Bourdon) took Pass a'Loutre, and Henri de Tonti (Iron-hand) and Father Membre sailed down South Pass (*Chambers 1968:63-64; Davis 1976:28-29; Parkman 1937:306; New Orleans Daily Picayune April 30, 1875*). This was the climax of their journey, and it gave them great joy to have reached the Gulf. In describing the passes of the river, Tonti later wrote "We found all of them excellent, broad and deep" (*Chambers 1968:64*). They spent the next two days exploring the passes fully (Figure 3).

Having ended their quest for the great river's mouth, the Frenchmen withdrew to a site four leagues above the Head of Passes (probably near modern-day Venice), where a ceremony was held on April 9, 1682 in which La Salle claimed for the French monarch all of the lands drained by the Mississippi River "and all the nations, peoples, provinces, cities, towns, villages, mines, minerals, fish, streams and rivers" within that territory (*Osler 1967:140*). They raised a cross (the traditional French navigational marker) and affixed to it a lead plaque bearing the royal coat of arms of France and the engraved inscription "Louis Le Grand, Roi De France et de Navarre, Regne; Le Neuvieme Avril, 1682" (*Charlevoix 1962:214; Ogg 1968:110-112; Parkman 1937:306-307*). This land was named Louisiana in honor of Louis XIV, France's reigning Bourbon monarch.

La Salle's attempt to return to the mouth of the Mississippi two years later and enter the Passes from the Gulf was unsuccessful. He passed by the Mississippi's mouth and made landfall in Matagorda Bay in Texas. He was finally assassinated by his own men as he attempted to make his way eastward to the Mississippi. Many of his colonists were wiped out by hostile Indians (*Ogg 1968:119-26; Parkman 1937:366-430).*

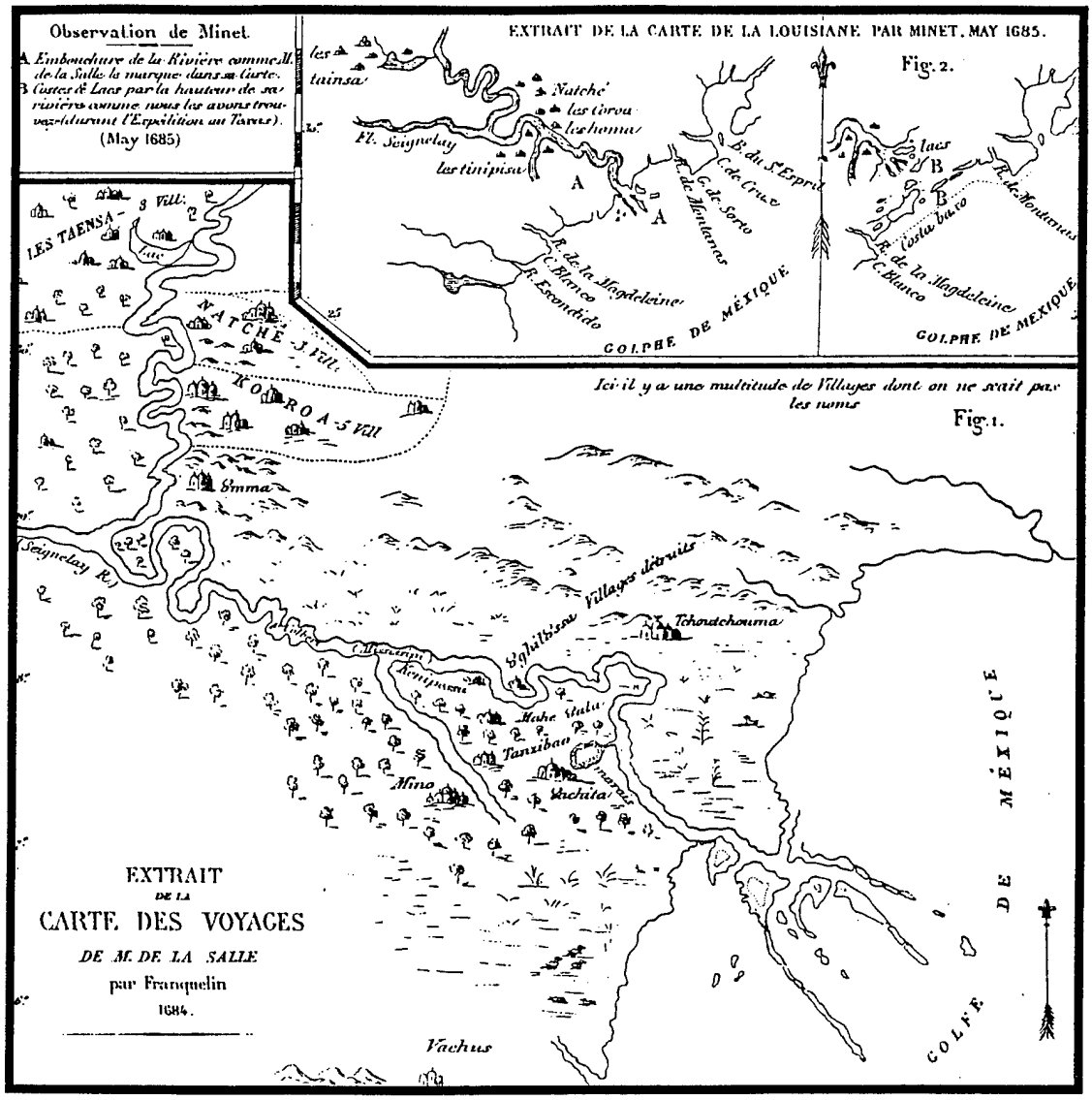


Figure 3. 1685 Map of the lower Mississippi based on the voyage of La Salle.
(from *Thomassy 1860: Plate 1*)

In 1685, after learning of La Salle's ill-fated attempt to colonize the lower Mississippi River, Admiral Gaspar de Palacios assigned Juan Enríquez Barroto and Antonio Romero, senior pilots of the Spanish Windward Fleet, to chart the Gulf Coast westward from San Marcos de Apalache (present-day St. Mark's, Florida) to "the bay of Miscipipi or Espíritu Santo." Barroto, however, enjoyed overall command over the expedition because of his cartographic skills and extensive geographical knowledge (*Weddle et al. 1987:129*).

After departing Havana on January 3, 1686, the Barroto expedition made its way to Mobile Bay before coasting westward to the mouth of the Mississippi River. Arriving at North Pass, they encountered an embouchure choked with driftwood and ringed by mud lumps, leading the Spanish

pilots to dub the channel and its extended banks River of the Palisade and Mud Cape. While the expedition debated the merits of hazarding an attempt to enter the river, a storm arose and drove the Spaniards across the Gulf of Mexico. Running short of provisions, the Barroto expedition limped into Veracruz harbor on March 13, 1686 (*Weddle 1987:131-132*).

Once again, the Spanish government squandered an opportunity to seize and defend the strategic lower reaches of the Mississippi River, creating another chance for the French to establish a foothold at the gateway to North America. In 1698, Pierre LeMoyne d'Iberville, illustrious Canadian hero of the almost incessant North American colonial wars, was assigned to find the mouth of the Mississippi and set up a suitable colony on the Gulf Coast in what La Salle had called "Louisiana." The French had information that the British were going to attempt to colonize this region, and they wished to beat them in this attempt to settle along the lower Mississippi. With him came his younger brother, Jean Baptiste LeMoyne, Sieur d'Bienville (*McWilliams 1981:1*).

Setting out from Brest in command of two frigates (*Badine* and *Marin*) and two *traversiers* (small, one-masted freighters), Iberville traveled to the Gulf Coast by way of Saint-Domingue (present-day Haiti), arriving at the Ship Island roadstead on February 10, 1699. The expedition set out with 51 men aboard two longboats and two birch-bark canoes in order to stay close to shore and not miss the mouth of the Mississippi. Iberville and his party reached the mouth of the Mississippi on March 2, 1699 in the midst of a storm that threatened to capsize their small craft. Iberville recalled the dramatic event in his journal:

> Gales and heavy seas. The seas were so heavy we could neither remain at sea nor put ashore. The area being too shallow to land safely, I remained at sea, lying offshore with my longboats, the canoes aboard, frequently shipping water from the waves. Having followed the cape to the southeast for three hours in order to round a rocky point, the pall of night descended and the storm continued. The gales being such that they could not be withstood; unless we put ashore at night we would perish at sea. I arrived at the rocks in order to land during the following day, and thus save my men and my longboats. -While approaching these rocks to find a refuge from the elements, *I discovered a river there.* I sailed between two of these rocks, in twelve feet of water. Extremely heavy seas. In approaching these rocks, I found fresh water with a very strong current.
>
> These rocks are actually logs petrified by mud which has caused them to become black stones which repel the sea. They are innumerable, above the waterline .... This caused me to realize that it was in fact Rio de la Palizade.... [*Brasseaux 1979:38-39*]

What La Salle believed to be petrified logs were actually mud lumps, a fact he did not comprehend until later. The Spanish had called the Mississippi the "Rio de la Palizada" or Palisade River because of these obstructions.

He entered the river at what Richebourg Gaillard McWilliams, the translator of Iberville's Gulf journals, feels was North Pass which leads into Pass a'Loutre. Iberville estimated that there was about 12 to 15 feet of water at the pass's entrance, although the "petrified rocks" would make it difficult for regular ships to enter. In the longboats the Iberville party traveled up Pass a'Loutre and made camp among the reeds growing thick along the pass. These were as high as fifteen feet and gave coverage to the Frenchmen during the night.

The next day Iberville traveled to the Head of Passes. He estimated in his journal that South Pass (the middle one) was the same width as the pass he had come up (*McWilliams 1981:51-53*). He described the land along the passes as "a country of reeds and brambles and very tall grass," while upstream about six leagues he noted that "trees begin to appear, especially on the left side going upstream, which are alders as big as a man's body and 30 to 40 feet high" (*McWilliams 1981:53*). Iberville traveled for several hundred miles upriver visiting Indian villages and inquiring about La Salle's expedition earlier to ascertain if he really was on the same river. Iberville traveled as far north as the Houma village near the present Angola State Penitentiary in West Feliciana Parish to verify the river's identity.

He returned to the coast through Lake Pontchartrain (which he named), while Ensign Sauvole and Iberville's brother Bienville led a party downriver through the passes and returned to the French vessels waiting at Ship Island (*McWilliams 1981:53-86*). Sauvole and Bienville brought Iberville a letter which Tonti had left with a Mougoulascha Indian chief for La Salle. He had come looking for his lost former commander in 1685 and after not finding him had left the letter. This proved to Iberville's satisfaction that he had really reached the Mississippi River which La Salle and Tonti had traversed (*Giraud 1974, Vol. I:33; McWilliams 1981:87-88*).

On April 8, 1699, after returning to Ship Island by way of Lakes Maurepas, Pontchartrain, and Borgne, Iberville commanded his men to clear a fort site near present-day Ocean Springs, Mississippi. Construction of the installation, dubbed Fort Maurepas, and the transfer of supplies from the French freighters was completed on April 27. On May 3, Iberville set sail for France, leaving behind a garrison of 10 officers and 70 soldiers at Fort Maurepas des Biloxi (*Brasseaux 1979:72-79*). France had at last established a foothold in Louisiana (Figure 4).

French Colonization

The occupation and development of the region adjoining the mouth of the Mississippi River was crucial to French colonization in the North American interior; yet, despite its obvious strategic importance, the region enjoyed only brief periods of intensive French interest followed by years of complete neglect. Indeed, the area remained a stagnant backwater of the French empire during much of the Gulf Coast's early colonial development. France's vacillating policies regarding the area and the great disparity between the region's real and perceived values to the mother country stemmed directly from the circumstances under which the area was settled prior to 1731 (*Brasseaux 1983:417*).

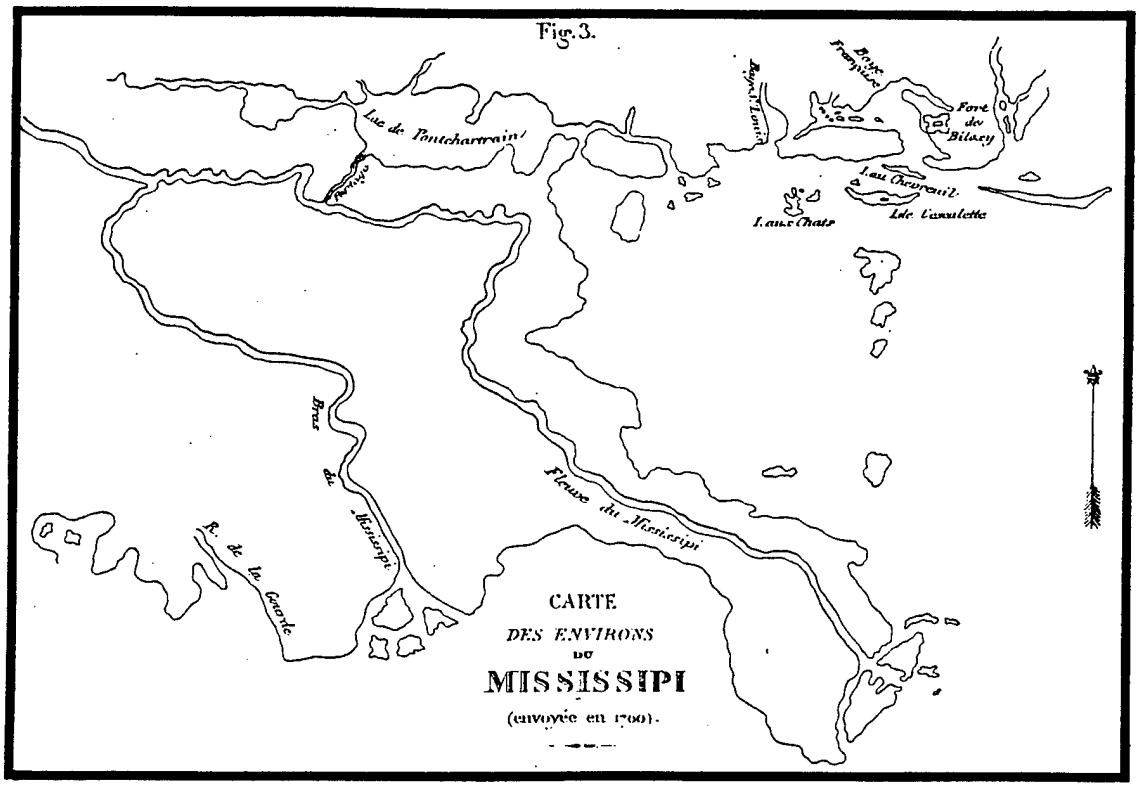


Figure 4. 1700 Map depicting the mouth of the Mississippi and "Fort de Biloxy."
(from *Thomassy 1860: Plate 1*)

From the beginning France squandered its advantages in the Mississippi Valley. Unsubstantiated reports of precious metals and exaggerated accounts of the region's proximity to Spain's New Mexican mines first aroused the French government's interest in the mouth of the Mississippi River. Following La Salle's disastrous attempt to colonize the mouth of the Mississippi River in 1684, the French government displayed great reluctance to underwrite subsequent colonial ventures in that area. French disinterest and administrative lethargy persisted for nearly two decades, and the result might have been complete neglect, save for the efforts of Canadian Pierre Le Moyne d'Iberville (*Brasseaux 1979:1-10*).

A man of vision, Iberville was the principal architect of the French empire in the Mississippi Valley. Noting the need to occupy and develop the lands claimed for France by La Salle in 1682, Iberville suggested the establishment and maintenance of posts along the lower Mississippi and Mobile rivers (*Brasseaux 1983:417-18*). Iberville's colonization scheme fell on deaf ears. Plagued by an over-burdened treasury and increasing European tensions, the French government maintained only a low profile along the Gulf Coast, and Iberville had to implement his colonization plans with insufficient resources.

During his second voyage to Louisiana, in early February 1700, Iberville was informed by Sieur de Sauvole, whom he had left in command of a small French garrison at Biloxi, that, during his absence, a sloop transporting English colonists had entered the Mississippi. Jean-Baptiste Le Moyne de Bienville, Iberville's younger brother and a future governor of Louisiana, had turned back the English ship, which had come up the Mississippi River as far as what be came known as "English Turn," by telling them the French had already established a settlement upriver and fortified it. This was not true, but the English accepted it, turned around, and left the Mississippi River lower coast (*Taylor 1976:6; Davis 1976:41; McWilliams 1981:108*). Though the captain had been persuaded to leave, the vessel's presence was an indication of English intent to move into the territory. The English commander had vowed to return "with warships light enough to enter the river" (*McWilliams 1981:107-09*).

On February 1, 1700, Iberville led 60 men from the Biloxi encampment to the lower Mississippi River to establish a settlement to protect France's claim to the region. Three days later, he encountered Bienville at a point eighteen leagues (approximately 54 miles) above the river's mouth. Bienville's Bayougoula guide indicated that a nearby, east-bank ridge provided the perfect location for a settlement because it not only was free from flooding, but it also contained abundant timber for construction of a fort (*Brasseaux 1983:418*).

Iberville accepted the Native American's recommendation, and construction of the post began the following day. Iberville personally designed and supervised construction of the post: a two-story wood and mud-plaster blockhouse armed with four four-pound cannon, and surrounded by a 12-foot-wide moat (*Giraud 1974:40*). The blockhouse was flanked by an eight-foot square wood-and-palmetto storehouse and a crude altar and cemetery complex. Upon completion of the structure, Iberville ordered fields cleared and crops planted, commissioned Bienville as commandant of the post, and assigned 15 Canadians to the garrison (*Giraud 1974:39-40*).

From the outset, the outpost, variously called Fort Mississippi or Fort de la Boulaye, exhibited several fundamental flaws which ultimately resulted in its abandonment. First, the post was too far inland and too inadequately armed and staffed to repulse any foreign invasion of the lower Mississippi Valley. Fr. Gravier, who visited the settlement in December 1700, noted that the garrison failed to build adequate defenses for the blockhouse, which had been appropriated by Bienville as his personal quarters. The cannon provided by Iberville were "planted on the brow of the bluff," without "entrenchment or redoubt" (*Ries 1936:854-55*). Indeed, so poorly defended was Fort Mississippi that it became to local tribes a symbol of France's military impotence.

The post was also plagued by flooding, famine, unsanitary water, disease, mosquitoes, and serpents. The site's inherent problems appeared during construction of the facility, when fully one-half of Iberville's Canadian detachment fell ill and was unable to complete the project, apparently having been stricken by dysentery. The source of the illness was the settlement's poor water supply. The nearest source of potable water lay over one-half mile from the post, and it was subject to contamination by saltwater intrusion and flooding (*Giraud 1974:40-41*).

The problem of flooding was not confined to the post's principal water source. The Bayougoula guide's statements notwithstanding, the ridge upon which Fort Mississippi was constructed was frequently inundated. The five or six cabins erected by Bienville's Canadians adjacent to the blockhouse during the winter and spring of 1700 were flooded to a depth of several feet in August of that year, and the garrison was apparently driven to higher ground upriver (*Brasseaux 1983:419*).

The flood also washed away the post's wheat and pea crops bringing famine to the fort's isolated inhabitants, and conditions would not quickly improve. In the summer of 1701 Ensign Sauvole, commandant at Biloxi, reported that, unable to find food along the river, Bienville had been forced to seek provisions from the Natchez and Houma Indians, but, perceiving their deteriorating economic and military positions and the dim prospects of long-term French self-sufficiency, the tribes refused to provide assistance and thus encourage continuing dependency. Having no alternative, Bienville dispatched his troops on hunting expeditions as far as Bay St. Louis (*Brasseaux 1983:420*).

Moved with pity for them, Sauvole provided Bienville's troops from Biloxi's meager reserves of Indian corn, but this only temporarily ameliorated their condition. In 1701, Bienville had the Biloxi tribe transferred to the Bayou St. John area in order to "have their assistance in provisioning this post" (*Giraud 1974:79*).

Isolated from European and Indian villages and reduced to a hand-to-mouth existence, the members of the Fort Mississippi garrison fled the post at the first opportunity. Officers were no exception. Following Sauvole's death in August 1701, Bienville, the colony's second in command during Iberville's absence, quickly sought new surroundings along the Gulf Coast (*Brasseaux 1983:420*).

The aversion among the colony's senior officers to the tiny, disease-ridden outpost on the lower Mississippi affected the course of French colonization in Louisiana following Iberville's demise in 1706. Assuming command of the colony after Iberville's death, Bienville ordered the evacuation of Fort Mississippi and transportation of the post's "war munitions and all other merchandise" to Mobile aboard longboats and canoes (*Giraud 1974:110*). Bienville realized that the colony, now temporarily abandoned by war-torn France, must consolidate its resources in order to survive, particularly as recent English assaults on Florida seemed to presage a general British invasion of the northern Gulf Coast.

The abandonment of Fort Mississippi diminished France's prestige among the Indian tribes living on the banks of the lower Mississippi River. In compliance with Bienville's orders, Saint-Denis, who succeeded Bienville as commandant of Fort Mississippi, remained at the post for several weeks to pacify the Native Americans and restore their confidence in France but his efforts were largely unsuccessful. The absence of a French outpost on the lower river reinforced the Indians' perception of the colony's fundamental military, economic, and demographic weaknesses (*Brasseaux 1983:421*).

In the years following French withdrawal from Fort Mississippi, conditions in Louisiana steadily worsened, despite the establishment of a new proprietary regime in 1712. The colonial government marshaled its resources to establish the Natchitoches Post on Red River in 1714 in a desperate though unsuccessful effort to stimulate trade with Spanish New Mexico (*Phares 1952:35-144*). French dominion over the lower Mississippi River was restored in 1718 after a second proprietary regime, John Law's Company of the West, temporarily rejuvenated the colony, but their presence in the lower valley was limited to a few hovels built on the present site of New Orleans (Figure 5) (*Le Page du Pratz 1975:21*).

Established along both banks of the great river, primarily between present-day Gentilly and Pointe à la Hache, by Pierre Le Blond de La Tour, who was employed by the major concessionaires, and by Ignace Broutin, a company engineer, the nascent settlements quickly fulfilled their role as entrepots and staging areas for the plantations to be established upriver. Particularly prominent among the new habitations were staging areas for the largest concessions in early French Louisiana—those owned by John Law and by Sieur LeBlanc, the French minister of war. By November 1719, for example, the LeBlanc operation at Chaouachas alone boasted three officers, 28 domestics, and 36 women and children (*Brasseaux 1983:422*).

Not until 1721 did the French return to the banks of the lower Mississippi River in substantial numbers. The decision to reoccupy the region stemmed from developments far from the river's banks. Arrival of hundreds of settlers sent to the colony by the new proprietors coincided with the outbreak of Franco-Hispanic hostilities on the Gulf Coast. As military exigencies forced Louisiana officials to mobilize all available resources for the colonial defense, the immigrants, including the parties of concessionaires granted large tracts of land in the Mississippi Valley, were deposited on Biloxi's Gulf shores, and there they languished for months while their transport vessels were employed in the Pensacola campaigns (*Le Gac 1970:41-42*).

During the seemingly endless delays, scores, if not hundreds, of immigrants perished on the beaches from exposure and malnutrition, while the better equipped concession workers consumed most of their provisions. As a consequence, these parties were incapable of undertaking the long journeys to their employers' lands in the central Mississippi Valley. When the concessionaires, many of whom were politically powerful in France, ordered their employees home, colonial officials quickly took steps to avoid a disastrous exodus from Louisiana. In April 1721, shortly after the cessation of hostilities, the concessionaire workers were transported primarily to sites below New Orleans at company expense. The decision to use the area was based not only on its proximity to Biloxi, but also upon its successful use as a staging area in 1718, when a group of tobacco workers, employed by the company, had been temporarily installed at English Turn. Arable land was parceled out among the concessionaires, with the largest operations receiving partially cleared areas to permit their employees to sow seeds and rapidly revictual for the ascent to their respective plantation sites (*Giraud 1974, 4:208*).

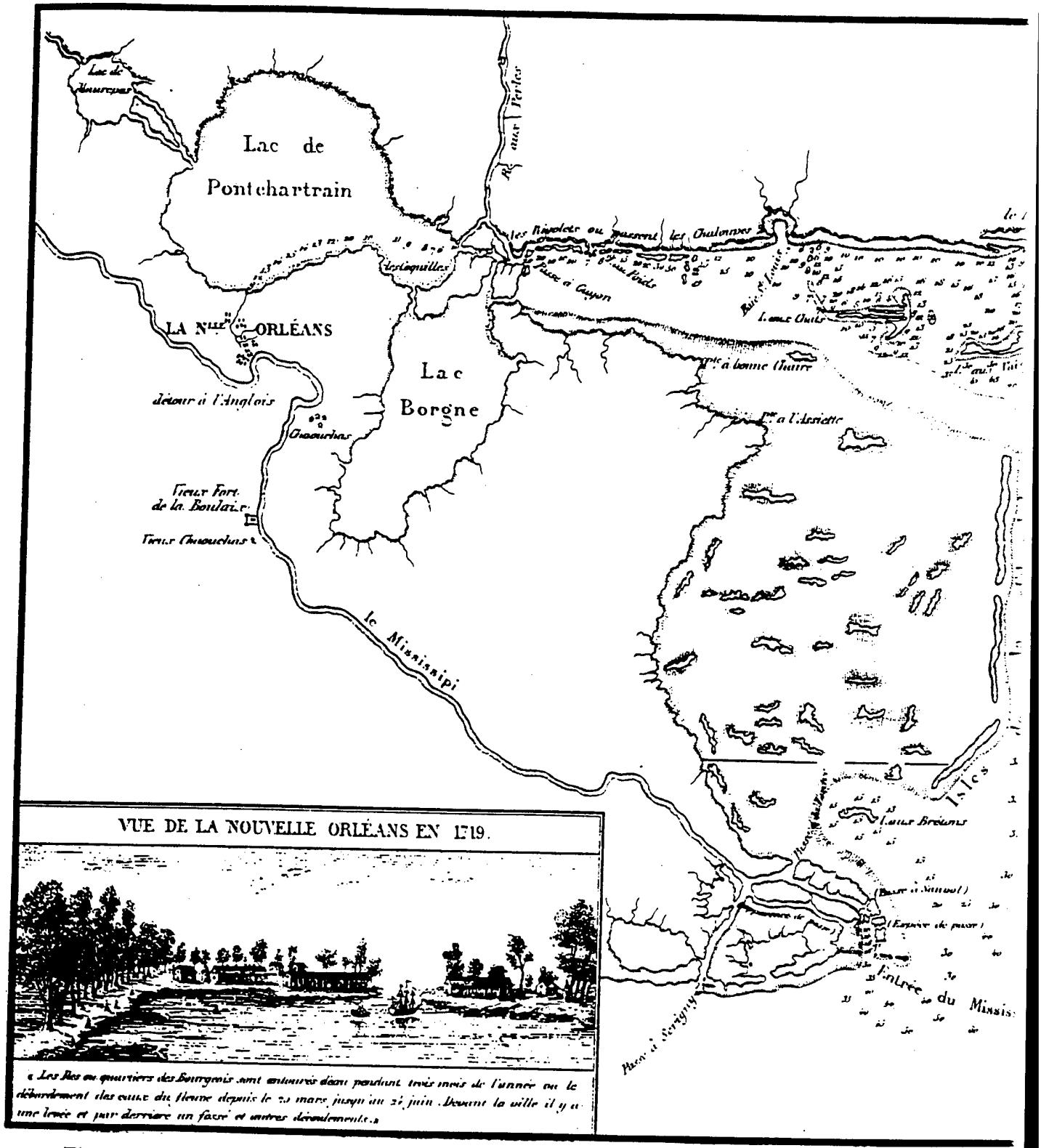
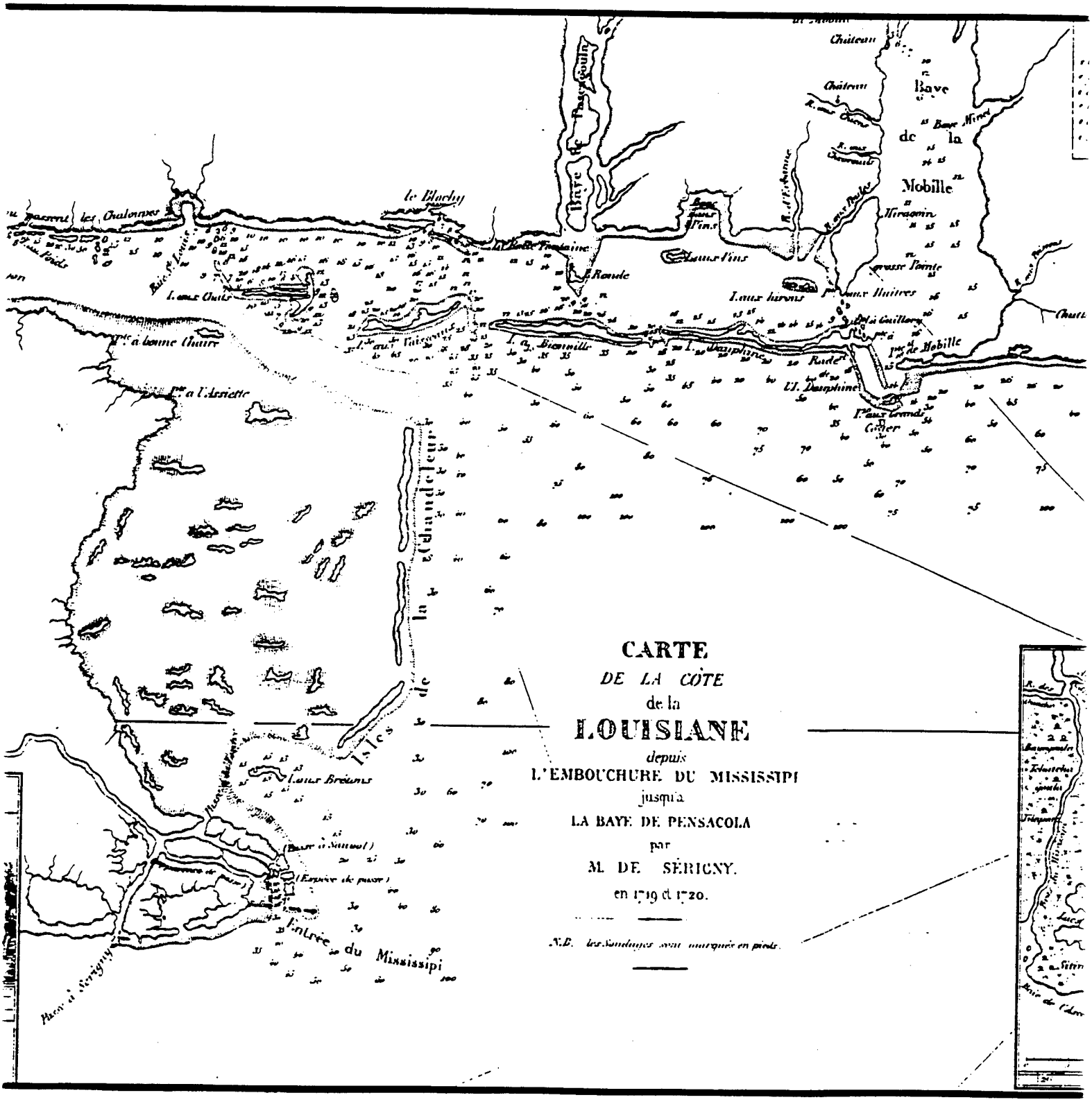
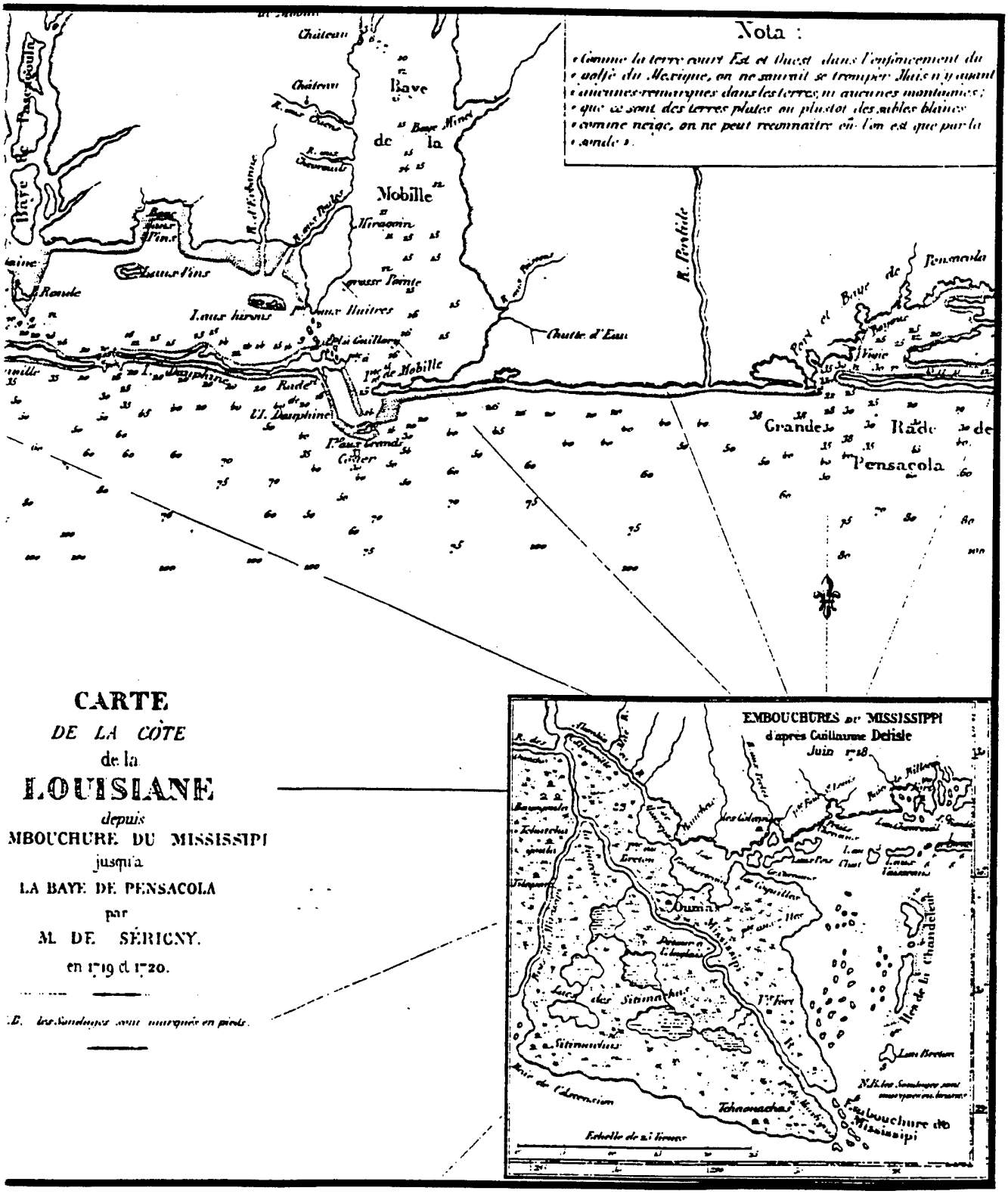


Figure 5. 1719-1720 map of the northern Gulf Coast depicting New Orleans and Fort de la Boulaye (or Fort Mississippi).
(from *Thomassy 1860*)



depicting New Orleans and
ssippi).



CARTE
DE LA CÔTE
de la
LOUISIANE
depuis
L'EMBOUCHURE DU MISSISSIPI
jusqu'a
LA BAYE DE PENSACOLA
par
M. DE SÉRIGNY.
en 1719 et 1720.

N.B. les Sondanges sont marquées en pieds.

Despite encouraging initial progress at the staging areas, the system soon collapsed. Following John Law's disgrace and flight from France in 1721, most of the financier's workers dispersed. Particularly crippling was the decision of Law's chief administrators to return home after learning that their new employer, the Company of the Indies, would demote them. They were followed by many intermediate-level plantation supervisors and numerous disgruntled workers who no longer wished to endure disease, chronic food shortages, the region's hot, humid climate, and, most importantly, the uncertainty regarding wages and back pay. The exodus was not restricted to the Law concession. Workers left in droves from estates between Gentilly and Chaouachas, and the movement was enhanced by the decision of some now impoverished proprietors to abandon their agricultural ventures (*Giraud 1974, 4:216*).

The outpouring of colonists from Louisiana reached such proportions in late 1720 and early 1721 that the Company of the Indies ordered its colonial representatives to detain young concession employees, particularly laborers. The ban on emigration, however, did not apply to workers found to be of no utility to the colony. Settlers continued to leave under this technicality, and local officials actually encouraged their departure by granting them free passage to France aboard nearly empty freighters returning to Europe. The result was a rapid decline in concession populations. For example, of the 70 persons known to be on Law's Chaouachas estate—located on the site of the original Chaouacha Indian village—in November 1721, fewer than 30 remained in March 1722. Though the large concessions persisted, often under new ownership and management, their chances of survival were marginal at best (*Giraud 1974, 4:235-238*).

As the major French-owned concessions crumbled between 1721 and 1723, smaller enterprises, generally owned by Canadians who intended to remain in Louisiana, gradually replaced the plantations as the backbone of the colonial settlement below New Orleans. This is particularly true of the English Turn region, where yeoman farmers slowly cleared, improved, and cultivated habitations of six arpents frontage and forty arpents depth. Between Pointe à la Hache and Gentilly, the small farms of Canadians Deslau, three Carrière brothers, Trépagnier, and Burel eventually flourished, while the neighboring, large LeBlanc and Law concessions fell into ruin. Of the 11 concessions on the west bank below New Orleans, only those of Burel and Trépagnier survived; Bienville, who owned an immense tract of property in that area, cleared only enough land to house his modest estate—"Bel Air" (*Giraud 1974, 4:252-55*).

The flurry of development immediately below New Orleans, though short-lived, influenced the course of colonial development in the entire lower Mississippi Valley (Figure 6). With the founding of New Orleans in 1718, thought began to be given to the best passes at the mouth of the river for vessels to enter and exit (*Davis 1976: 41-42, 55-56*). Prior to 1721 all colonial commerce had been directed to the roadsteads off Ship and Dauphin Islands, because French shipmasters had greatly feared the bar at the mouth of the Mississippi.

Indeed, until 1720 the river was generally considered unnavigable to ocean-going vessels because the bars at the passes as late as 1731 provided only "eight or nine feet" of clearance (*Le Page du Pratz 1975:130*). Hence, goods bound for New Orleans and Natchitoches had to be placed

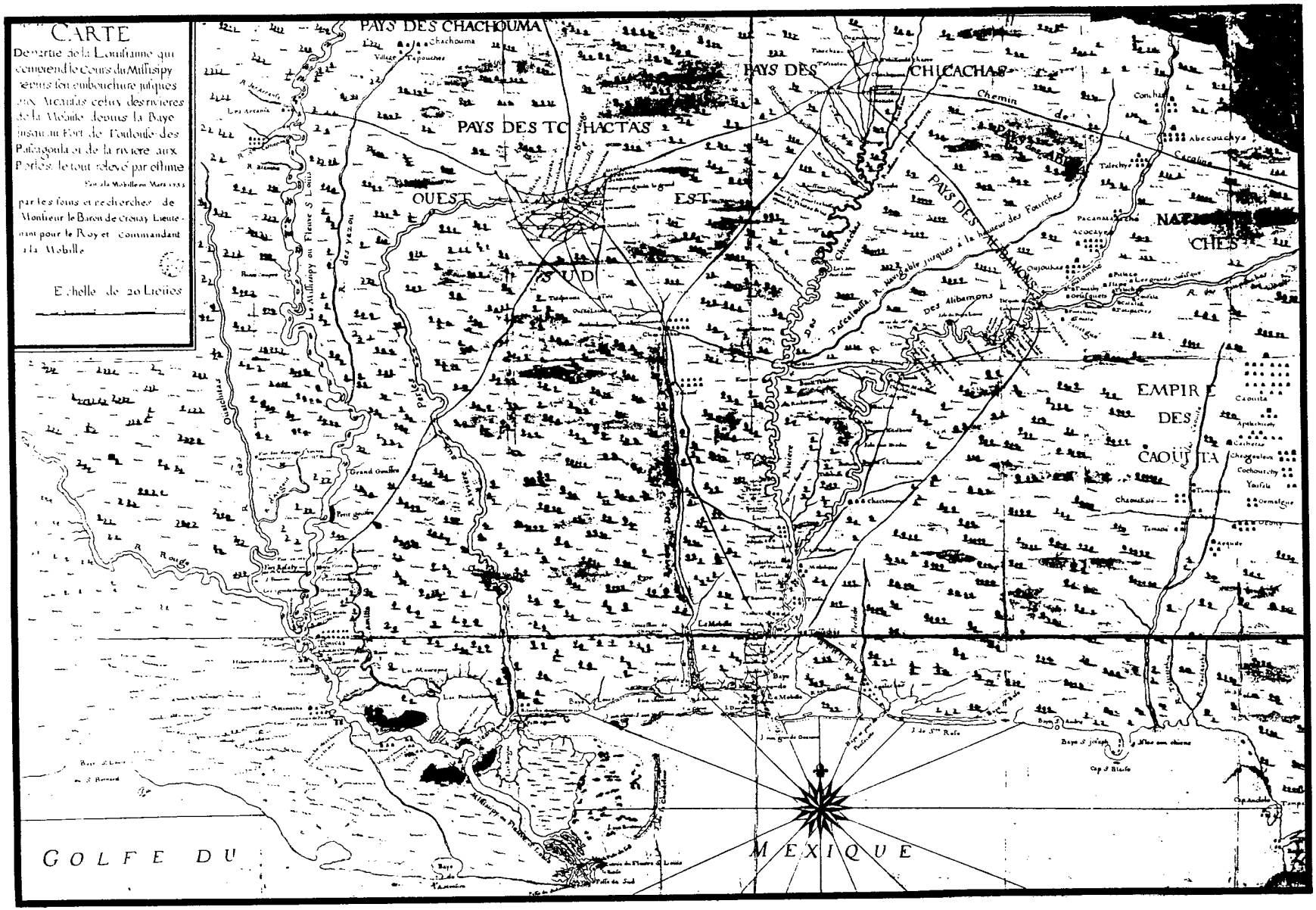


Figure 6. Baron de Crenay's 1733 map of Louisiana.
(from the Center for Louisiana Studies)

on longboats, transported 20 miles to shore, inventoried, transported aboard coasting vessels through the Rigolets, Lake Pontchartrain, and Bayou St. John, near the embryonic town of New Orleans. There, the process was repeated until the cargo reached its destination. During the trans-shipment of goods, inordinate amounts of scarce provisions were consumed by workers, and the colony consequently lived under the constant threat of famine (*Le Gac 1970:14-15; Margry 1876-1886, 5:615*).

The problem became particularly acute when the Law and LeBlanc concessions established entrepots at Chaouachas. These operations had carried large quantities of freight to Louisiana aboard chartered merchantmen, and transportation of their cargoes by traditional methods would only have further retarded the establishment of the concessions, necessitating additional expenditures. Pressure from the concessionaires coincided with demands by Bienville and engineers Etienne Pauger and Pierre Le Blond de la Tour that commerce be re-routed through the mouth of the Mississippi River. Though this change was opposed by company representatives in Louisiana, particularly company director Charles Le Gac who feared the loss of company vessels, the demands produced the desired effect.

In late December 1721 the company's central office ordered construction of a fort, barracks, and warehouses on the Island of Balize both to guard the Mississippi's passes against invaders and to assist vessels in crossing the river's treacherous bar (Figure 7). Five months later, company officials in Paris directed its Louisiana representatives to build a harbor at the mouth of the Mississippi and formidable artillery batteries at Balize. Finally, in late December 1722, the company ordered construction of a warehouse and three batteries at English Turn to serve French commerce and to prevent "hostile vessels" from ascending the river. The growing Parisian interest in opening the Mississippi to navigation culminated with the French regent's decision to transfer the colonial capital to New Orleans (*Brasseaux 1983:424-25*).

The Balize Post and the Early Development of the Delta

The first steps toward establishment of a French military base at the mouth of the Mississippi River were taken in January 1721, when engineer Adrien de Pauger visited the delta to determine the best means of improving navigation in the passes. In April 1721, with the assistance of four soldiers and three carpenters, he erected a 62 foot-high beacon—or *Balize*—on an island at the mouth of Southeast Pass that Fr. Charlevoix, a visiting missionary, dubbed Toulouse Island (*Farnsworth and Masson 1987:24*). This beacon was the second oldest navigational aid in United States history, antedated only by Boston lighthouse erected in 1716 (*Farnsworth and Masson 1987:24*). The community would eventually take its name from the beacon—Balize.

Construction of the beacon, which marks "the beginning of permanent settlement of the lower delta region," produced almost immediate consequences (*Goodwin et al. 1985:45*). In April 1721, the French frigate *Dromadaire*, with the assistance of the light and the assistance of engineers, crossed the bar and entered the Mississippi River—becoming the first large French vessel to navigate the passes. *Dromadaire* ascended the river to the proposed site of the new colonial capital. This feat

caused colonial leaders to re-direct all ocean-going French vessels to New Orleans in place of the colony's former commercial centers—Biloxi and Mobile (*Brasseaux 1983:425-26*).

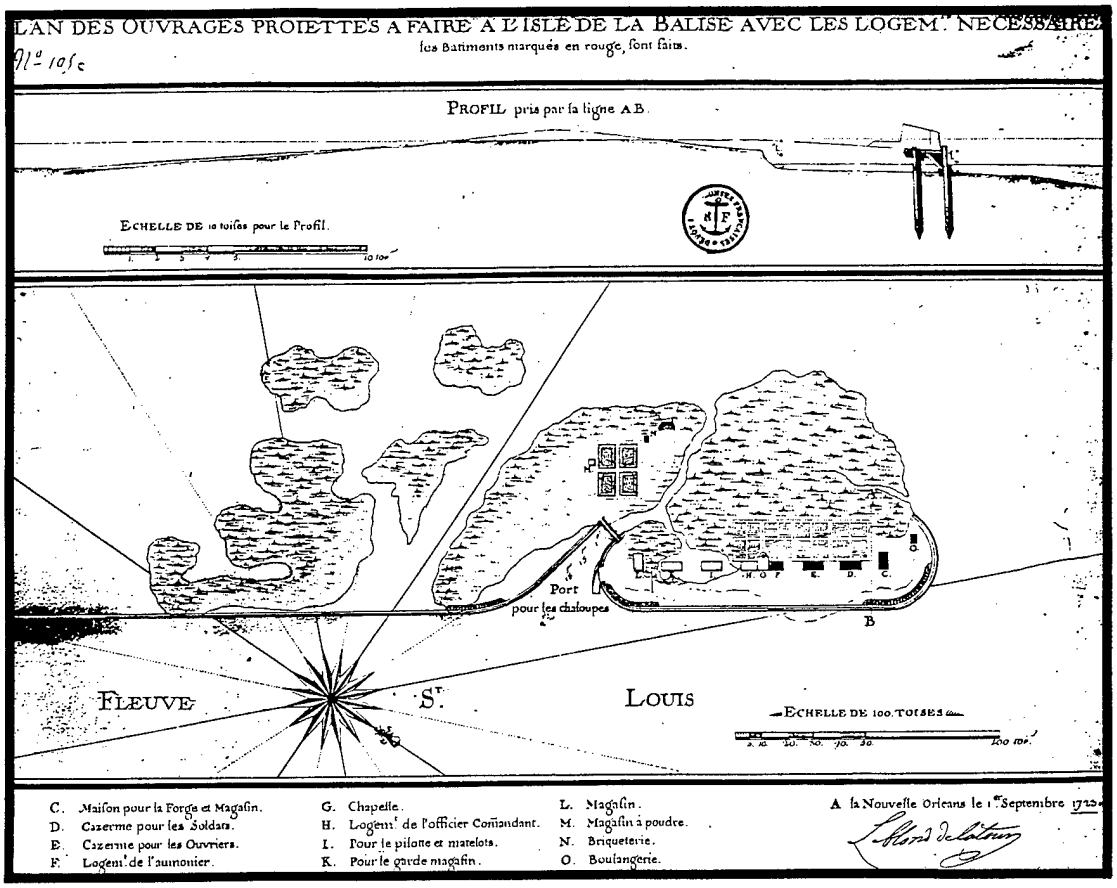


Figure 7. Map of Balize by Le Blond de la Tour, dated September 1, 1723.
(from Center for Louisiana Studies)

Successful navigation of the lower river was heavily dependent upon the facilities and services provided by the Balize post, because the main channel and the bars were constantly shifting. Though vessels frequently grounded while entering or exiting the river, none were lost in the years immediately following the Balize post's establishment as a result of the assistance provided by the bar pilots. With the resulting confidence of French ship captains involved in both commerce and colonial defense, the administrative decision to make the lower Mississippi Valley the focal point of colonial development became a reality, and the colony's older settlements rapidly lost importance (*Brasseaux 1983:425-26*).

The rising confidence of ships' captains was based largely upon the competence of the bar pilots who served the crown at the Balize post. These pilots were initially required to assist the engineers in freeing the channel of navigational hazards. Sieur Fiou, the second French pilot assigned to duty at Balize, was directed by Adrien Pauger on May 26, 1724, to utilize "ten grapnels

with as many buoys" to mark the principal channel and "to dislodge the trees and heavy roots which strand there, as well as to dredge it [the bar] to dig it out when there are dredges" (*Farnsworth and Masson 1987:25*). This is the first recorded use of buoys as navigational aids in United States history. The pilots consistently marked only Southeast Pass for navigational hazards because of the channel's proximity to the Balize post on Toulouse Island.

The significance of the pilots in marking the navigational channel in Southeast Pass increased with the growing volume of commerce delivered to the developing colony. As a consequence, the size of the royal investment in maintaining the post increased significantly in succeeding decades, as a complex of fortifications, warehouses, and barracks was constructed on the marshy island. Subsidence, however, took a terrible toll upon the structures. "In 1738, for example, the store (warehouse) had deteriorated to a state of having to be torn down and rebuilt; the store and bakery were roofed with shingles, and a brick guard house with a tile roof had to be constructed" (*Goodwin et al. 1985:45*). Most buildings at the Balize post were unserviceable by 1763, when Spain acquired Louisiana through the Treaty of Paris (*Farnsworth and Masson 1987:28-39*).

Writing near the end of the French period, Governor Louis Billouart de Kerlérec noted that the Balize post had become

> So deficient in substance and solidity, that it is not possible, without considerable expenses, to establish thereon a settlement or durable fortifications. The fortifications which the India Company [actually the Company of the Indies] had caused to be erected there, and which were extensive, are destroyed. There are remaining but few vestiges of them, which are daily sinking into the mud, and are always under water when the tide rises, notwithstanding the repairs made to them in 1741 and 1742. [*Goodwin et al. 1985:47*]

Spain's first Louisiana administration, which assumed control of Louisiana in the late 1760s, initially attempted to re-establish a viable military presence at the Mississippi's mouth through establishment of an outpost on an island near Balize called Isla Real Católica de San Carlos. Spanish Governor Antonio de Ulloa devoted nearly nine months of his short-lived administration to the establishment of this outpost (*Moore 1976:70-71*). Construction of the fort, designed by Ulloa, began shortly after March 12, 1767, and the installation was largely complete by the end of May 1767 (*Moore 1976:71*). This outpost, featuring a pyramidal, elevated beacon for incoming vessels, continued the French practice of providing navigational aids in the colony's principal outlet to the sea (*Moore 1976:71-73*).

While the pilot station was still functional in 1770, the San Carlos outpost was virtually abandoned after Ulloa's expulsion[1] from Louisiana in 1768, and Balize, though it received far less attention and money from the Spaniards, remained the major provider of navigational assistance to

[1]Ulloa left Louisiana as part of local merchants' calls for the Spanish to leave. A key factor igniting local emotions was a Spanish regulation that ordered the importation of none but Spanish wine.

incoming vessels. By 1802, the post consisted only of an "open work of 54 feet of height by 8 feet square. This tower is built on a house constructed in wood, serving as guard house and as quarters for the troops. It is constructed to serve as block house. In addition [there is] a house serving as lodging to the customs guard" (*Farnsworth and Masson 1987:35*).

During the French period (1722-1766), the Balize pilots were royal employees who worked closely with the colonial garrison. Oral tradition among river pilots of the modern era maintains that Native Americans were hired to assist these early pilots, but the documentary record does not support this contention (*Salomone 1967:41-42*).

Under Spanish rule (1766-1803), individuals were permitted to purchase the office of chief pilot. This provided the officeholder a monopoly on pilotage services and fees. Though they hired as many as 24 assistants, the performance of the pilots was unsatisfactory under this system because there was no system of accountability. Ronquillo and his employees refused to assist vessels in inclement weather, resulting in the unnecessary grounding of numerous vessels.

The situation grew considerably worse in 1800, when Americans by the names of Johnson and Bradish purchased Ronquillo's monopoly and then promptly replaced experienced pilots with anyone willing to work for "negligible wages" in an attempt to maximize their profits. Oral tradition among river pilots maintains that, during this period, "pilots would dive overboard and swim to shore whenever the notion struck them, even though the ship might be nearing the most treacherous point on the river" (*Salomone 1967:43-44*).

The abuses of the Spanish monopolistic system would not soon be corrected by Louisiana's American administrators in the wake of the Louisiana Purchase (1803). In 1804, the Legislative Council of the Territory of Orleans established a special committee to investigate the reported abuses by bar pilots. The following year, responding to the committee's report, the territorial legislature "abolished monopolism and set up the competitive pilotage system" (*Salomone 1967:44*). This legislation established the first regulations for the bar pilots and also created a system of gubernatorial appointments which, it was erroneously believed, would eradicate the abuses of the monopolistic system.

The lack of effective oversight led to the creation of competing teams of bar pilots and their employees, all seeking to maximize their income based exclusively upon pilotage fees determined by a vessel's draught. The result was chronic factional strife, sporadic violence, and generalized professional malfeasance, as Benjamin H. Latrobe noted in his visit to Balize in April 1819:

> [April 11, 1819] . . . we landed first at the Balize. A more wretched village—for it is a sort of a village—cannot be conceived. It consists of a Tavern, a wretched habitation for the revenue officer U.S. and three or four other wooden buildings, belonging to the Pilots besides the Blockhouse. The whole population consists of 90 Men and 11 Women, and an internal feud breaks up this little society into parties who are at war with each other. Lately all the Pilots, whose competition was greatly

> advantageous to the public, have united, and the consequence is, that working only for their own convenience, and having the monopoly among them of the business, the Ships are exceedingly neglected, and both in coming in and going out are most unjustifiably delayed: the Association keeping as few boats as possible and employing *journeymen* pilots, generally English sailors who have deserted their Vessels. These men are of course neither very skillful nor very sober. One of the Pilots keeps a Tavern and a billiard room, which, it is supposed, absorbs the principal part of the wages of their underlings. There is however some useful industry here also. Two coasting Vessel[s] were here for repair and several boats were building. [*Carter et al. 1980:287-88*]

As a consequence, many small vessels were obliged to navigate the bar without the benefit of pilots, who were actively pursuing work with larger vessels (*Salomone 1967:45-48*). Many of these vessels predictably grounded on the bar.

Legislation adopted by the state legislature in 1837 sought, once again, to curb river pilot abuses. The legislation required, for the first time in the American period, a minimum degree of competency on the part of river pilots. The pilots licensed under the new system adopted a uniform and organized themselves into a Pilots' Association. Between 1837 and 1967, this group reorganized twice—in 1878 and 1900.

With the legal reforms of the nineteenth century, the nature of the pilots' community among the passes changed rapidly from lawlessness to respectability. An investigative committee of the Louisiana legislature reported in 1846 that

> The change upon the morals of the Balize is scarcely credible. The pilots have become fathers of families, while before it was a rare thing to see a married woman there. Children have grown up around them, whose prattle awakes other emotions than those that night revels and bawdy sons once stirred within them. They have established a school and a reading room, police to suppress disorder. They have dragged earth for flower beds from the river. [*Goodwin et al. 1985:53*]

While the committee's findings are perhaps overstated, there is no question that the community had undergone a metamorphosis, in part because Balize had become "'a supply and labor center' for ships requiring emergency servicing" (*Goodwin et al. 1985:53*). The Balize community continued to boast many taverns, as the 1860 census attests, but it also contained a surprisingly large number of shopkeepers, artisans, and skilled laborers from throughout the world.

The Development of Plaquemines Parish

Because of environmental conditions, development of the delta area had been limited exclusively to individuals responsible for providing navigational assistance and, later in the nineteenth-century, disease control after the Louisiana Quarantine Act of 1855. The 1763 census

of the "Captaincy of English Turn" (the administrative and militia district for the area along the Mississippi River below New Orleans) lists a population of only 543—125 whites (23%), 38 free persons of color (7%), and 380 slaves (70%) (*Voorhies 1973:51-61*). The sparse population of this huge geographical area was concentrated in the English Turn area. Because of the difficulty of clearing the river banks, the inhabitants were far more actively involved in ranching than in agriculture. Only three ranches—populated only by a handful of workmen—existed in the Pointe à la Hache area, which then constituted the southernmost limit of civilian habitation (*Voorhies 1973:61*).

The general population had not spread much farther south by the end of the eighteenth century. One observer, writing in 1804, noted that

> From Balize to Fort Plaquemine [actually Fort St. Philip]—the first fort met on the river—is reckoned ten leagues. The lands lying on the right and left are very low, that being the reason why no habitations are seen. Ducks, water fowl, wild geese, and all other animals that inhabit the swamps, are the sole living things that the hunter finds there, and he makes good provision of them. [*Robertson 1911:51*]

Population schedules of the 1810 census reveal that the population of Plaquemines Parish had grown incrementally throughout the late eighteenth and early nineteenth centuries, despite the settlement of a colony of Isleños (Canary Islanders) in neighboring St. Bernard Parish in 1779. According to the third decennial census, there were only 1,310 inhabitants of Plaquemines Parish. The Balize settlement was too small to warrant a separate enumeration. Once again, the population was concentrated at the northern end of the parish (*Meyer 1981:49-51*).

By 1860, however, the population had begun to move into the lower, habitable extremities of the parish. The 3,111 persons listed in the free population schedules of the 1860 federal census were distributed as follows: Pointe à la Hache, 760 (24%); Grand Prairie, 240 (8%); Jesuits' Bend, 280 (9%); Ronquillo Settlement/Point Michel, 680 (22%); Buras Settlement, 680 (22%); and Balize, 471 (15%). The Buras Settlement and Balize communities, however, remained separated by a virtually impenetrable expanse of sea marsh. The populations in the two communities were also separated by an economic and cultural gulf resulting from the agrarian and maritime pursuits of the respective settlements.

Port Eads - Establishment and Development

Events Leading to the Development of South Pass

The need for a navigable channel at the mouth of the Mississippi River grew proportionally as New Orleans emerged as one of the world's great ports during the antebellum period (Figure 8). In the postbellum era, the Crescent City's desperate search for a solution would result in the development of South Pass as the primary navigational channel in the Mississippi delta.

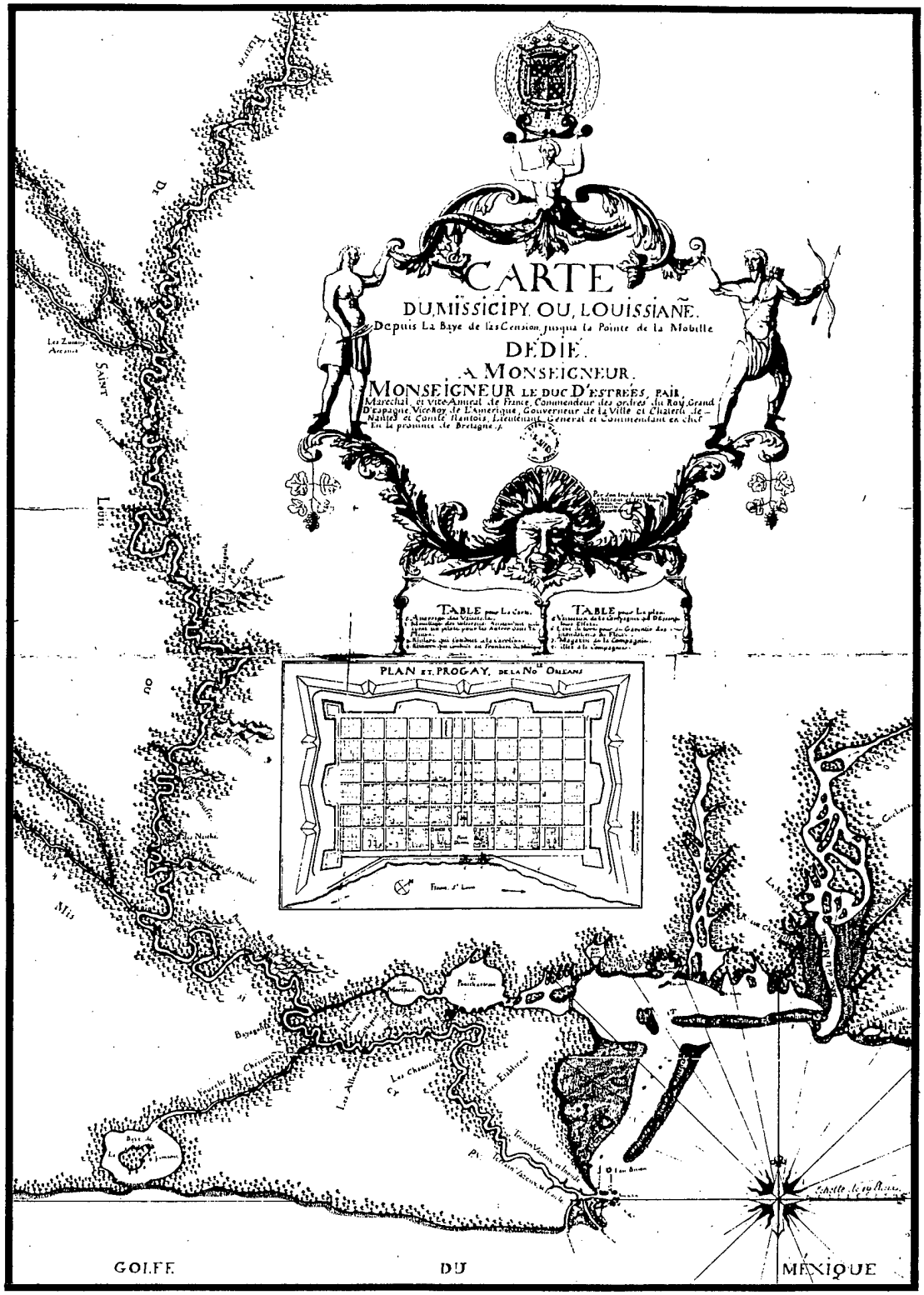


Figure 8. Map of the Mississippi or Louisiana, ca. 1762.
(from Center for Louisiana Studies)

New Orleans's emergence as a great commercial center was due in no small part to the rise of steam navigation in the early nineteenth century. Following the settlement of the Old Southwest, New Orleans's role as an entrepot, which had flowered in the late eighteenth century as ocean-borne commerce was established with the major cities of the Atlantic seaboard (*Kendall 1922:202*), had been accelerated by the appearance of steam-powered vessels in the early nineteenth century. Following Capt. Henry Miller Shreve's successful legal challenge against the Fulton-Livingston monopoly on steam-powered vessels in 1815, the number of steamboats plying the Mississippi River rapidly proliferated. By 1822, 83 steamboats were engaged in commerce on the lower Mississippi River. The increasing number of steamships and the increasing speed of vessels resulted in a rapidly expanding flow of goods from New Orleans, and, by the mid-1830s, the Crescent City had emerged as America's leading exporter (*Goodwin et al. 1985:52-53*).

Most of New Orleans's exports were carried through the Mississippi Delta to manufacturing centers in New England, Great Britain, and France. As the volume of commerce crossing the passes grew, so did the problem of navigation over the shallow Mississippi River bar, which had maintained a constant depth since early colonial times. The technology used to combat this navigational problem, unfortunately, remained as unchanging as the nature of the bar. In 1726, French engineers and pilots had utilized primitive harrows attached to ships' keels as a means of breaking up sand bars This scraping method increased the depth of the main channel only briefly, for the sand bars reformed quickly.

Navigation at the mouth of the river remained treacherous—particularly for large sailing vessels—throughout the late eighteenth and early nineteenth centuries. Capt. Phillip Pittman, a military engineer serving with a detachment of English troops assigned to Illinois in 1764, noted that, even at the end of the French period,

> The navigation of the Mississippi is confined to vessels not drawing above seventeen feet water, there being little more in the deepest channel on the bar, which is subject to shift very often; so that a pilot is constantly employed in sounding. On every part of the bar there is nine feet water, and small vessels go over it without fear: frigates of thirty-six guns have often gone through the channel, after taking their guns out. [*Pittman 1973:5-6*]

Though of obviously limited utility, harrowing remained the navigational remedy of choice for Mississippi bar pilots through the end of the colonial period as a temporary measure against sand bar formation (*Goodwin et al. 1985:46; Clay 1983:22*). American-era pilots continued the practice of harrowing until at least 1835 (*Goodwin et al. 1985:53*). Bar pilots also utilized winches aboard "auxiliary ships" to help dislodge ships that grounded on the bar (*Clay 1983:22*).

The navigational problems of the delta were magnified by the increasing maritime traffic in the passes in the early nineteenth century as New Orleans became the international center of the cotton trade. The increasing volume of usage was compounded by the rapidly increasing size of the ships traversing the delta.

> The problem of navigating the bars at the Mississippi's mouth grew more severe as the size of ships increased geometrically in the steamship era. It [the bar at the mouth of the river] had always been a problem.... But as the bar grew worse with the years, ships became larger and drew more and more water. And as New Orleans advanced to the position of one of the world's greatest ports, the approach to it grew more dangerous and difficult.... The fact remains that by 1830 the bar had become of such proportions that the newest, largest, and fastest ocean vessels, those which would naturally have carried the vast and valuable cargo of New Orleans, were actually unable to reach the city. New Orleans' ocean cargo was being carried in bottoms that were second and third class in capacity and speed.
>
> There were times when ships lay grounded on the bar for days and even weeks, sometimes preventing other vessels from entering or leaving, and it is impossible even to estimate how many millions of dollars were lost on that great pile of Mississippi mud. [*Sinclair 1942:173-174*]

At the beginning of the nineteenth century, the average size of ocean-going ships calling upon the Port of New Orleans was 150 tons, but by 1840, the average size was 236 tons. The size of the vessels grew even more rapidly in the twilight years of the antebellum period. The median displacement of ships calling on New Orleans was 376 tons in 1857 and 521 tons in 1860.

Captains of these ocean-going behemoths and New Orleans merchants alike became increasingly vocal in their concern about the lower Mississippi's ability to accommodate these ever-larger vessels. As John Smith Kendall (*1922:204*) observed, "Larger ships could not easily enter the Mississippi on account of the bars at the mouth of the river. As early as 1829 attention had been called to this fact." Improvement of navigation at the Mississippi's passes was essential, the captains and merchants argued, because of the skyrocketing value of New Orleans's exports: $43,500,000 in 1836 and $77,000,000 in 1846. Imports and exports together accounted for $324,000,000 in 1860 at New Orleans (*Sinclair 1942:175*).

As waterborne trade magnified the need for a navigable outlet to the sea, environmental factors were reducing the navigability of the Mississippi Delta passes. The passes were becoming progressively more shallow at the very time that the displacement and deep-water requirements of the typical merchant vessel were increasing at an unprecedented rate. In a "Report to the War Department, January 8, 1851," engineer Charles Ellet, Jr. pointed out that shipping no longer passed the Balize on Balize Bayou as that waterway was silting up. Pilots lived there, but their piloting was done mainly on Pass a'Loutre or Northeast Pass (Figure 9). Pass a'Loutre particularly was increasing its trade of smaller vessels. Ellet (*1853:332*) wrote that "This pass has accordingly taken the place of the ancient favorite entrance to the Mississippi, for all inward and outward bound vessels of less than 13 feet draft, when the wind favors that route, and steam can be obtained to help them through."

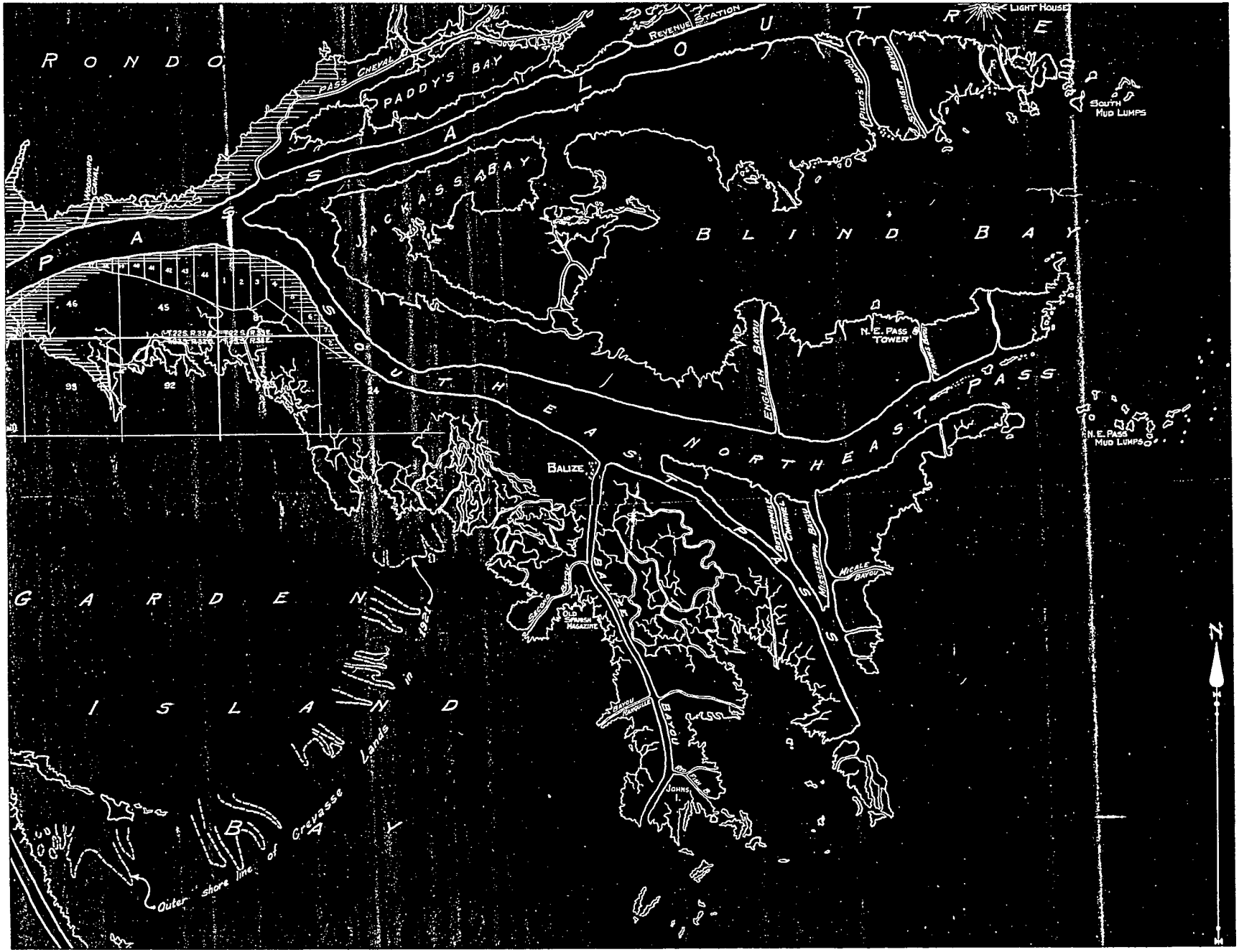


Figure 9. Map depicting the eastern passes of the Mississippi Delta.
(from *U.S. Coast and Geodetic Survey 1875*)

In 1837 Northeast Pass, which had been used as the main navigational channel for ocean-going vessels throughout the early nineteenth century, became impassable due to shoaling. Vessels then began to enter the Mississippi River by means of Southwest Pass, which typically maintained a navigable channel of 15 to 16 feet (Figure 10). Between 18 and 20 steam towboats operated on Southwest Pass pulling ships up and down this pass. The bar at Southwest Pass, Ellet (*1853*) estimated, had 15 feet of water, but ships drawing 18 feet could be pulled over it through the soft oozing mud. Sometimes ships struggled through the mud on their own with a pilot's guidance, but this "required several weeks for a ship to sail, or rather wallow through 4 or 5 feet of mud, where the rudder has no control of her course" (*Ellet 1853:333-34*).

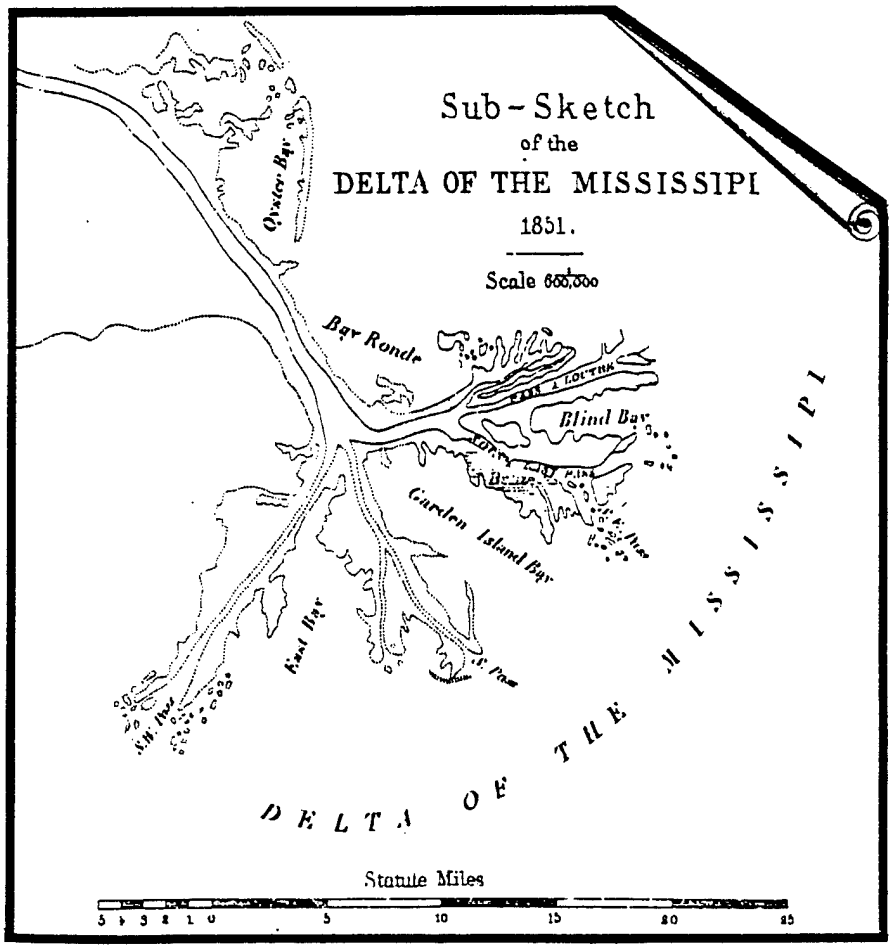


Figure 10. An 1851 sketch of the Mississippi Delta, showing the various passes.
(from *Thomassy 1860*)

By 1850, however, Southwest Pass was no longer deep enough to accommodate most freighters, which now often displaced more than 1,000 tons and drew more than sixteen feet of water. Many ships consequently attempted to use lighters to cross the bar at the mouth of Southwest Pass. But even after discharging their cargoes, many ships still could not clear the bar (*Kendall*

1922:204). Side wheel steamboats were used for towing work. In antebellum times, the ship was charged a set fee to be towed over the Southwest Pass bar. But by the 1870s, the towboat owners had united through the Towboat Association which set fees at $100 an hour. If a vessel went aground on a sandbar on the edge of the ship channel, then more than one tug might be required or some cargo might have to be removed to lighten the ship's load. All of this cost more money (*Ellet 1853:333; Kane 1944:134-35*). In the summer when the river was low, dozens of ships were caught in the Gulf or in the river waiting to pass over the shallow bars at Southwest Pass, Pass a'Loutre, or Northeast Pass. In a one-week period in 1852, at least 40 vessels ran around near the mouth of Southwest Pass (*Kendall 1922:204*). The result was rapidly escalating freight charges that proved devastating to New Orleans, which began a rapid decline as a commercial center.

The national and state governments were slow to respond to this economic strangulation of New Orleans, in part because there was no certain remedy to the worsening navigational problem. In 1835, Congress appropriated $250,000 for dredging the mouth of the Mississippi, but most of the appropriation was expended upon surveying and development of dredging equipment. A serviceable dredge boat was not put into use at the passes until 1838, and even then the boat was retired after only one year of service because of chronic mechanical problems (*Goodwin et al. 1985:53*).

Numerous, often implausible remedies to the growing navigational crisis were proposed in the 1840s, but no solution was forthcoming. In 1852, Congress appropriated $75,000 for improvements to the Mississippi's outlets to the sea and established a Board of Army Engineers to devise means of deepening the main channel at Southwest Pass. The board eventually formulated a set of proposals, each contingent upon the success of staggered attempts to provide an acceptable depth over the Southwest Pass bar. The board suggested dredging; then closure of the other passes and diversion of the entire discharge into Southwest Pass, where it would be channeled by jetties; and, finally, construction of a canal from a point near Fort St. Philip across Plaquemines Parish to the deep waters of the Gulf of Mexico.

Acting in compliance with the engineers' proposed agenda, the War Department dredged Southwest Pass to a depth of 18 feet in 1853, but, by 1856, "no trace of the former deepening of the channel was left" (*Gould 1889:315*). When it became obvious that dredging had failed, Congress appropriated $300,000 for the construction of jetties at Southwest Pass and Pass a'Loutre. A contract was subsequently let to the firm of Craig and Rightor for construction of the jetties and maintenance of a 20-foot channel at the passes for a period of 50 months. This federally subsidized project, however, proved no more successful than its predecessor. Construction of the jetties began in 1856, but "the river destroyed the flimsy walls almost as fast as they could build them, and sea worms ate the remaining piling" (*Lowrey 1964:241*). Worse still, the contractors abandoned the project before its completion and absconded with the remaining government funds before they could be held accountable for their substandard construction methods. The Mississippi nevertheless very briefly reached an acceptable depth of 18 feet at the passes.

This fortuitous natural trend quickly reversed itself, and by 1859, New Orleans was "blockaded" by the bars at the mouths of the Mississippi (*Lowrey 1964:241*). During an inspection

trip to the mouth of the Mississippi River in 1859, a group of leading New Orleans businessmen discovered "thirty-five ships waiting outside to get in; three vessels were grounded on the bar. Meanwhile, merchandise was rotting in warehouses and commerce was a trickle" (*Goodwin et al. 1985:58*).

The Civil War interrupted attempts to improve navigation in the Mississippi's passes as well as New Orleans's golden era of antebellum prosperity. The Union Navy's blockade of Louisiana following the Pelican State's secession from the Union in January 1861 had devastating consequences for the New Orleans business community. Huge amounts of agricultural produce sat idle in riverfront warehouses. Limited commerce resumed following the Union occupation of New Orleans in April 1862, but the Crescent City remained isolated by the war from its traditional markets in the central and upper Mississippi Valley.

The United States made no effort to resume work on the Mississippi's passes until 1866. Because of the Craig and Rightor episode of the late 1850s, the Army Corps of Engineers refused to entertain the thought of jetty construction at the passes. Lt. Colonel Miles D. McAlester, supervising engineer for projects at the river's mouth, designed and procured approval for the *Essayons,* a dredge boat of unusual design. The vessel was equipped with compressed air tanks to vary its draft and featured a "propeller at one end [that] would propel the vessel into the bar, where the twenty-three-foot revolving forward propeller would then cut into the mud and stir it up" (*Lowrey 1964:242*).

The *Essayons,* which took one year to complete, worked just twenty minutes during its initial tour of duty at Pass a'Loutre, which the Corps intended to develop into the main navigational channel. When it became evident from painful experience that the *Essayons* could not operate for more than a few days without requiring major repairs at New Orleans's shipyards, a second dredge boat, the *McAlester,* was pressed into service. Capt. Charles W. Howell, "an engineer of great pride, remarkable powers of imagination and rationalization, and no apparent ability," remained an uncompromising advocate of dredging the channels at the mouth of the river for years after it had become obvious to everyone else that "the bars shoaled up despite constant working of both dredges" (*Lowrey 1964:243*).

The continuous shoaling was disastrous for the New Orleans economy which was struggling to achieve some semblance of normalcy in the wake of the Civil War. The opening of the passes was absolutely essential. The city's continuing dependence upon water-borne commerce and Capt. Howell's quixotic battle against the bars cast a pall of gloom over the New Orleans commercial sector. Merchants faced constantly rising transportation costs, and insurance underwriters sustained staggering losses. This gloomy situation was exacerbated by the Panic of 1873. Indeed, "the Panic of 1873 probably hit New Orleans harder than any other city" (*Jackson 1969:209*).

The economic dislocation caused by the depression was compounded by developments unfolding in the spring of 1873. Despite serious shoaling at Southwest Pass, Capt. Howell docked the *Essayons* and used a second dredge boat, the *McAlester* only sporadically. Numerous ships

consequently grounded, including the *Dilharee,* which "entirely blocked the river" (*Lowrey 1964:245*). While the *McAlester* and several tugs struggled to free the *Dilharee,* 50 ships (15 out-bound and 35 in-bound) were forced to cast anchor. A sense of desperation swept through the crews of the vessels awaiting the reopening of Southwest Pass in response to rumors that the *Dilharee* might block the pass for at least one month. Fearing spoilage of their cargoes, numerous captains resolved to "creep around the grounded vessel, only to go aground themselves" (*Lowrey 1964:245*). Because the *McAlester* was employed as a full-time tugboat, clearance in the ship channel was reduced to 13 feet through siltation. The Port of New Orleans was, as a consequence, "almost hermetically sealed for months" (*Lowrey 1964:246*).

Southwest Pass remained closed until late summer, when the river released its hold on vessels still grounded on the bar and scoured the channel to a usable depth. These promising developments turned sour when a yellow-fever induced quarantine closed the Port of New Orleans to outside commerce.

These disasters, however, merely accelerated a downward spiral in economic activity which began in the 1850s as a result of navigational problems in the Mississippi Delta. The emergence of railroad networks linking New Orleans's traditional markets throughout the Midwest with East Coast seaports also hastened the Crescent City's economic decline. By 1880, "New Orleans' share of the total commerce in the United States was much lower than it had been before the Civil War" (*Jackson 1969:211*).

In the 1870s a debate arose over what would be the best course to solve the daunting navigational problem at the Mississippi's mouth. A movement for the building of a canal somewhere in the vicinity of Fort St. Philip gained many advocates in the U.S. Army Corps of Engineers, Congress, and the City of New Orleans (Figure 11). This canal would bypass the mouth of the river and its passes and allow ships direct access into the river from Breton Sound. It was estimated that it would cost in the neighborhood of $10,273,000 to construct (*Samuel et al. 1955:56; Lowrey 1964:246-47; Dabney 1944:272*).

Such a canal had first been suggested by Louisiana State Engineer Benjamin Buisson in 1832, but the plan had been rejected because feasibility reports had indicated that locks necessary to connect the river and the canal could not be stabilized because of the "soft delta soil"—a problem that would inevitably confront the United States Engineers in the 1970s. Approval of the canal plan was temporarily blocked by General John Gross Barnard, a member of the Board of Army Engineers and a veteran of the losing battle against siltation at the Mississippi's mouth (*Lowrey 1964:247*). The canal plan nevertheless enjoyed enthusiastic support of New Orleans's business leaders and the city's newspapers who wanted a dependable Mississippi outlet at any price (*Lowrey 1964:246-247*).

MUD LUMP BLOCKADE
AT MOUTHS OF THE PASSES.

Forty-seven vessels blockaded at Southwest Pass, and one hoisted upon a Mud Lump in the channel that has suddenly reared its head right across the channel.

Major Howell, directing the great Dredges at Pass a l'Outre, replies to the prayer for relief that he cannot respond, because his own Pass is blocked by a vessel on a new Mud Lump in the channel, but in two days he feels confident that he can get her off with his dredges. He is under orders to work away on that pass, in order to keep it open, and the Southwest Pass will have to take care of itself.

For Pity and Economy's sake, if not in the interests of the commerce of the Mississippi Valley, give us the

FORT ST. PHILIP CANAL,

That all Engineers agree and know will be a PERMANENT CHANNEL for deep navigation out of reach of the

INEVITABLE MUD LUMPS

That weekly, daily, and hourly menace the Channels at the mouths of the River.

The LIFTING POWER

Of the Mud Lumps is irresistible, and must destroy any JETTIES or other works of man under which they are liable to rise.

Forty-seven Mud Lumps flanked the Bar of the Southwest Pass on the last Coast Survey.

P. O. HEBERT,
C. G. FORSHEY,
Civil Engineers of Louisiana.

EBBITT HOUSE,
WASHINGTON, D. C., *April* 5, 1874.

Figure 11. An 1874 argument for the Fort St. Philip Canal.
(from *Thomassy 1860*)

New Orleans's demands for improved navigability on the Mississippi River was by no means unique. By the 1870s Southerners were desperate for internal improvements of any kind (*McBride 1995*), and states throughout the Mississippi Valley were clamoring for a more dependable outlet for the Mississippi River. In 1873, these states sponsored a transportation convention at St. Louis which was attended by over 100 Congressmen. On the second day of the convention, Capt. James B. Eads, a resourceful, self-made St. Louis engineer, presented an address as a representative of the St. Louis Merchants' Exchange. In his presentation, Eads advocated construction of jetties at the Mississippi's mouth as a means of creating a dependable outlet to the sea. This proposal precipitated a bitter debate between the proponents of canals and jetties.

In an effort to quell the controversy, the Board of Army Engineers issued a public statement advocating construction of a canal and condemning the jetties proposal. The canal plan was put forth by Chief of Engineers, General Andrew A. Humphreys, and supported by the majority of the engineers in the Corps, but U.S. Army engineer General John G. Barnard issued a dissenting report that was publicly supported by James Eads (*Lowrey 1956:373, 1964, 5:251*). General Barnard favored the building of jetties on one of the Mississippi River passes as a solution (*Lowrey 1964, 5:246-51*).

It was against this backdrop that James Buchanan Eads made one of the boldest proposals in the annals of American engineering. In January 1874, Eads proposed to Congress that jetties be placed at the end of Southwest Pass which would give a permanent channel depth of 28 feet. He requested that he be paid $10,000,000. Of this sum, $1,000,000 would be paid when his operations had produced 20 feet in the depth of the pass's channel and the rest of his money progressively as he completed the job (*Samuel et al. 1955:56; Dabney 1944:272; Kane 1944:137*).

Eads had to fight bitter opposition from officials in the U.S. Army Corps of Engineers led by General Humphries, from Congress, and from numerous newspaper editors in New Orleans and other towns along the Mississippi. Their main argument was that jetties were impractical, would not work, and could even prove dangerous by creating a larger bar out in the gulf. They backed the canal project instead (*Dabney 1944:273-74; Lowrey 1964:251-54*).

Eads's proposal was initially accorded a chilly reception by Congress, but debate over the engineer's offer raised widespread concerns about Howell's "scandalous" behavior at the Mississippi River passes. These concerns prompted Congress to create an independent board to weigh the merits of the competing outlet improvement plans. In January 1875, the board released its report in favor of Eads's jetties proposal with some changes. First, the jetties were to be built on the smaller pass—South Pass—not Southwest Pass. Second, he was to be paid $5,250,000 for this scaled-down project (*Dabney 1944:274*). On March 3, 1875, Congress adopted legislation (amended by the acts of June 19, 1878 and March 3, 1879) authorizing Eads to construct jetties and maintain a 26-foot-deep and 200-foot-wide channel through South Pass with a maximum central depth of 30 feet.

Eads accepted the offer, but was bitterly disappointed that Congress would not name Southwest Pass, the larger pass, as the one to receive jetties (Figure 12). He even indicated he would take less than his first plan called for if Southwest Pass would be designated. But the Congressional offer stood firm. It was to be South Pass that would get the jetties (*Kane 1944:135-37; Dabney 1944:274*). In undertaking the South Pass jetties project, Eads accepted the challenge of establishing, in the most notoriously shallow and narrow Mississippi outlet, a navigational channel of unprecedented depth and width; in accomplishing this feat, Eads established himself as one of the great civil engineers of the late nineteenth century.

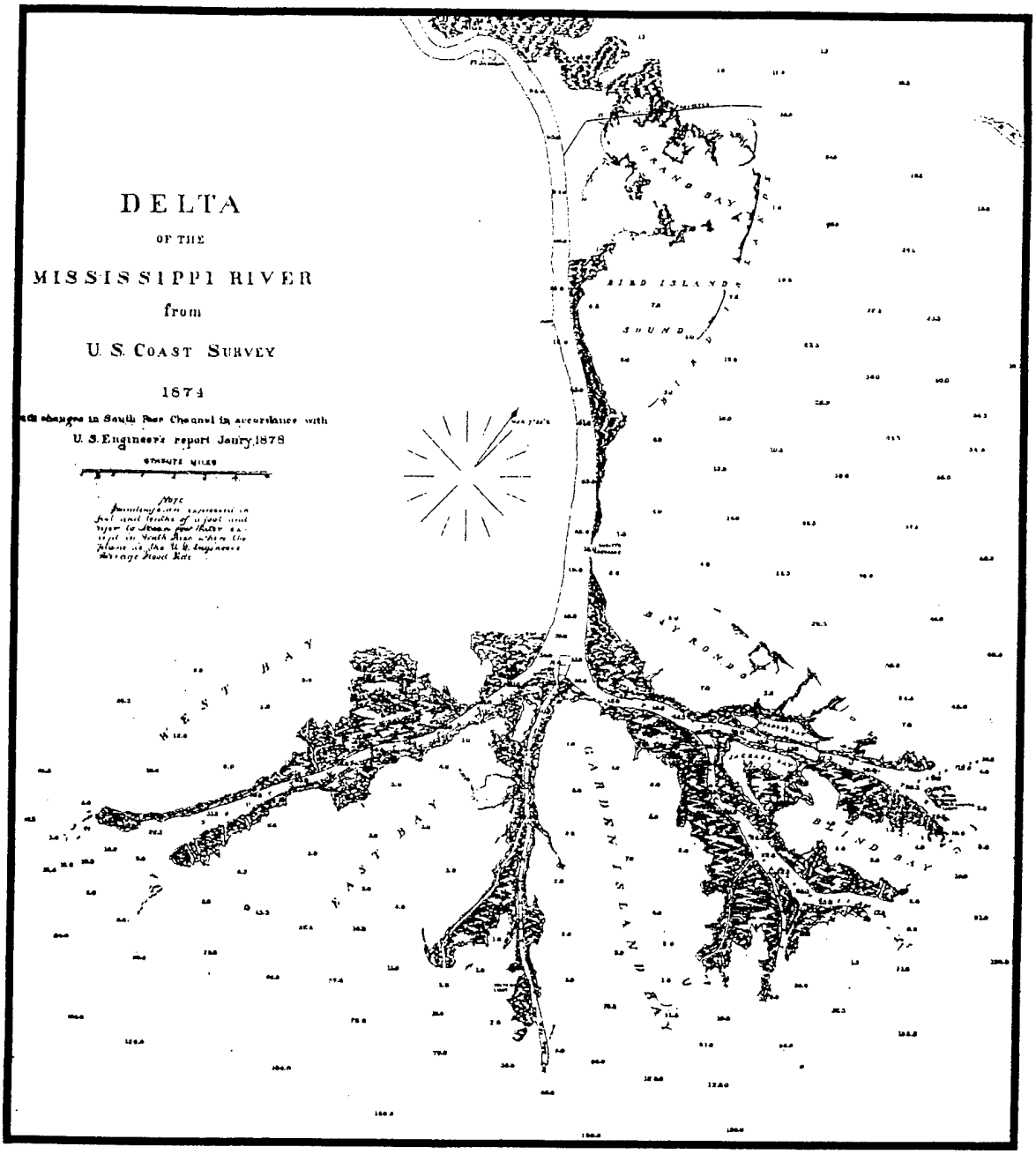


Figure 12. 1874 Map of the Mississippi River Delta.
(from *Corthell 1881: Plate 4*)

James Buchanan Eads, the son of Thomas and Ann Eads, was born May 23, 1820 in Lawrenceburg, Indiana. Eads, who had little formal education, tutored himself by reading through the library of his first employer during his spare time. In 1838, Eads became a purser aboard a steamboat. For three years, he sailed between St. Louis and New Orleans. During this time he invented and patented a diving bell. At the age of 22, he invented what he termed a "submarine"—actually a surface vessel from which he could use his diving bell to recover iron pigs,

lead, and other valuable freight lost in riverboat disasters. Eads salvaged freight for 12 years throughout the Mississippi Valley. From 1857 to 1861, he enjoyed a period of semi-retirement, living with his family on the fruits of his labors in the salvage business (*Lowrey 1956:377; Malone 1930:587-589*).

At the beginning of the Civil War, President Lincoln consulted with Eads about the best way to utilize the western rivers for military purposes. Eads proposed construction of a fleet of shallow-draught, steam-propelled ironclads. The self-taught engineer subsequently designed and built a flotilla of heavy mortar boats and "tinclads" for the United States Navy (*Malone 1930:587-589*).

In 1865, James Eads secured a contract to build a steel triple-arched bridge across the Mississippi River at St. Louis. Work on the bridge began on August 20, 1867, and the structure was officially dedicated on July 4, 1874. "Eads Bridge" was considered one of the great engineering achievements of its age (*Malone 1930:587-589*). It would be eclipsed, however, by his achievement at South Pass in the late 1870s.

South Pass Before Eads

South Pass had been long neglected by maritime interests and governmental projects to improve the navigability of the Mississippi River's outlets because it had consistently been the narrowest and shallowest channel throughout historic times. In the first years of the eighteenth century, however, South Pass was used along with Pass a'Loutre and Southeast Pass. South Pass has a special name on some eighteenth century maps—Pass a'Serigny. Joseph LeMoyne, Sieur de Serigny, was a brother of Iberville and Bienville who visited Louisiana several times and served briefly as a co-commandant of the Louisiana colony with Bienville between 1719 and 1720. He was given the charge by the French government of surveying the coastline between Mobile and the mouth of the Mississippi, but most of his time was taken up in naval warfare against the Spanish in the area of Pensacola. However, after he returned to France in 1720, he had a map of the passes drawn in 1723 on which South Pass or Pass a'Serigny is indicated as 20 feet deep (*Charlevoix 1962:43-64; Brasseaux 1988:733*).

The entrance over the bar, however, was much shallower than the depth along the pass. When Adrien de Pauger, an engineer in the employ of the Company of the West, was sent down to the mouth of the river in the 1720s to help in building a pilot's station, he described the entrance to South Pass in these words: "at the outlet of this pass there is a bar upon which there is but 9 to 10 feet of water, and which is about 100 toises wide" (*Ellet 1853:328*).

In 1721, French colonial leaders redirected all ocean-going vessels to New Orleans in place of the ports in Mobile and Biloxi (*Brasseaux 1983:425-426*). South Pass was used along with Pass a'Loutre and Southeast Pass for access to New Orleans. In the decade after Pauger's visit to the lower river South Pass began to shoal up at its junction with the Mississippi River. While participating in an attempt to sound the passes on January 24, 1722, Father Pierre François-Xavier

de Charlevoix noted that South Pass had only two feet of clearance over the bar (*Charlevoix 1977:176*). South Pass was eventually abandoned as a regular route for vessels coming up and down river in favor of Southeast Pass, a tributary of Pass a'Loutre which was served by the outpost at Balize.

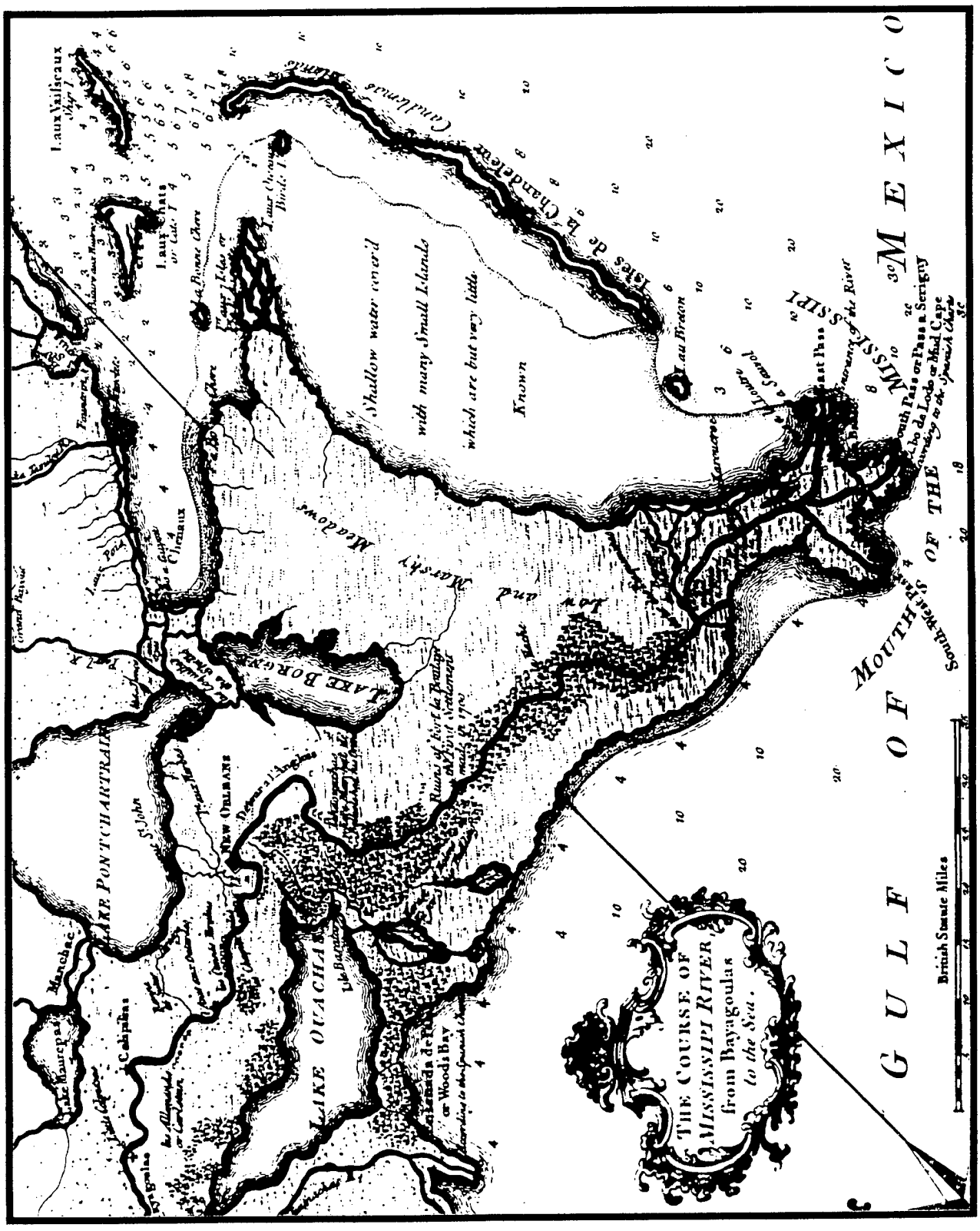
Southeast Pass was to serve as the main entrance for ships into the Mississippi through the early nineteenth century (*Charlevoix 1962:70; Wilson 1968:27-30*). By the mid-eighteenth century, two English maps, *The Course of the Mississipi River from Bayagoulas to the Sea* (*1759*) and Gault's map from the British Admiralty survey carried on between 1764 and 1771, record the water depth off of South Pass as eight to nine feet. (For information on Gault's map, see *Ellet 1853:328.*) As late as 1861 there were only six feet of clearance over the South Pass bar, and, as a consequence, the region was not directly involved in the naval warfare of the Civil War (*Wells 1978:301*).

Another handicap to navigating South Pass was the Cabo de Lode. South Pass had mud lumps offshore which were referred to as Cabo de Lode or Mud Cape in a 1732 French map, *Carte de la Louisiane par Le S. D'Anville*, and again in the 1759 English map, *The Course of the Mississipi River from Bayagoulas to the Sea* (Figure 13). Both map makers indicated they had gotten this title from the Spanish. The mud lumps were obviously well known to mariners in the Gulf and are depicted as most numerous at the mouth of South Pass.

These odd protuberances are unique—not found anywhere else in the world (Figure 14 and 15). Modern scientists feel they are created by soft mud being pressed upward by the weight of the sediment which the river deposits in the Gulf. They are erratic and can appear suddenly, last for a brief or long time, and then disappear into the deep again (*Kane 1944:132-33; Hesse-Wartegg 1990:231*). Those that lasted any length of time became covered with marsh grass and, as late as the 1870s, were inhabited by wild rabbits who could swim from mud lump to mud lump (*Keeler and Waud 1871:524*).

Throughout the French and Spanish periods in Louisiana, South Pass remained dormant as a gateway to maritime travel. But on Balize Bayou, there was a tower with a light burning as a beacon to ships as early as 1767. This was repaired under American rule in 1818 at the same time that a lighthouse was constructed on Frank's Island in Blind Bay near Northeast Pass which enters into Southeast Pass (*U.S. Coast Guard 1976:32*). Northeast Pass in French colonial times had been known as Pass a'Sauvole after Iberville's lieutenant who had been left in charge of the colony the first time Iberville returned to France in 1699.

South Pass finally got a lighthouse in 1831; according to Coast Guard records, this lantern was built on Gordon's Island at the opening of the pass. A 65-foot brick tower supported a lantern that contained 14 lamps with 14-inch reflective plates. Since South Pass is lower than the eastern passes, the lantern could be seen for 20 miles and was the first light seen by vessels drawing near the Mississippi from the south and east (*Cipra 1976:33*). This first South Pass landmark appears in historical cartography on an 1839 chart of the Mississippi Passes by Thomas Lee (*Weinstein 1984:18*). The massive structure was destroyed by a tempest in December 1840.


THE COURSE OF
MISSISSIPI RIVER
from Bayagoulas
to the Sea.
GULF OF MEXICO
MOUTHS OF THE MISSISSIPI
LAKE PONTCHARTRAIN
LAKE BORGNE
LAKE OUACHA
Shallow water cover'd
with many small Islands
which are but very little
Known
Marsh
Meadows
Lake
and
Lake
Isles de la Chandeleur
Caul Lands
Isle aux Vaisseaux
Isle aux Chats
Isle Dauphine
Isle Massacre
Isle Ronde
Isle aux Pins
Isle aux Prunes
Isle Cocodrie
Isle Pelican
Isle Maurepas
Isle Chapitas
Isle Bacchus
Isle Alemands
Isle Corne Bonde
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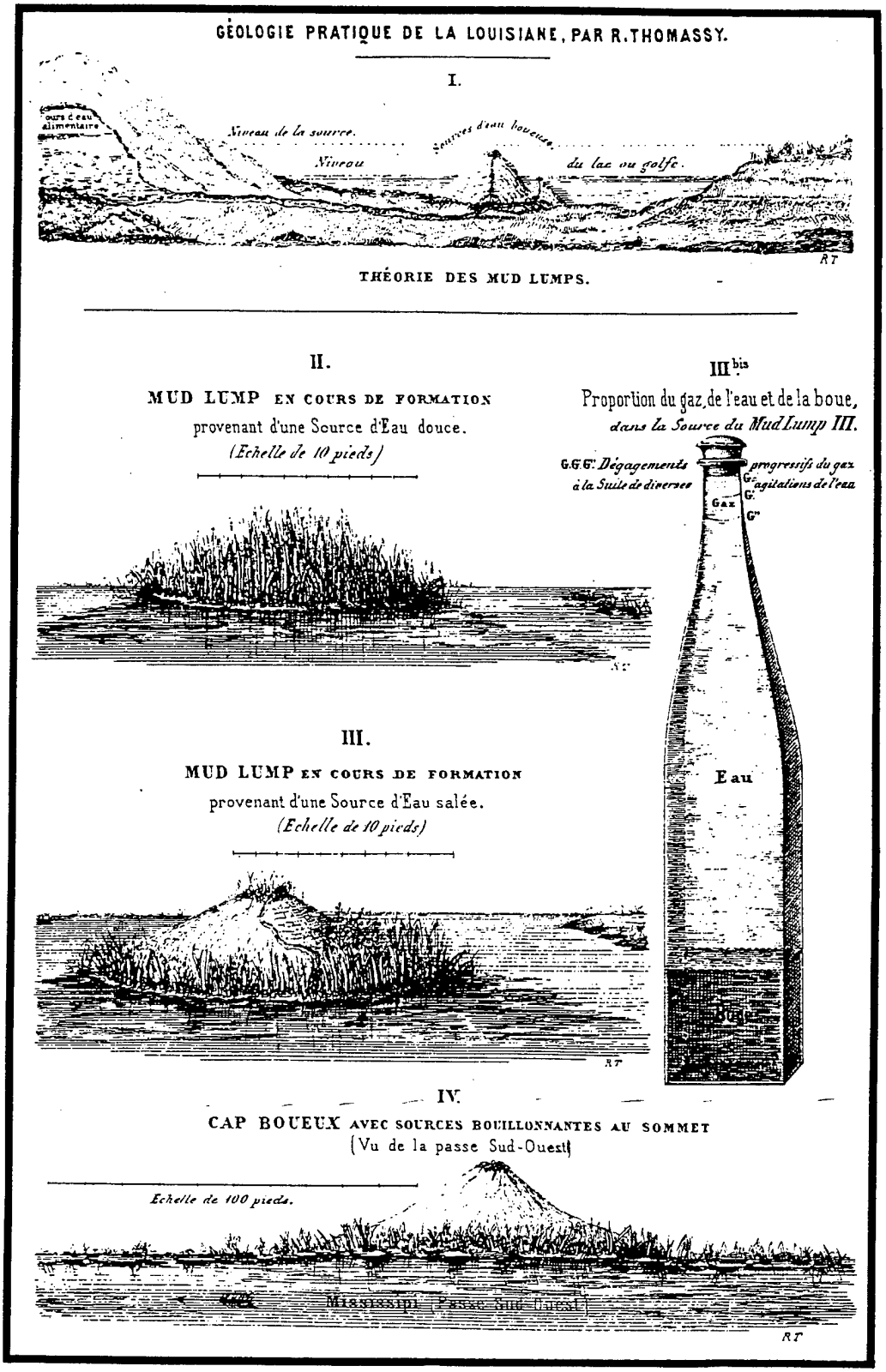


Figure 14. Geology of mud lump formation.
(from *Thomassy 1860*)

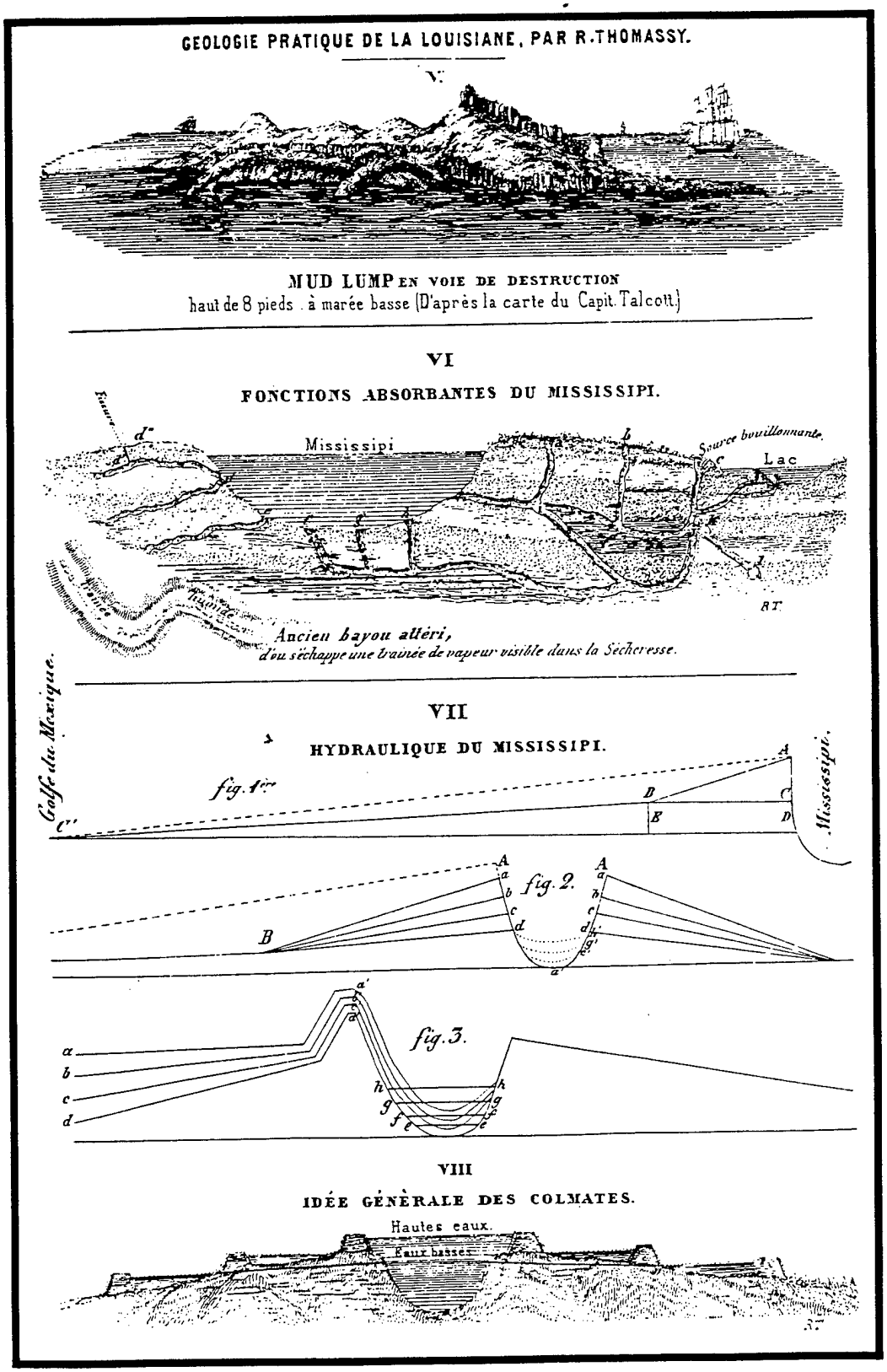


Figure 15. Geology of mud lump formation and associated hydrology.
(from *Thomassy 1860*)

A new lighthouse was not built until 1848 inland on the west bank of South Pass (Figure 16). This lighthouse possessed a 60-foot, slate-covered "wooden tower on the keeper's dwelling, with a visibility of only 13 miles. The light revolved and was visible every 90 seconds, although it was changed to 75-second revolutions by 1858" (*Cipra 1976:33-34*). The light was dismantled by Confederate forces early in the Civil War. Arriving at Head of Passes in early June 1861, Raphael Semmes, who was then in charge of the Confederate Light House Bureau, was horrified to find lights burning because the functioning lighthouses aided the Union blockaders off the Louisiana coast. The day after his arrival, he dispatched workmen to dismantle the South Pass light. The oil taken from the lighthouse warehouse was transferred to Semmes's ship, while the flashing lenses and clock machinery were removed for storage (*Wells 1978:302*).



Figure 16. Sketch of the 1848 lighthouse.
(from *Harper's Weekly 1878*)

The lighthouse was evidently not reactivated until the end of the Civil War, for the *Official Atlas of the Civil War* (Plate CLVI) shows only three lighthouses—Southwest Pass, Northeast Pass, and Head of Passes—in operation during the conflict (*Wells 1978:300*). In 1868, the Lighthouse Board recommended that the strength of the light on South Pass be raised from a Third Order lens to a First Order lens. This was impossible since the lighthouse had rotted so extensively that the size of the light had to be reduced rather than increased.

It was not until 13 years later, in 1881, that a new lighthouse with an iron tower to support a First Order lens was constructed on South Pass on the west bank. The iron tower was originally planned for Trinity Shoals, but it was stored on Southwest Pass for 10 years before the Lighthouse

Board decided to place it on South Pass (*U. S. Coast Guard 1976:33-34*). The events which occurred on the pass during the 1870s certainly influenced this decision. South Pass came out of the obscurity it had known since colonial times, with only a few fishermen's huts and the old battered lighthouse, to become the premier pass of the Mississippi in 1879 when Eads's jetties project had been completed (*Cipra 1976:34*).

The Construction of Eads Jetties

James B. Eads reached South Pass in May 1875 and confronted a stark landscape. E. L. Corthell, chief assistant and resident engineer representing the Corps of Engineers, provides the best available description of South Pass before the onset of jetty construction:

> With the exception of the lighthouse, there was, in June, 1875, no elevation within one hundred miles, nor any building, except a few fishermen's huts, within ten miles of the mouth of South Pass. A view from the top of the South Pass Lighthouse takes in the whole country; a low, flat marsh of mud, reeds, and grasses, which, in long narrow strips, is thrust out into the gulf. Except a solitary mud-lump, about two miles away, near an outlying reef, there is not a spot as far as the eye can reach that is not overflowed by the river or the tides. [*Corthell 1881:69*]

In June, 1875 work began on the South Pass jetties. Suddenly, the little backwater pass stirred with activity. To the isolated world of the decrepit lighthouse, a few fishermen's huts, and small fishing boats were added tugs, barges, pile drivers, and large yawl boats filled with men who would work on the pass for the next four years.

The little flotilla tied up on the east bank at the end of the pass. The men began building their living and working quarters on this east bank of South Pass, "where only a few yards of land divided the river from the Gulf inlet" (*Dorsey 1947:182*). The pile drivers had to put down piles to support such structures as a wharf, a warehouse, and a large square building which would serve as the headquarters and living quarters for the administrators (*Kane 1944:139; Dorsey 1947:182-83*). Other smaller buildings and cottages were added as need arose. Wooden walkways were built to connect the buildings. On the west bank, clustered around the lighthouse, were placed workers' boarding houses and house boats pulled up on land (Figure 17).

Eads's right hand man, James Andrews, gave the little emerging community the name of Eadsport which ultimately became known as Port Eads (*Dorsey 1947:182*). Some workers had come with Eads all the way from St. Louis. Others were recruited from such river towns as Memphis or New Orleans. But lower coast residents were also attracted to the formerly desolate pass. Residents from the other passes and from communities along the river such as Buras, Ostrica, and Cubit's Gap moved down to South Pass, gaining employment with the jetty company. During the peak of the jetties' construction, about 300 men were employed and lived on South Pass. When the work was completed and itinerant workers returned upriver, the lower coast natives stayed. They

became maintenance workers along the pass for Eads and, later, the Corps of Engineers, employees of the bar pilots, or oyster fishermen and trappers (*Jackson 1993:17-19*).

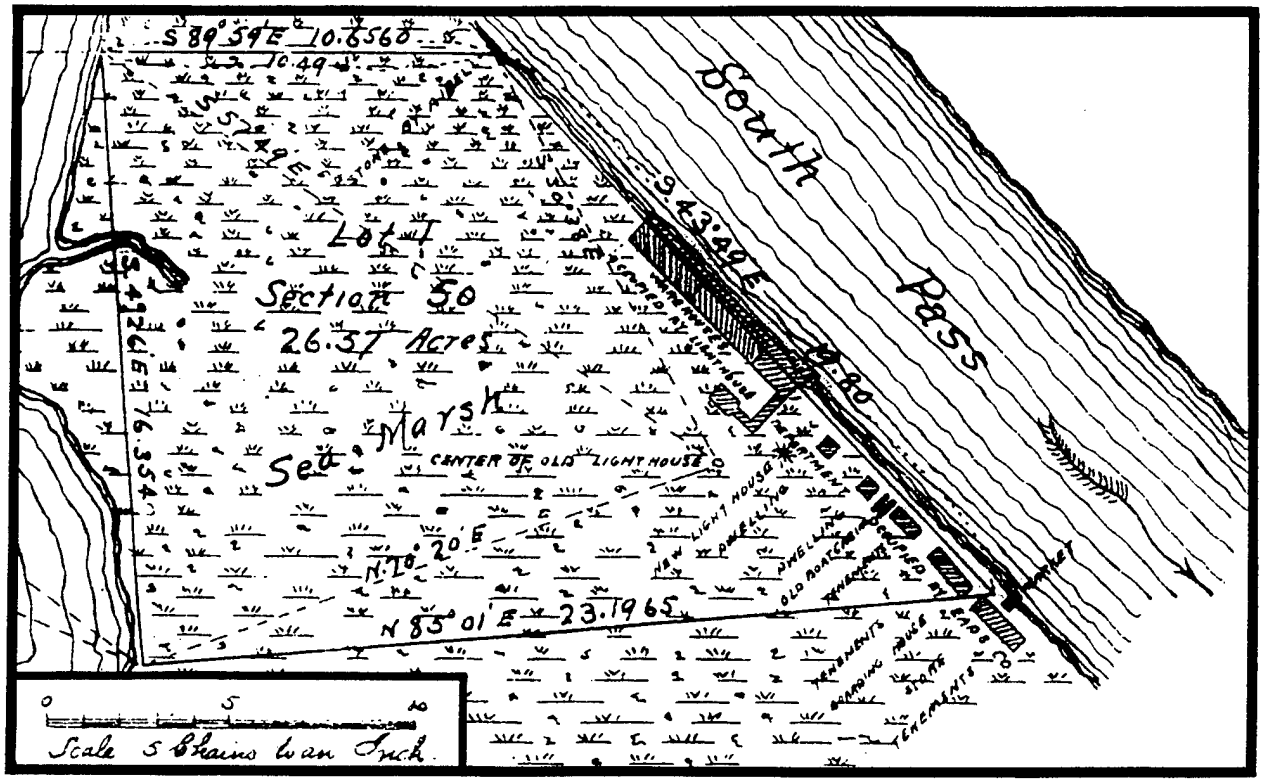


Figure 17. Map depicting buildings along the west bank of South Pass.
(from *Office of Surveyor General October 24, 1889*)

Within a week of arriving, the pile drivers began driving two lines of piles to extend the east and west banks of the pass and serve as the outline for the jetties. The east jetty was extended for two and a third miles. The west jetty was somewhat shorter since the natural west bank itself was longer than its eastern counterpart (*Dorsey 1947:183; Corthell 1881:75*).

To build up a jetty wall on each side, Eads had decided to use willow "mattresses" which would be piled on top of each other and held down with stones called "riprap" (*Corthell 1881:76*). Typically 100 feet long, 35 feet wide, and two feet thick, the mattresses were floated alongside the piles then weighted down with stones until they sank. Riprap was added to hold the mattresses in place while sand and mud gradually filled the crevices between the willow reeds and logs used in their construction. Eventually the artificially constructed framework, with its filling of natural river sediments, would coalesce into a semi-permanent dike *(Weinstein 1984:25; Corthell 1881:75-80; Yager 1968:96-98*).

Sometimes, the mattress construction went too rapidly for the cutting of the willows or the dropping of the riprap on the finished mattresses. Disaster could follow. Heavy rains delayed

willow cutting at one point. Then, with one hundred mattresses floating in place at the east jetty waiting for riprap to be added, a September 1875 storm destroyed them before they could be safely sunk. Another storm in December of that same year did further damage (*Dorsey 1947:184-85*). But the Eads project never faltered.

The east jetty framework was completed by September 9, 1875. By the end of February 1876 with only eight months of work finished, the South Pass channel, which had once been eight feet deep, had reached 13 feet. The partially-built jetties were working already to force the river to scour out a deeper channel (*Dorsey 1947:185*). The west jetty was completed in April 1876 (*Corthell 1881:84*).

While Eads and his crew were struggling to set the jetties in place on South Pass, his enemies were releasing stories to the press that his work was a failure. The worst rumor was that a great shoal was being formed out in the Gulf which would bar any ship from ever entering South Pass. Captain Eads got the skipper of the *Mattie Atwood*, which was carrying cotton out of New Orleans to Russia, to use South Pass. But when the ship arrived in the pass, the tide was out and the *Mattie Atwood* was drawing thirteen and a half feet, a deeper draft than the shallow bar could sustain. The ship grounded and had to sit for a day until the tide came in before it could leave South Pass (*Dorsey 1947:185-86*). This delay was quickly broadcast in the press and panicked investors in Eads's South Pass Jetty Company.

To turn aside bad publicity, and learn the truth for themselves, company stockholders in St. Louis chartered the steamer *Grand Republic* to travel downriver in April 1876 to see for themselves. When they arrived on South Pass, Eads and his assistant Elmer Corthell were waiting to board the *Grand Republic* and take the visitors across the bar into the Gulf. After an uneventful journey across the bar, the *Grand Republic* returned to Port Eads with an enthusiastic party of visitors. But while Eads was accepting congratulations from them on the deepening of the ship channel at South Pass's bar, a U.S. Army Corps of Engineers officer, Captain Collins hurried up to the visitors and showed them a hastily drawn chart he had just made from soundings taken shortly before the *Grand Republic* made its trip into the Gulf. He claimed that there was a large shoal building up past the bar and that the bar itself was not as deep as Eads claimed. Once again doubt and suspicion clouded Eads's efforts to justify his project (*Samuel et al. 1955:57; Dorsey 1947:1887-88; Corthell 1881:96-100*).

In May of 1876, a large ship, the *Hudson*, successfully came up South Pass without seeking help from the towboat monopoly. Corthell recalled this test of the South Pass jetties in these words:

> The pilot straightened up the steamship for the channel over the bar, the Captain rang the bell for full speed, and on she came like a thing of life, as if intent upon proving that we had a navigable channel of sufficient depth. As long as she carried that "white bone in her teeth"—the great wave that her proud bows pushed ahead of her as she sped onward—we knew that she had found more than Mayor Howell's twelve feet, and she carried it continuously throughout the entire two and one-quarter miles

> of jetty channel, until she checked her course in the deep water at Port Eads. [*Corthell 1881:108-109*]

When the *Hudson* reached New Orleans, shipping interests were agog with this information. This would encourage other ships to try South Pass.

Another plus for Eads and his jetties was a royal visit to South Pass by the Emperor of Brazil, Dom Pedro II. He was deeply interested in Eads's accomplishments with the jetties and asked him to come to Brazil to do the same thing on Brazilian rivers. Eads refused the offer, but suggested W. Milnor Roberts as a substitute (*Dorsey 1947:190-91*).

Meanwhile, despite the progress being made on the jetties, Eads still had a difficult time with many officials in the U.S. Army Corps of Engineers, the press, and the Federal government when he tried to get copies of an official government survey done of his work. He finally got the House of Representatives to pass a resolution directing the Secretary of the Treasury to give him a copy of the chart. When he made its findings public, the chart justified his claim of a true deepening of the ship channel leading from South Pass into the Gulf and contained no evidence of any shoal building up in the Gulf (*Dorsey 1947:192-95*).

But merely building the jetties did not answer the problem of a steady forceful flow of water into South Pass. There was an outlet from South Pass, Grand Bayou which flowed into West Bay, which had to be closed off. It had diverted one-fourth of the water coming down the pass. Also, Eads narrowed the entrance into Pass a'Loutre by 600 feet and built a dam to close off one side of the passage into South Pass around the shoal at its upper entrance (*Dorsey 1947:196-97; Corthell 1881:110-122; Dabney 1944:275-76*). This was a most difficult task. For awhile, as this work progressed, much water from South Pass had to be deflected into other passes and ships warned not to enter it. Eads's assistant Corthell described the dam at South Pass's head in these words "The river and its entire volume, and its great width of a mile and three quarters, thirty feet deep, with a strong current, was bridled by cheap, rough mattresses laid as sills upon the beds of the great Passes, guiding and holding the volume of water into South Pass as required, deepening the bar at its head..." (*Dorsey 1947:197*).

By October 1876, the engineering on South Pass had produced 20 feet of depth over the bar. This was a milestone for the project and according to Eads's contract with the government should have earned him a partial payment for his work. But he had to fight for several months before he was paid $500,000 in bonds (*Dorsey 1947:198-200*). His debts were considerable by this time and swallowed up the payment. Eads's actual contract with the government called only for a 28 foot passage over the bar of South Pass and included nothing about clearing the obstruction of the shoal at the head of the pass. That hindrance had to be addressed and overcome, however, if sufficient water was to flow down the pass to scour the channel at the bar of the pass. The job of overcoming the shoal at South Pass's head had been tortuous, strenuous, and financially draining.

Between 1876 and 1878, a series of 150-foot wing dams were built at right angles from the jetties into the channel to narrow the river and thus accelerate its flow. But financial difficulties continued to hound Eads's work. Once again negative rumors against his project hindered his ability to get loans and caused the Federal government to investigate the project while it held back further payments (*Jackson 1993:19; Samuel et al. 1955:60*).

Eads's faithful assistant Corthell asked the crew to work for certificates rather than cash until funds would be available to pay them. Of the 74 men still employed, only two quit; the others stayed to finish the job. Next yellow fever struck and 11 men died (*Jackson 1993:19; Samuel et al. 1955:276*). Despite these setbacks, concrete slabs were finally placed atop the jetties in December 1878, ending the historic riverine project.

The building of the concrete slabs had been a task of great ingenuity and precision. The larger of the slabs at the sea end weighed as much as 260 tons each. To withstand the fury of stormy seas, a concrete mixer, steam elevator, and dumping cars were employed to take bargeloads of sand, cement, and crushed rock and turn it into cement which in turn could be poured into great open box-molds built on top of the jetties to make the slabs. When the slabs were completed the wall was four to 12 feet wide and five feet by seven feet high. Eads added one extra touch to his project in 1879 in the form of spur cribs which were built outside each jetty wall and loaded with broken stone and ship ballast. These were to break the force of storm waves which might cause harm to the jetty structures (*Dorsey 1947:215*).

By July 8, 1879, the navigational channel achieved the prescribed depth of 30 feet, which was soon reduced by legislation to 26 feet (*United States War Department 1941:843*). In addition, the head of the Pass was cleared of the shoal which had blocked it formerly (Figure 18). As testimony to its successful clearance, 840 steamships and 1,130 sailing vessels traveled through South Pass between July 1879 and May 1880 (Figure 19) (*Corthell 1881:375*).

The economic impact of the jetties was tremendous. Exports from the Port of New Orleans increased by an astounding 2600 percent between the beginning and completion dates of construction of Eads' jetties (*Dorsey 1947:216*). This increase in exports is reflected in the commercial receipts of the Port of New Orleans for the decade following their construction which increased from $371,664,126 in 1876 to $456,062,948 in 1886 to $521,484,618 in 1889, growing to $531,484,618 in 1890 (*Jackson 1969:212*).

At last Eads received the overdue recognition for his accomplishment. Once the prescribed depth had been achieved, the Eads representatives entered into a 20-year maintenance agreement with the United States government. Under this agreement, the Eads representatives were obliged to maintain a ship channel of at least 26 feet in depth. After finalizing the contract, the Eads representatives began a series of improvements to the South Pass jetties. "Two side outlets were closed and spur dikes were built at 2 locations in South Pass. Inner east and west jetties, with lengths of 11,170 and 4,710 feet, respectively, were completed in 1886" (*Lowrey 1956:283; United States War Department 1941:843*).

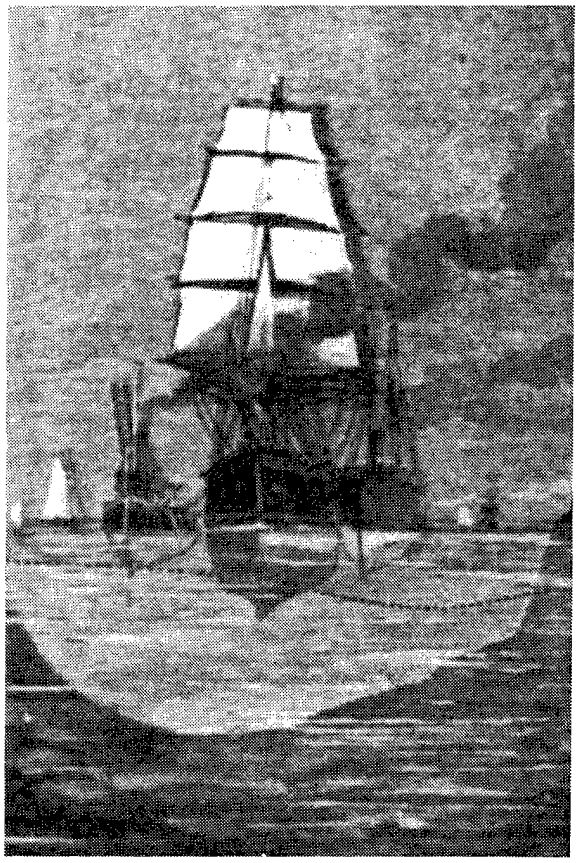


Figure 18. Sketch showing the new channel depth following jetty construction.
(from *Harper's Weekly 1883*)

These enhancements to the South Pass jetties coincided with construction of a new, cast-iron, lighthouse in 1881 (Figure 20). With major maritime traffic moving through the pass, the Lighthouse Board approved the building of a new lighthouse on the west bank. "The iron tower originally intended for Trinity Shoals lay in storage at Southwest Pass for about ten years before its erection at South Pass was undertaken. The First Order lens, still in use, was first lighted on August 25, 1881" (*Cipra 1976:34*). It also developed into a buoy repair center and coal depot for all government vessels in the vicinity in the early twentieth century (*US Coast Guard 1976:34*). The United States Customs Service also had officials at South Pass who boarded ships entering the Mississippi River. Their office and dwellings were on the west bank (*Jackson 1993:51-52*). The lighthouse, automated in 1971, is now identified as the South Pass Rear Range Light. It stands 108 feet high and is visible for a distance of 23 miles (*Cipra 1976:34*).

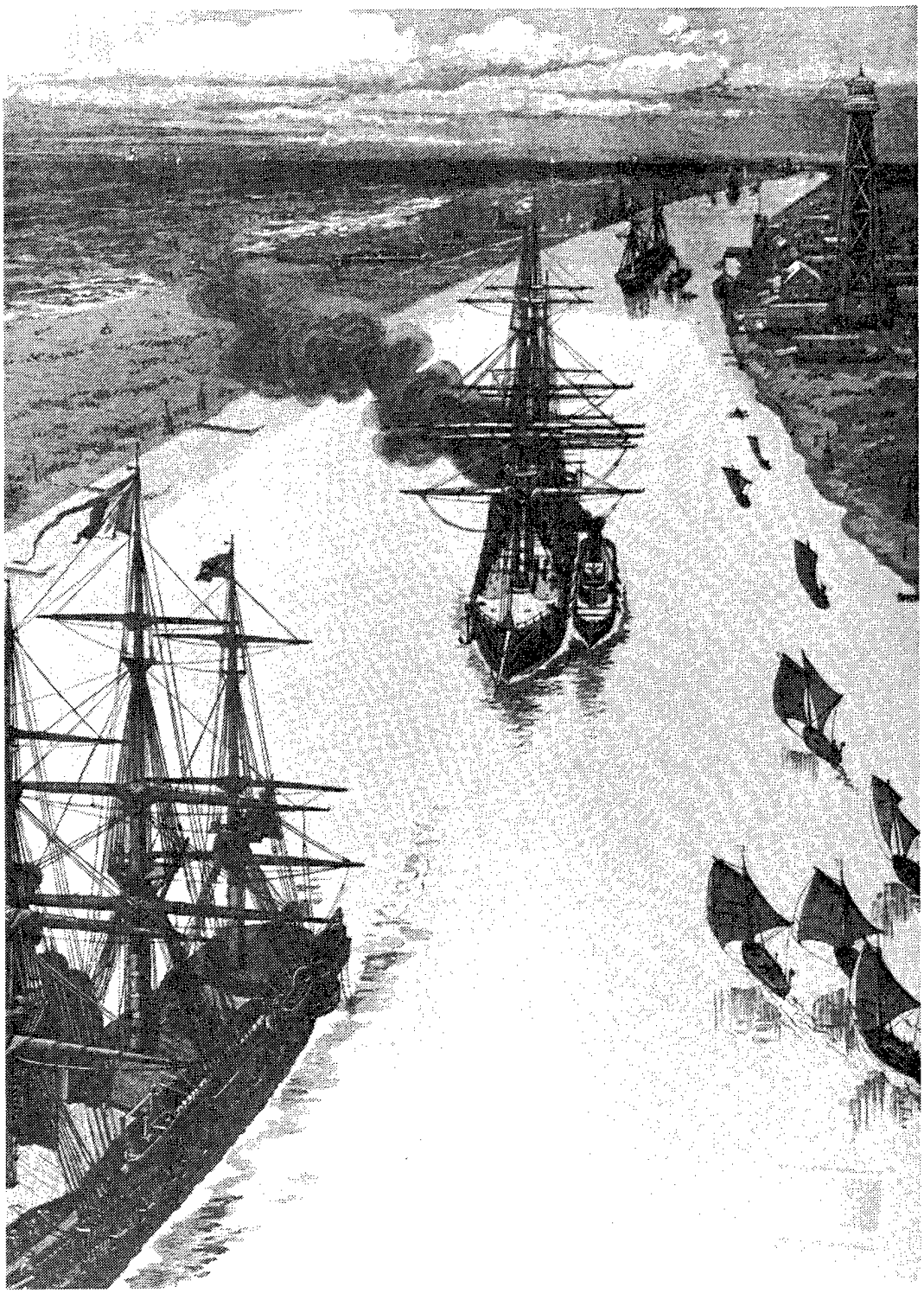


Figure 19. Sketch of South Pass in 1884.
(from the collection of Joy Jackson; first appeared in *Harper's Weekly 1884*)

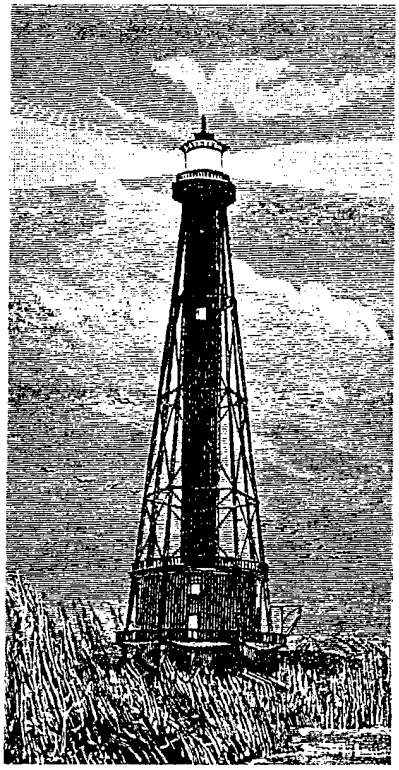


Figure 20. Sketch of the 1881 South Pass lighthouse.
(from *Harper's Weekly 1883*)

During the latter part of the nineteenth century when Eads had the contract to keep the pass at a depth of 30 feet, the U.S. Army Corps of Engineers made frequent inspections and reported their findings in annual reports. In 1881, assistant engineer C. Donovan found the pass in good condition and noted that two wing-dams had been put in place near the west shore while an old wing dam was extended below East Point and two new lattice-dams built on the same side. Dredging was carried on for 71 days at various points along the pass and jetties that year (*U.S. Army Corps of Engineers 1878-81, 1881:1257*). This dredging, and building or rebuilding of dams connected to the jetties and the restoration after storms of parts of the mattress works of the jetties were the usual tasks continuously pursued on South Pass.

Inspecting officer Capt. W. H. Heuer and Capt. Thomas Turtle in 1884 found the bar at the mouth of South Pass "26 feet in depth, not less than 200 feet in width at the bottom, and having through it a central depth of 30 feet without regard to width." They also noted that the difficult shoal at the head of South Pass had maintained a satisfactory depth of 26 feet. The small Picayune Bayou, an outlet from South Pass, was completely closed by a dam composed of willow, stones, gravel, and sand. The average force employed in 1884 was 34 men who in addition to work on the jetties, drove 26 piles for barge moorings, built a boat house, set up a coal yard, and repaired several dwellings (*U.S. Army Corps of Engineers 1884:206-207, 1238-39*).

In the 1894 report on South Pass, the author, Maj. James B. Quinn, pointed out that the ends of the jetties had settled somewhat since their construction, but were completely covered by land formation which protected them. Describing the west jetty, he wrote "Two hundred and twenty feet of the outer end is 4 feet below the surface of the water, and has 2 feet of sand over it." The reef or coast line east of the east jetty had been receding rapidly during the 1890s, but Quinn felt that the crib dams placed at that point in 1893-94 had arrested the erosion (*U.S. Army Corps of Engineers 1894:1333-37*). This report points out one of the basic problems keeping South Pass open to deep draft ships involved—dealing with the relentless sinking of the jetties at their outer edge and the disappearance of reefs and marsh land on the outer banks of the pass. Closing up Grand Bayou and Picayune Bayou made more water flow swiftly down South Pass, but it ended the sediment deposit which these waterways had supplied to West Bay.

The tremendous amount of river traffic now flowing through South Pass had a surprisingly limited impact upon the area's human landscape. Plate G—"Comparative Chart of the Mouth of South pass, Mississippi River, Showing the Changes Between May 1875 and June 1879"—of E. L. Corthell's *A History of the Jetties at the Mouth of the Mississippi River* provides the best available guide to construction of structures during the Eads jetties project (Figure 21).

On the west bank, early buildings were clustered around the South Pass lighthouse, which was set back slightly from the west bank (Figure 22). Between the lighthouse and the edge of the riverbank was a long, rectangular structure, which was probably the pilothouse. The pilothouse and the lighthouse were connected to the riverfront by a walkway that evidently extended to the riverside as a short wharf. Along the riverbank and slightly upstream from the pilothouse were two long, rectangular buildings identified as "L.H. [lighthouse] Warehouses." Approximately 200 feet downstream from the pilothouse stood a complex of nine "boarding houses," evidently living quarters for the Eads jetties workers. The second "boarding house" downstream from the pilothouse was connected to a landing along the river by a short walkway.

The east-bank complex extended approximately twice the distance of its west-bank counterpart. Across the channel from the uppermost lighthouse warehouse stood a coal yard. An unidentified structure existed approximately 200 feet downstream. Approximately 100 feet below it were three "dwellings" standing perpendicular to the center of the river. About 300 feet downstream stood the large "headquarters" building, which was connected to a 150-foot-long riverside landing by a short walkway. Approximately 100 feet downstream from the headquarters building stood a large "office," flanked by a small, unidentified, rectangular building. Between the office and the riverbank stood a small, unidentified, rectangular building. A complex of five "shops" stood about 700 feet downstream from the office. Three buildings were clustered at the northern end of the complex. Approximately 100 feet downstream stood the first of the two remaining shops, and 50 feet beyond it stood the last building in the "shops" complex. A large landing extended nearly 200 feet along the riverbank adjacent to the southernmost shop. A walkway extended from this landing to the coal yard, connecting all of the east bank structures.

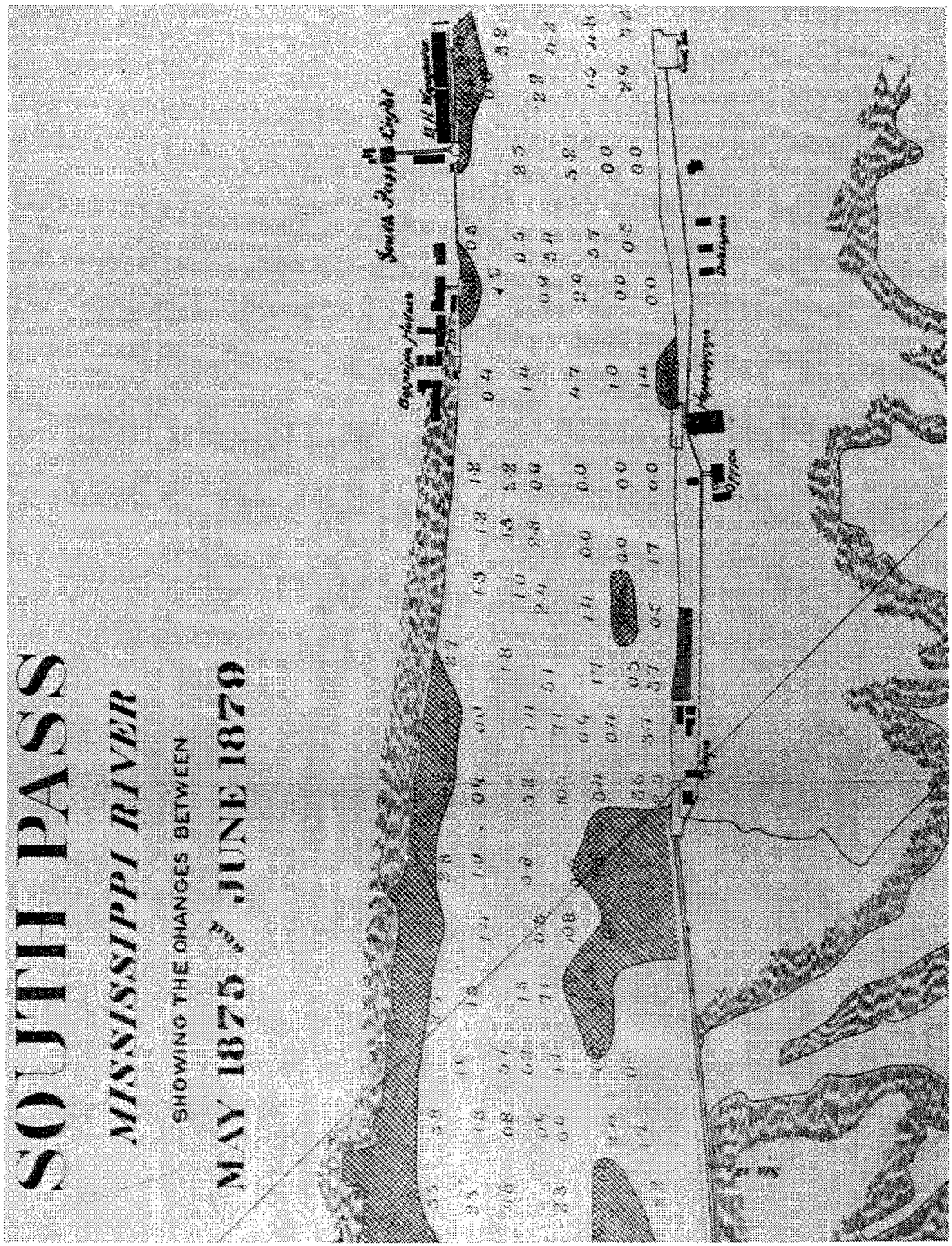


Figure 21. Map depicting Port Eads settlement from 1875 to 1879.
(from *Corthell 1881*)

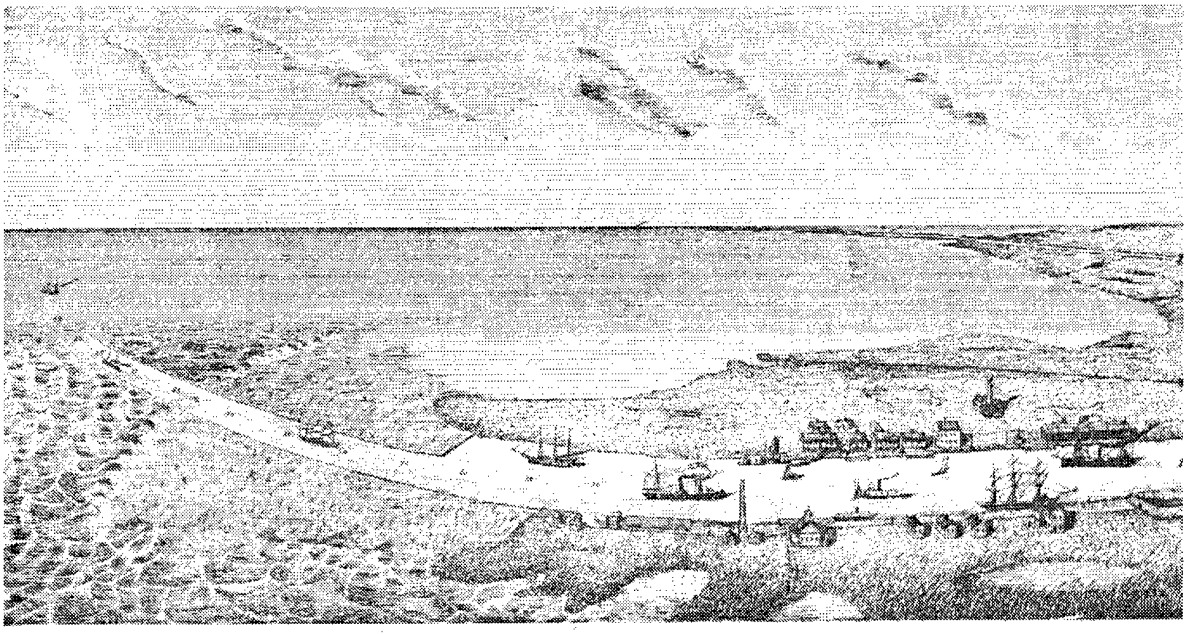


Figure 22. Birdseye view of Port Eads and South Pass, 1879.
(from *Corthell 1881*)

As mentioned earlier, both during and after jetty construction, there were quite a number of "boarding houses" and houseboats pulled up onto land on the west bank at Port Eads. A drawing of Port Eads showing these houseboats appeared in *Harper's Weekly* in 1884. At the lower end of South Pass on the west bank, the Associated Branch Pilots known as bar pilots, who piloted ships from the Gulf into the river and vice versa, built a pilots' station. They also had a station at Pilottown above Head of Passes which was the point at which they left or boarded ships in the river. Their Port Eads station had living and eating quarters, a coal yard, and wharves for their pilot boats. It was remodeled and rebuilt several times over the years.

On the east bank were Eads's headquarters (in the large building known later as the hotel—depicted in Figure 23), machine shops, and miscellaneous dwellings. Ballast rocks and coal were also stored at the upper limits of Port Eads on the east bank (*U.S. Army Corps of Engineers 1881*). By 1893, Port Eads, the east-bank settlement, contained eight structures (*Weinstein 1984:31*).

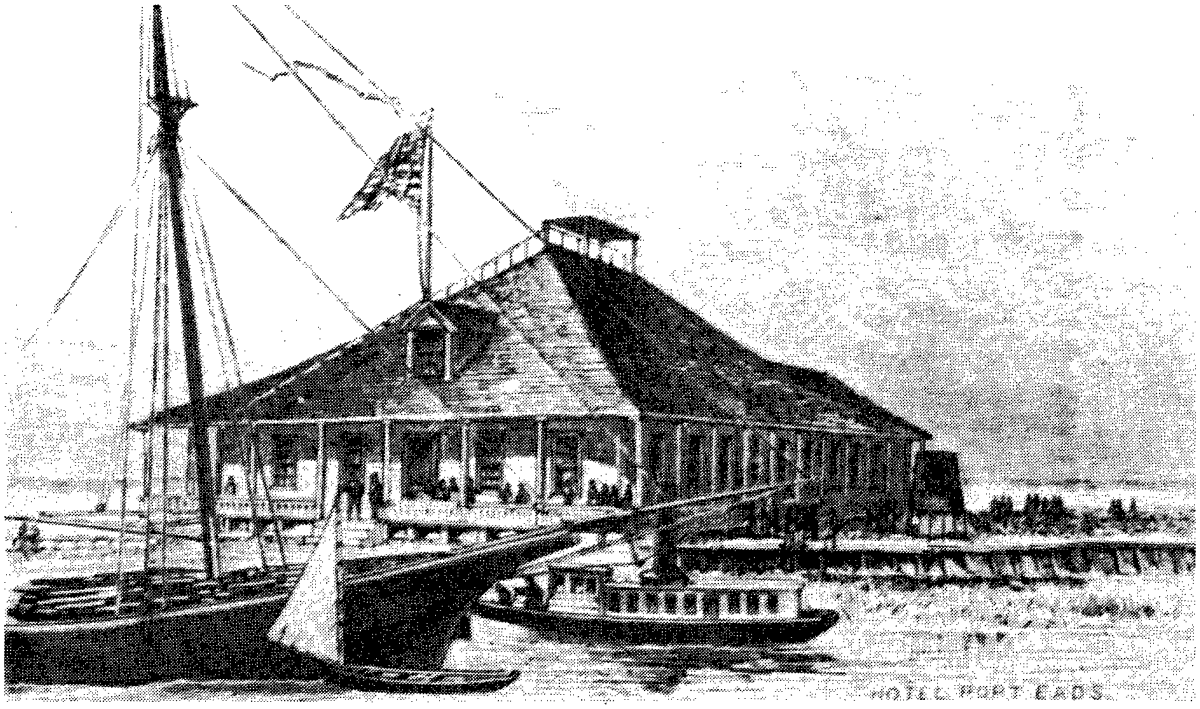


Figure 23. Sketch of Hotel Port Eads.
(from *Harper's Weekly 1878*)

Up the pass from the Port Eads settlement were fishing camps on both banks where oyster fishermen and trappers lived. Some of them kept cattle and pigs. At the Head of Passes there was a small state-operated lighthouse which aided downriver traffic at night. Behind the lighthouse was a cemetery. On the east bank across from Head of Passes was an open area where the willow mattresses were constructed. Since occasional repairs had to be made to the jetties, this work went on intermittently over the years. Another small family cemetery was located on this east bank of upper South Pass (Figure 24).

South Pass in the Early Twentieth Century

The Eads maintenance contract with the United States government expired on January 28, 1901 (*United States War Department 1941:843*). After that date, the Corps of Engineers supervised maintenance of the South Pass navigational channel (*U.S. Army Corps of Engineers 1915:1850; Jackson 1993:54*).

One problem with South Pass by 1920 was the narrowing of its banks as the discharge of the river became greater. The 1920 U.S. Army Corps of Engineers report noted that

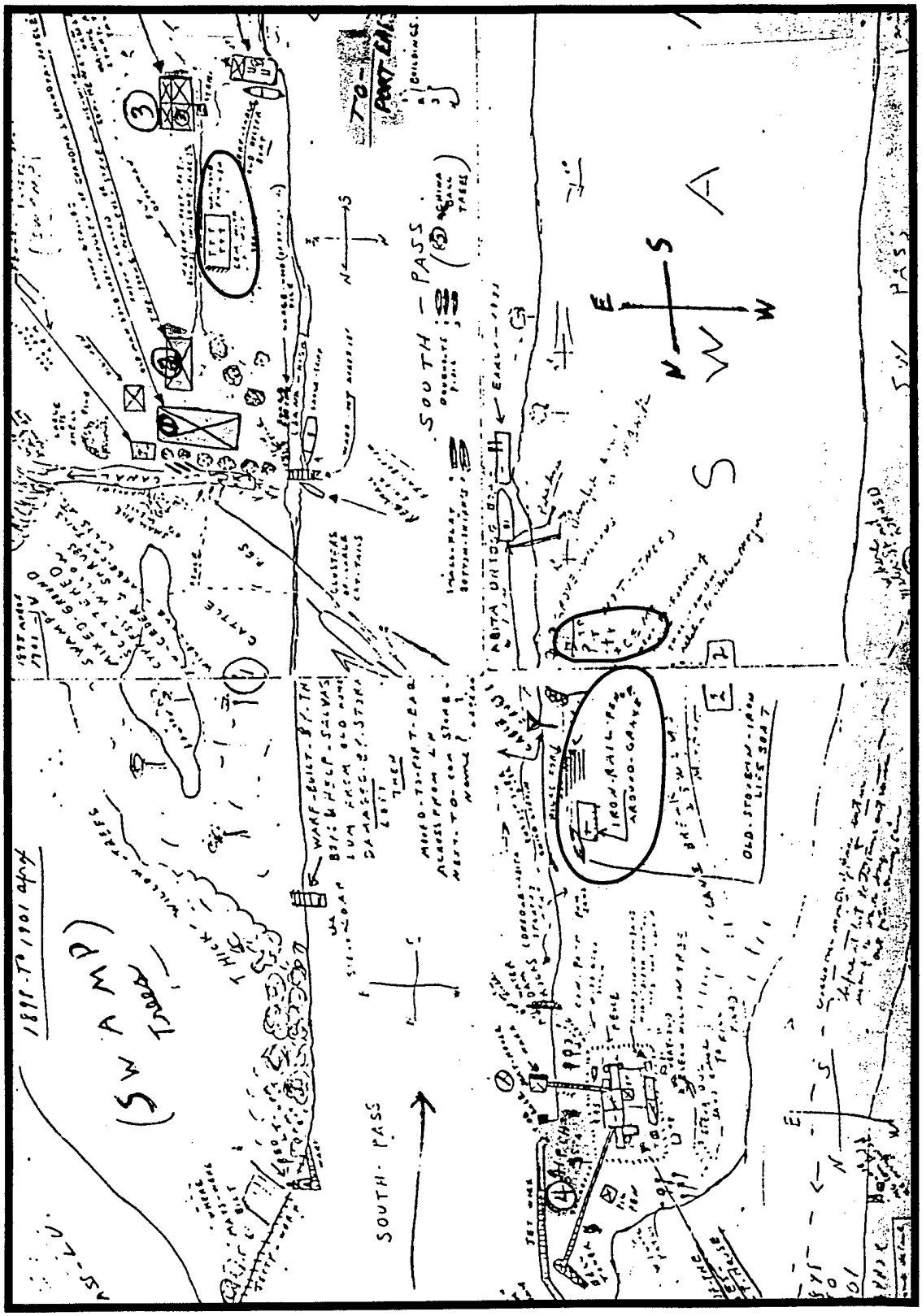


Figure 24. Hand drawn map of settlement at the head of South Pass, ca. 1898-1901.
(Cemetery locations are circled; from the collection of Joy Jackson)

> The banks are already extremely thin at certain places and there is danger of a cave occurring at some point where the banks are so narrow that a crevasse will result. The natural process by which the banks at South Pass were originally formed was such that the portion of the bank nearest the channel constituted the highest and firmest part. The parts of the natural banks still remaining have less resistance to erosion than the parts that have been washed away. [*U.S. Army Corps of Engineers 1920:939-40*]

The report concludes that it would be very costly to protect the existing banks and reduce the discharge down the pass while maintaining navigation. South Pass's future as a shipping lane for large vessels seemed doubtful to the engineer writing the report. He felt that another outlet had to be provided to the Gulf in the future (*U.S. Army Corps of Engineers 1920:939-40*). The problem of protecting the eroding banks of the pass and keeping it open to ships remained the major concern of the U.S. Army Corps of Engineers for the next half century until the ship traffic on the pass was finally discontinued in the 1970s.

Work undertaken by the Corps in the early twentieth century included construction "of a shoreward extension of 872 linear feet to inner east jetty; placing of a mattress sill across the head of South Pass, which was removed in 1935; an upstream extension, 1,300 feet long, of the headland dike between South and Southwest Passes; sinking of 232,742 square yards of mattress for bank-protection purposes at the head of the passes; construction of spur dikes along the left bank above the head of the passes; and placing of submerged deflecting dike across the head of Pass a'Loutre" (*United States War Department 1941:843-44*). In 1939, the Corps of Engineers capped with concrete the inner east jetty. In 1940, 4,300 linear feet of the outer east jetty were repaired (*United States War Department 1941:844*).

Incremental improvements were also made to the navigational aids along the jetties. The following quotations from the *United States Coast Pilot, Gulf Coast: Key West to the Rio Grande* describe South Pass area navigational aids:

> **South Pass Light Vessel** lies about 1 1/2 miles east-southeastward from the entrance in latitude 28° 59' N., longitude 80° 07' W. The vessel has a red hull with "South" painted on both sides; two black masts; and a black cylindrical lantern and gallery on tubular foremast. The light is ... flashing white, 2 flashes every 15 seconds ... 50 feet (15.2 m.) and visible 13 miles. A fixed white light is shown on the forestay.... The fog signal is a siren, blast 2 seconds, silent 2 seconds, blast 2 seconds, silent 24 second[s]. If the siren is disabled, a bell will be rung by hand, 2 strokes every 15 seconds. The submarine bell rings ... 2 strokes every 15 seconds.
>
> The **entrance** between the jetties is marked by lighthouses and lighted ranges. The light on the outer end of the east jetty is oscillating red. A fog bell sounds a single stroke every 10 seconds. The outer end of the west jetty is marked by a fixed white light, which, with another fixed white light 430 yards, 298° true ... from it forms the

range for entering. The front light is on a white house, black vertical stripe, on pile foundation, and has an air diaphone fog signal, 1 blast every 20 seconds. The rear light is on a black, square, pyramidal, skeleton structure, with a white vertical stripe, and is visible on the range line only.

South Pass Lighthouse, on the west bank, 2 1/2 miles above the end of the jetties, is a white skeleton structure enclosing a cylindrical stairway. The light is flashing white (flash 1.5 seconds, eclipse 3.5 seconds),108 feet (33 m.) above the water, visible 16 miles, and the strongest light at the passes of the Mississippi River.

South Pass Radio Compass Station, maintained by the United States Navy, is located in latitude 28° 00' 43" N., longitude 89° 09' 33" W. The call letters are NBX. [*Department of Commerce, U.S. Coast and Geodetic Survey 1925:126-128*]

When the U.S. Army, Corps of Engineers took over maintaining South Pass in 1901, the lifestyle and work of the people who lived on South Pass did not change. In 1903, the U.S. government purchased land from the Eads family for a reservation on the east bank which covered an area approximately a mile long and 300 feet wide (*Jackson 1993:54; U.S. Army Corps of Engineers 1910:493*). The only change seems to have been the building of more dwellings on the east bank by the Corps of Engineers to replace the temporary buildings on the west bank. The houses, which were rented to workers, were set on pilings above the ground and connected by wooden sidewalks.

At the same time, the Corps of Engineers developed a facility for maintenance of dredges on the east bank of Southwest Pass (the site of Burrwood Plantation). This was developed in 1903 and would later be the site of a different use some 40 years later.

This was the "Golden Age"—ca. 1879-ca. 1923—for South Pass. As at Balize in the late eighteenth and early nineteenth centuries, a small maritime community formed near the Mississippi's main outlet to service vessels navigating the pass. Memoirs of former residents suggest that there were "about thirty-two houses and other buildings" at Port Eads around 1910 (*Jackson 1993:51*). Maps dating from the mid-1930s "indicate numerous houses, camps, and other structures lining both banks of the pass between Port Eads and the Gulf. Included are radio towers, jetty and range lights, a wharf, a water tank, a school, and, of course, the South Pass Lighthouse" (Figure 25) (*Weinstein 1984:31*). The camps were undoubtedly utilized by oystermen who plied their trade throughout Plaquemines Parish in the late nineteenth and twentieth centuries (*Gagliano et al. 1979:3/9-3/19*). Weinstein notes the existence of 28 west bank structures and 30 east-bank structures in 1932 (*Weinstein 1984:31*). Among these structures was the Pilots' House, constructed near the lighthouse around 1918 and utilized by bar pilots until 1983 (*Weinstein 1984:31*).

The use and significance of South Pass declined over the course of the twentieth century because of the problems inherent to the nature of South Pass, problems that had first been described by Eads before beginning work on the jetties in the 1870s. Eads realized that "a channel at narrow

South Pass could not be increased in width and depth when the size of ships had outgrown it" (*Dorsey 1947:178*). This is precisely what happened over the course the century following completion of the South Pass jetties. Jetties constructed at Southwest Pass between 1908 and 1923 created a 35-foot-deep navigational channel, and the largest ships bound for New Orleans began to utilize the deeper outlet as soon as it was complete (*Goodwin et al. 1985:61*).

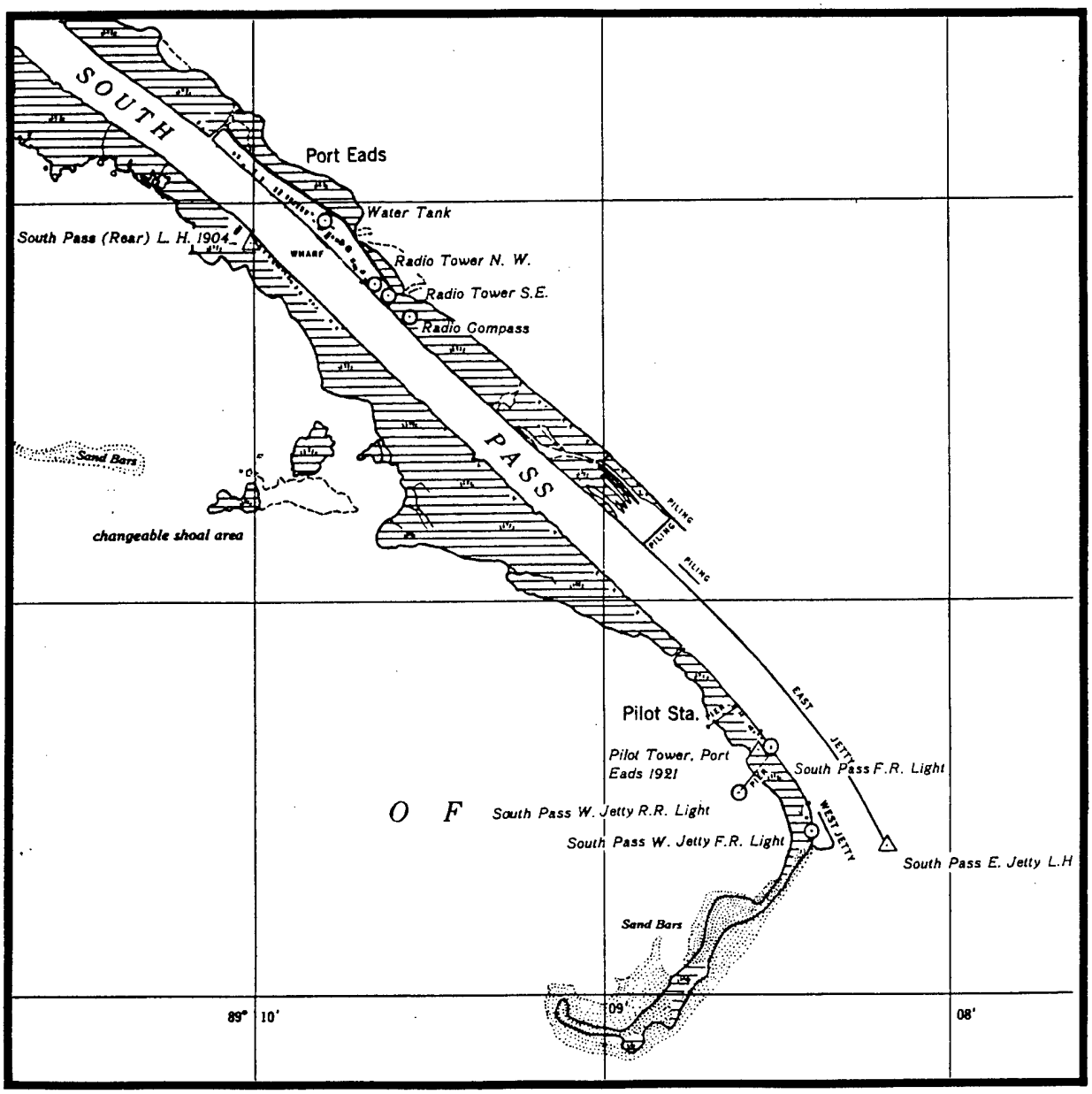


Figure 25. 1933 map of Port Eads and South Pass.
(from U.S. Coast and Geodetic Survey 1933)

South Pass's decline is reflected in the federal government's benign neglect for the period 1901-1941. During this 40-year period, when considerable resources were expended in upgrading the navigability of Southwest Pass, Congress approved only two pieces of legislation dealing directly with South Pass—both extending routine maintenance operations "with funds from regular annual War Department appropriations" (*United States War Department 1943:651*). In addition, on February 25, 1939, the works at South Pass were combined with "the existing [federal] projects for Mississippi River, Baton Rouge to New Orleans, and for Southwest Pass" thereby further reducing the status of, visibility of, and, inevitably, the funding for the South Pass navigational channel projects.

The Mississippi Delta During World War II

Shortly before World War II broke out, the Navy decided to place some modest fortifications at the mouth of the Mississippi. A small naval base was constructed on the lower portion of the Burrwood reservation on Southwest Pass. It was separated from civilian dwellings by a barbed-wire fence. This installation had an administration building, officers' quarters, a mess hall, barracks, a storage building, a heating plant, four fuel storage structures, a fire pump, and a 100,000 gallon water tank (*Goodwin et al. 1985:30-43, 113, 115*). The water tank had an observation tower and signaling platform. Five buildings were devoted to ammunition and explosives, two being large bunkers. A sentry box guarded the lower end of the base where the explosives were stored and an Army gun battery was installed at the mouth of Southwest Pass (*Goodwin et al. 1985; Jackson 1993:204*). The Army constructed a second gun battery, described below, at South Pass on the lower west side (*Jackson 1993:204; Goodwin et al. 1985:74-75*).

Traffic through South Pass and neighboring Southwest Pass decreased significantly during World War II. German submarines entered the Gulf of Mexico sometime in the spring of 1942, and the Gulf area surrounding South Pass became a vast killing ground, causing havoc to shipping (*Jackson 1993:201*). From May through September of 1942, 58 ships (of about 300,000 tonnage) were sunk by German submarines (*Cronenberg 1990:163*). From mid-May to mid-June 1942, German U-boats sank 41 ships (219,867 gross tons), the largest number of sinkings in any single month of World War II (*Morison 1963:115-116*).

On some nights, residents living at Port Eads and Burrwood could see fires from ships hit by torpedoes far out in the Gulf. On May 12, 1942, the jetties on Southwest Pass (which had been built at the turn of the century after South Pass proved successful) were struck by a torpedo: "an explosion, attributed to enemy action, occurred at east jetty, damaging about 100 feet of concrete jetty between stations 245+95 and 246+97, and displacing sections of the concrete cap approximately 5 feet riverward" (*United States War Department 1943:713*). The torpedo was fired by a German submarine aiming at an American destroyer attempting to enter Southwest Pass (*Goodwin et al. 1985:186; Harvey 1995*). Debris was blown into the air and the entire lower pass was shaken by the blast, causing an employee at the Southwest Pass lighthouse to have a heart attack (*Jackson 1993:203; Goodwin et al. 1985:186-87*).

On the same day as the hit on the Southwest Pass jetty, the *Virginia*, an oil tanker, was torpedoed and sunk by three torpedoes off of South Pass as it awaited a pilot to guide it into the river. The crew on the pilot boat which was nearby could feel the heat from the intense fire which erupted on the ship. Twenty-six men were lost in that explosion (*Jackson 1993:203*).

During the German U-boat onslaught of 1942 (*Hoyt 1978:74-128*), foreign and coastwise traffic fell precipitously—approximately 9 and 61 percent respectively (*Jackson 1993:209*). The coastwise trade through South Pass, which had been 22,821,000 tons in 1941, dropped to a mere 1,814,000 tons in 1943. Indeed, in late 1942, the South Pass pilots were virtually unemployed (*Jackson 1993:207*). New Orleans nevertheless prospered because of the booming local boat building industry (*Martinez 1955:133*).

By mid-1943, through the use of convoys, shore blackouts, patrol boats, aerial surveys, and radar, most German submarines were chased out of the Gulf of Mexico. As the submarine threat diminished, foreign trade increased, as did the coastwise trade; by 1944, commerce was reverting to normal for Gulf of Mexico ports (*Jackson 1993:209*). As Joy Jackson notes, "The last two years of World War II saw a steady rise in the number of ships coming upriver to the refineries, grain elevators, and bauxite plants" (*Jackson 1993:211*).

The World War II Gun Emplacement Below South Pass: The U-boat activity in the early stages of World War II led to the creation of a vast body of folklore regarding German submarines and the Louisiana coastline. It is true that German submarines did lay mines off the mouth of the Mississippi River in May 1942 (*DeWolf 1995:14-18; Conn 1964:99*). These mine-laying operations were conducted at night while the U-boats were submerged. The *U-166* laid mines near the main Mississippi River passes on July 25, 1942 (*Corkern 1978:41*), but this operation, which caused no damage, "went undetected until the opening of German records after the war disclosed" it (*Conn 1964:99*). It is also true that U-boats sought prey at the very mouths of the jetties, as in the 1942 attack at the mouth of Southwest Pass (*Goodwin et al. 1985:186*). It is also true that a number of Allied servicemen and, in the early days of the war, civilians lost their lives when their ships were torpedoed. However, most of the stories still in circulation about coastal Louisiana U-boat activities are apocryphal.

Weinstein (*1984:39*) recorded "tales of German submarines laying offshore and shelling the pilot station and even entering the pass." There was no recorded submarine attack on the South Pass pilot station, nor could the Type IXC U-boats then operating in the Gulf enter the Mississippi River because these vessels, the largest in Hitler's undersea fleet, drew too much water (*Christ 1985; McMurtrie 1941:216, 1942:216; DeWolf 1995:4, 7*).

Considerable popular confusion also surrounds the American effort to defend the mouths of the Mississippi River against the German sea wolves. Local lore points to construction of a concrete gun emplacement "set on pilings" that "was reportedly built at the mouth of South Pass" during World War II to combat the U-boat menace (*Weinstein 1984:38-39*). Yet, the annual *Reports of the Chief of Engineers, U. S. Army* for the years 1940-1946—the most authoritative source of

information regarding construction by the federal government at South Pass for the war years—make absolutely no mention of the construction of artillery batteries or other military structures at or near South Pass or the jetties.

The best published histories on the American attempt to bolster domestic defenses during the war ignore coastal defenses, mentioning only that presidential orders at the beginning of the war made coastal defense the responsibility of the United States Army. Recent research on the naval war in the Gulf of Mexico has completely ignored the coastal batteries and the coastal patrols established by the Army during the first two years of the war, focusing instead upon the use of naval convoys and air cover from military and civilian airfields, including Houma's municipal airport, to shield the Mississippi's passes and shipping in the central Gulf Coast area from the U-boat menace (*DeWolf 1995:16*).

Flying regular missions in ancient and often decrepit aircraft (*Corkern 1978:35*), Coast Guard and Army airmen patrolled the Gulf Coast from Pensacola, Florida to Galveston, Texas. These aircraft routinely attacked U-boats with depth charges when submarines were sighted in coastal waters, and at least one German submarine, the *U-166,* was destroyed by this means in the main shipping lanes leading to the Mississippi's passes (*DeWolf 1995:15-18; Corkern 1978:41-42*). By mid-1942, the combination of air attacks and convoys had become so successful in protecting Allied shipping that the last two submarines operating in the Gulf of Mexico were recalled by the German high command in late July 1942. They would not return to the Gulf until March 1943, and then only briefly and in small numbers (no more than three submarines) (*Conn 1964:437*).

According to William F. Harvey, Jr. with United States Navy History Center, on land American military authorities initially concentrated their attention upon beach patrols and, to a far more limited extent, construction of "defensive facilities" (*telephone conversation, July 26, 1995*). On December 29, 1942, General George C. Marshall and Admiral Ernest J. King issued a directive recognizing beach defenses "as a primary mission of the Army." Harvey relates that the Army, however, had already taken a leadership role in organizing America's coastal defenses—at least in the Mississippi Delta. According to Harvey, in late March or April 1942, the Army Coastal Artillery department placed small caliber guns mounted on wheeled gun carriages onto gun emplacements built on wooden piers at the mouths of Southwest Pass and South Pass. In a telephone communication, Harvey (*1995*) verified that the Navy had no involvement whatsoever with the South Pass gun emplacements.

Harvey observes that these gun emplacements, which, despite published reports to the contrary (*Gagliano et al. 1978:55*), had no concrete reinforcement when they were first pressed into service, were equipped with search lights that servicemen sporadically trained on the sea at night in futile attempts to locate surfaced U-boats. Indeed, the gun emplacement had no contact whatsoever with the enemy (*Harvey 1995*).

Servicemen operating the South Pass gun emplacements lived in tents. Once a month, they were granted liberty in New Orleans, after which the coastal gunners returned to their isolated

outpost (*Harvey 1995*). Burrwood's oral tradition corroborates that of former servicemen regarding the isolated gun emplacements at Southwest and South passes. Burrwood residents recall that, during World War II, a gun emplacement stood on piers erected upon a shoal beyond the lower extremity of the western South Pass jetty (*Goodwin et al. 1985:113, 115; Jackson 1993:204*).

Oral accounts of the gunnery units are supplemented by numerous published references to the gun emplacements. Joy Jackson, in her authoritative recent work on the lower Mississippi River, notes that shortly before America's entry into World War II, that the Navy had begun "building a base on the lower portion of the Burrwood reservation" at Southwest Pass (*Jackson 1993:204*). Jackson states that the building of the Burrwood base, which reflected the greater significance attached to this navigational channel by the war era, preceded the construction of a battery "with a wide range of fire" at the mouth of Southwest Pass. A "similar" facility was constructed at the mouth of South Pass. The South Pass battery evidently received logistical support from a nearby Coast Guard station (*Goodwin et al. 1985:174*). (The Coast Guard was incorporated into the United States Navy for the duration of the war by Executive Order 8929 of November 1, 1941.)

These facilities were built with the intention of bolstering the area's porous defenses against anticipated attacks, but, as Jackson concludes, they were not equal to the challenge. "This station [Burrwood] was supposed to help in antisubmarine warfare, but it never had the fast, powerful boats or the aerial backup necessary to make this objective a reality. Nor were the gun battery at Southwest Pass and a similar one placed at the mouth of South Pass of much practical value in fighting the terrible submarine menace in the Gulf in 1942" (*Jackson 1993:204*). Indeed, according to Eric Guidry, who reported a U-boat sighting to the South Pass Coast Guard station, "there was nothing they could do" (*Goodwin et al. 1985:174*). As a consequence, Rear Admiral James L. Kauffman, commander of the Gulf Sea Frontier which included the Mississippi passes, was forced to rely instead upon convoys operating in the Gulf of Mexico to protect Allied shipping (*Morison 1963:142; Cronenberg 1990:163-178; Corkern 1978:35-36*).

According to oral tradition in the Burrwood area, the military facilities at Southwest Pass operated throughout the war. The Burrwood base was evidently deactivated in 1945, along with coastal airbases and comparable defensive facilities throughout the upper Gulf Coast (*Goodwin et al. 1985:176; Casey 1983:236*). Many structures at the Burrwood naval facility were dismantled by 1953, and two remaining barracks were closed in 1954-55 (*Goodwin et al. 1985:176*).

Unlike the Burrwood facilities, the gun emplacement at the mouth of South Pass did not endure the war. The gun emplacement was still operational in September 1942, but former servicemen recall that the facility was dismantled shortly after the withdrawal of the U-boat fleet from the Gulf of Mexico in late summer 1942 (*Harvey 1995; Wingerter 1995*).

The Post-War Decline of South Pass

By the 1940s, the depth of South Pass from Head of Passes to the outer ends of the jetties, a distance of 14.2 miles, was 30 feet deep (mean low Gulf) by 450 feet wide. At the South Pass bar

there was 30 feet depth (mean low Gulf) across an area 600 feet wide. The necessity to keep workers living on the passes to maintain this depth, make repair to the jetties, take soundings, and dredge came to an end in the late 1940s. The U.S. Army Corps of Engineers made the decision to begin closing down its reservation at Port Eads in 1946, and by 1949 the reservation was completely closed (*U. S. Army Corps of Engineers 1946:976; U.S. Army Corps of Engineers 1949:965*).

In 1954 Burrwood on Southwest Pass was also closed. The Army engineers moved their entire operations up to Venice; from there it was a quick easy trip downriver to work on South and Southwest passes. The buildings at Burrwood and at Port Eads were either torn down, moved, or put up for sale, and the buyers removed them from the passes. In 1952 when Claude Buras, who had lived at Port Eads in the 1920s and 1930s, returned to work under contract on South Pass, his work crew was housed in the only building at that time left on the east bank—the two-room school house (*Buras 1986:14-17*). Aerial photography showing both banks in the mid-1950s indicates that the once thriving South Pass community had dwindled significantly since the 1920s. These photographs indicate the presence of only the lighthouse, the pilot station, the Coast Guard station, and approximately a dozen fishing camps (*Weinstein 1984:39*).

The Chief of Engineer's report for 1950 is representative of those for the entire post-war period: "The general plan of improvement of South Pass provides for the construction and maintenance of jetties and spur dikes" (*United States Department of the Army 1951:963*). The U.S. Army Corps of Engineers kept South Pass in condition for ocean-going vessels to use until 1973 when it was abandoned in favor of Southwest Pass which had become the premier pass on the river and the Mississippi River Gulf Outlet which had been opened in the 1960s. This outlet quickly attracted shipping from the Mississippi passes, especially South Pass, the smallest of the two. The bar pilots' station on South Pass, however, continued to be used by them until it was badly damaged by a storm in 1983 (*Weinstein 1984:56*). Since then it has been destroyed by fire.

By 1984, the old Port Eads community was reduced to "the lighthouse, two fishing camps, an office, and two trailer homes for the two permanent employees of the recently constructed Port Eads Marina" (*Weinstein 1984:39*) (Figure 26). Near the mouth of South Pass there stood a collection of abandoned camps and an abandoned Coast Guard station slated for demolition.

Life at Port Eads - A View from the Inside

Just before the end of the nineteenth century, Ira Hutchinson was employed by Duvic Brothers to deliver a boat to a Mr. LeBrano at Port Eads (*Hutchinson 1951*). He provides a brief diary of the trip, including some anecdotal information about the occupants. Reportedly, Mr. LeBrano was one of the Government supervisors. Mr. Hutchinson notes that the town was built upon pilings and that vast expanses of marsh "met the eye in every direction" (*Hutchinson 1951:48*).

He characterized the local workers as a tough lot, most of whom spoke "French jargon" and a few of whom spoke or understood English. On pay day, they congregated around Mr. LeBrano's store and office (next to his home). Mr. LeBrano may have trusted the workers, but Mr. Hutchison

was leery as he recounted the Saturday when the former was about to pay for the boat. He counted out 2,000 one hundred dollar bills and handed them to Mr. Hutchison in a room filled with workers. He was told that the purser would call for him in his hotel room 30 minutes before the steamboat that would take him back to New Orleans was ready to leave.



Figure 26. Port Eads Marina Complex: 1970s construction.

Mightily distraught and distrusting of everyone, Mr. Hutchison returned to his room, the location of which had been announced at the time the hundred dollar bills were dispensed. Having felt them to be a tough lot to begin with, Mr. Hutchison placed his money under a rug, laid a table over the rug and after some fitful tries, finally fell asleep. A loud knock on his room unnervingly jarred him from sleep, but he was relieved to hear the purser announce that the boat was ready to leave. Mr. Hutchison left Port Eads with his money intact, but he would not soon forget the experience at Port Eads, so very different from his home on St. Andrew Bay, Florida.

More insight comes from Oliver Jackson, who had been born on South Pass and returned in 1910 as a young teenager to live with his father, a boatman for the Customs Service. Oliver found a neat little maritime village in which everyone knew each other and was often related. The Port Eads community consisted of about 32 houses and other buildings with fishing camps dotting the pass above this settlement. In addition to the houses, there was a store and a school.

Packet boats such as the *El Rito* came downriver several times a week in the early twentieth century with supplies for the store and other dry goods or clothing items which Port Eads residents might desire. Itinerant merchants brought their catalogs of jewelry, household items, or clothing. Oliver purchased a spyglass and a ring for his godmother from such a merchant (*O. Jackson 1980:14-16; J. Jackson 1993:51-55*).

Men employed by the Corps of Engineers worked on dredge or survey boats, in machine shops, and in the making of willow mattresses and repairing of jetties. Others living on South Pass worked for the bar pilots who needed men to shovel and haul coal for their boats, serve as deck hands, oarsmen, mess boys, and other manual laborers at the pilot station (Figure 27). Finally, some of the families on the pass were oyster fishermen who seeded oyster beds usually on the west side of South Pass. They sold their oysters by shipping them on luggers either all the way up to New Orleans or to Buras where they were placed aboard the New Orleans, Fort Jackson, and Grand Isle Railroad and shipped to Algiers on the west bank of New Orleans. Those shipping to New Orleans had relatives or associates who received the oysters and sold them in the Crescent City. At the turn of the century there was an oyster packing plant located at what became known as Oysterville on South Pass and Whale Bay.

Trapping was a part-time occupation for many of the men who lived on South Pass. While otters and larger wild animals were not as common in the early twentieth century as in antebellum days, trappers still managed to collect muskrats in large numbers to sell for profit. The stretched skins of muskrats drying were a common sight in back of the cabins of fishermen.

The folkways of a fishing village were also evident on South Pass in 1910. Oliver Jackson's father, Monroe, was a skilled net maker; it was a common sight to see him weaving a net, when he was not engaged in rowing the customs officer and quarantine doctor out to board a ship (Figure 28). The beginning of the net was tied to a door knob. As he wove and it got bigger and bigger, he moved away from the door until the net was finished and ready for trawling.

Monroe's brother, Thomas Jackson was a gifted carpenter and boat builder. He built his nephew Oliver one of those little sailing boats which were the main form of transportation on South Pass and the other passes. It had a pointed bow and a square stern with one sail. Thomas Jackson could also carve canoes out of cypress logs which were so light a man could carry one on his back without strain.

Oliver's grandfather, Captain "Andy" (Andrew) Jackson had been an experienced boatman, fisherman, and cook. He once won a ribbon for his recipe for pickled oysters in a contest with Maryland oystermen. Such dishes were common among the residents of South Pass who made tasty oyster and redfish dishes. When Captain Andy died in 1902 his body was carried to its final resting place on South Pass at Head of Passes by the bar pilots' boat, the *Jennie Wilson*. He was buried beneath a cypress tree close to the river in a spot he had selected years earlier (*Jackson 1993:24-25; New Orleans Daily Picayune 1902:3*).

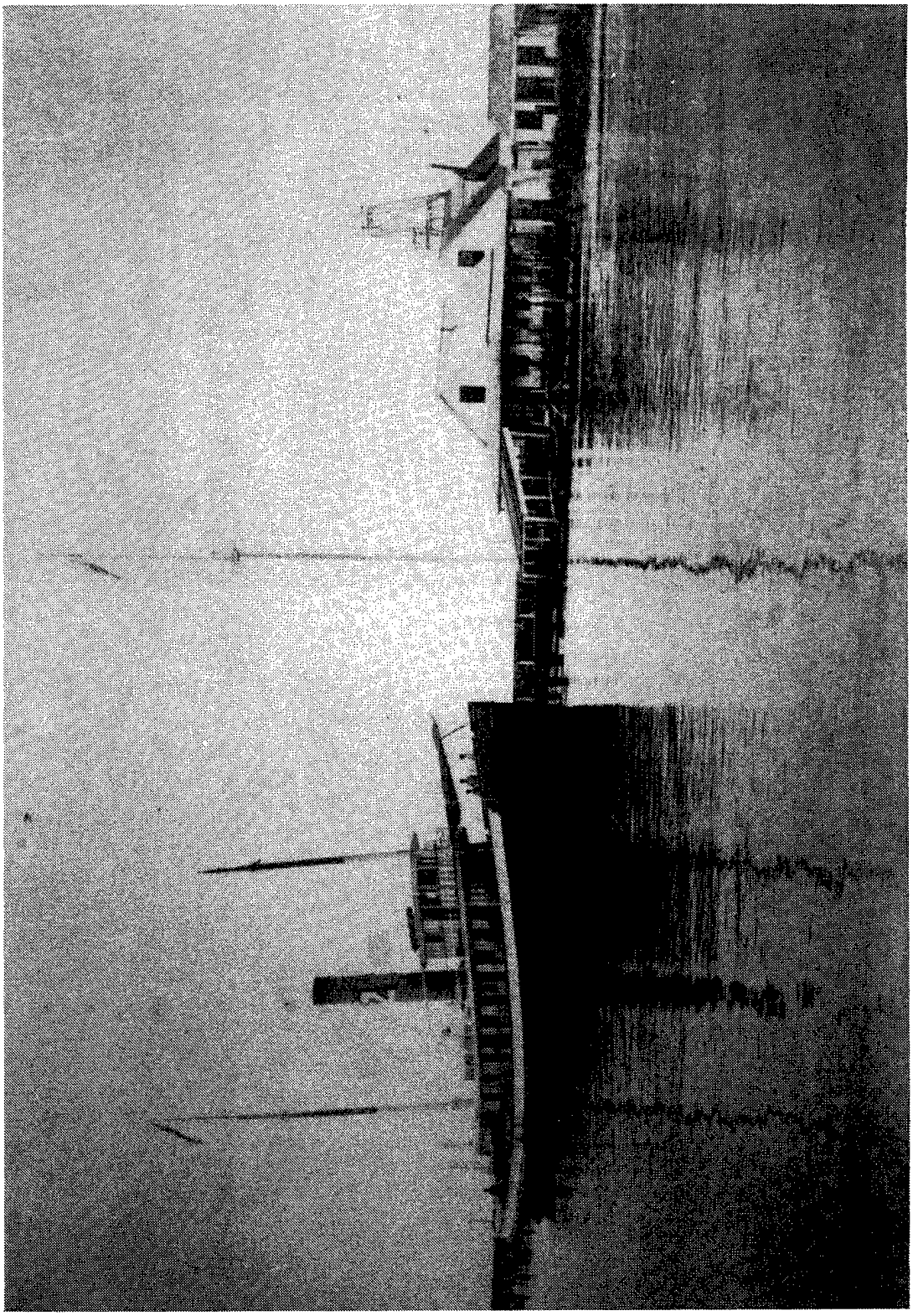


Figure 27. The bar pilots' boat, *The Underwriter*, anchored in front of the pilot's station on the lower west bank of South Pass in the early 1900s.
(courtesy Southeastern Louisiana University Archives)

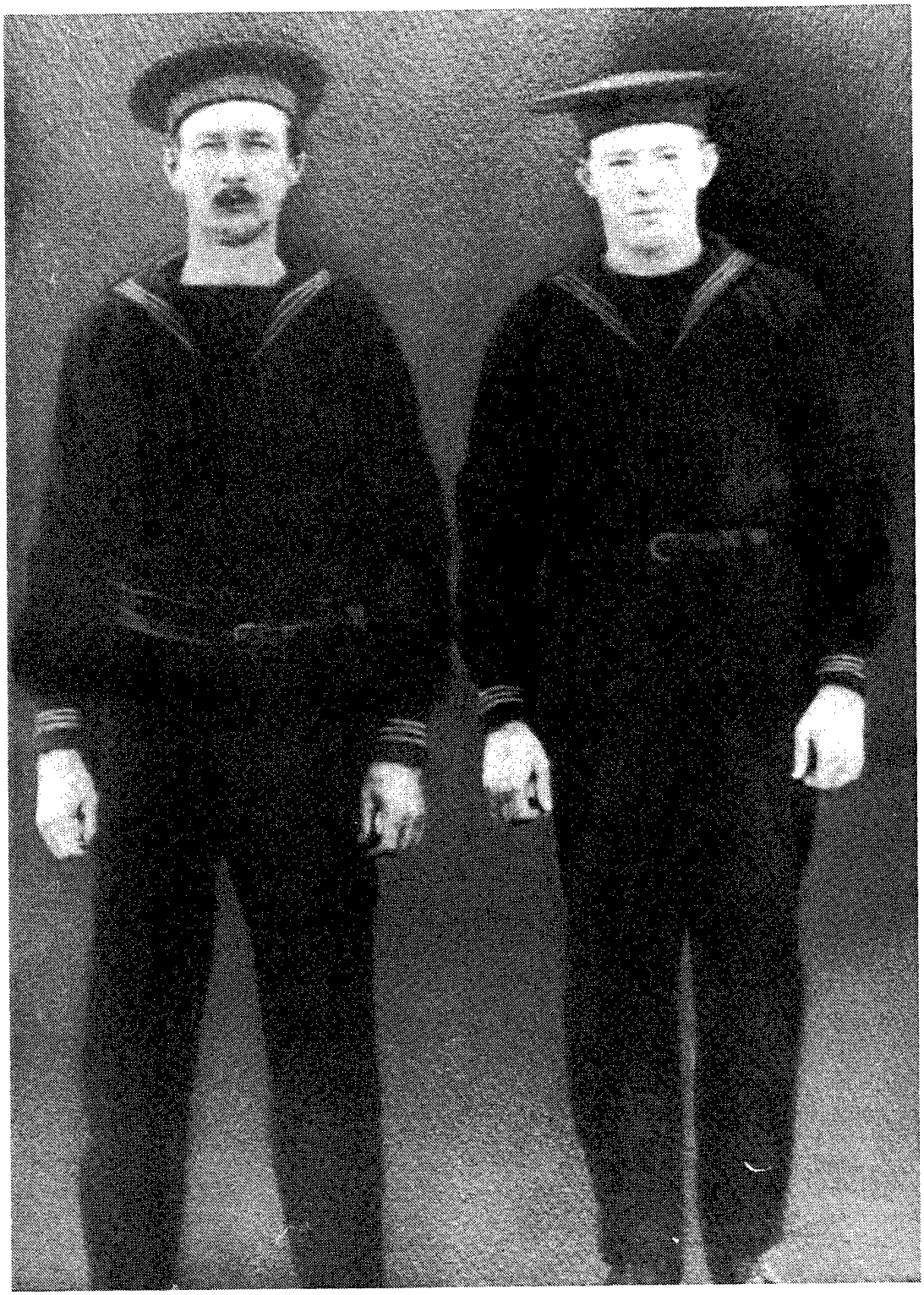


Figure 28. Early twentieth century photograph of Monroe Jackson and Henry Morgan in the uniforms they wore to row customs officials to incoming ships at Port Eads.
(from the collection of Joy Jackson)

Pastimes in 1910 included swimming parties, fishing, dances with a local musician supplying the fiddle music, and baseball games played with rival teams from such nearby river towns as Buras and Pilottown (*Jackson 1993:58-59*). A mail boat kept the community in touch with the outer world. Clergymen from varying faiths came to Port Eads about once a month to hold services, perform marriages, and baptize babies. It was possible to have three children in the same family baptized in different faiths.

One event which the young people of Port Eads remembered fondly was the arrival of a fruit boat carrying bananas from Central America. Always such a boat drew a half dozen small skiffs with teenaged boys and girls who caught small bunches of ripe bananas (called hands) thrown by the crew of the ship. In the warmer months, almost every house in Port Eads had a bunch of bananas hanging from a hook on their porch (*Jackson 1993:54-55*).

By the 1920s, Port Eads had not grown in size—it still had about the same number of houses and other buildings as before World War I. But it did have some improvements. An electric light and radiotelegraph plant was completed by 1920 and a rear protection levee had been built at Port Eads.

Claude C. Buras, who lived in Port Eads from 1924 to 1938 recalled in 1986 what life was like in the early twentieth century. He remembered the use of a two-generator power plant to produce electricity. Also, the outhouses "perched on the bank of the sanitary canal in back of each residence" and the galvanized tubs in which individuals had taken baths filled with rain water heated on a wood stove had been replaced by sanitary sewerage and indoor bathrooms. Rain water caught and stored in cisterns was still the source of drinking water. All windows were screened by the 1920s to protect against the droves of mosquitoes which came out of the nearby marshes (*Buras 1986:14-17*).

The faithful packetboats continued to make Port Eads a stop in their trips downriver from New Orleans. After the end of Prohibition in 1934, the *Victoria*, a packet owned and operated by Captain Peter Talianich and his son Sam, came to South Pass on Saturdays and laid over at night to sell beer to the Port Eads natives. The hotel which had once been Eads' headquarters was used as a rooming house (mainly for married couples) with a large dining hall. There was also a bunkhouse for single men, a small post office, the two-room schoolhouse, a carpenter shop, a boat ways, a lumber storage warehouse, an administrative building, and a recreation hall that could seat approximately 300 persons. At night the main wooden walkway facing South Pass was lit by reflector-backed electric lights on creosoted timber poles about one hundred feet apart. The main walkway was fifteen feet from the bulkhead at the water's edge. Between the bulkhead and the walkway grew oleander bushes which bloomed pink and white in the summer.

During the years Claude Buras lived in Port Eads the United States Navy had a Naval Compass Station at Port Eads as an aid to navigation. A Chief Petty officer and his family lived on this station and enlisted men had a barracks and mess hall. It was located at the downstream end of the Port Eads reservation on the east bank and was abandoned in the late 1930s (*Buras 1986:14-17*).

The recreation hall at Port Eads was used for church services, school plays and graduations, dances, public meetings, and Sunday movies. This hall had a foot-lit stage and dressing rooms at one end, large windows on each side and a clerestory roof with windows that could be opened to cool the hall. In the 1920s silent movies were shown in this hall to the accompaniment of a *Victrola* phonograph, which played such pieces as "Barney Googles and His Goo Goo, Googly Eyes" while stars like Charlie Chaplin, William S. Hart, and Tom Mix emoted on the screen (*Buras 1986:14-17*).

Boats closely connected to the life and history of Port Eads included the bar pilots' boats, the *Underwriter* and the *Jennie Wilson*; the lighthouse tenders vessels, the *Magnolia*, *Sun Flower* and *Camellia*; the lightship *South*; and the Corps of Engineers vessels, the survey boat *Balize* and the motor-tender tug *General Reese*. Most of these boats worked on South Pass from the 1880s through the 1940s (*Buras 1986:14-17*).

The bar pilots' station on South Pass continued to be used after South Pass was abandoned in 1973 until it was badly damaged by a storm in 1983 (*Weinstein 1984:56*). Since then it has been destroyed by fire.

A few boat houses and fishing camps have been put up in recent years in the vicinity of the Lighthouse on the west bank of South Pass. Recent maps indicate that a small Coast Guard station, a landing stripe, and a helicopter landing pad existed briefly on the west bank of South Pass. But nothing remains of these today. South Pass has become again what is was in antebellum times—a restful backwater at the mouth of the mighty Mississippi (Figure 29).

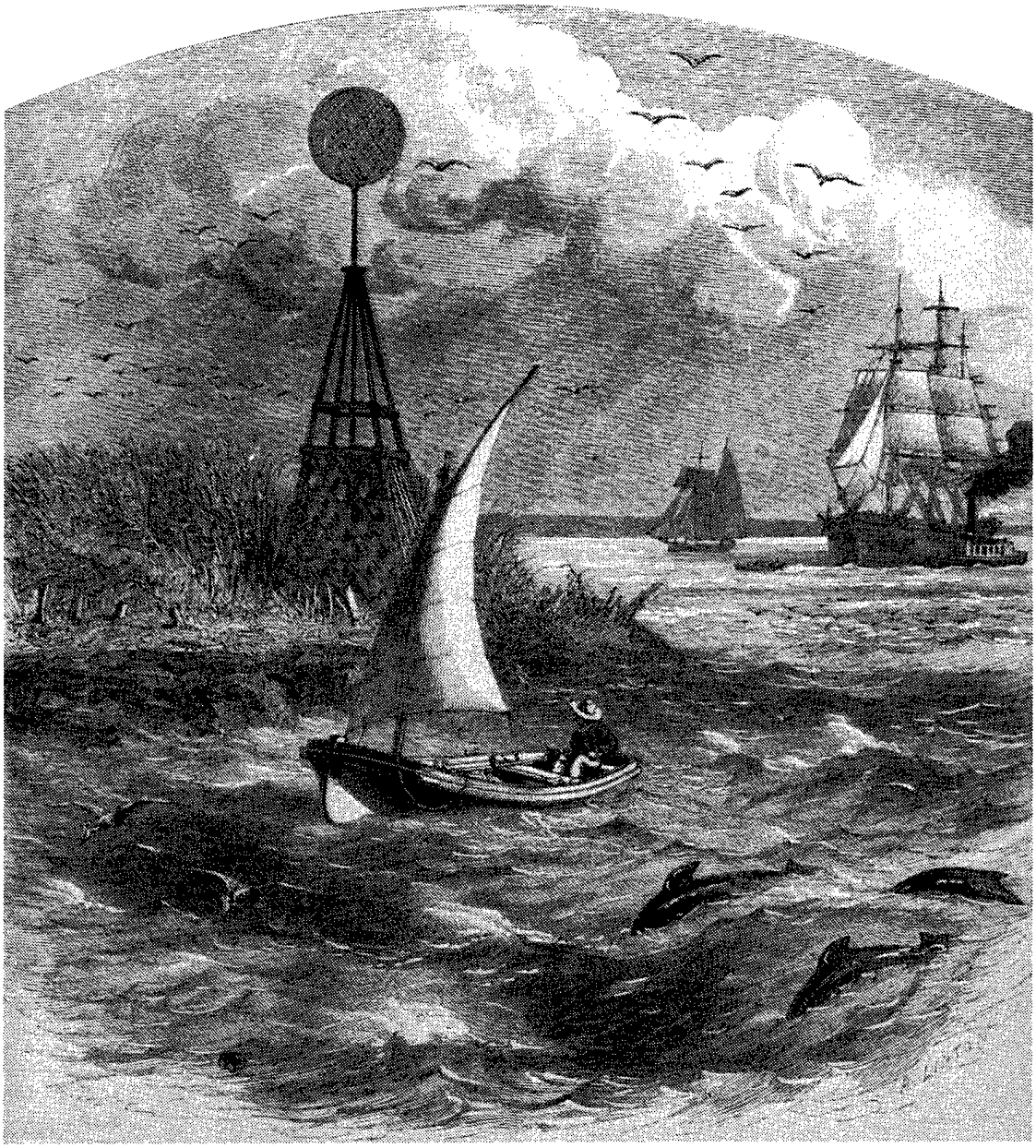


Figure 29. A sketch of South Pass after the Civil War and shortly before jetty construction.
(courtesy Southeastern Louisiana University Archives)

CHAPTER FOUR
MARINE INVESTIGATIONS

BY
ALLEN SALTUS

CHAPTER FOUR - MARINE INVESTIGATIONS

INTRODUCTION

The marine survey was performed in July of 1995. The marine survey equipment consisted of a positioning system, marine magnetometer, side scan sonar, and a fathometer. The positioning control was obtained with a Magnavox Differential Global Positioning System (GPS). The GPS utilized a single shore station to establish the differential in signals received from a suite of satellites. The GPS system aboard the survey vessel included a link from the GPS to a monitor which provided navigation and steering information with position data of the survey points along the lines stored in the computer. A Geometrics 806 magnetometer, an EG&G 259 side scan sonar, and an Innerspace model 448 fathometer made up the survey equipment which was used in this study.

The survey methodology included: 1) 100 foot lane spacing in lieu of 150 foot lane spacing to cover any potentially significant anomalies; 2) shotpoints were recorded at 100 foot intervals along the survey lines; 3) the magnetometer background noise was less than +/- 3 gammas; 4) the magnetic data was recorded utilizing a duel pen record displaying both a 100 and 1000 gamma scale; 5) the magnetometer sensor was deployed 80 feet behind the survey craft outside of the survey vessel's magnetic field; and 6) positioning data was reduced to the Louisiana Coordinate System.

BACKGROUND RESEARCH

Wreck lists and associated documentation, including various annual reports of the Chief of Engineers, were reviewed to develop an understanding of the potential vessel losses which could lie in the South Pass study area with extra consideration given to the two study areas scheduled for marine investigation. These reports represent accidents—either collisions and/or wrecks, although the former do not always represent full site deposition. The vessels could have gone on after the accident, leaving nothing from the event or the entire vessel could have been a loss. Table 1 lists vessels that could be present within the study area as a whole.

Four vessels, for which we know the names, have been documented as falling within the two study areas. Three of these, the *Wild Wagoner* (1876), the *Julia* (1915), and the *Doris* (1985), are placed within the study area based on specific locational data provided by the Corps of Engineers data base coordinates. The fourth, the *S.J. Dickson*, lost in 1901, has coordinates which fall seaward of Area 1. However, other documentation states that the vessel, or portions of it, ended up on the jetty, placing it within the study area. Five other wreck locations lie within these two study areas. They appear on bathymetric charts dating 1852, 1875, 1876, 1881 and 1892. The wreck on the 1876 map is labeled as an "unnamed Barge," and the vessel on the 1881 map is denoted as a model barge. The names and nature of the remaining three craft are unknown.

Additionally, there is a record of vessels that collided at South Pass. Remnants of these may or may not be present. Examples include *Theodora Weems* with the *SS Hiredia* in 1915, *Detroit* with the *SS Augusta* in 1919, *Chas Chamberlain* with the *SS Hise* in 1903, *Columbia* with the *U.S. Gov. coal barge* in 1920, and *Patsey* with the *SS Jamaica* in 1920.

Table 1. Potential shipwrecks in the project area.

SHIP NAME	DATE	SHIP NAME	DATE
Unidentified	1852	Unidentified	1900
A.B. Chambers	1860	Unidentified	1900
Tabitha	1875	*S.J. Dickson*	1901
Unidentified	1875	*Taurus*	1912
Unnamed Barge	1876	*Julia*	1915
Wild Wagoner	1876	*Fairhope*	1918
Governor Morton	1877	*Catania*	1920
Unnamed Model Barge	1881	*Louisiana* (screw steamer)	1926
Sam Houston	1883	*Louisiana* (steamship)	1926
Laura	1884	*H. T. Deflaredeleben*	1934
Taurus	1885	*Dorothy Gloria*	1950
Charles Luling	1892	*Compadre*	1953
Unidentified	1892	*Pamela M.*	1965
Henry C. Winship	1897	*Doris*	1985
Unidentified	1900		

PROCEDURAL CONSIDERATIONS

Bathymetric Survey and Anomaly Interpretation

Several types of geophysical equipment are useful in the survey of the underwater environment. They include the side scan sonar, fathometer, and subbottom profiler—all sonar devices.

The side scan sonar allows a picture of the seafloor or river bottom to be recorded. Limitations of this type of equipment are created by several factors, including the geometry of the sensor in relationship to the seafloor. Objects will not be detected if the survey environment is not correct; problem areas may include tow depth, line direction related to seafloor feature, dissolved air in water column, buried objects, etc. The side scan sonar data are useful, acting like aerial photography, noting objects on the bottom, sediment type, sea floor scars, and topography.

The fathometer records a series of water depths which can be plotted. For the archeological survey it is useful when run with the magnetometer to understand the general mass of the magnetic anomaly. Somewhat more important, these data can be plotted as a topographic projection underwater called a bathymetric projection. This projection is used to reveal bottom irregularities in the seafloor which result in hydrological disturbances caused by foreign objects such as trees, shipwrecks, cars, trucks, or features such as bridges, wharfs, weirs, or jetties. Bathymetric features associated with the magnetic record tend to increase site potential and further delineate the location of cultural material on the seafloor or in a shallow burial state (*Saltus 1985*).

The subbottom profiler is similar to the fathometer, but penetrates the seafloor providing a stratigraphic record under the survey vessel. The limited field of view tends to limit this equipment to locating and delineating potential prehistoric site areas. Other limiting factors include sediment type, sands, gas, shallow water depths, and resolution. Sound penetrates gas and some sands poorly. Data in shallow water tends to be affected by the sharp seafloor echo where the only unaffected zone in the data under the seafloor is equal to the water depth. This is seen as multiple seafloor echos until the useable data is masked. Resolution in these data generally varies in response to the power of the sound source—the greater the power, the deeper the penetration, but the resolution decreases.

Magnetic Survey and Anomaly Interpretation

Magnetic surveying involves measurement of the earth's magnetic field intensity, in gammas, using a magnetometer. The present study is concerned with the application of magnetometers and bathymetry in the search for shipwrecks in Area 1 and Area 2 and to identify and delineate any historic remains relating to Port Eads. Details on the physics and mechanics of magnetometers are discussed elsewhere (e.g. *Aitken 1958; Breiner 1973; Pearson and Saltus 1990*). A variety of objects and materials, including some buried archeological features, cause localized disturbances, or "anomalies," in the earth's magnetic field that can be detected with a magnetometer. Archeological objects typically located by magnetic survey can be divided into three categories: (1) iron or other ferrous materials; (2) burned features such as fire hearths, kilns, bricks, and daub; and (3) unfired features such as walls and wall trenches, ditches, storage pits, and wells.

The first category is most easily detected, since ferrous objects cause substantial magnetic disturbances. The other two categories generally are detected less easily. They are caused by variations or disturbances within the clay substrata—pyrite concentrations, faults, and various other magnetic fluctuations. The current study was focused on locating large or numerous ferrous objects which could represent portions of submerged watercraft.

Magnetic signatures (anomalies) can be characterized by two nonexclusive factors, strength (intensity) and shape. Both factors are dependent upon a variety of anomaly source characteristics, which include size, shape, and number of objects; orientation and mass; magnetic susceptibility; distance of the anomaly from the point of measurement; and magnetic properties of the surrounding matrix. Magnetic anomalies caused by a single-source ferrous object typically form a positive-negative anomaly pair known as a dipole. The dipole normally is oriented along the axis of

magnetization, with the negative portion located nearer the north pole of the source object. The positive portion of the anomaly commonly is of greater intensity than the negative portion. Monopolar anomalies often are formed by non-ferrous geological features, linear objects such as pipe or long rods where only one end is detectable with the magnetometer, and dipolar anomalies in which only one of the poles is detected in the search pattern.

Historic shipwrecks, which often contain numerous ferrous objects, usually produce complex magnetic signatures comprised of multiple dipole and/or monopole anomalies. This class of signature is apparent particularly when the wreck is scattered and dispersed.

Anomalies of archeological interest can vary from several hundred gammas or more to less than one gamma, depending upon the characteristics and orientation of the source material and its distance from the point of measurement. As a rule, the strength of an anomaly is proportional to the inverse cube or square (depending on orientation) of the distance between the source and the point of measurement. Because of this rapid decline in anomaly strength, objects near the sensor are more likely to produce marked variation in magnetic intensity than are more distant objects. A variety of techniques have been developed to estimate distance of the anomaly from the sensor, all of which have varying degrees of error (*Breiner 1973*).

Even though a considerable body of magnetic signature data for shipwrecks is available, specific signatures cannot be positively associated with shipwrecks or other features or objects. The variation in iron content, condition, orientation, and distribution of a shipwreck all influence the intensity and configuration of the anomaly produced. In general, the magnetic signatures of moderate and large watercraft, or portions of watercraft, are large in area, minimally 24m to 27m in diameter across their smallest dimension, range from moderate to high intensity (greater than approximately 30 gammas) at a distance of six meters, and may or may not be complex in nature.

The complexity of an anomaly is influenced largely by distance of the sensor from the source. For example, a magnetic anomaly recorded with the sensor located close to a shipwreck may exhibit a complex configuration, as the sensor records individual ferrous objects. At a greater distance, the signature may resemble a single dipolar anomaly, with the entire wreck recorded as a single object. Riverine anomalies smaller than nine meters by 18m eters generally are considered not significant since they normally represent flotsam or jettisoned material like paint cans, 55-gallon drums, camshafts, small anchors, small vessel parts, cable, chain, tires, and appliances. Examples of magnetic signatures of identified anomalies are presented in Table 2. The hull remains of a small steamboat would be expected to produce an anomaly over 100 feet in a shallow river and more if the machinery was not salvaged from the watercraft.

Other Considerations

Other considerations for anomaly significance concern cartographic reconstruction of waterways and anomalies which represent or are of a geological nature. Portions of rivers often are not old enough to have remains of historic watercraft. This is especially true of the Mississippi and

Red Rivers, where natural dynamic hydrological processes are in operation, along with manmade modifications. In this survey subsidence, alluvial fill, and jetty construction appear as dynamic forces dictating the association of the seafloor to the water level.

Table 2. Magnetic signatures of known objects.

OBJECT	SIZE OF OBJECT (ENGLISH/METRIC)	AREA (FEET/METERS)	MAGNETIC GAMMAS
Single Objects			
engine camshaft	20" x 2"/.508m x .0508m	50' x 45'/15m x 45m	45
cast iron soil pipe	10'/3.048m long	65' x 45'/20m x 14m	1407
iron anvil	150 lbs/68kg	26' x 26'/8m x 8m	598
cable	120'/36.57m	200' x 200'/61m x 61m	75
iron kettle	22'/6.7m diameter	23' x 23'/7m x 7m	200
iron anchor	6'/1.82m shank	270' x 80'/82m x 24m	30
Multiple Objects			
pipe and bucket	8'/2.4m pipe	60' x 50'/18m x 15m	250
two pipes	10'/3m and 3'/.91m	110' x 110'/34m x 34m	450
burn pile	8' diameter x 8" high/ 2.4m diameter x .203m high	40' x 30'/12m x 9m	20
Shipwrecks			
coastal sailing craft-wood	90' x 20'/27.43m x 6.09m	250' x 150'/76.2m x 76.2m	35
wooden steamer Lotawanna	180' x 47'/55m x 14m	350 x 300'/107m x 91m	310
wooden steamer Spray	140' x 18'/43m x 6m	210' x 160'/64m x 49m	520
Schooner James Stockton	55' x 90'/17m x 6m	130' x 90'/40m x 27m	80
Ocean Merchant El Nuevo Constante	126' x 26'/38m x 8m	250' x 150'/76m x46m	65
Ironclad CSS Tuscaloosa	150' x 40'/46m x 12m	300' x 200'/91m x 60m	4000
gasoline sternwheeler	50' x 10'/15m x 3m	200' x 140'/61m x 43m	450
machinery removed, 1840s towboat	65' x 13'/20m x 4m	110' x 60'/34m x 18m	110

Some magnetic anomalies are geological in nature. Ferrous conglomerates such as pyrites as well as some clays have a magnetic quality and can produce magnetic anomalies. In some studies anomalies of four to 20 gammas have been observed. They were believed to be caused by a fluctuating clay strata associated with slump blocks, crossing old channel courses, and current channel mouths. The inherent magnetic quality of the clays is formed when they are deposited in a magnetic alignment. This clay surface in shallow water makes up a fair portion of the ambient magnetic field. If this surface undulates and is close to the sensor the results could effect the magnetic readings. Slump blocks, erosional channeling, and crossing old channels all effect the magnetic record through these undulating surfaces as the distance from the clay source to the magnetometer's sensor varies. The results are changes in the magnetic field which are recorded on magnetometer data as anomalies.

However, not all magnetic anomalies represent shipwrecks or geological phenomena; some are associated with cultural activities. Other factors in interpreting magnetic data in the riverine environment are associated with several site depositional processes. These processes include over bank trash disposal, cultural material slumping into the river as the banks erode, remnant or intact river flow control structures and refuse material at landings. Over bank trash disposal is common in rivers with high banks used either as a dump associated with a "farm" road or home site or as rip rap to impede bank erosion near a home site. At times these two cannot be differentiated.

Cultural material such as houses, outbuildings, fence lines, trash pits, etc. slump into the river as the bank erodes unless they are relocated. Cultural material ends up in the river at landings in the form of refuse or lost material. All of these over bank disposals result in many objects scattered in a given area forming a complicated or complex magnetic area. The intensity varies, with the component cultural material making up the site normally in the low to mid magnetic range, 10 to several hundred gammas, with a relatively long duration. The magnetic duration of the anomaly areas appears to be made up of numerous anomalies trending along a bank. Figure 30 displays one of these complex magnetic areas which defined the site 16LV65, Water Street Docks/Wharf at Springfield, Louisiana (*Saltus 1985*). Cultural material at landings can represent watercraft, especially small low ferrous component craft, along with other jettison, flotsam and lost material. Pipelines also produce complex anomalies along a linear trend with magnetic polarity alternating along its route.

Remnant or intact river flow control structures like weirs, dikes, jetties, etc. also produce complex magnetic areas usually from ferrous cables associated with their construction. Magnetic anomaly areas differ from magnetic anomalies in that magnetic anomalies, single objects, and shipwrecks have one or few magnetic focus or foci and lobes in discrete areas whereas magnetic areas are complex with numerous foci and lobes with lineal trends along one of the river banks. A magnetic foci is the area between the two lobes of a dipolar anomaly where the source of the anomaly most likely would be found.

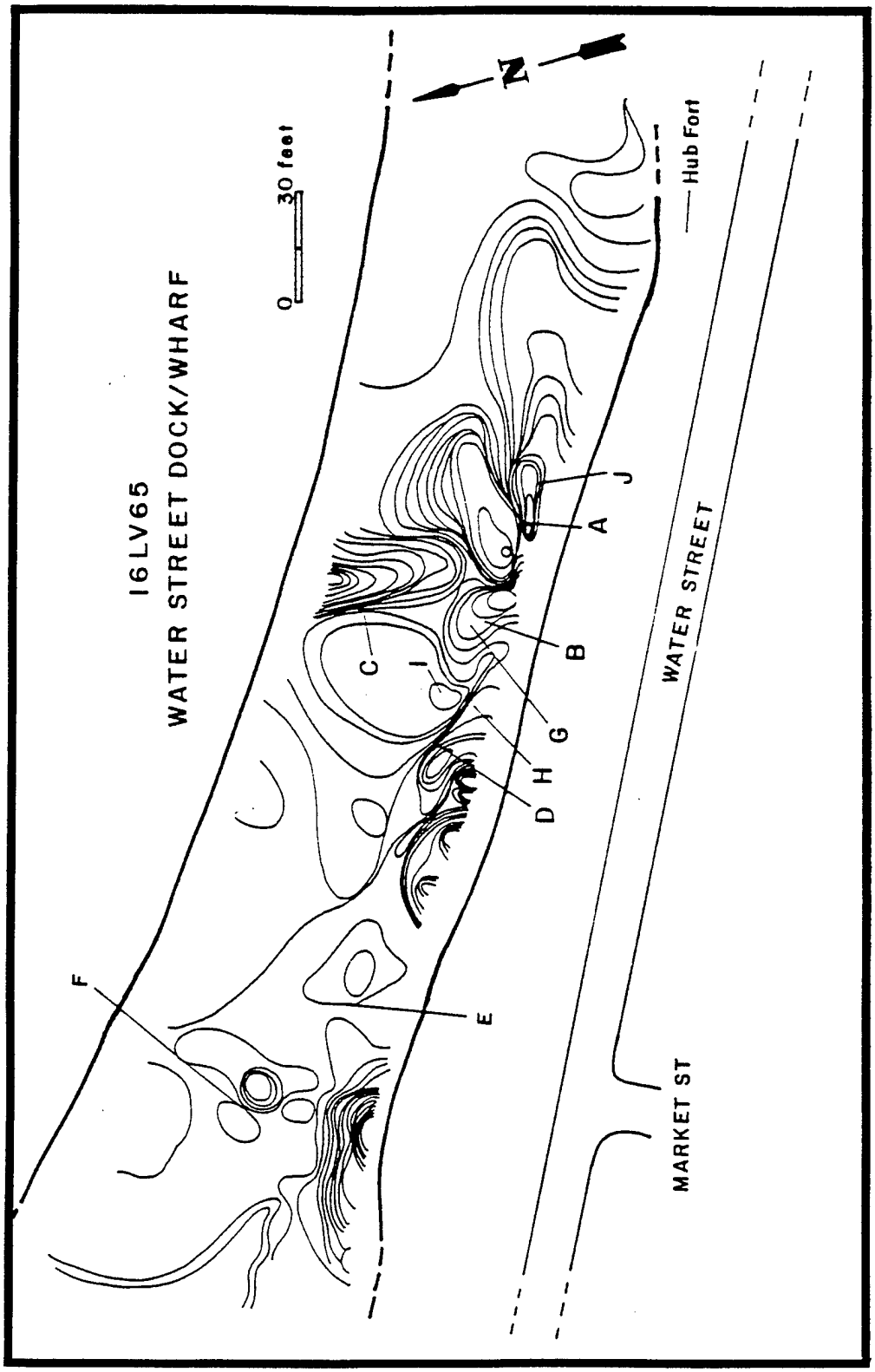


Figure 30. Map of 16LV65.
(from *Saltus 1985:Figure 40*)

STUDY AREA DESCRIPTIONS

For the marine investigations, the project area was divided into two study areas as described below. For reference, each area is labeled on the maps referenced below (e.g. Figure 31).

Study Area 1

The purpose of the survey in Area 1, as defined in the scope of service, was to identify any potential shipwrecks. Area 1 was to encompass an area 4,000 feet wide, east of and adjacent to the east jetty for a distance of 6,500 feet (refer to Figure 31). The survey was designed to start 200 feet seaward of the end of the jetty. Preplotted lines were placed 100 feet apart, parallel to the upriver area of the jetty which arches southward toward the seaward end. This orientation placed the survey at a northwest-southeasterly direction. Additional short lines were designed to cover the area where the jetty arches southward on its seaward end. Lines were run as far to the northwest portion of the survey area as safe navigation permitted; generally, to three feet of water.

As the survey progressed to the east the lines became shorter; line 1 through line 22 are 5,500 feet long, line 23 is 6,000 feet long with each line getting progressively shorter. Line 45 has a length of 5,300 feet. A shallow bar or reef where water depths change quickly from three feet to less than 18 inches within 50 feet was the limiting factor of the survey coverage in the northwestern portion of this survey. To get greater coverage in the northern portion of lines 1 through line 22, we selected high tide to run four additional lines at 150 feet apart in a northeast-southwesterly direction.

Three tie lines were also run in a northeast-southwesterly direction, one in the southern portion of the study area, one in the central portion of the study area and the third across the northern portion. This northern tie line was run as close to the sand bar or reef as navigationally possible and tended to move to the north until the bottom was felt. This provided the best coverage possible with the available equipment. The depth of water varied from two to three feet in the upper end of the study area to slightly over 20 feet in the lower edge of the study area which is within the northern edge of the east-westerly ship fairway.

Study Area 2

Area 2 included the lower end of South Pass from Standard River Mile (Mile) 10.5 Below Head of Passes (BHP) to the end at Mile 13.5 (refer to Figure 31). The purpose of this survey as defined in the scope of service was to identify and delineate any historic remains relating to Port Eads. The survey investigations included taking positions on exposed historic features such as pilings, navigation buoys, etc. The coverage of Area 2 was designed to encompass the lower area of South Pass between the existing bank line and the navigational channel from Mile (BHP) 10.5 to Mile 13.5. This study area was subdivided into upper and lower segments. Three to four lines were executed away from each river bank at 100 foot line spacing in the upper segment, Mile 10.5 to Mile 12.2.

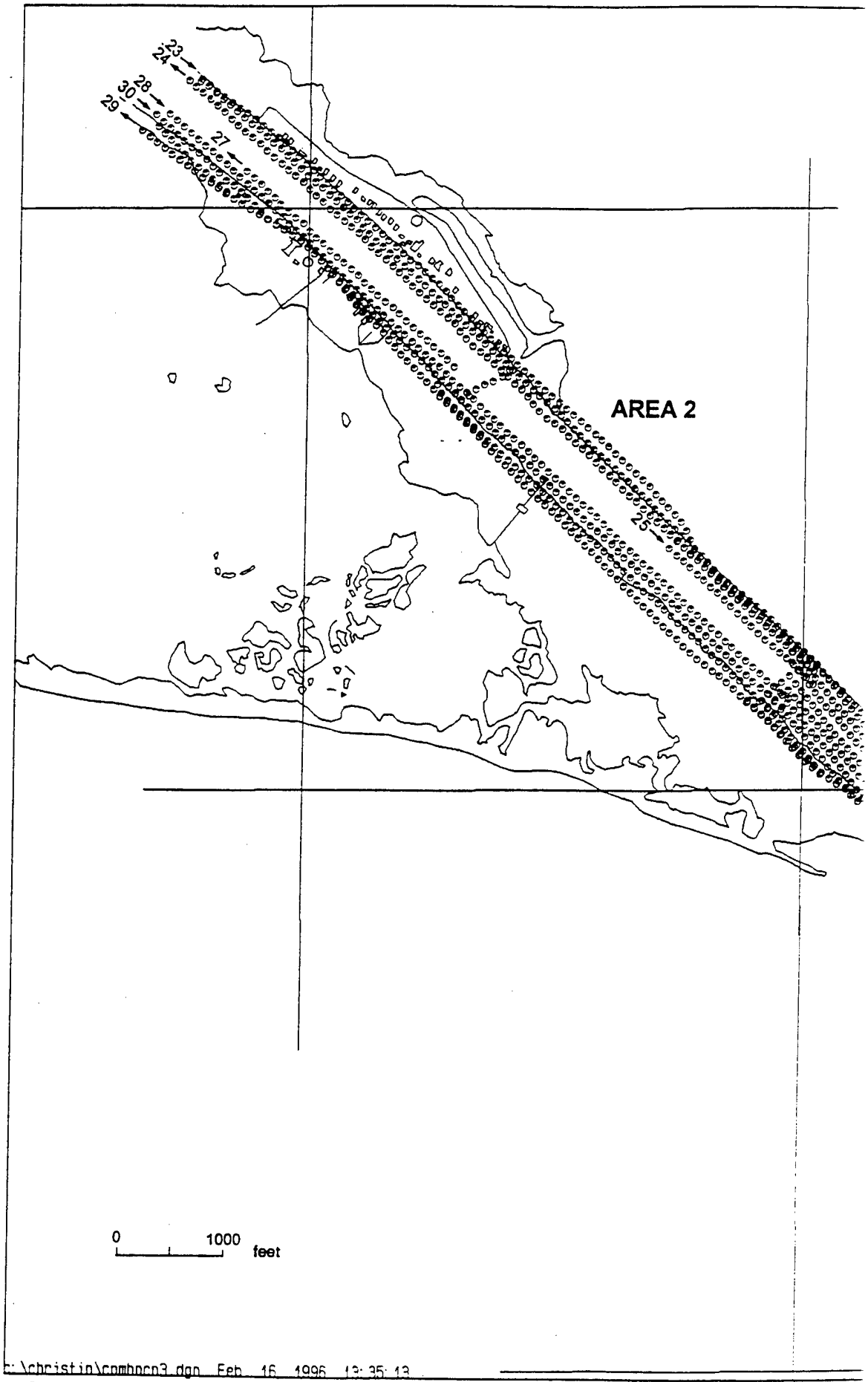
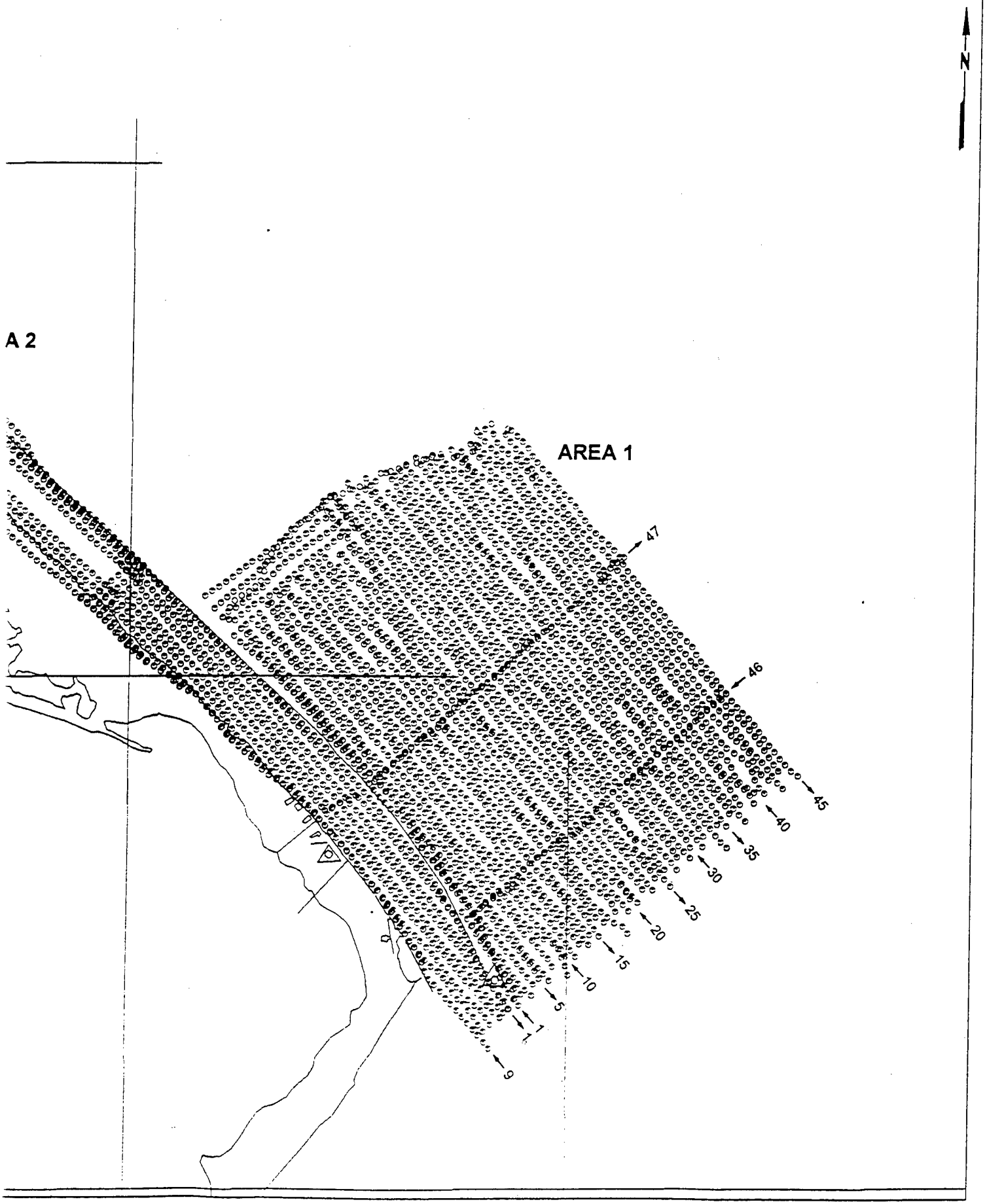
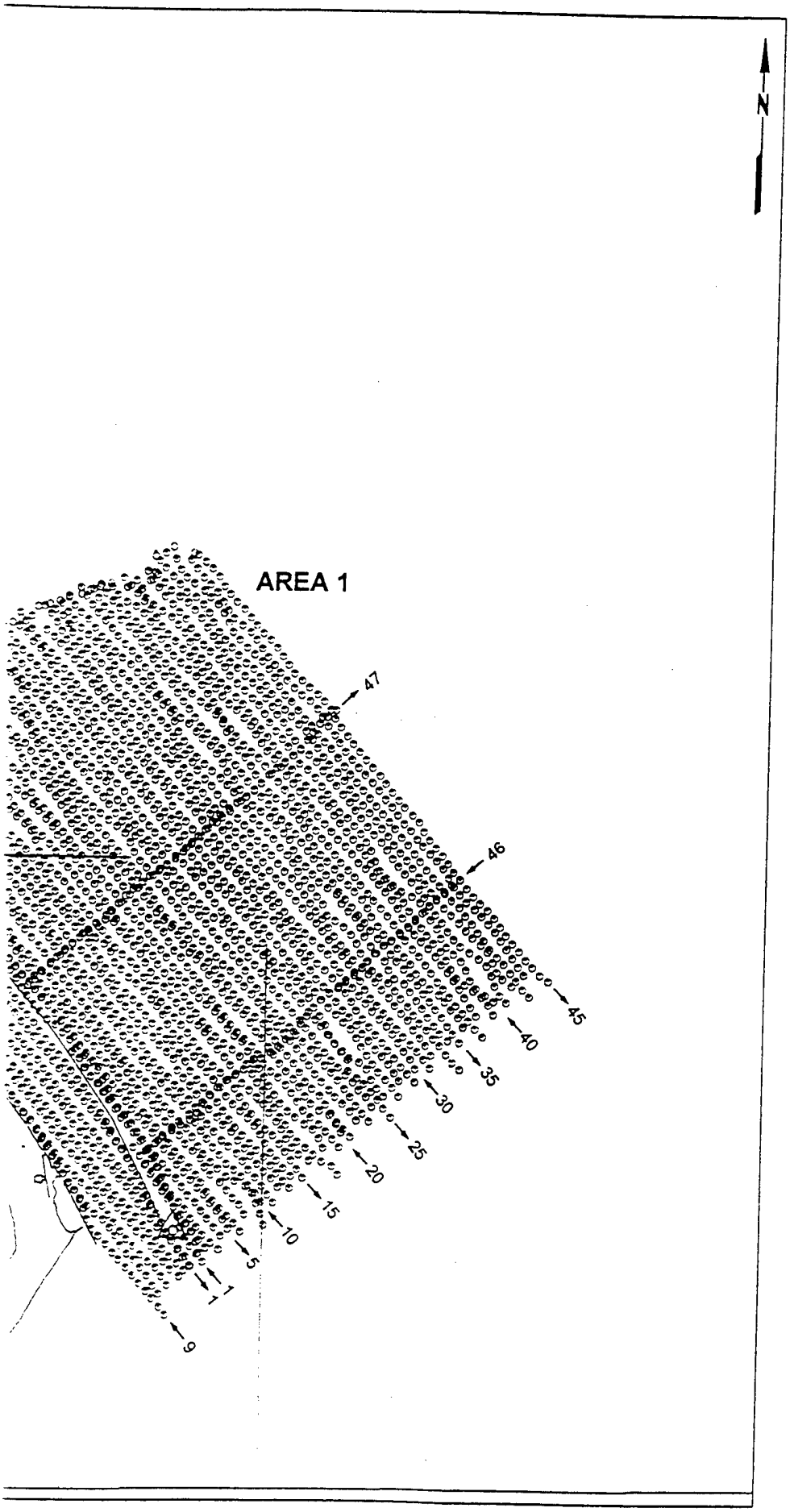


Figure 31. Survey track lines in Areas 1 and 2.


N
A 2
AREA 1
47
46
45
40
35
30
25
20
15
10
5
1
1
9


N
AREA 1
47
46
45
40
35
30
25
20
15
10
5
1
1
9

The lower segment of Area 2 from Mile 12.2 to Mile 13.5 was also surveyed using 100 foot lane spacing, but the entire area between the jetties was covered as it was almost as easy to cover this entire river area as opposed to making many turns required by shorter lines. Positions on eleven prominent or historical features were recorded along with several points established by the terrestrial archeological field crew.

RESULTS

The results of this study are presented in Figures 31 through 34 and summarized below. The results were plotted over a 1922 map to facilitate identification of features associated with the historic settlement and shoreline.

Figure 31 shows the location of the shot points and the direction of the survey track lines for Areas 1 and 2. Figure 32 displays the bathymetric data at a one foot contour interval for these two areas, and Figure 33 shows the locations of the magnetic anomalies and complex magnetic areas. Magnetic contour intervals for Area 1 varied from 10 gammas to 50 gammas either side of the ambient magnetic value and 100 gamma intervals in the areas of the well heads and pipelines. Ten gamma contour intervals are used in Area 2. Figure 34 is a stylized representation of Figure 33 for easier identification showing the locations of the anomalies and complex anomalies in Area 2 and the referenced modern and historical material in both areas.

Area 1

The magnetic data reduction of Area 1, the area east of the east jetty, displays a complex field. The complexity is due to the gas production in this area with 12 wells reported within the study area and two others within close proximity to the study area where their magnetic influence was recorded. The two well sites which lie near but outside the study area are listed as Wells 4 (serial #65237) and 14 (serial #194113). In addition, Wells 9 through 11 share the same locational information (Figure 34 and Table 3). Locational data was obtained for the 12 wells within this study area and one of the two nearby from the Louisiana Department of Natural Resources and Gulf Ocean Services, Gibson, Louisiana. Table 3 lists these well locations.

Along with these modern cultural features there are two linear magnetic features with alternating polarity. These features suggest two pipelines or pipeline routes with multiple flow lines which appear to start and end in a complex magnetic area associated with known well locations. Shallow, two to three feet, circular depressions are seen on the side scan sonar (Figure 35). They are some +/-100 feet in diameter lying in the area of the Apache Corp. structure SP-21-1 (104-1) listed as Number 13 in Table 3. Apache Corp. acquired this well in 1985 according to the Notice to Mariners, No. 37-85 of August 28, 1985, p. 20 (*U.S. Coast Guard 1985*) from Davis Oil who proposed to install the structure in 1983 (*U.S. Coast Guard 1985*).

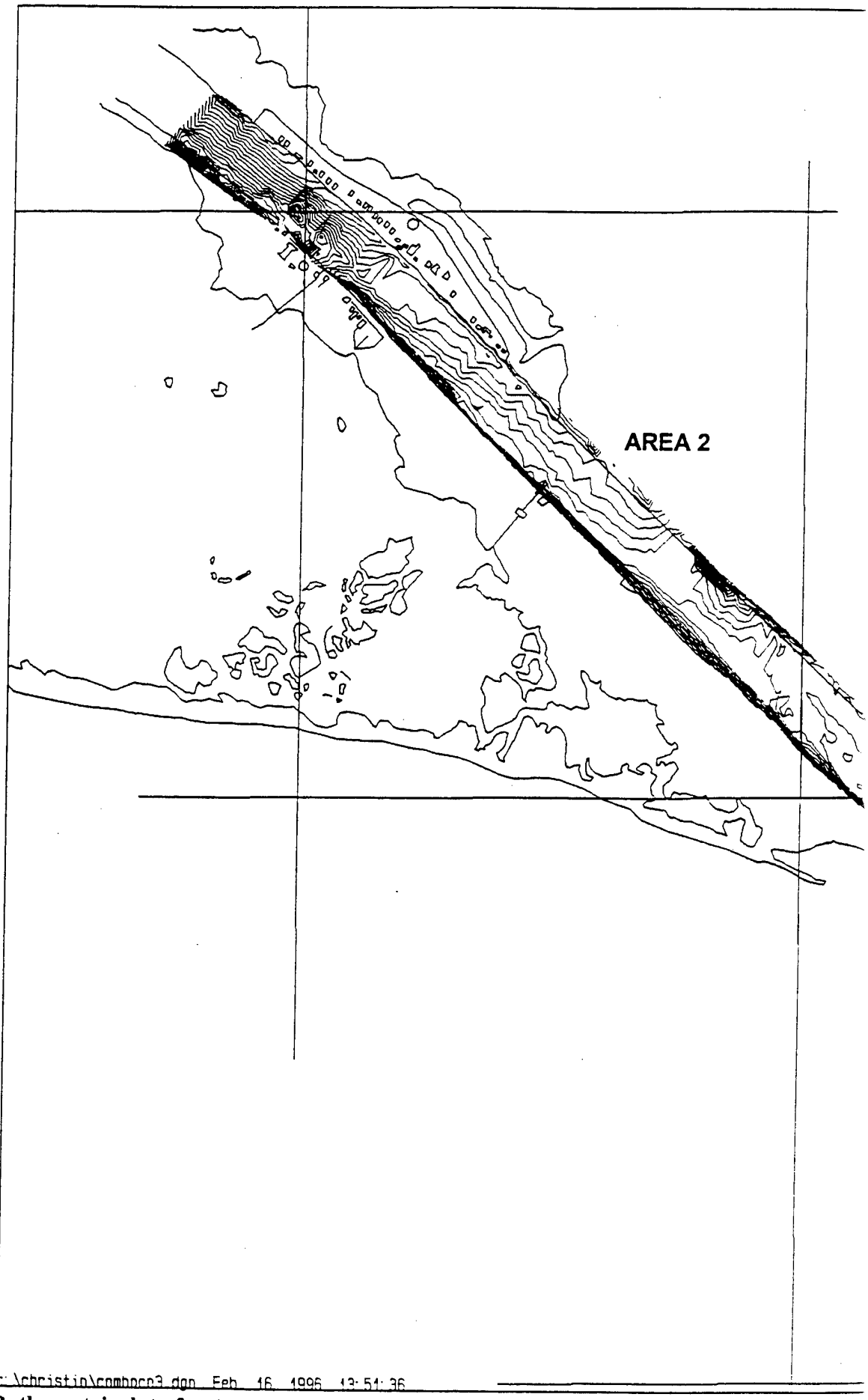
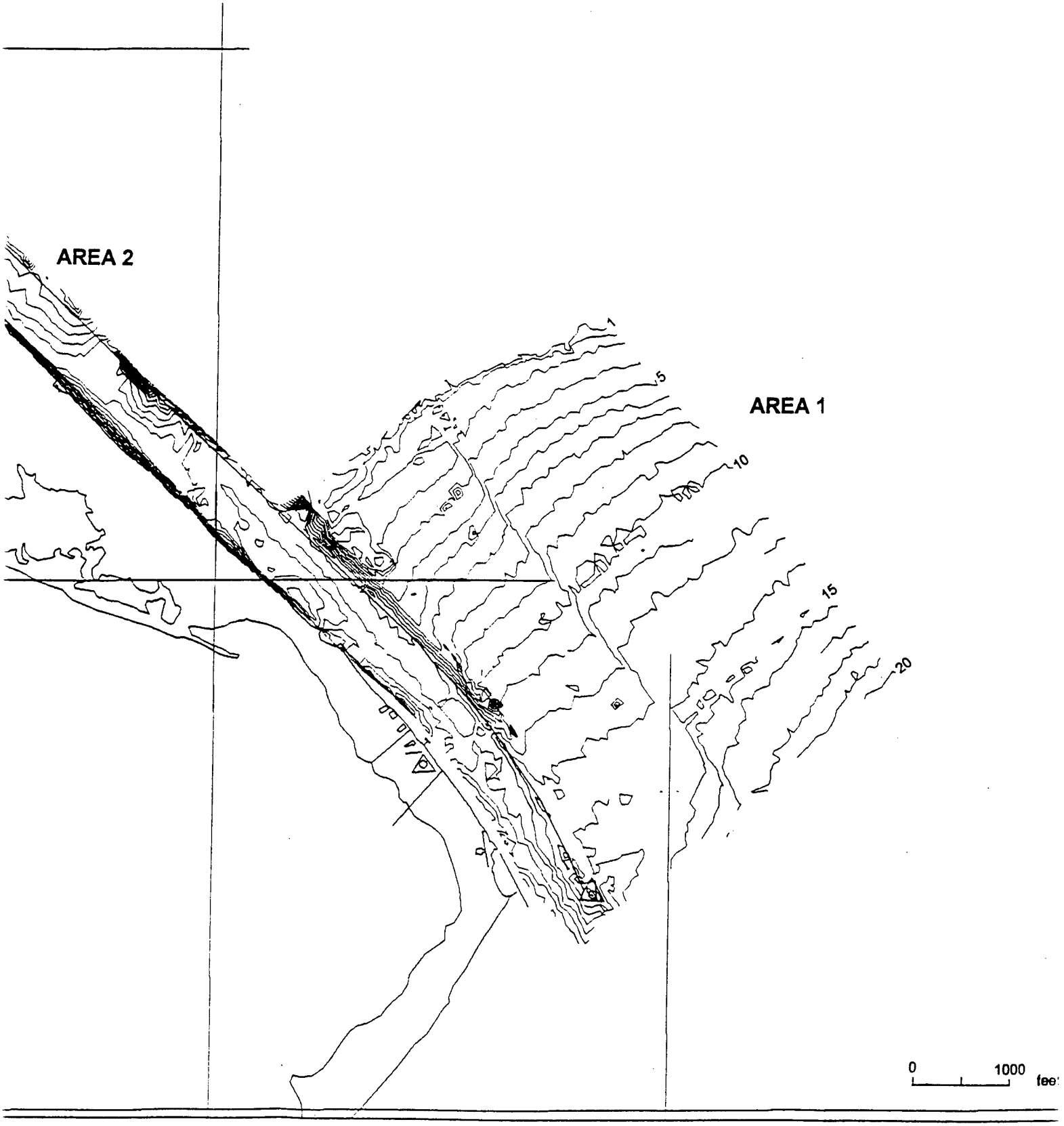
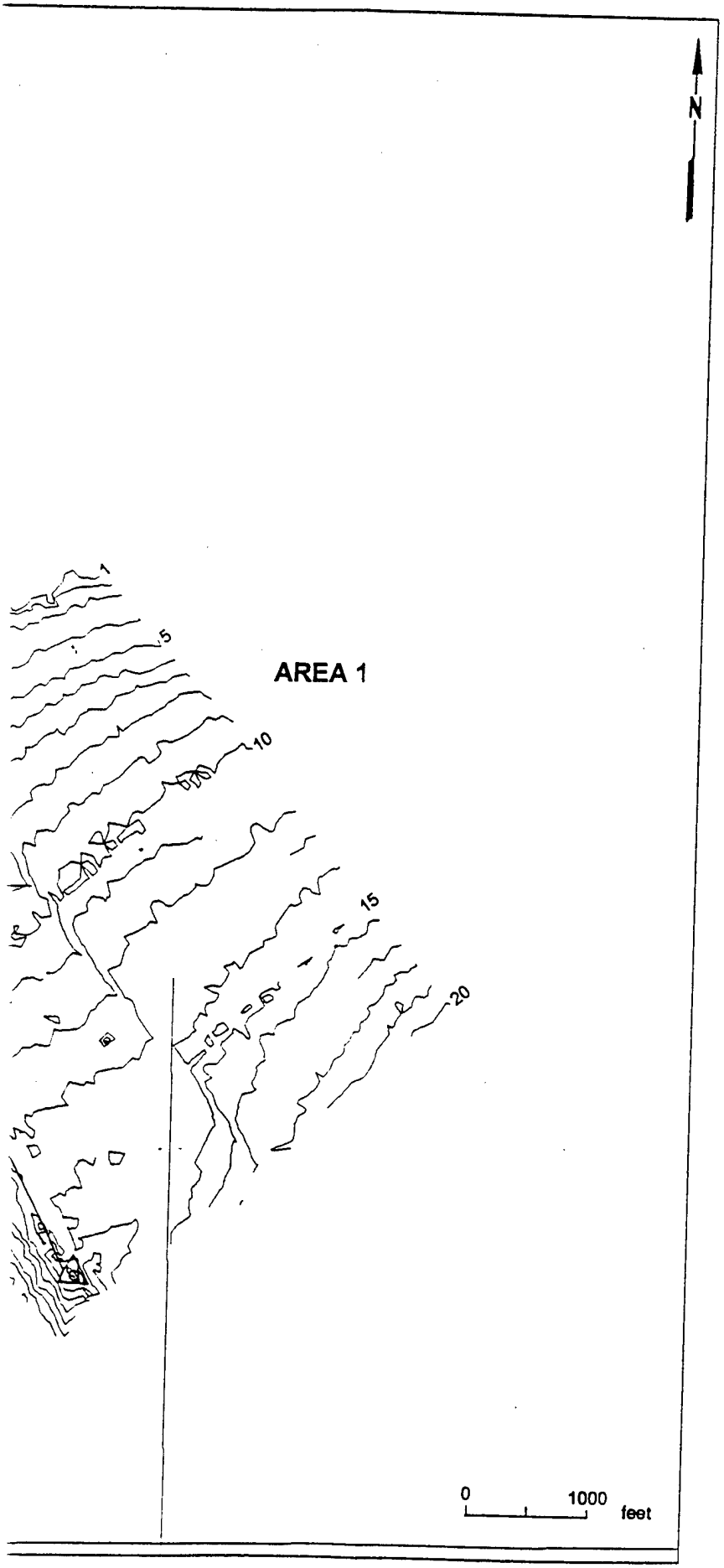


Figure 32. Bathymetric data for Areas 1 and 2. *(One foot contour intervals)*



ntervals)


N
AREA 1
1
5
10
15
20
0
1000
feet

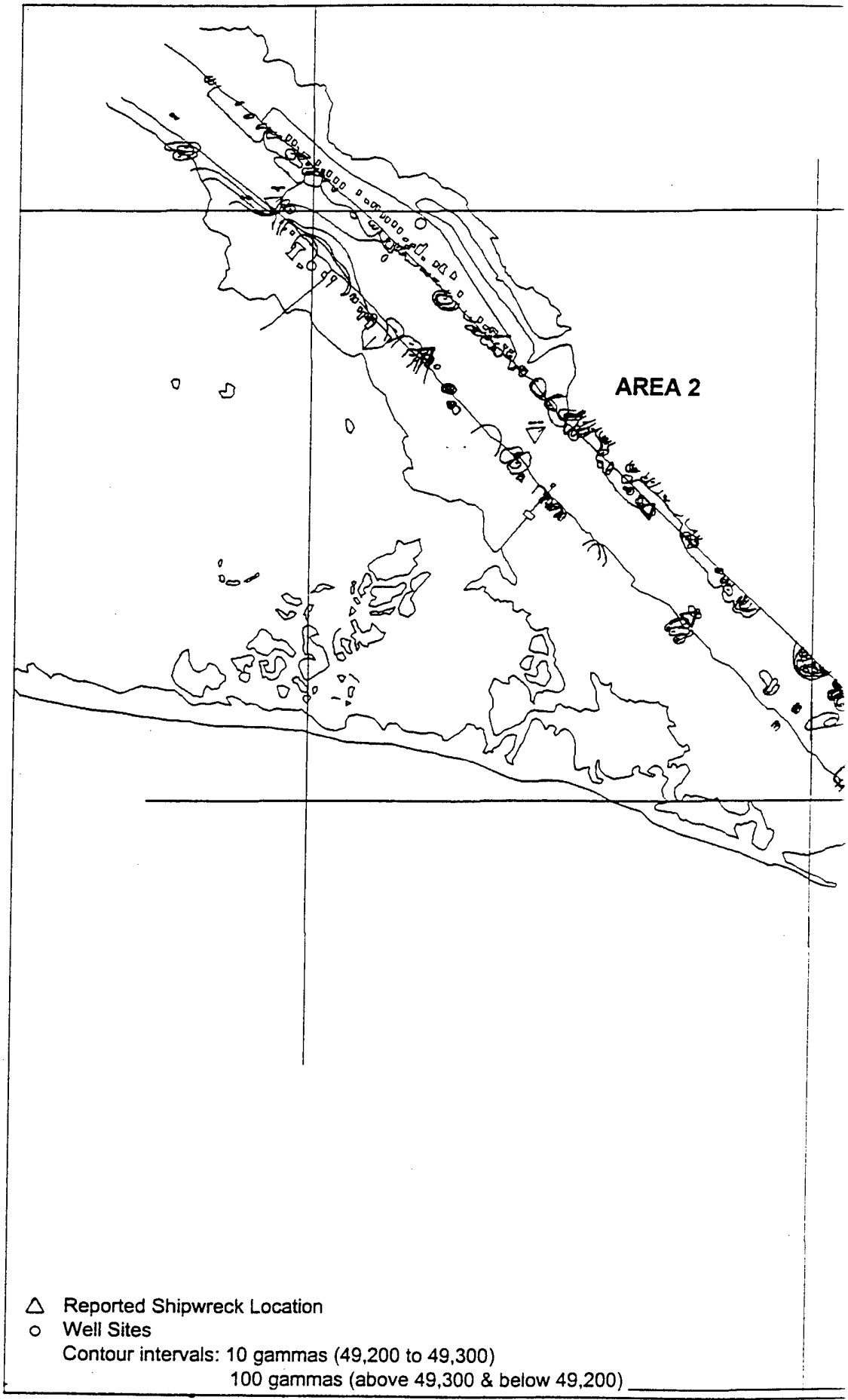
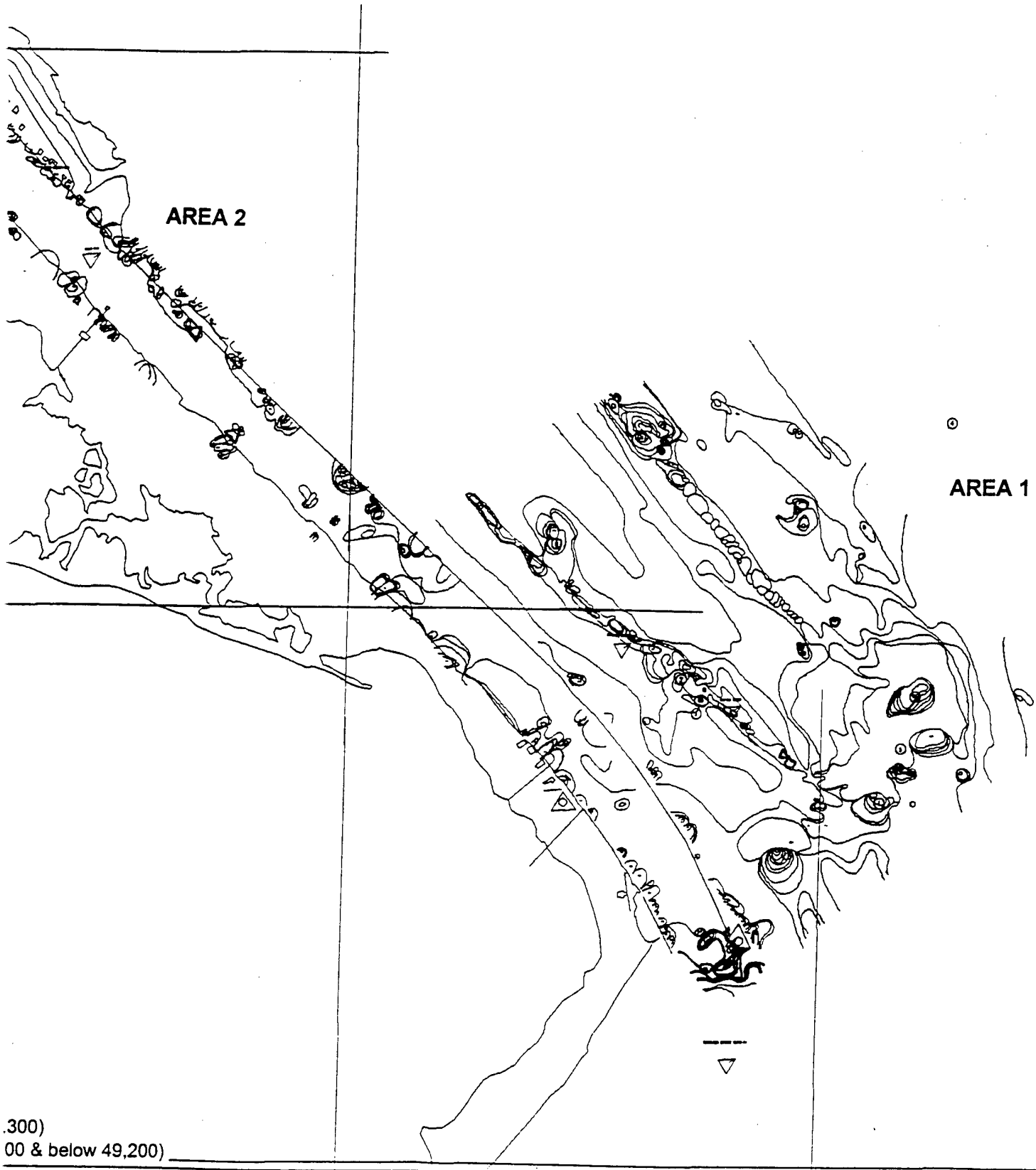
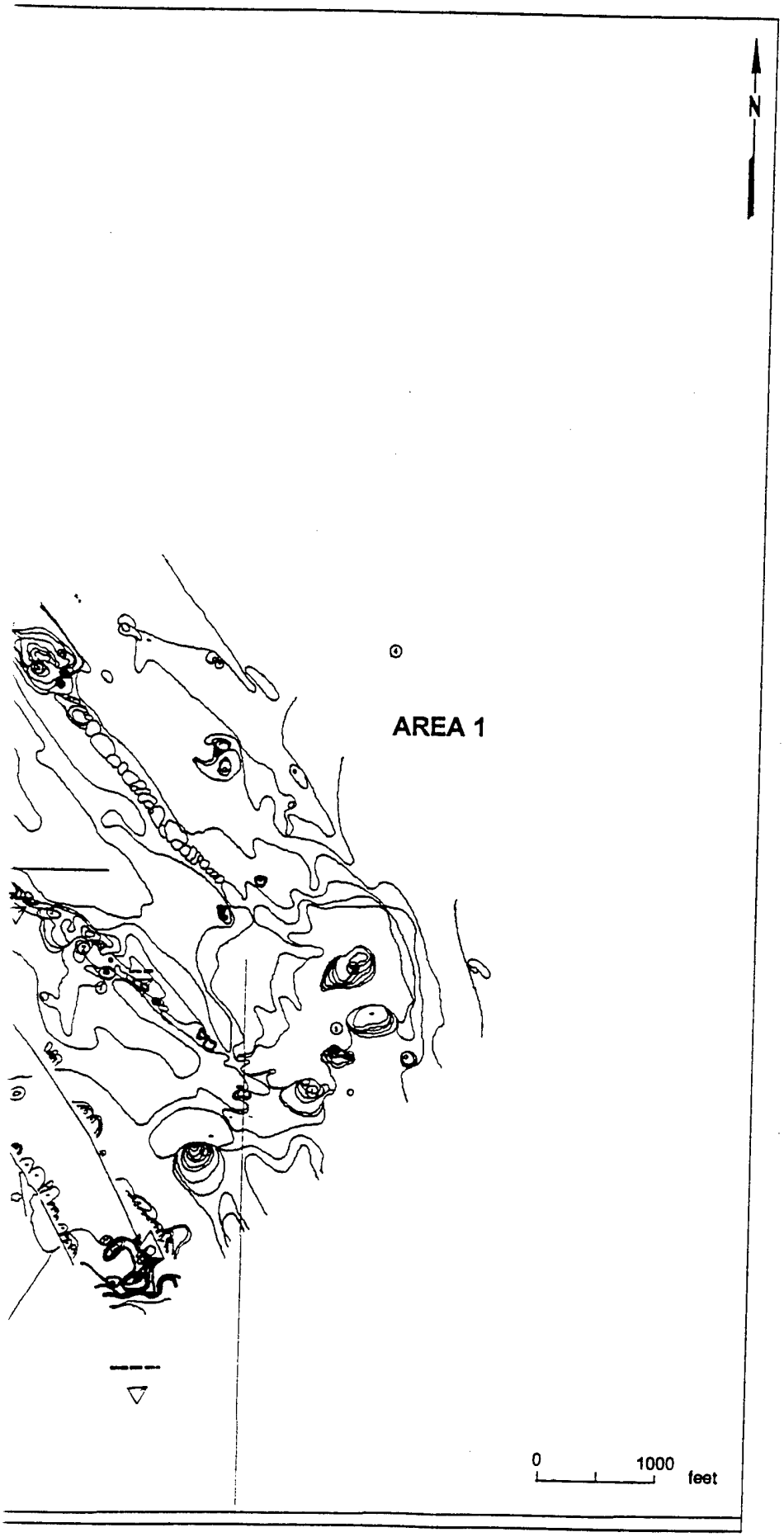


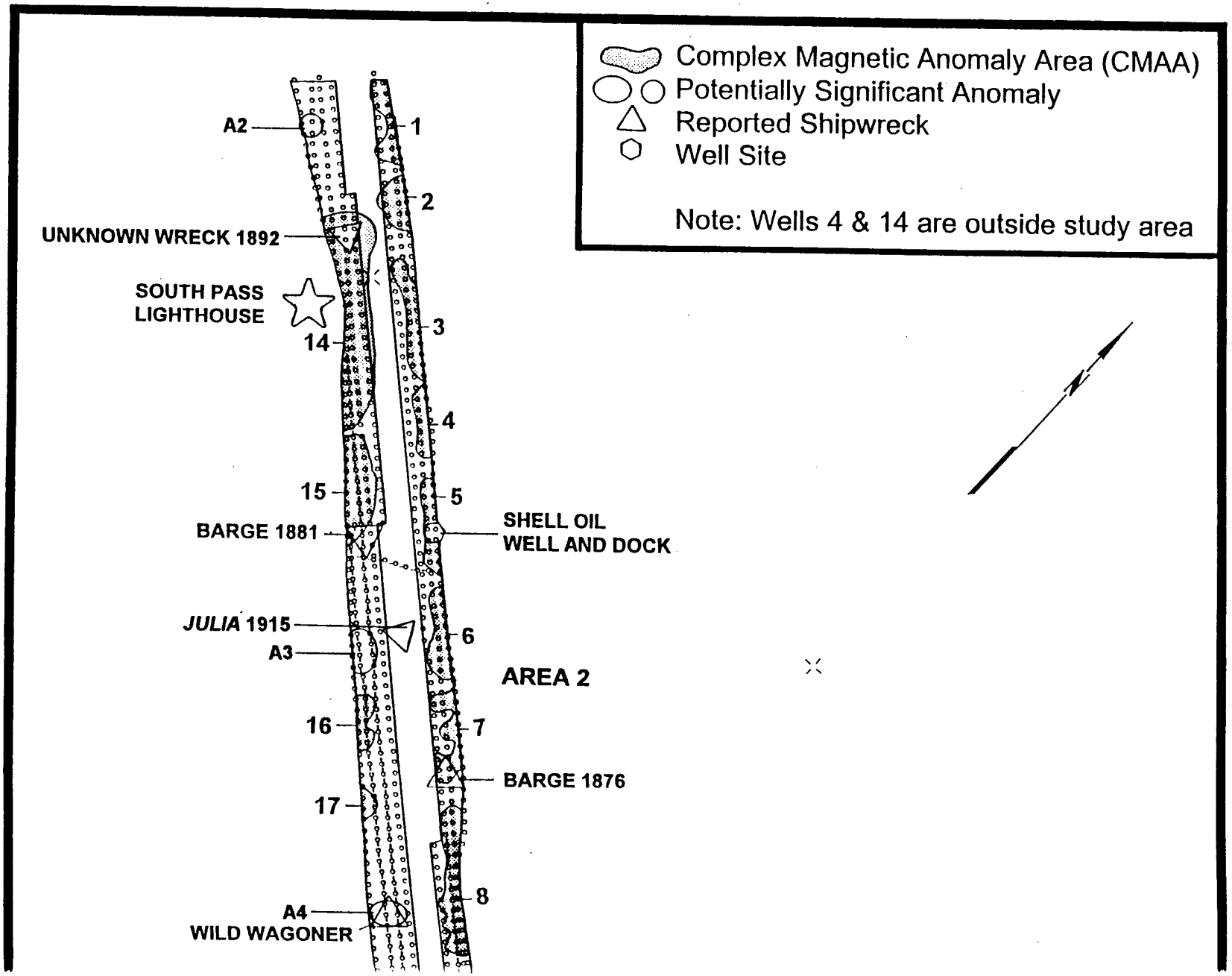
Figure 33. Magnetic anomalies and complex magnetic areas.

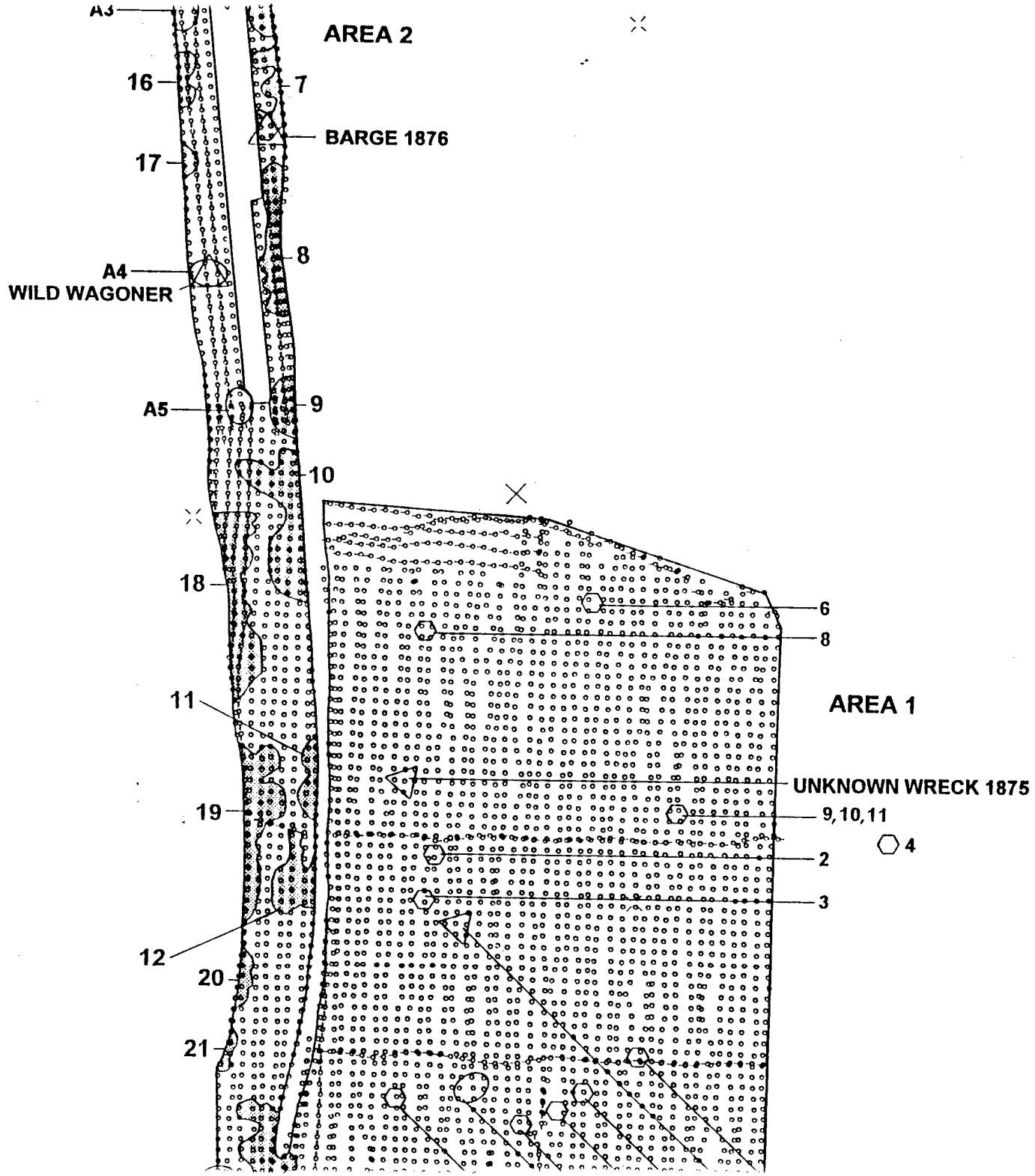


.300)
00 & below 49,200)

gnetic areas.


N
AREA 1
0
1000
feet


Complex Magnetic Anomaly Area (CMAA)
Potentially Significant Anomaly
Reported Shipwreck
Well Site
Note: Wells 4 & 14 are outside study area
A2
1
2
UNKNOWN WRECK 1892
SOUTH PASS LIGHTHOUSE
3
14
4
15
5
BARGE 1881
SHELL OIL WELL AND DOCK
JULIA 1915
6
A3
AREA 2
16
7
BARGE 1876
17
8
A4
WILD WAGONER


A3
AREA 2
16
7
BARGE 1876
17
8
A4
WILD WAGONER
A5
9
10
18
6
8
11
AREA 1
UNKNOWN WRECK 1875
19
9,10,11
4
2
3
12
20
21

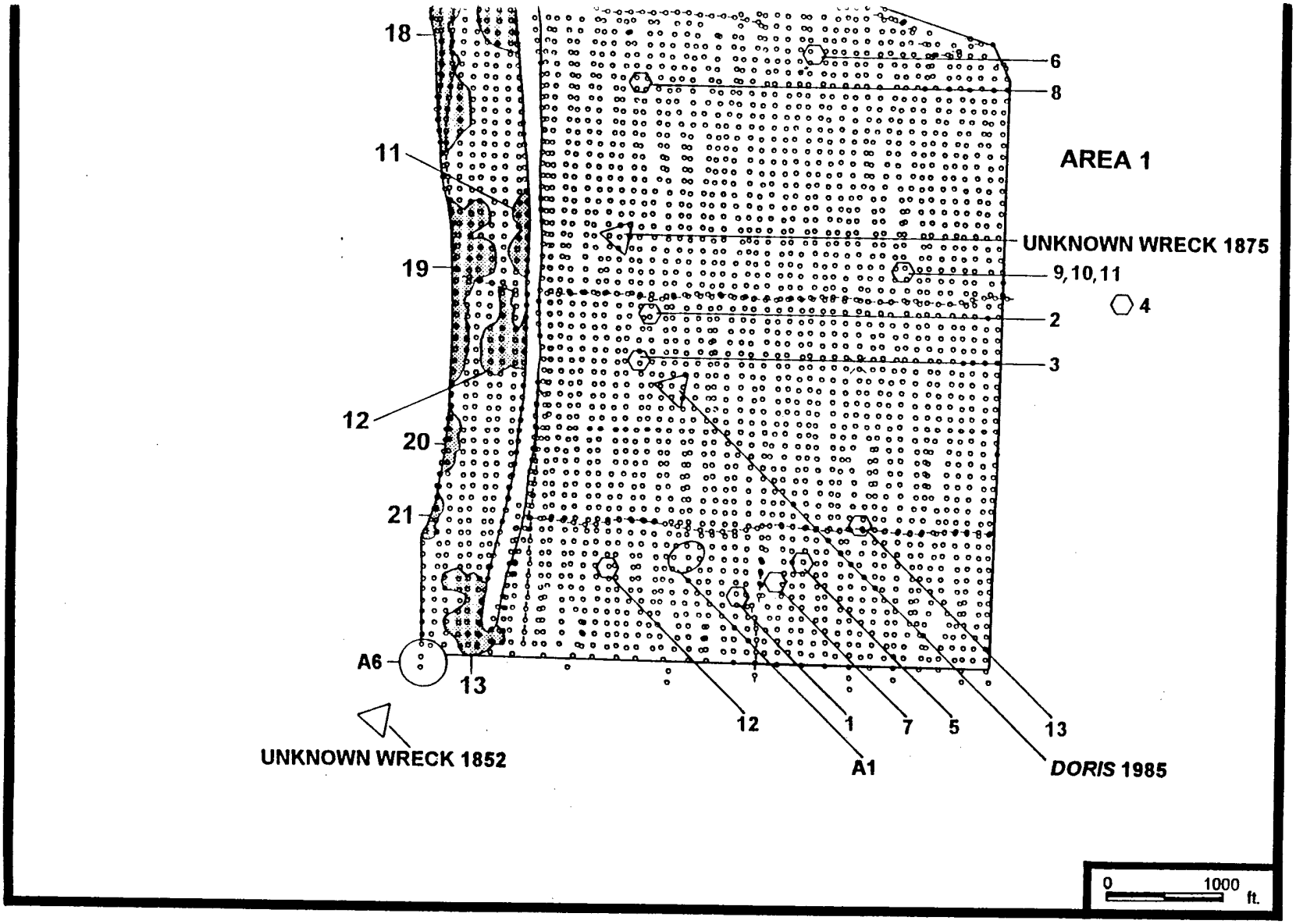


Figure 34. .Stylized representation of anomalies and complex anomaly areas.

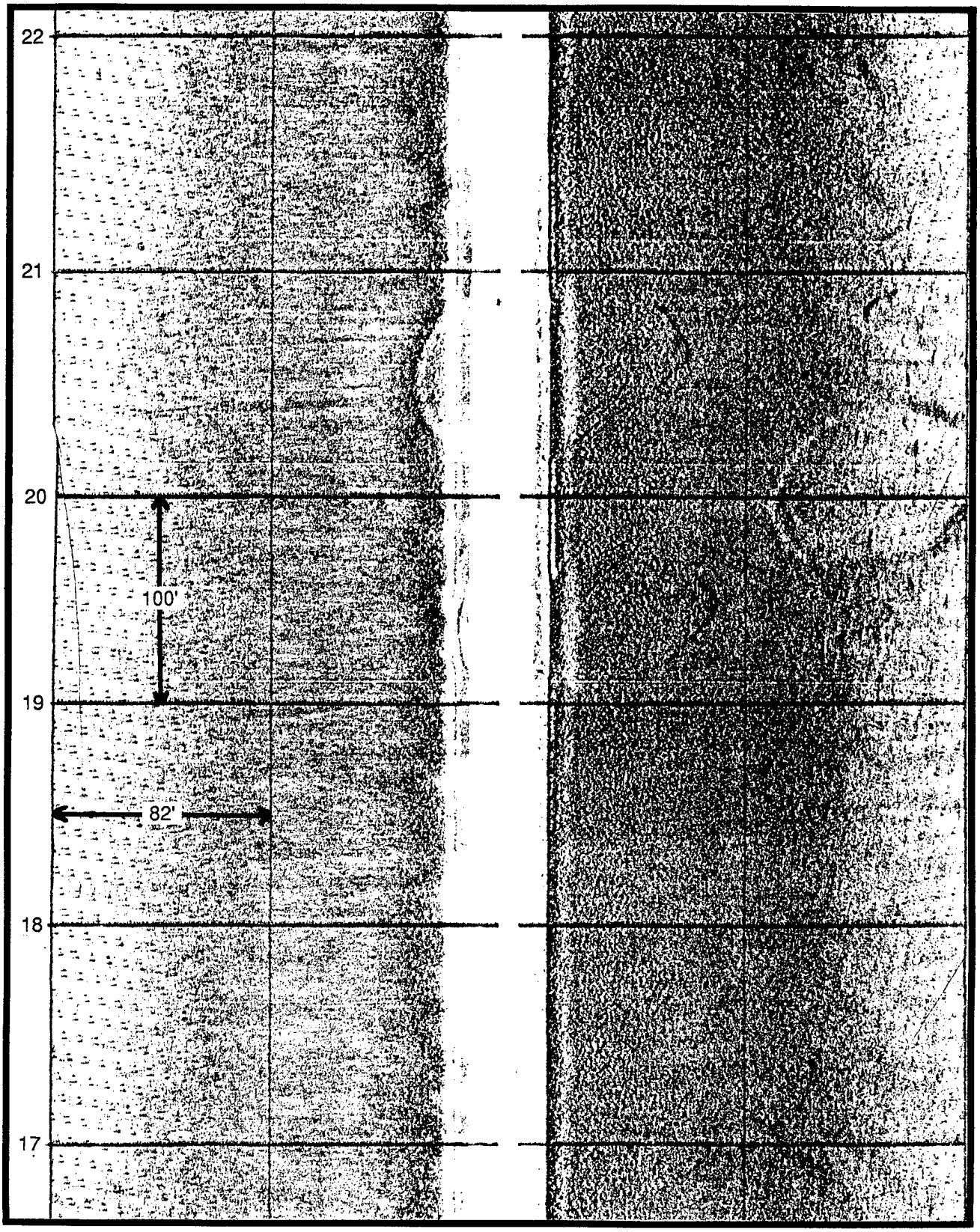


Figure 35. Side scan sonar print out.

Table 3. Area 1 Well Locations.

Number	Serial #	Latitude	Longitude
1.	56139	28-59-38	89-07-55
2.	59121	28-59-51	89-08-19
3.	64339	28-59-48	89-08-16
4.	65237	29-00-19	89-07-45
5.	71775	28-59-44	89-07-51
6.	89233	29-00-18	89-08-24
7.	135726	28-59-41	89-07-52
8.	136860	29-00-06	89-08-35
9.	148519	29-00-09	89-08-03
10.	153787	29-00-09	89-08-03
11.	156619	29-00-09	89-08-03
12.	198042	28-59-32	89-08-06
13.	206031	28-59-49	89-07-49
14.	194113	n/a	n/a

In Area 1, only one magnetic anomaly outside of the magnetics associated with the modern jetty remains represents potentially significant cultural material. This anomaly remains after review of the data which eliminates the magnetics associated with the 14 well sites, two linear features presumed to be gas pipelines, jetty construction magnetics, and small magnetic monopolar and dipolar anomalies associated as arcs around the well site. The latter anomalies, which form an arc or circular pattern around a well head, are thought to be associated with mooring of the drilling rigs. Two are associated 800 feet from Well 6, five anomalies are 800 feet from and around the location of Wells 9, 10, and 11, and four anomalies are 1200 feet from Well 13. The latter anomalies are generally monopolar or a monopolar-like dipole, having much greater intensity at one side of the anomaly, with less than a 75 foot diameter.

The remaining anomaly may also represent mooring material. It is 240 gamma anomaly with two foci: one at x=2,703,210, y=125,660 and the other at x= 2,703,210, y=125,725. A foci occurs in the anomaly where one would most likely find the origin of the magnetics. This anomaly, Anomaly 1, lies within and adjacent to well site magnetics but appears to display an area of some 300 feet by 150 feet, and its complex magnetic nature and spacial size is consistent with shipwrecks as discussed earlier. The *S.J. Dickson* was lost on September 13, 1901 at latitude 28-59-25 and longitude 89-07-35. This position places the wreck location south of our study area, but the WPA wreck report states it sank in a hurricane on the concrete and off the east jetty, South Pass. This wreck reference could conceivably be associated with this anomaly. No evidence in either the side scan sonar or magnetometer data appears to represent the other two reported wrecks within the Area 1 study area including the *Doris*, lost in 1985, or the unnamed shipwreck depicted on the 1875 hydrological chart. However, the massive amount of ferrous material in Area 1 associated with the well heads and pipelines could very well mask the magnetics of historic period shipwrecks.

Outer East Jetty

In addition to the magnetic anomalies discussed above, a long linear bathymetric anomaly trends parallel to the South Pass inner east jetty. It is associated with a series of bathymetric features whose center line lies some 150 to 200 feet east of this jetty. These seafloor features are some 150 feet wide and from 100 to 300 feet long with three to six foot elevations. This trend lies in the general area and orientation of the outer east jetty location as shown on the *Chart of the Mouth of South Pass Mississippi River* in 1879 (*U.S. Engineers July 1879*) when this historic map is compared with the current hydrographic chart.

This feature (or features) does not seem to have any direct magnetic correlation with the exception of several complex magnetic anomaly areas along the survey lanes close to the inner east jetty. These magnetic features appear to be associated with ferrous metal, either metal rods in the jetty or associated with relict portions of the Inner South Pass Light. If the outer east jetty was in the area of the "old crib" as shown on the map accompanying the 1915 Chief of Engineers Annual Report, then very little or no magnetics in the area would be expected: "crib" construction as shown in the sketches by J.O. Davidson in Harper's Weekly (*December 8, 1883*) appears generally void of massive metal fittings.

This bathymetric trend is also visible on the side scan sonar. Here it appears more as a long feature lying some 150 feet off the east jetty. Data from multiple lines on either side of this possible early jetty feature, lines 5 and 8, suggest it is about 275 feet wide at the base. This feature was first interpreted as cross talk or sonar echo as it maintained a parallel orientation to the east jetty as the survey vessel's course varied along the line to avoid recreational fishermen in their anchored boats. The top of the east jetty, its rock slope, bathymetric feature, and a trawl scar across this feature can be seen in Figure 36, line 5. Figure 37, line 8, shows this feature and the flat, plain seafloor typical of the rest of the study area east of the east jetty.

Area 2

The purpose of this survey as defined in the scope of service was to identify and delineate any historic remains relating to Port Eads including shipwrecks or abandoned watercraft. There are 21 complex magnetic anomaly areas (CMAA) defined within Area 2 (Figure 38). They appear to be associated with the historic demographics of Port Eads, the Pilot Station, the inner jetties, and closures of distributary channels. These areas have been delineated using their standard river mile locations. Each of these areas are associated with the adjacent bank and have multiple magnetic lobes suggesting either a scattering of numerous objects at landing areas, submerged terrestrial sites, or bank stabilization work such as jetties, concrete articulated mat, weirs, etc. These 21 complex magnetic anomaly areas, their location, and cultural association are listed in Table 4.

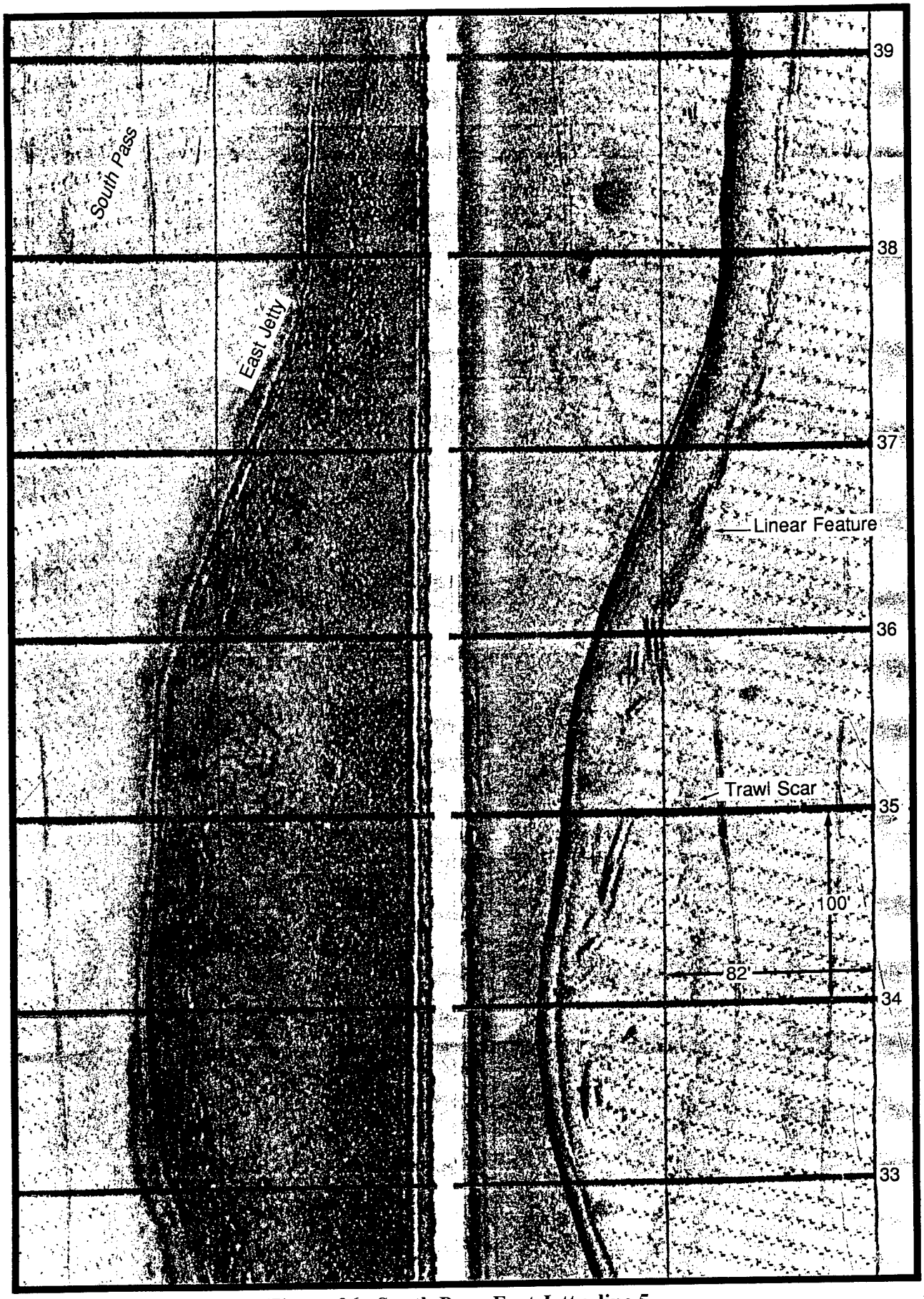


Figure 36. South Pass, East Jetty, line 5.

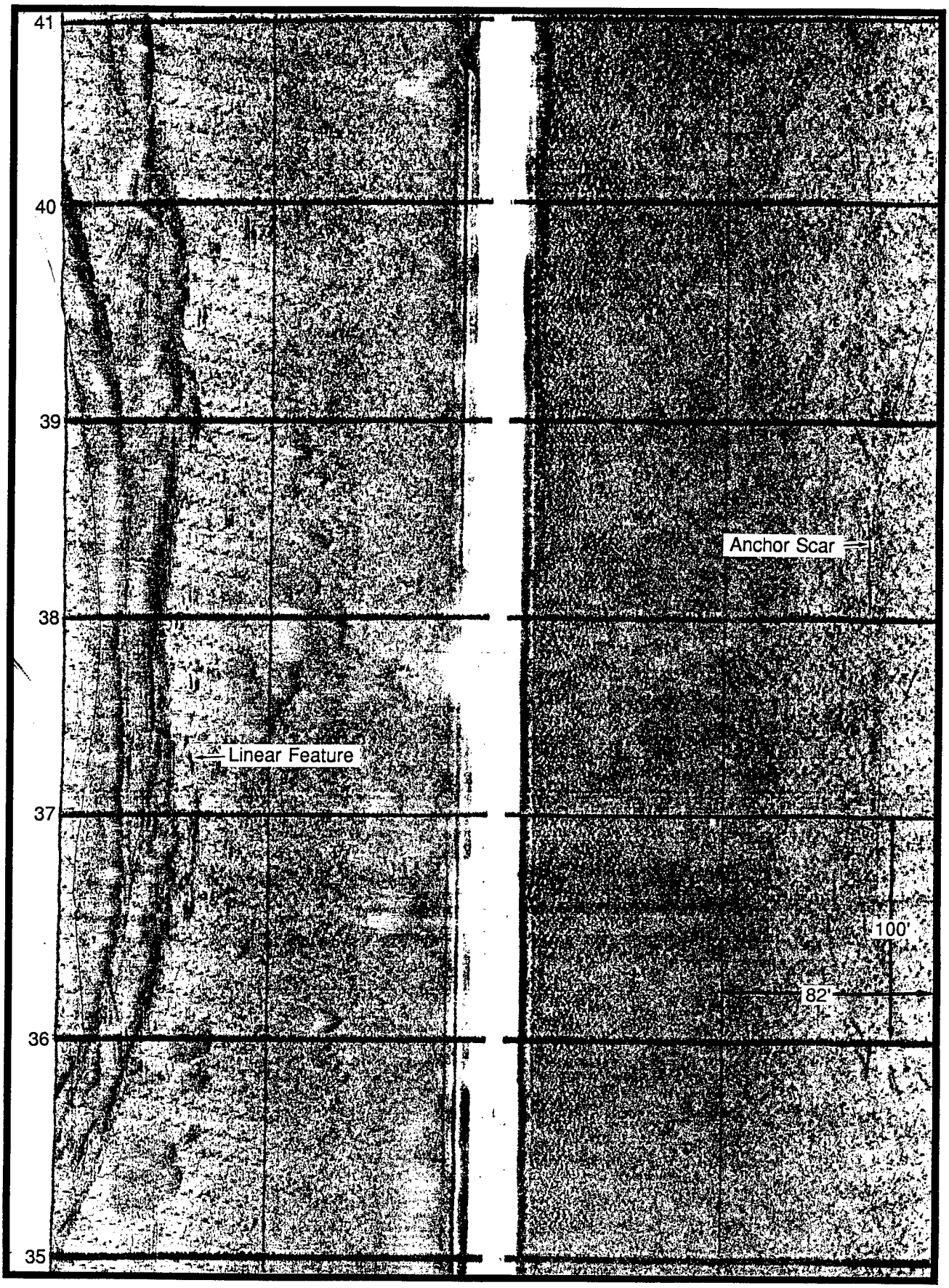


Figure 37. East of jetty area, line 8.

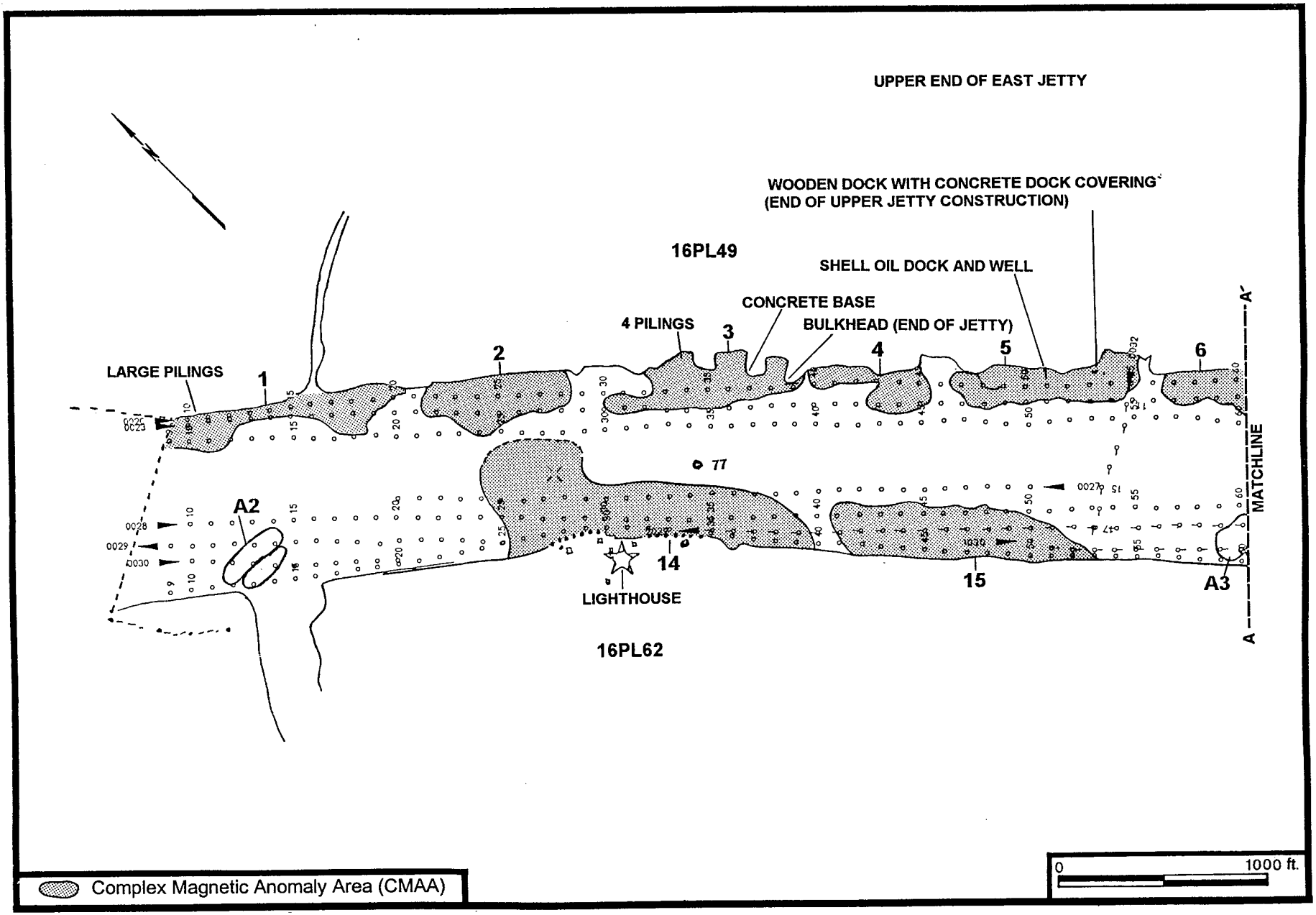


Figure 38. Magnetic signatures in Area 2, northwestern section.

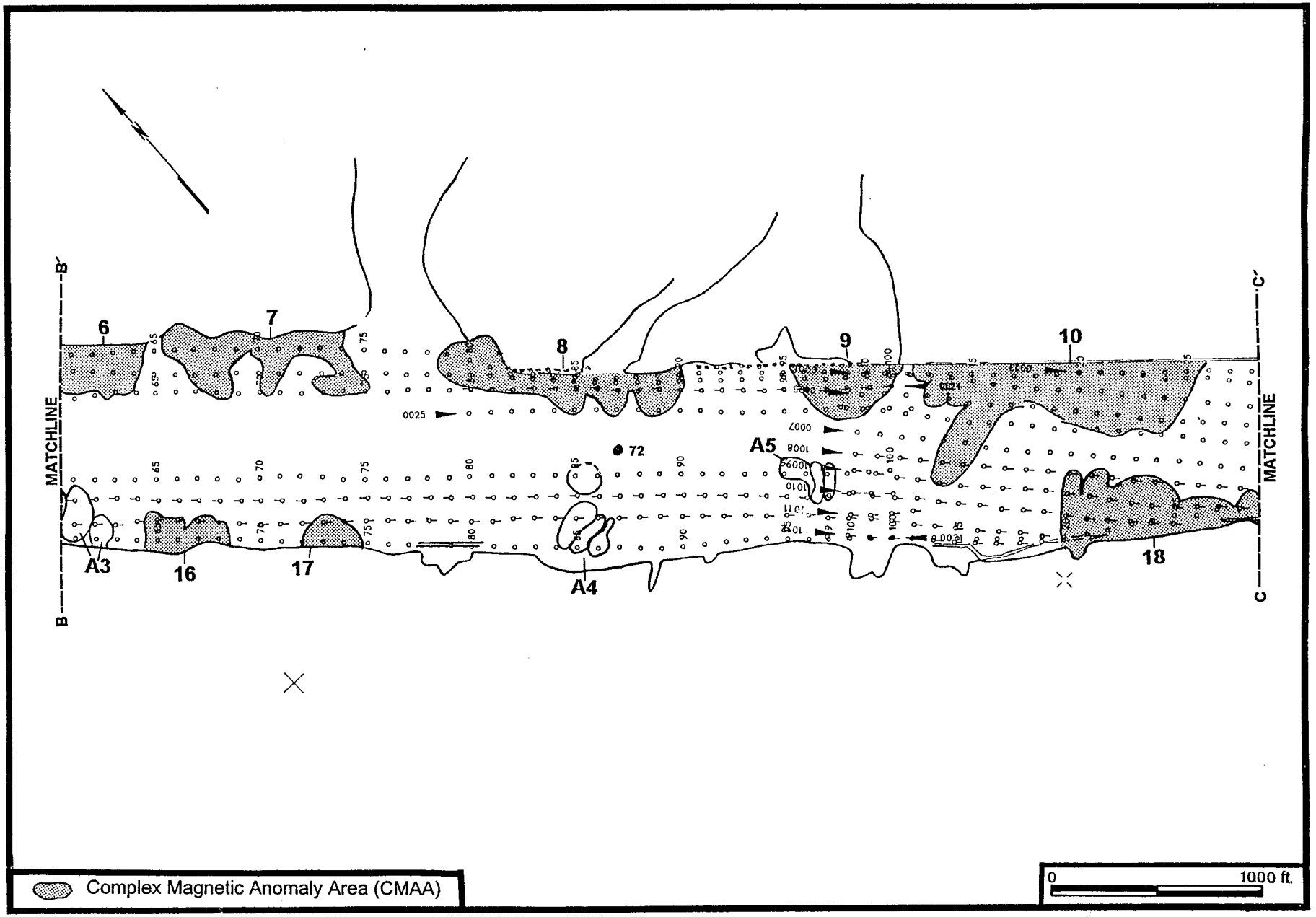


Figure 38. Magnetic signatures in Area 2, central section.

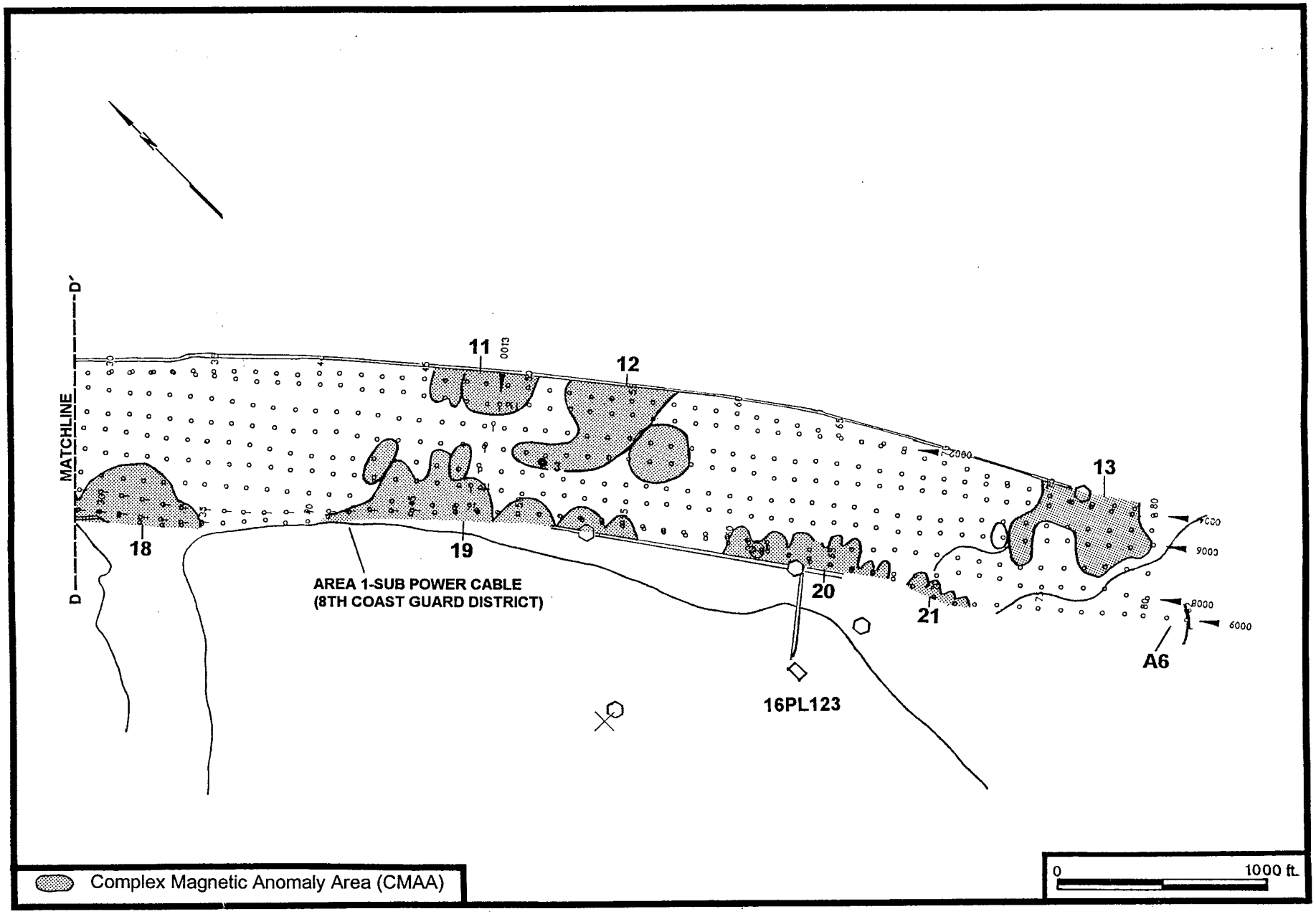


Figure 38. Magnetic signatures in Area 2, southeastern section.

Table 4. Area 2 Anomaly Areas.

No.	Area	Location	Association
1	East Bank	Mile 10.5 to Mile 10.72	possible coal landing, pilings
2	East Bank	Mile 10.76 to Mile 10.88	upper Port Eads area
3	East Bank	Mile 10.92 to Mile 11.07	landing docks, bulkhead, structures 2, 3, &12
4	East Bank	Mile 11.10 to Mile 11.20	location of ways (1876, 1881 Annual Reports)
5	East Bank	Mile 11.23 to Mile 11.37	Shell Oil well/dock, structures 6, 7, 8, & 9, East Point and pile #1
6	East Bank	Mile 11.42 to Mile 11.56	upriver limit of 1881 Inner East Jetty, Dam 3
7	East Bank	Mile 11.60 to Mile 11.78	Dams 4 & 5 Inner East Jetty, sunken barge (1881)
8	East Bank	Mile 11.82 to Mile 12.05	closure 12.0E
9	East Bank	Mile 12.16 to Mile 12.24	
10	East Bank	Mile 12.26 to Mile 12.54	end of the concrete jetty slabs
11	East Bank	Mile 12.90 to Mile 12.13	
12	East Bank	Mile 13.02 to Mile 13.12	
13	East Bank	Mile 13.45 to Mile 13.54	Inner East Jetty Light
14	West Bank	Mile 10.80 to Mile 11.09	Light house area, cistern & dock
15	West Bank	Mile 11.12 to Mile 11.25	lower government compound, dams, barge (1876)
16	West Bank	Mile 11.55 to Mile 11.63	
17	West Bank	Mile 11.72 to Mile 11.76	
18	West Bank	Mile 12.40 to Mile 12.68	closure 12.6W
19	West Bank	Mile 12.80 to Mile 13.10	Pilot Station, pilings
20	West Bank	Mile 13.18 to Mile 13.35	South Pass boathouse, pilings and dock
21	West Bank	Mile 13.37 to Mile 13.42	end of Inner West Jetty

Thirteen of these CMAAs lie along the left descending bank of South Pass; these apparently represent remains associated with the historic settlement of Port Eads, modern rip-rap, and other river flow structures, including the South Pass inner east jetty. This bankline appears to be in relatively the same place as it was in the late nineteenth century. The historic settlement of Port Eads is associated with and encompassed by CMAAs 1, 2, 3, 4, and 5. The bank is fairly uniform in this river reach with a 10 to 15 degree slope to the toe of slope some 100 feet off the bank in 14 to 16 feet of water. CMAA 1 is located some 500 feet above the outlet which forms the northern boundary of the land survey area at the old settlement of Port Eads. This complex anomaly area lies between Mile 10.5 and Mile 10.72 and could possibly represent remains associated with a coal landing (*Dr. Joy Jackson personnel communication 1995*) as four or five large cut off piling-like posts, 10 to 12 inches in diameter, were observed between the rock rip-rap and the bank vegetation.

CMAA 2, the upper extent of Port Eads, between Mile 10.76 to Mile 10.88; CMAA 3, Mile 10.92 to Mile 11.07; CMAA 4, Mile 11.10 to Mile 11.20; and CMAA 5, the lower extent of Port Eads, Mile 11.23 to Mile 11.37 make up four complex magnetic areas associated with the cultural features at Port Eads as seen on the 1879 hydrographic and construction *Chart of the Mouth of South Pass Mississippi River* (*U.S. Engineers July 1879*). There were no exposed cultural features in magnetic areas CMAA 2 and 4, but there are pilings in the upper portion of CMAA 3 possibly associated with the three dwellings on the 1879 chart and a bulkhead and dock or wharf at the lower

end of this area which seems to be associated with the "headquarters and office" area. More visible cultural material can be seen at CMAA 5 including the Shell Oil Well and Dock. Associated with this modern material is another possible remnant dock structure. The lower portion of CMAA 5 appears to be where East Point was located and is where the east jetty construction begins (*U.S. Engineers July 1879*).

CMAA 6 and CMAA 7 apparently lie over the east jetty location. The 1881 sunken barge and two historic dams correspond with their locations, as does the upper area of the east jetty construction. The sunken barge (1881) is located in the lower portion of CMAA 7.

CMAA 8 and 9 appear to be associated with a portion of recent channel outlet closures. The bathymetry in the area of CMAA 8 appears as a disturbed, bathymetric anomaly riverward of a modern structure as seen on the 1991-92 Hydrographic Chart. CMAA10 is associated with the upper portion of the inner east jetty, while CMAA11, CMAA12, and CMAA13 are associated with the lower end. CMAA13 is located at the end of the east jetty where the east jetty light used to be.

Eight complex magnetic anomaly areas (CMAA) lie along the right descending bank of South Pass. The South Pass Lighthouse, a government compound, rip-rap, and other river flow structures, a Pilot Station compound and the South Pass inner west jetty are located along this descending bank line. This bank has been drastically altered by erosion. Over 100 feet of land loss has occurred the area of the South Pass Light, while as much as over 200 feet has eroded in the lower segment of this study area above Pilot Town.

CMAA14 and CMAA15 are associated with the historic South Pass Light and government compound. The South Pass Light, houses and cistern are located at CMAA14. The 1876 model barge may be associated with the lower end of CMAA 15. The river bank in these areas appear to have eroded some 100 to 150 feet. Structures like the boarding house and warehouses would now be in the river. These two complex magnetic areas along with Anomaly A2 have to be bank related cultural material or modern river deposits. The bank and bottom in this area are disturbed, as seen in the bathymetric data and in the side scan sonar record of this area shown in Figure 39.

CMAA16 and CMAA17 represent areas which have experienced some 175 to 200 feet of bank erosion. These areas would have been land in 1879. These areas traverse over portions of a "rock jetty" as noted on the 1991-92 Hydrographic Chart. CMAA18 is located over a portion of this same "rock jetty" and associated with channel closure.

CMAA19 appears to represent the Pilot's Station; this area is associated with numerous pilings possibly remnants of docks, wharfs, boat houses and the Pilot House. Also in this area there is a submerged power cable. The magnetics either suggest that this cable is located some 20 to 400 feet down river from the generally located placement of this feature on the 1991-92 Hydrographic Chart or that it went undetected in the plotted location. CMAA20 and CMAA21 represent and/or are associated with the South Pass West Jetty Day Marker/Light #5, South Pass Boathouse Light, river gauge, South Pass West Jetty Range Front Light and dock, and portions of the west jetty.

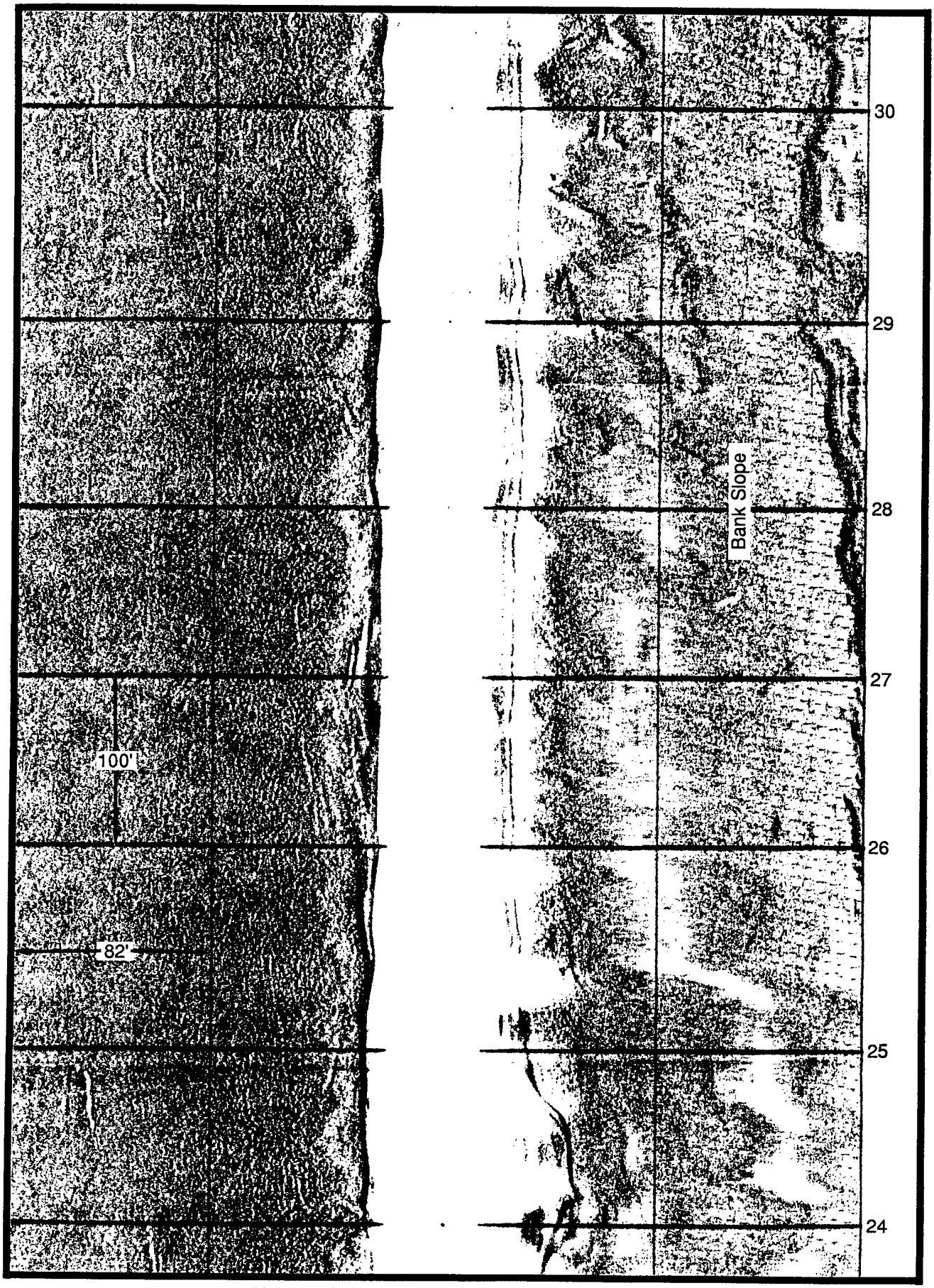


Figure 39. Area of South Pass Light, line 27.

Five (5) magnetic anomalies are associated with Area 2 which have wreck-like magnetics. They are listed in Table 5, which also includes the one potentially significant anomaly from Area 1. The table lists the amount of magnetic inflection, magnetic area and its location. Anomalies 2 and 3 lie in areas which were land by 1879. Anomalies 4, 5, and 6 have wreck-like magnetic qualities. Anomaly 4 lies in the area of the *Wild Wagoner* (1876). Anomaly 5 lies in 10 feet of water in an area where the bottom is disturbed. This bottom topography along with the magnetic record places this as a potential area for a shipwreck. The dredge records suggest that this area should have been altered, yet the surface disturbance suggests that the source of the magnetics would be found at or just under this bottom somewhat precluding it representing a significant historic shipwreck. Anomaly 6 not only has a wreck-like magnetic quality and lies in a bathymetric anomaly area but also is associated with a documented 1852 shipwreck as seen on map of the reconnaissance of South and Southwest Passes and the Sands reconnaissance of Delta Passes (*Weinstein 1984*). This area appears to be outside of the normal channel which historically seems to be more to the northeast.

Table 5. Magnetic Anomalies.

Area	Anomaly #	Inflection (gammas)	Size (feet/meters)	x=	y=	Association
AREA 1	1	240	300' x 150' 91m x 46m	2703210 2703210	125660 125725	*S.J. Dickson (1901),* wreck (1876), and *Doris* (1985)
AREA 2	2	2000	350' x 400' 107m x 122m	2691230	134000	
	3	490	300' x 400' 91m x 122m	2694720	131335	*Julia* (1915)
	4	250	300' x 150' 91m x 46m	2697450	129620	*Wild Wagoner* (1876)
	5	70	250' x 150' 76m x 96m	2697450	129000	
	6	5000	+400' x +200' +107m x +61m	2702270	123550	wreck (1852)

SUMMARY

For convenient reference, the magnetometer and fathometer data for Port Eads and the jetty area are included in Figures 40 through 43.

Area 1

Area 1 produced evidence of 14 wells (two outside the study area), two linear magnetic features presumed to be pipelines, 11 magnetic anomalies that appear to be associated with rig moorings, one possible shipwreck-like anomaly and possible remains of the outer east jetty.

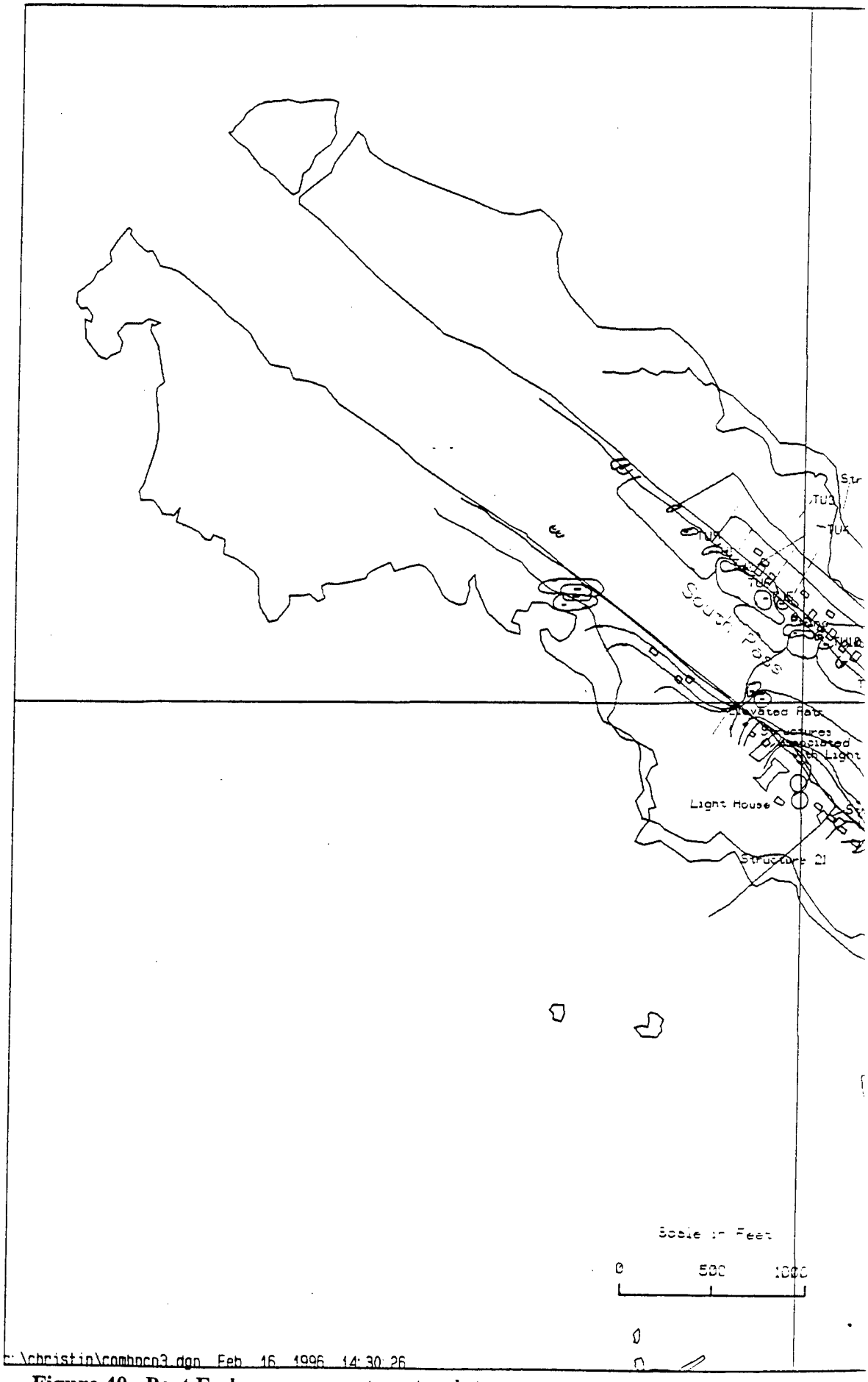
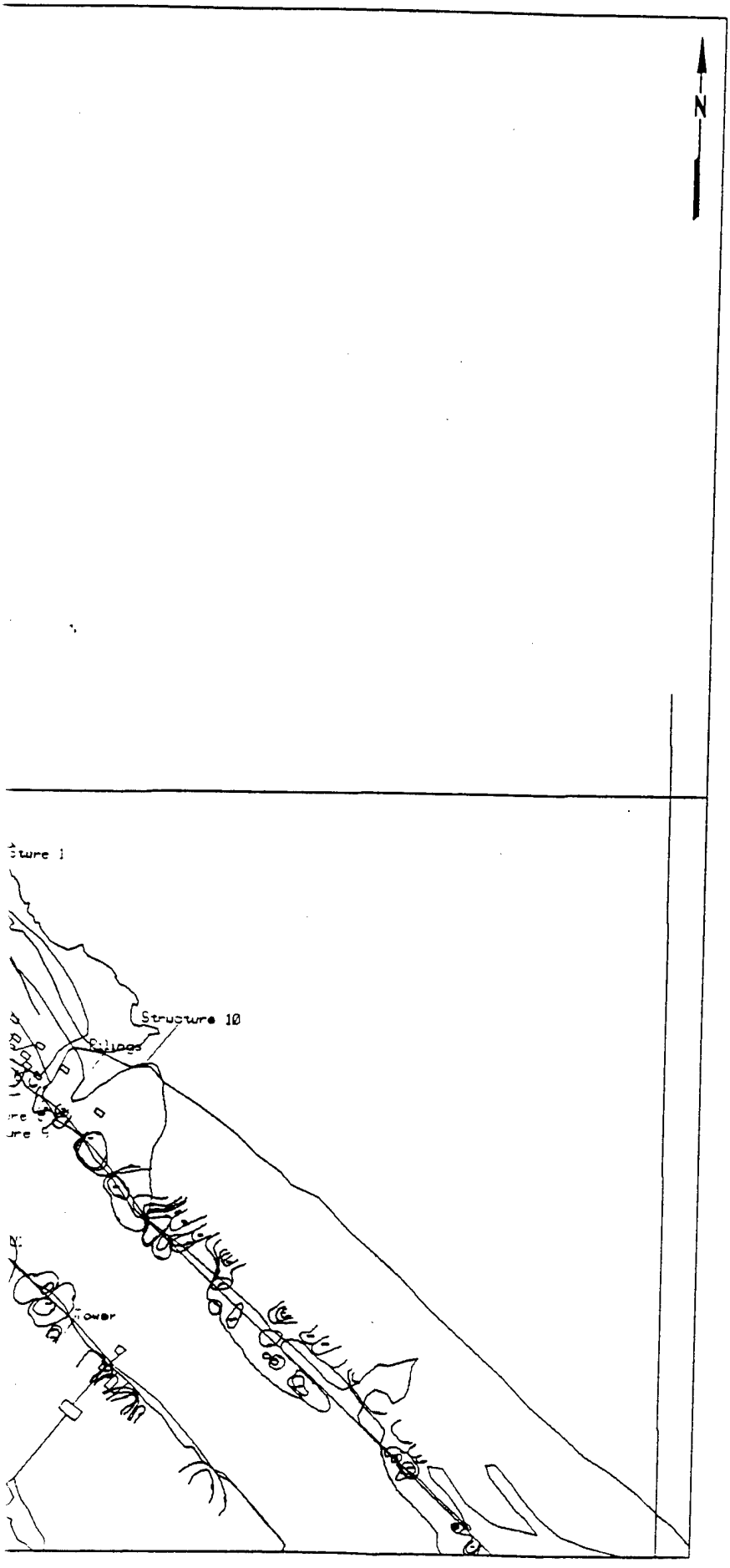


Figure 40. Port Eads area magnetometer data.


Structure 4
TU3
TU4
Structure 5
TU16
Structure 1
TU17
TU15
Light House
Structure 20
Tower
TU19
Structure 10
Pilings
Tower
Scale in Feet
0
500
1000

data.


N
Structure 1
Structure 10
Tower

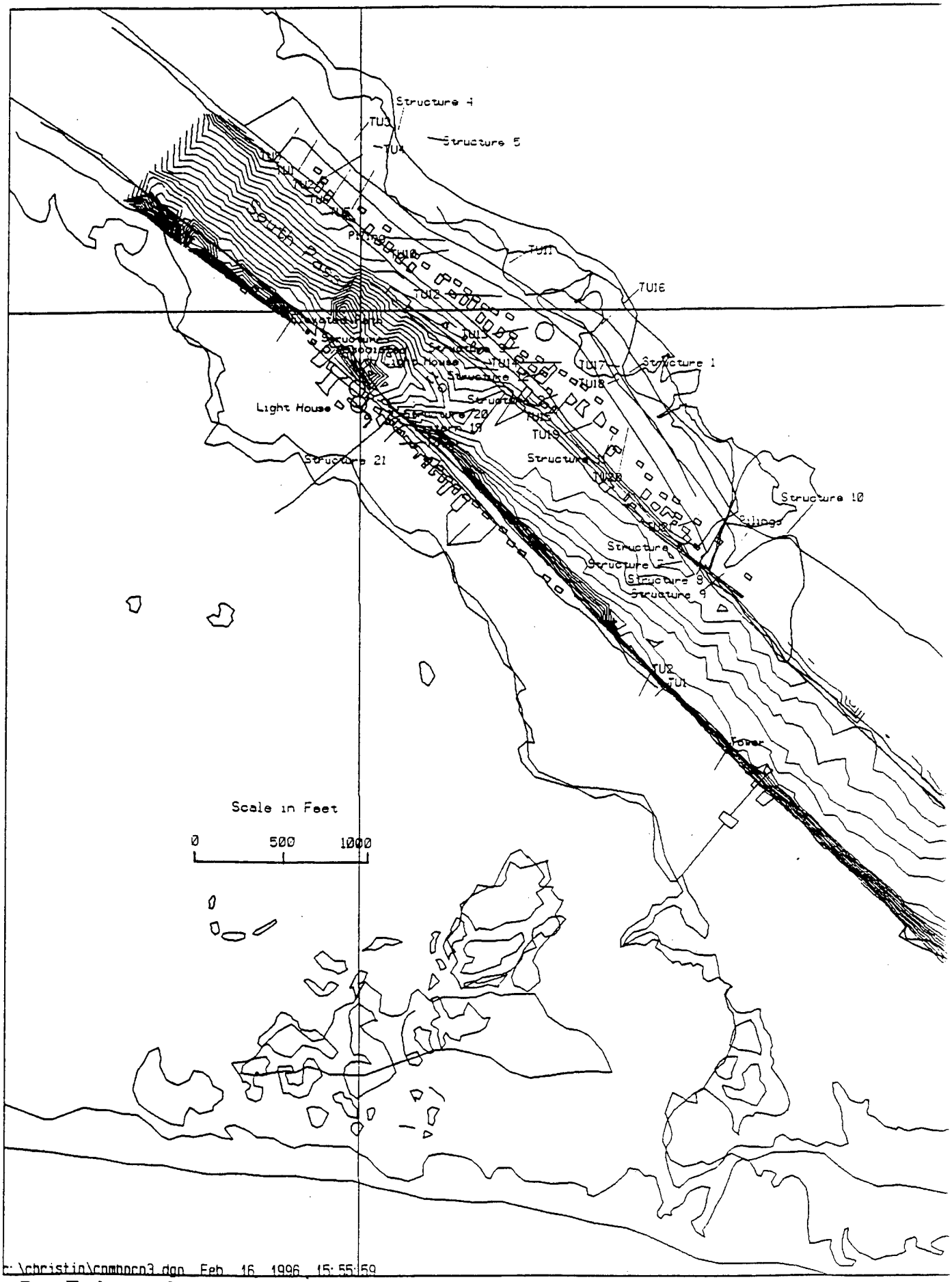
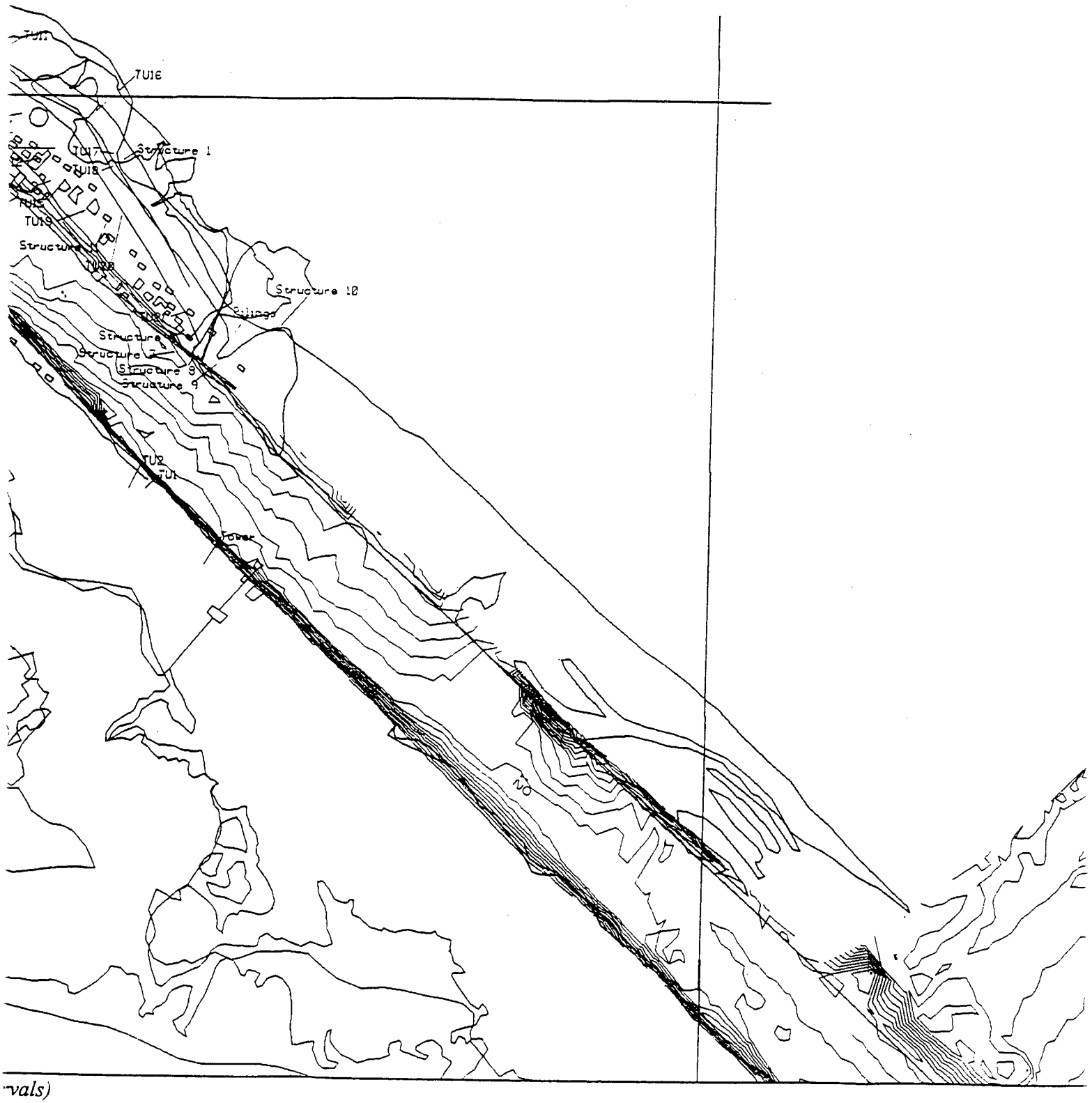
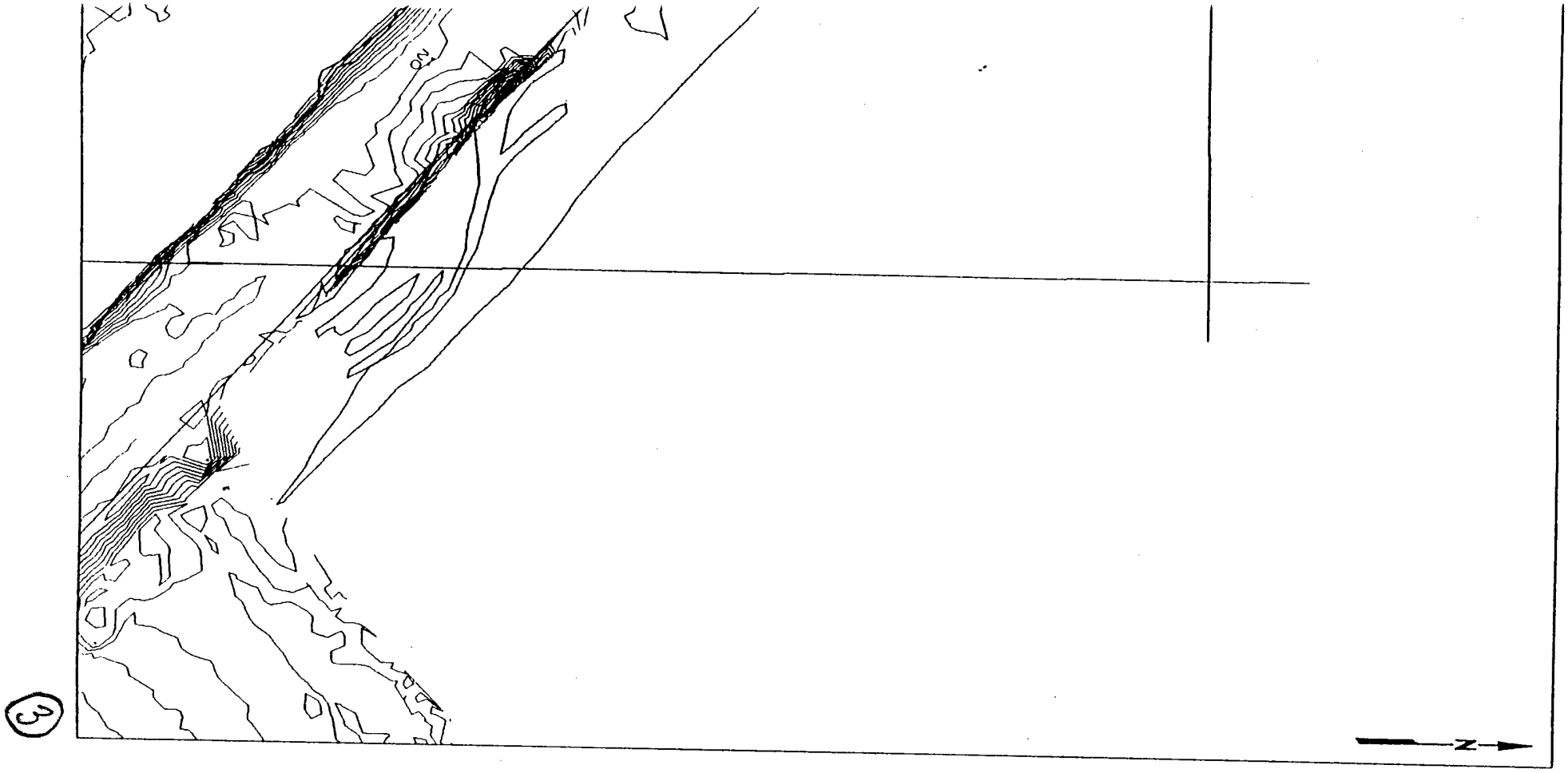


Figure 41. Port Eads area fathometer data. *(One foot contour intervals)*


TU16
TU17
TU18
TU19
Structure 1
Structure 10
Structure 9
TU2
TU1
Tower
20

vals)



(3)

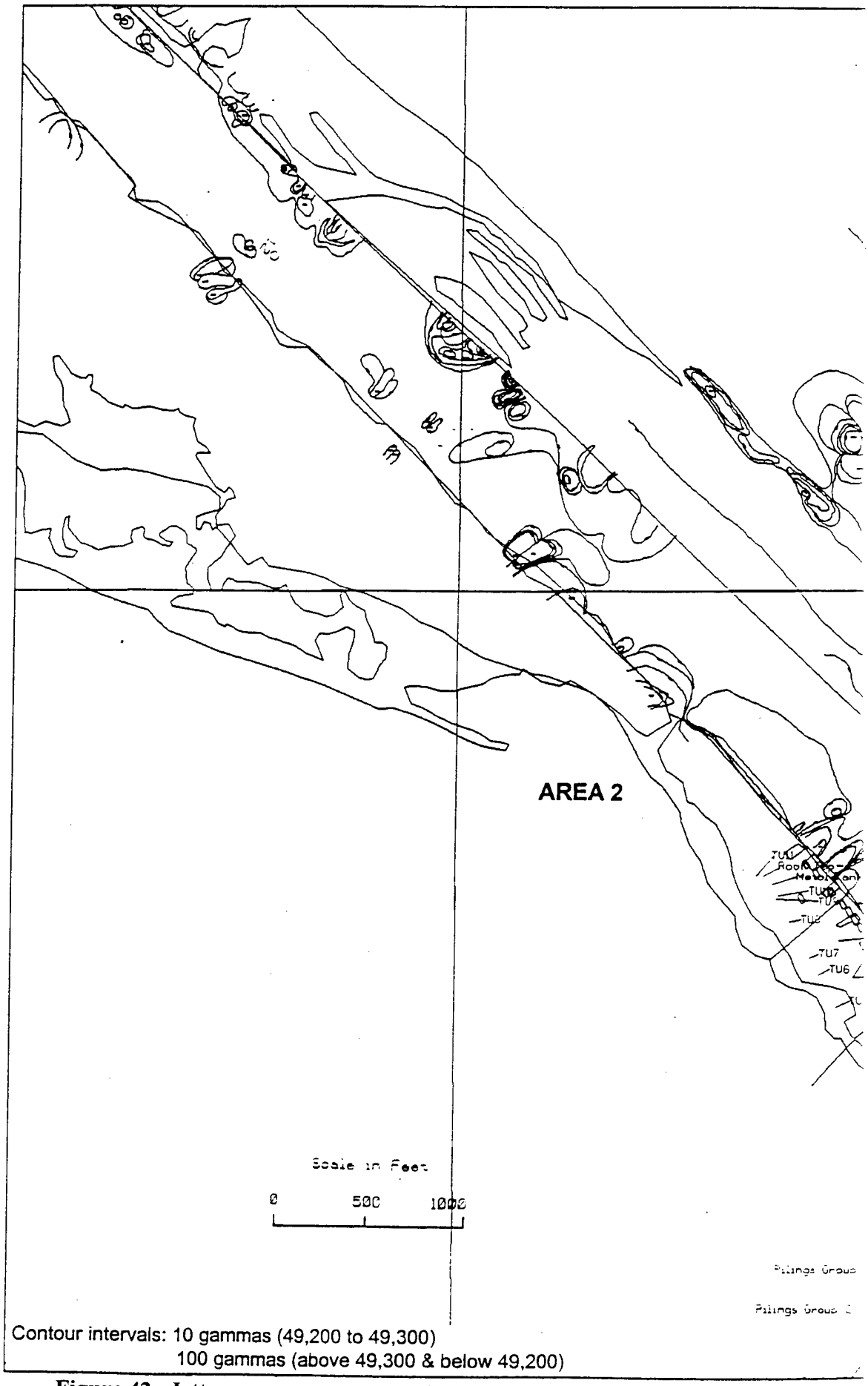
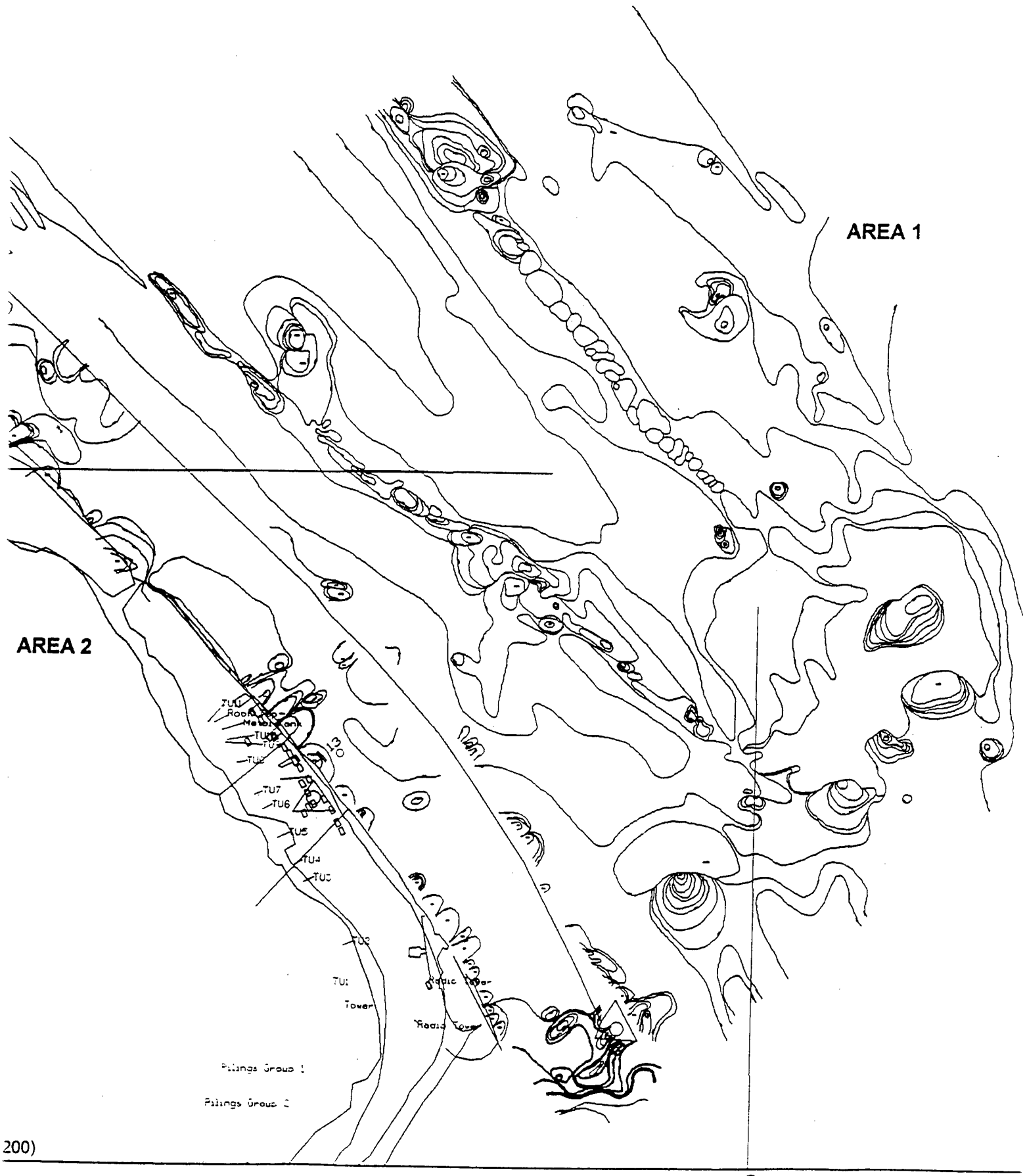
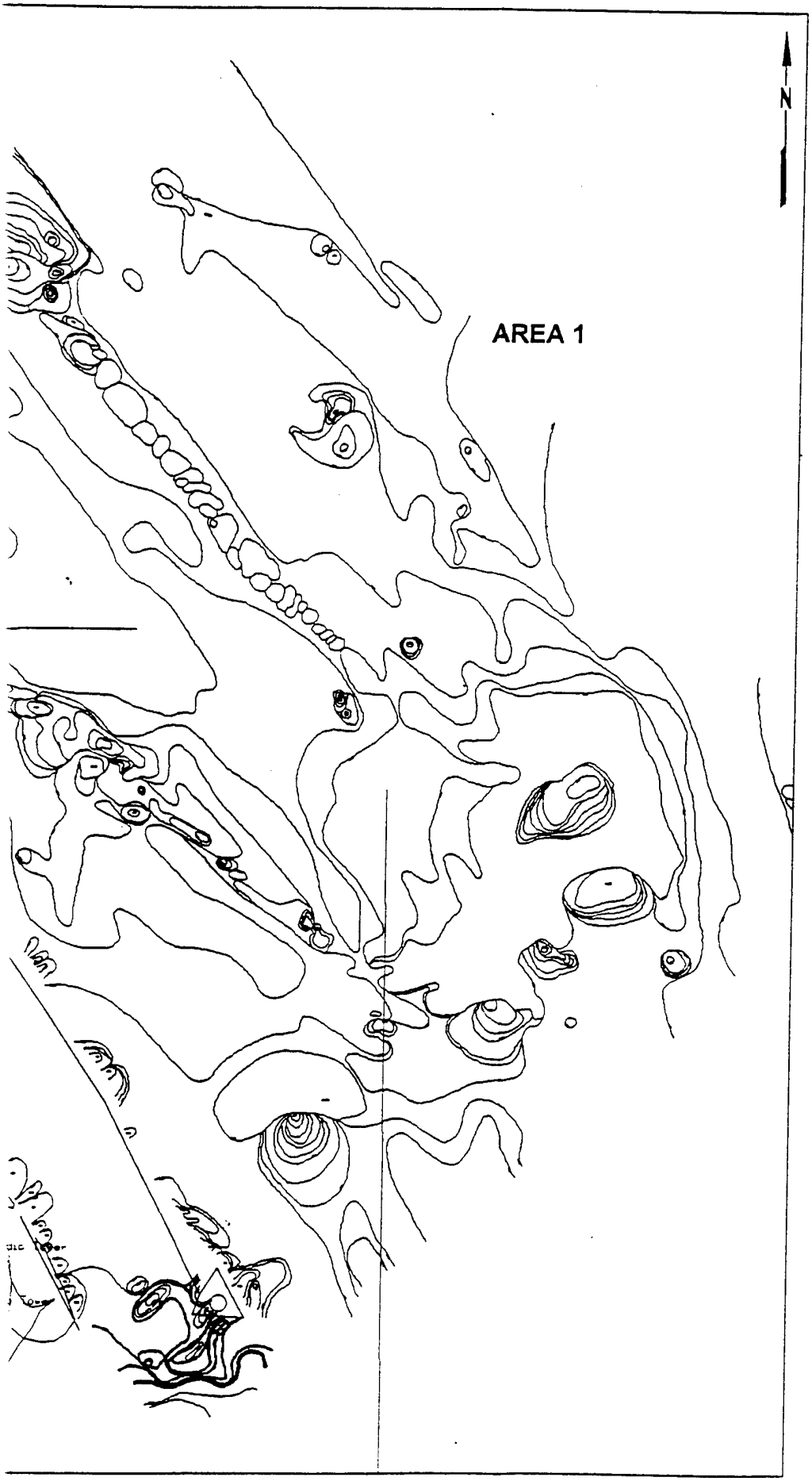


Figure 42. Jetty area magnetometer data.


AREA 1
AREA 2
TU1
TU2
TU3
TU4
TU5
TU6
TU7
TU8
130
Tower
Radio Tower
Pilings Group 1
Pilings Group 2

200)

(2)


N
AREA 1

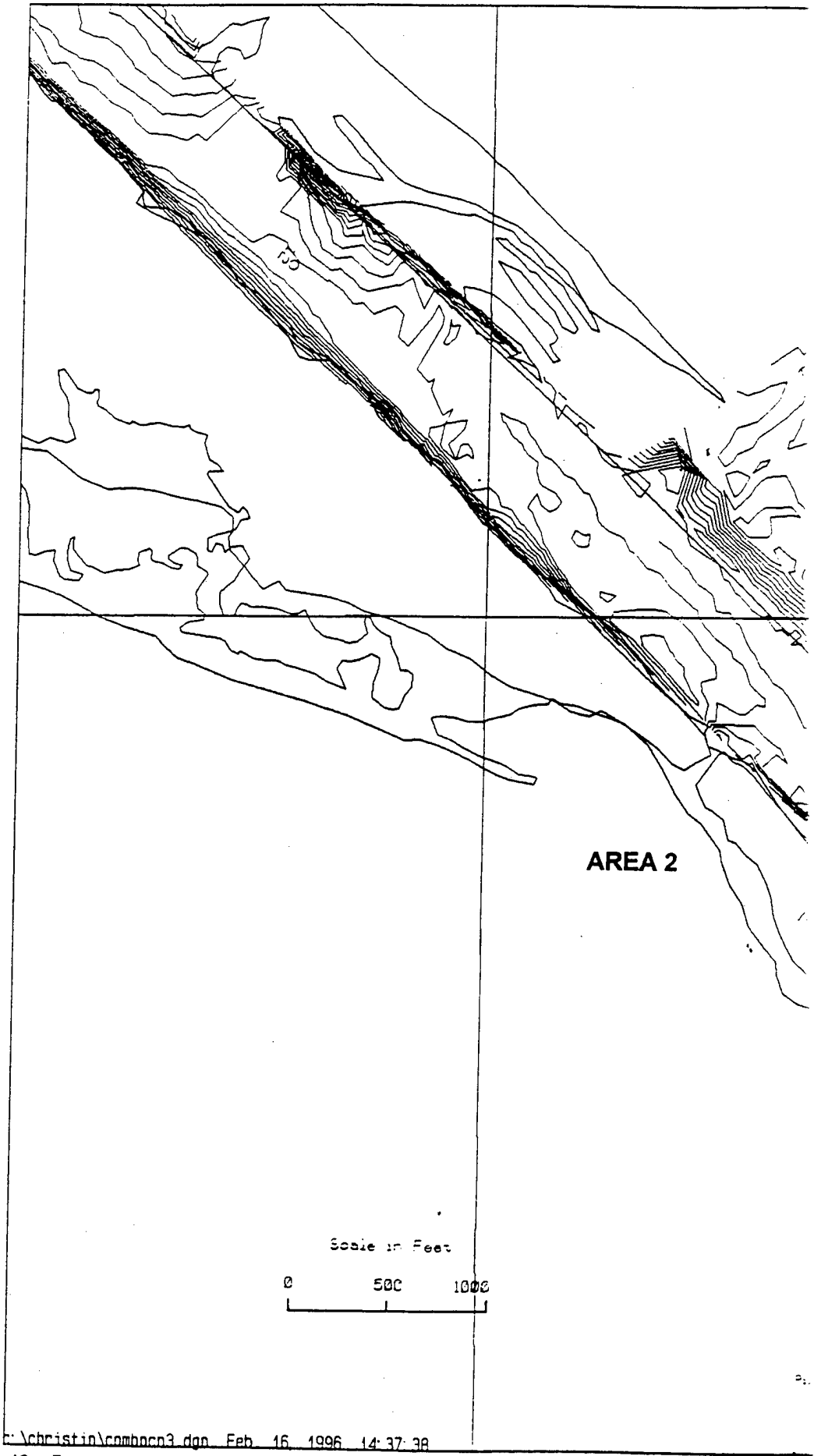
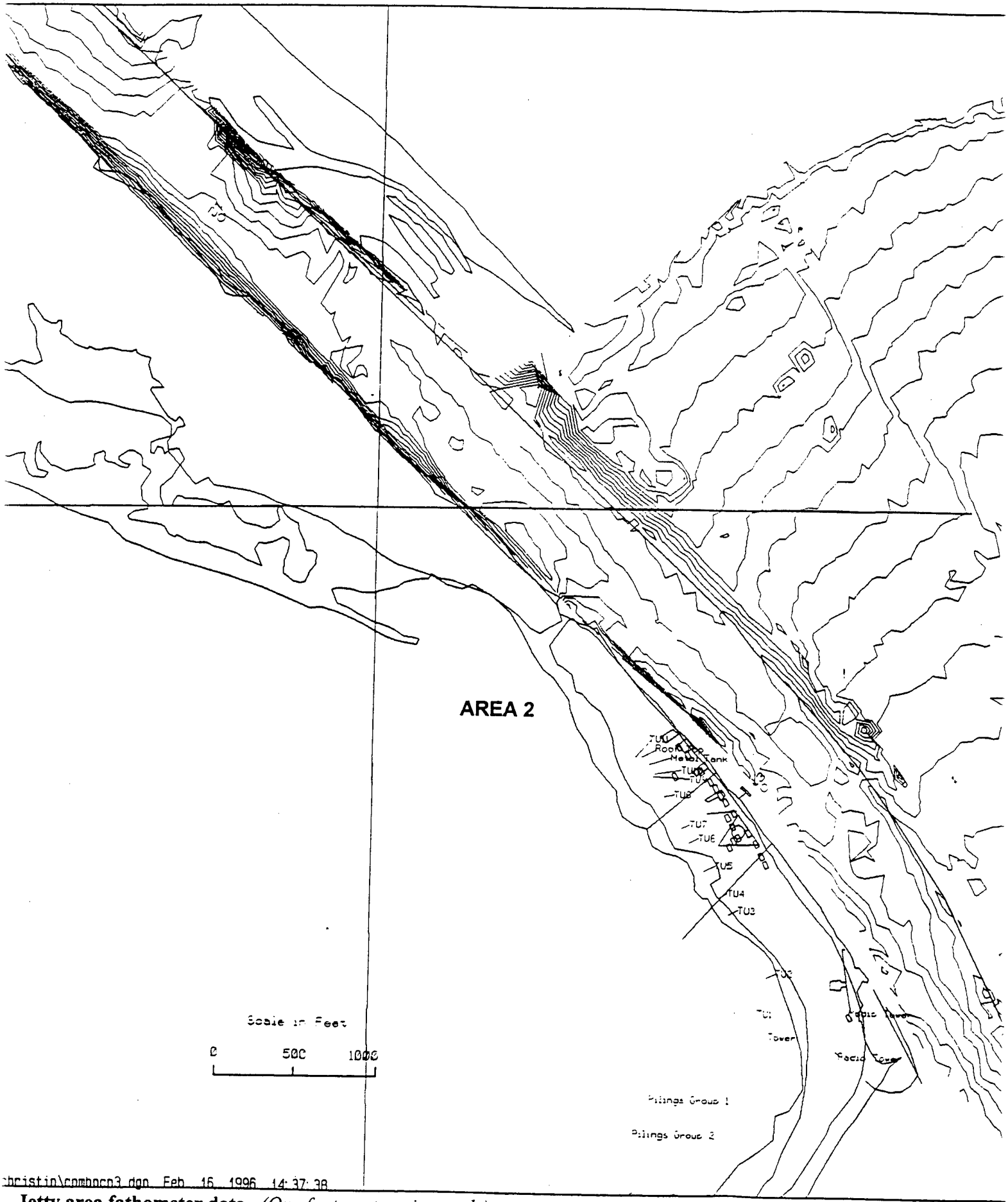
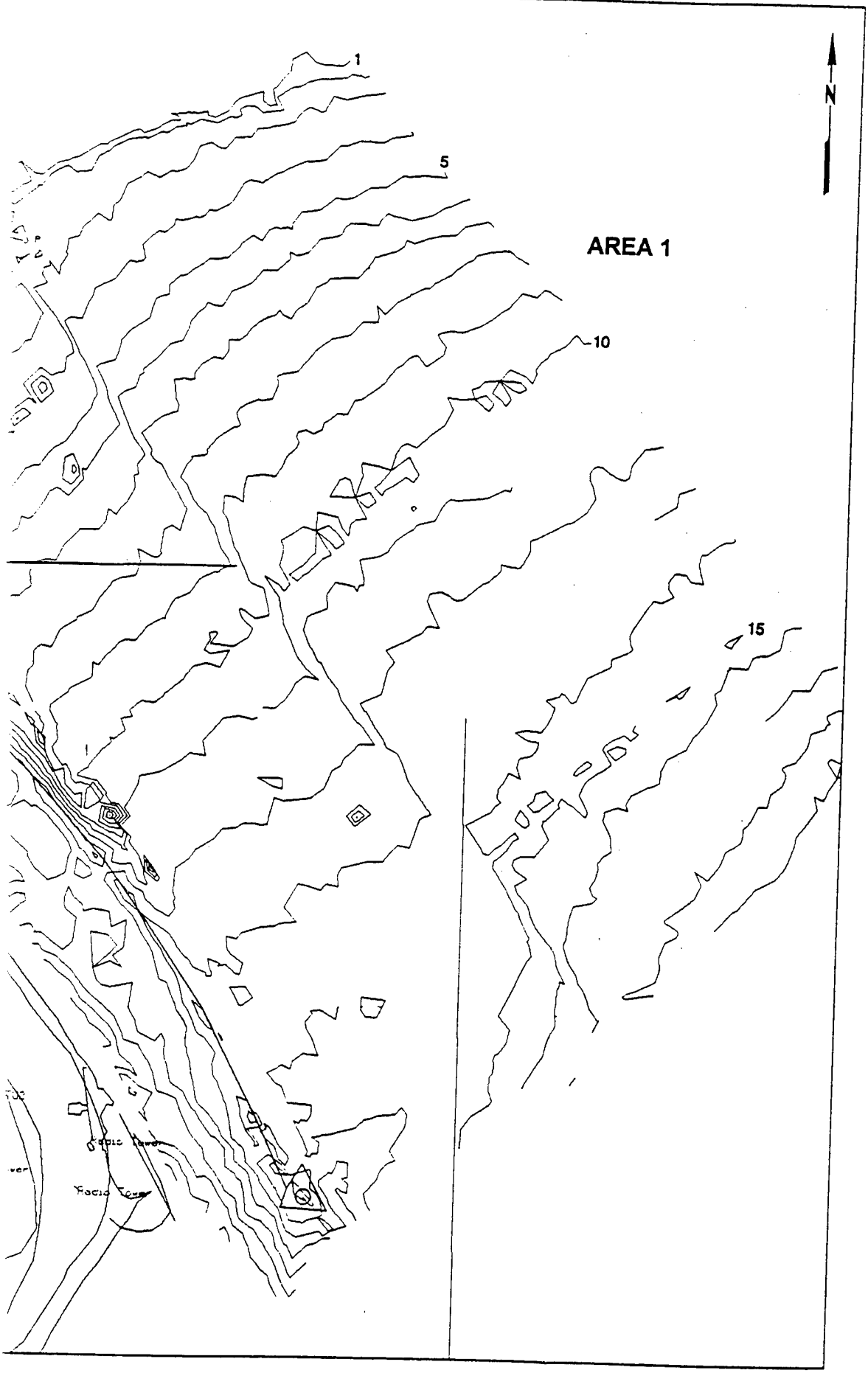


Figure 43. Jetty area fathometer data. *(One foot contour intervals)*



. **Jetty area fathometer data.** *(One foot contour intervals)*

(2)


1
5
10
15
AREA 1
N

Possible Shipwrecks

Anomaly 1 is within and adjacent to the well site magnetics, but exhibits an area 300 feet by 150 feet (91.44m by 45.72m). Its magnetic nature, configuration and size are consistent with shipwrecks and may be the remains of the *S.J. Dickson.* That ship was lost in 1901 in a hurricane, but latitude and longitude coordinates for the wreck place it south of our study area. However, the wreck report states that it sank on the concrete of the east jetty. If the written report is correct and the coordinates are in error, the remains of the *S.J. Dickson* may be within study Area 1. Conversely, this location may represent the 1875 shipwreck or a shipwreck for which we do not have a record. Diver investigation of the site is required to determine if this anomaly is, indeed, the remains of a shipwreck, either the *S.J. Dickson* or perhaps another as yet unidentified wreck. It is also possible that additional wrecks are located within this area as the massive amount of ferrous material in Area 1 associated with well heads and pipelines may mask the magnetics of historic period shipwrecks.

Possible Outer East Jetty Remnant

Investigations in Area 1 produced a linear bathymetric anomaly that could possibly represent the outer east jetty abandoned in 1881 or portions of this crib style construction. There do not appear to be any magnetics which can be attributed directly to this bathymetric trend. The magnetics in the area of this possible outer jetty feature appear to develop from and are associated with the inner east jetty. This bathymetric anomaly trends parallel to the existing inner east jetty in the same general area as shown on the historic 1879 Chart of the Mouth of South Pass Mississippi River.

Area 2

Area 2 produced 21 magnetic anomaly areas referred to as CMAAs and five single anomalies. Each category of findings is discussed below.

CMAA

Port Eads East: CMAAs 1 through 5 are likely associated with Port Eads. Among these anomalies may be remains of the coal landing, landing dock, bulkhead, and structures associated with the industrial community as depicted on the 1879 chart of the mouth of South Pass. CMAA 5 may also be where construction of the east jetty began. CMAA 8 and 9 appear to be outlet closures and require no further consideration. CMAAs 6, 7, 10, 11, 12, and 13 appear to be associated with the 1881 inner east jetty. As will be discussed in more detail in Chapter Six, construction of the Inner east jetty commenced under the 20 year maintenance agreement with Eads' representatives, and the inner jetty has been continually maintained since that time. CMAA 7 is also associated with the location of a sunken barge (1876).

Port Eads West: Five CMAAs are found on the west bank in the area of Port Eads West. CMAAs 14 and 15 are associated with the historic South Pass Light and government compound.

CMAA 15 is also in the location of the model barge wreck (1881). CMAAs 16, 17, and 18 do not appear to be associated with potentially significant remains.

Pilot Station: CMAA 19 appears to be the Pilot's Station, associated with pilings, and likely associated with docks, wharfs, boat houses and the Pilot House. CMAA 20 and 21 are not associated with potentially significant remains.

Possible Shipwrecks

Three single anomalies in Area 2 have wreck-like signatures. These are Anomalies 3, 4, and 6. The former is at a location near the *Julia*, which was lost in 1915. Anomaly 4 is associated with the *Wild Wagoner* (1876). Anomaly 6, which poses exciting possibilities, is within and outside the project area, lying near a reported 1852 wreck. However, this area was the scene of many wrecks, including the *Louisiana, Catania*, and a barge. Two additional wrecks are reported lost in areas of complex magnetic anomaly areas. The sunken barge (1876) is reported lost in the lower portion of CMAA 7, and the model barge (1881) in the lower area of CMAA 15.

Unknown Anomalies

Anomalies 2 and 5 also had wreck-like magnetics. However, Anomaly 2 is at the mouth of a freshly dredged outlet and was land by 1879. Anomaly 5 was also land by 1879; moreover, Anomaly 5 is located in association with a major channel outlet closure, outlet 12.6W submerged weir.

CHAPTER FIVE
TERRESTRIAL INVESTIGATIONS

By
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James H. Mathews
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M. Mathilda Cox

PREFATORY COMMENTS

Relevant Research

The earliest investigation pertinent to the study area was a study conducted for the NOD by CEI of Grand and Tiger Passes and Baptiste Collette Bayou (*Gagliano et al. 1978*). Weinstein (*1984*) notes that the report included an overview of the lower Mississippi River delta, including a short discussion of Port Eads, the South Pass Lighthouse, and the gun battery.

In 1979, CEI surveyed the Empire to Gulf Waterway (*Gagliano et al. 1979*), providing data on the historic backdrop of the area. Also in 1979, Tulane University investigated the Mississippi River banks between New Orleans and Venice, Louisiana (*Davis et al. 1979; 1981*). Both this and CEI's earlier project, however, were not specifically within the South Pass study area.

The first project to specifically focus on South Pass was CEI's *Cultural Resources Survey of the Proposed South Pass Bulk Terminal, Plaquemines Parish, Louisiana,* reported on by Weinstein (*1984*). The survey was conducted in response to the Plaquemines Parish Commission Council and the Plaquemines Port, Harbor and Terminal Authority's plans to construct a deep-draft port at the lower end of South Pass. In addition to the bulk terminal, a barge access channel was planned to connect the terminal to South Pass. Spoil dredged from the turning basin and access channels was to be deposited in the shallow waters west of South Pass.

Weinstein's (*1984*) investigations focused on a determination of whether any sites of potential National Register of Historic Places (NRHP) eligibility were threatened by adverse effect from the proposed actions. The survey was carried out by a two-person crew using a combined boat and pedestrian inspection to visit three previously recorded sites and to identify new sites. Sites investigated include Port Eads East (16PL49), Port Eads West (16PL62), the World War II Gun Batteries (16PL63), Pilot House and Coast Guard Station (Pilot Station - 16PL123), and the Port Eads Jetties (16PL130). Weinstein (*1984*) recommended that the entire area be included in an NRHP nomination form that was already underway for the 1881 lighthouse situated on Port Eads West.

In 1985, Goodwin et al. (*1985*) reported on their investigations at Burrwood Plantation (16PL133), an abandoned U.S. Army Corps of Engineer facility (with some Naval use) on the left descending bank of Southwest Pass in Plaquemines Parish. The work, designed to provide an evaluation of NRHP eligibility, included archival and historic research, oral history, surface survey, shovel testing, auger testing, and the excavation of 1m by 2m test pits.

The researchers concluded that Burrwood Plantation was associated with the commercial growth of the Port of New Orleans and the development and technological evolution of Mississippi River navigation. However, they further observed that the river has claimed the original bankside and remaining areas had been scoured by the river action. Structurally, they found that the site did not meet NRHP criteria for eligibility. As such and in view of the serious impacts from erosion, Goodwin et al. (*1985*) evaluated the site as ineligible. Although its focus is on Southwest Pass, the

Burrwood report also includes a brief description of the sites at Port Eads as well as a short historical review of jetty construction.

This is the sum total of previous research dealing with the South Pass study area. Of each example, only Weinstein's (*1984*) report actually physically covered the project area; in large measure, his report provides the framework for formulating fieldwork procedures and interpreting site remains.

Map References

Specific mention of a series of maps is necessary here to lead into a subsequent discussion of changes, in terms of settlement intensity, building, and landform alteration. Source data include the Mouth of South Pass maps, Coast and Geodetic series maps, Corps of Engineers maps, a proposed lease map, and USGS quadrangles. In addition, aerial photographs from 1951, 1957, 1961, 1973, 1983, 1986, 1990, and 1992 were reviewed. Some of these maps provided important base line data not only for interpretation of landform changes and the sequence of construction versus abandonment, but also for GIS digitization.

The data from the 1879, 1880, 1882, 1884, 1886, and 1896 Corps Annual Report maps; the 1942 Proposed Lease map; and the 1971 USGS quadrangle were digitized and presented to the Corps in Intergraph format. These data form the basis for overlays presented in the site discussions. In addition to the historic map data, the archaeological data were digitized and also presented in Intergraph format.

In digitizing the data, we encountered two handicaps. The first is that there are some discrepancies between the historic maps. As will be seen in the ensuing discussions, many of the maps accompanying Annual Corps Reports appear to have been stock maps that were simply updated from one year to the next. In some cases, however, there were no additions or deletions of structures even though the text reports changes. In other cases, structures disappear one year and reappear the next, seemingly an error on the part of the mapper. Also, there are some shifts in structure locations on the maps. The most noticeable was the 1881 lighthouse which is depicted in different places on the 1942 map and the 1971 quadrangle.

The second handicap was that the only established datum on many older maps was a crossing of one latitude and one longitude line; other maps lacked even this reference point. As noted, there were some shifts in structure locations even with regard to these lines. However, we needed to use an orthogonal transformation type, which is most appropriate for digitizing long and narrow drawings with most points confined to a single line. In order to digitize the data, therefore, the CAD specialists used buildings on either side of the pass, in this case the northern wharf on Port Eads West and the southern on Port Eads East, as reference points. These appeared to be the most consistent, although this two-point projection may be an additional source of digitized discrepancies if there is any variance at all.

Discussion of Data Presentation

Figures 44 through 46 compare the 1879, 1886, and 1942 shorelines with the current shoreline. These three figures illustrate that rather substantial changes have taken place with regard to shoreline erosion and accretion over the years. Examining all available maps and aerial photographs, we are provided with a dramatic and detailed picture of landform changes over the years. These changes are discussed in the context of each site description.

Each site description also contains references as to whether any of the archaeological remains seem to correlate with structures that appear on earlier maps. Shoreline change is also referenced in the structure discussions as appropriate. For reference, Appendix II contains a set of figures that overlay 1896 Corps map, 1942 Proposed Lease map, and 1971 quadrangle map data with the 1995 archaeological data for Port Eads East and West. A fourth map overlays the 1971 map data with the 1995 archaeological data for the area of the Bar Pilots' Station and vicinity of the reported gun batteries.

Any associations made in the text must, however, be viewed as preliminary. We have, in the recommendations, proposed an approach that may enable researchers to be far more conclusive in terms of the locations of remains, but this stage of work would be initiated at the data recovery level of investigation.

Construction Sequence at Port Eads

Prior to the fieldwork and findings discussions, the construction and abandonment sequence at Port Eads is reviewed based on documentary research at the New Orleans District Corps of Engineers. This construction sequence is included below and is intended to be reiterative of the documentary research, not interpretive. Interpretive observations on construction and abandonment at each site are included within the specific descriptions.

Although the old lighthouse was present on the west bank of the river as early as 1848, no detailed maps or reports dating to that period were identified in the course of background research. The most detailed data are reports of the Corps of Engineers written between 1875 and 1896. These documents summarize the construction and improvements at Port Eads and the jetties. Each report contains a narrative of the work accomplished during the previous period. As would be expected, these commentaries focus on details of jetty construction and repairs with occasional reference to storm damage and repair, scouring, and channel depths. Beginning with the sixth report, dated March 16, 1877, the information in the reports expanded to include tables with data on currents, water salinity, and tides. Later reports included additional information such as data on dredging activities, sedimentation, damage reports, epidemics, construction of the physical plant, and repairs to barges and other boats. The reports were issued about every four months during the primary construction of the jetties between 1876 and 1878. After that time, they were incorporated into the annual reports of the Chief of Engineers.

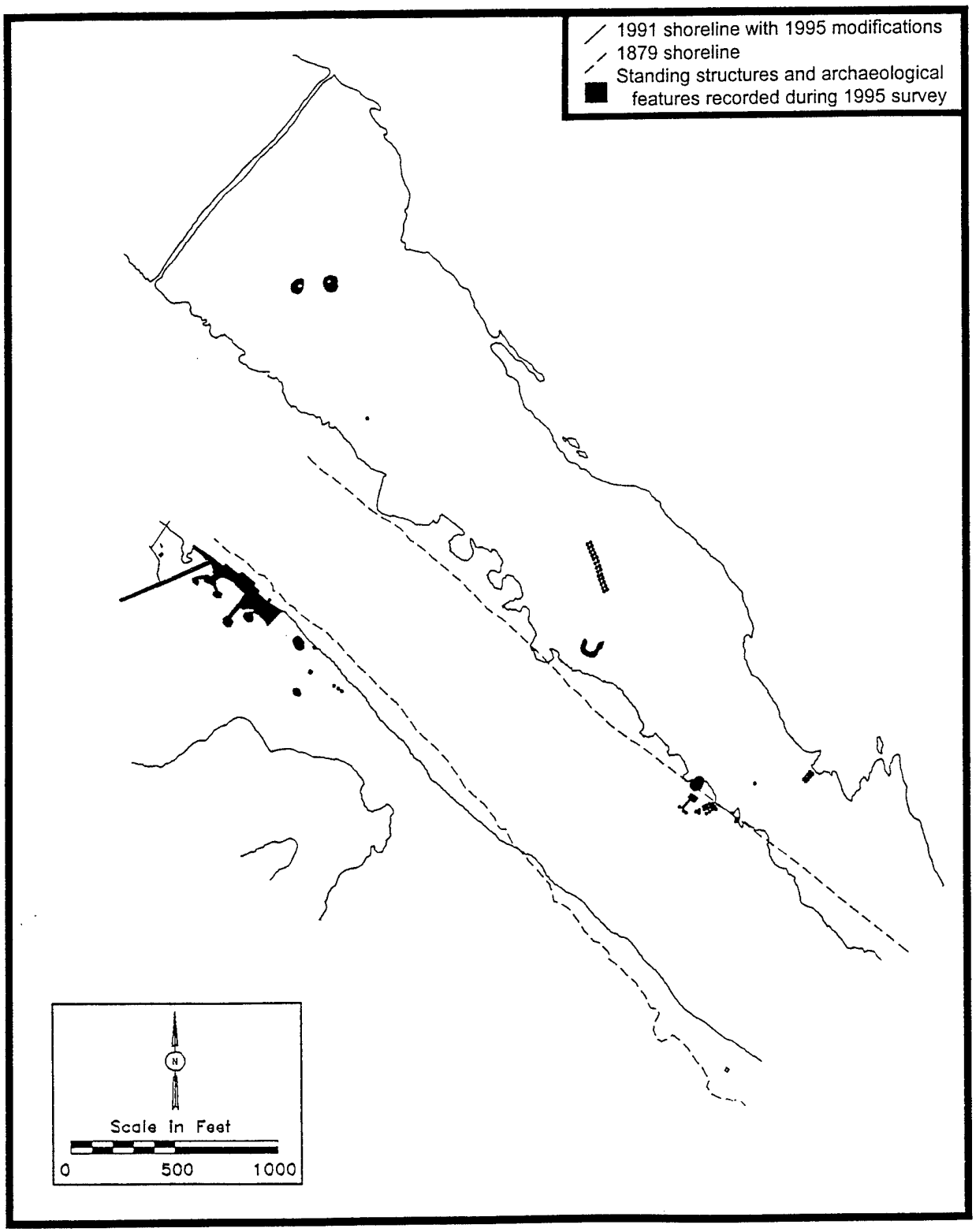


Figure 44. Map comparing the 1879 shoreline with the current shoreline.

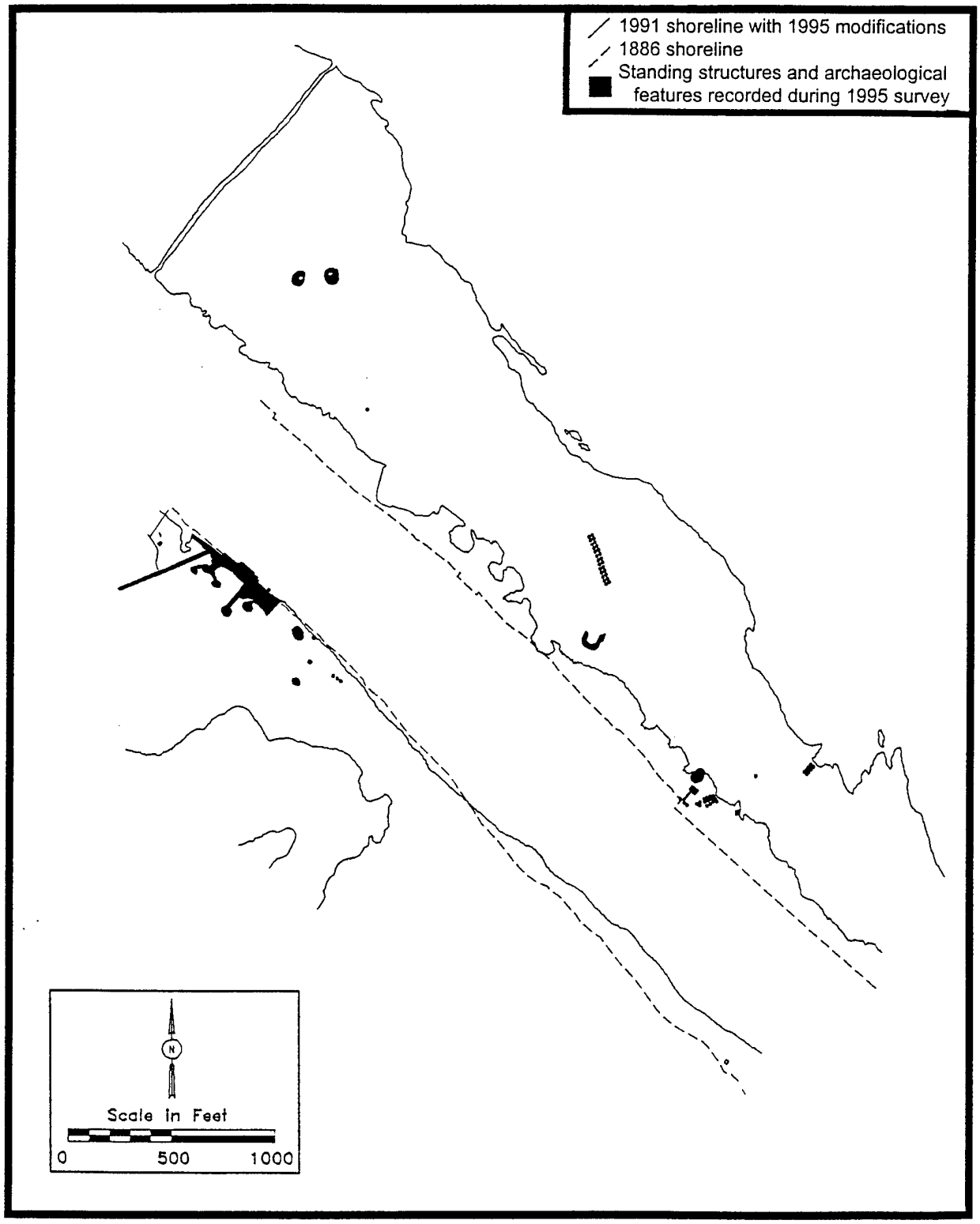


Figure 45. Map comparing the 1886 shoreline with the current shoreline.

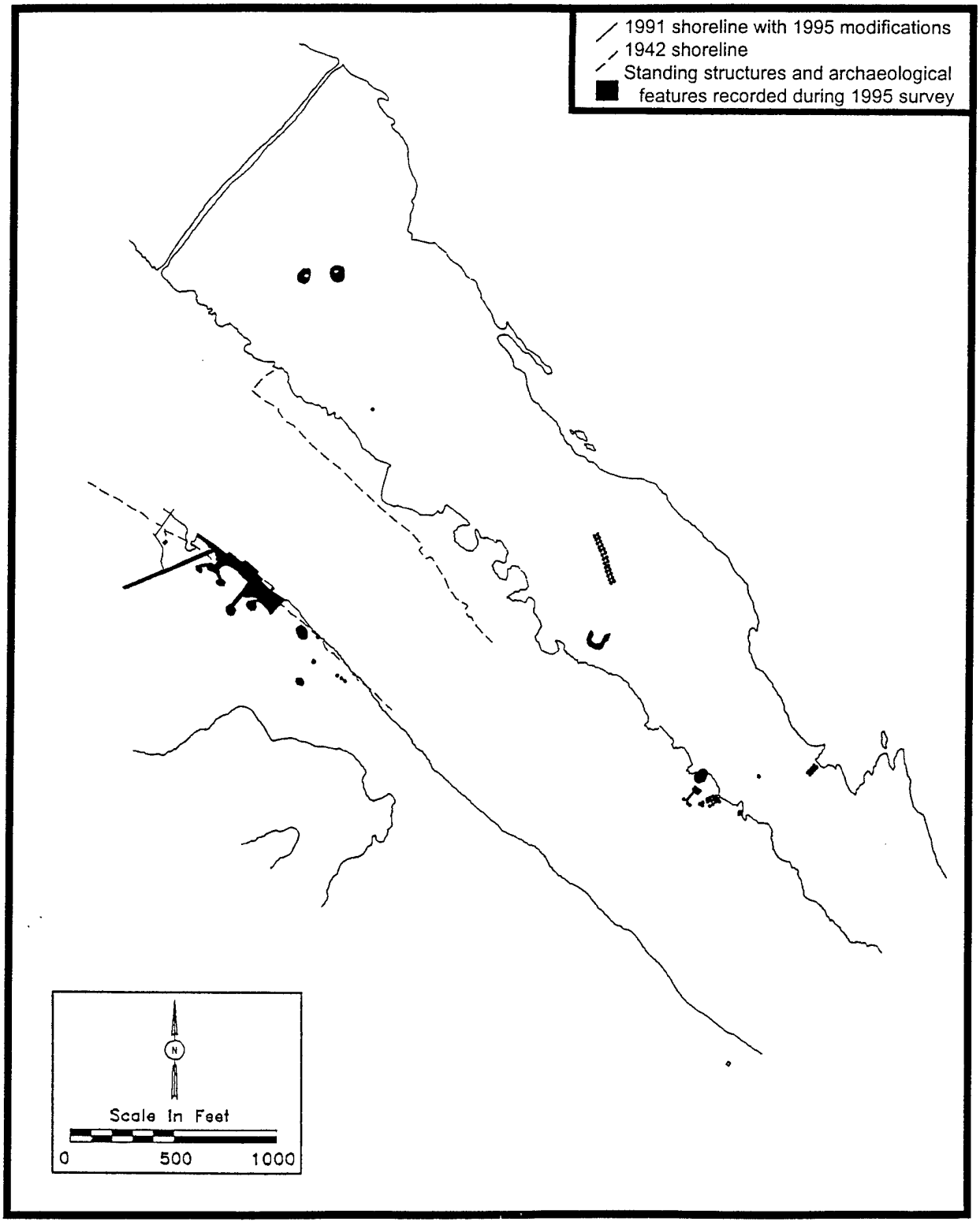


Figure 46. Map comparing the 1942 shoreline with the current shoreline.

Maps of the pass from Port Eads to the mouth are included in the reports. These depict the river bank and buildings, but they appear to be "stock" maps, used and reused. For example, for several reports, the accompanying maps do not show new structures mentioned in the written report or they may retain structures that were reported as demolished in the accompanying report. Bearing this in mind, the reports are extremely valuable in terms of providing important information on construction activities.

First Report - December 13, 1875

This report details the work completed from the beginning of the project on June 2, 1875 until November 14, 1875. The principal tasks consisted of driving piles and laying willow mats. From the head of the east side of the pass, 11,800 feet of piling were driven, while from the head of the west side 7,700 feet of piling were driven. A single layer of mattresses, 11,700 feet long, was laid on the channel side of the east piles and at places topped with a second layer totaling 3,400 feet. A line of piles 500 feet long was also driven westward from the head of the west jetty to the Kipp signal station. At the head of the pass an additional 120 piles, spanning 3,000 feet, were driven.

The first report also indicates where the timber for the mattresses was obtained, noting that James B. Eads was authorized to cut timber on public lands in Hancock and Marion Counties, Mississippi and in St. Tammany and Washington Parishes, Louisiana. Finally, the first report makes reference to the erection of shops, boarding houses, and ways for the construction of mattresses. Also, a wharf is mentioned as being located on the east bank adjacent to the willow mattresses. Unfortunately, there was no map accompanying the first report (*United States Senate 1876a:2-3*).

Second Report - April 7, 1876

Not much work had been accomplished since the first report due to seasonal rough weather. Additional mattresses were laid on both the east and west jetties, and work had been conducted along the row of piles connecting the head of the west jetty with the Kipp signal station. Now called the Kipp dam, this section was strengthened by the addition of planking called aprons. The work of replacing and redoing previous work damaged by wave action and other forces had also begun (*United States Senate 1876b:2-3*).

Addressing the question of scour, it is noted that from the head of the east jetty scouring had resulted in variable changes in depth (from one to four feet) and that the deepest water to carry out of the pass was 12 feet at high tide. It is reported that a schooner drawing 13 feet made the passage to sea through South Pass, but with difficulty. No map accompanying the second report could be located.

Third Report - June 9, 1876

Work on the east and west jetties during this period was devoted mostly to adding mattresses in low places to bring them up to low water level. This work was well over 90 percent completed. At the head of the pass, work was focused mainly on adding mattresses to the piles driven during the period covered by the first report. Efforts to dam Grand Bayou at the original starting point were abandoned and commenced about one mile further downstream (*Comstock 1876a:2-5*).

Alluding to subsidence is a discussion of the periodic disappearance of piles near the end of the east jetty. It is concluded that most have sunk gradually out of sight, even though their tops were at first several feet above water. The report notes that the top of the jetty within a few hundred feet of the end of the east jetty had sunk; again, it is surmised to be a result of subsidence. Less marked sinking was noted for the west jetty.

The first attempts were made during this reporting period to stir up the bottom of the river, thus aiding scour and increasing water depth. To this end a long chain with a heavy pulley on the end was dragged over the bottom. A large rake with iron teeth was also tried; this was towed by a scow. The chain was quickly abandoned as being unsuccessful, and the rake broke.

In the conclusion of the third report, the author, C.B. Comstock, states that, as of June 1876, "in their present condition the jetties are not permanent structures" (*Comstock 1876a:8*). The planned protective covering of stone had not yet been completed, thus the jetties remained incomplete.

The earliest map that shows the structures at Port Eads is included with this third report and is dated June 9, 1876. This map depicts the coal yard, headquarters, and East Point wharf on the east shore as well as the lighthouse, boardwalk, dock, and four small structures west of the lighthouse on the west bank. In addition, a small structure located approximately 2000ft south of the lighthouse is shown; this small rectangular structure is labeled "slaughter house."

Fourth Report - August 17, 1876

The report of August 17, 1876 begins with the statement "But little work has been done on either the east or west jetty since April 30" (*United States House of Representatives 1876:383*). As mentioned above, the third report noted the unsuccessful use of a rake towed by a scow to increase scouring. The fourth report noted that several larger rakes were subsequently constructed, but these too did not produce the desired result.

A few mattresses had been added to the east and west jetties, and work progressed on the addition of spurs extending at right angles from the inside of the jetties into the channel. Two pairs of spurs, each pair consisting of one spur on each jetty, had been built during the previous reporting period, and six were added during the fourth reporting period. Construction of the second wing dam

was begun during this reporting period, but it had not been completed at the time of the fourth report (*United States House of Representatives 1876:383-385*).

The map accompanying this report curiously is dated September 20, 1876, several weeks later than the date of the report. Signed by C.B. Comstock, the report's map shows the headquarters building, East Point wharf, and coal yard on the east bank. On the west bank are the lighthouse and associated buildings. Also shown is a wing dam and the Kipp structure, along with a sunken barge in the stream.

Fifth Report - November 18, 1876

As with the fourth report, the report dated November 18, 1876 begins by saying "but little work has been done on the jetties since August 17" (*Comstock 1876b:1*) On the east jetty most of the work focused on raising the sea end of the jetty where the piles had sunk. In the three months covered by this report almost six hundred feet of the southern end of the east jetty had sunk below the surface of the water. In making these repairs, pilings were set, mattresses laid, and rubble stone placed on the mattresses. Stone was added to areas of the jetty where there had been none before, a matter of criticism discussed in the third report. Eight new spur dams were added to "obtain scour at certain points" (*Comstock 1876b*).

The fifth report concludes by noting that the work at South Pass conducted by James Andrews and Company had employed about 70 men, not including the crews of the steamers, 30 subcontractors that constructed mattresses, or other men employed to quarry stone. This is the first mention in the Corps reports of these activities.

The map dated November 18, 1876 and signed by Captain M.R. Brown shows the coal yard, headquarters, and East Point wharf on the east bank and the lighthouse, pier, and dock on the west. Also shown on the west bank is a second pier and dock south of the lighthouse.

Two months after the fifth report was issued, an unnumbered report dated January 19, 1877 concerns a "Settlement in Favor of James B. Eads" in which Secretary of War, J.D. Cameron, reports a recognition in favor of James B. Eads for $500,000. The critical factor in this settlement was that the payment was to be made after a depth of 20 feet had been obtained at the mouth of the pass. A map signed by Captain M.B. Brown and dated January 9, 1877 certified that, as of that date, the required depth had been reached.

This map shows the same three structures at Port Eads East as had the earlier versions. On the west bank, the lighthouse, four adjacent structures, a pier, and dock appear (*United States House of Representatives 1877:1-8).*

Sixth Report - March 16, 1877

In the March 16, 1877 report, survey measurements, parameters, and construction of the jetties are discussed. It is noted that work was primarily confined to the construction or repair of wing dams to control current and erosion. A storm severely damaged 12 of the wing dams and mattresses and also damaged both the east and west jetties. Also discussed is the fact that a small amount of dredging (ca. 16,000 cubic yards) took place between the jetties. This report concludes with tables presenting the results of daily tests of water, velocity, specific gavity, etc (*Comstock 1877*).

The map for the sixth report, dated April 5, 1877, is identical to the January 9, 1877 map in terms of the structures shown.

Seventh Report - July 24, 1877

The seventh report, dated July 24, 1877, marks the first report prepared by M.R. Brown. Beginning with Captain Brown, the reports on South Pass improvements expand greatly in length and in terms of the details of construction, repairs, and other activities (*Brown 1877a*).

Damage, repairs, and improvements to the jetties are the primary subjects in this report. The report presents a technical discussion of repairs and construction at Dam No. 5, East Dike, Upper Arms of East T-Head, Mattress Apron Across Northeast Pass, Dam No. 3, and the West T-Head. These include tedious discussions of mattress laying, setting piles, etc. at each location. However, in the discussion of the jetties, it is stated that effort and expense of work on the jetties had been considerably greater than in any previous four-month period. It was during this period that the laying of stone became a major focus of activity.

A section in this report also discusses experiments in dredging the channel by dragging a series of plows with steamers and a barge. Several of the plows were lost, and the author concludes he doesn't know what it accomplished.

In June of 1877, there was break in the west jetty 1,000 feet south of Pile 1. It was repaired by driving piles along the river's edge and filling in the gap with alternating layers of willow mats and stones. Many hundreds of cords of willow and 300 to 400 yards of stone were utilized in the repair. The general construction stone for the jetty was hard and compact sandy limestone from the Ohio River, although the stone for ballasting mattresses also included ship ballast and sandstone from the Yazoo River. The stones are described as averaging 30 pounds, but varying from one to hundreds of pounds in weight.

The accompanying map either shows considerable growth at Port Eads or reflects the attention to detail provided by Captain Brown. This map illustrates the lighthouse and 16 other structures on the west bank of Port Eads. On the east side, the coal yard, Headquarters, and the East Point wharf are named, and 10 other unnamed structures are illustrated.

Eighth Report - December 15, 1877

The eighth report, dated December 15, 1877, starts out by stating "nothing has been accomplished here since July 16," except that the oldest dam, No. 1, had been rendered superfluous by newer dams, so that it was dismantled (*Brown 1877b*). However, the report then goes on to discuss damage and repairs to the jetty, dredging, the construction of a Kipp dam, and construction of wing dams. Two storms, described as cyclones, lasted three days; each caused a total of $4,700 damage to the jetties during the month of September. One storm had maximum winds of 75 miles per hour. Willow and stone mattresses were used to repair the damage (*Brown 1877b*).

A bucket dredge was employed for 40 days to deepen the channel at the bar and the pass. It removed a total of 12,000 cubic yards of sand, but the bar dredging was unsuccessful. On November 15, a new type of dredge using an Andrews Patent centrifugal pump began dredging. This report gives a detailed description of the vessel and the processes. This dredge, the *Bayley*, worked 20 days, removing an average of 800 cubic yards per day for a total of 16,000 cubic yards. Brown goes on to comment that the river is working against them as the channel does not reflect the removal of that much spoil. Problems with ship worm (*Teredo navales*) destruction of willow mattresses is also mentioned. Parts of the jetties also subsided up to one and one-third feet due to compression. The accompanying map is the same as the one appearing in the previous report.

Ninth Report - May 31, 1878

At the outset of the ninth report it is stated that no additions had been made to any of the mattress walls since the last report (the eighth, dated December 15, 1877) and that no additions of consequence had been made to the jetties. There is, however, discussion of stone having been stored at the East Point wharf and stone from the upper part of the east jetties being placed elsewhere on the east jetties. The ninth report further states that all works remains substantially in the same condition as previously reported (*Brown 1878a*).

The new Andrews-type dredge was still in constant use when not down for repairs or alterations. In order to facilitate the dredging, several small plows were used to break up the bottom sediments. There was more concern over the sinking of the jetties. For example, the report indicates that over a period of three and one-half months the jetties sank more than one foot. The only difference in the map from the one shown in the previous report is that the walkway is shown as two lines.

Tenth Report- June 30, 1878

Beginning with the report dated June 30, 1878, which follows the ninth report of May 31, 1878 by only one month, the reports on improvements were no longer numbered, but were dated and titled with the words "Annual Report." True to their title, they were issued at yearly intervals, unlike reports 1 through 7, which were issued at irregular intervals of two, three, or four months, or

reports 8 and 9, which were issued at a five and one-half month interval. An exception to the annual issuance of reports occurred in 1879 when, curiously, two reports were issued over an interval of one month. Thereafter, all reports were published at the end of each fiscal year (*Brown 1878b*).

M.R. Brown, Captain of Engineers, received instructions to prepare and submit an annual report to be dated June 30, 1878. In the introduction, Captain Brown notes that his seventh, eighth, and ninth reports (July 24, 1877; December 15, 1877; and May 31, 1878, respectively) covered the improvements for the fiscal year ended June 30, 1878. Because of the detail presented in the two previous volumes, Captain Brown states that it is unnecessary to repeat all of the material from those works. He concludes by stating that the annual report for 1878 will be a brief recapitulation of the most important facts from the previous reports.

This report states that no changes of consequence were made on any of the dikes or dams; however, a new wharf was built, extending toward the channel. Located 11,090 feet below East Point of Port Eads, the wharf was constructed so that stone could be placed on the jetty and thus overcome difficulties caused by shoaling of water between the wing dams. The wharf extended "189 feet from the directrix of the east jetty" (*Brown 1878b:6*). It had a projecting pier and a T-head. The bridge portion was about eight feet wide. The pier ended in a T-head which measured 71 feet long and 14 feet wide. The entire wharf was supported by 64 piles. It appears that this new wharf was near the mouth of the jetties and was designed as an aid to construction, but not as a permanent structure. It is labeled a tramway on the accompanying map.

A yellow fever epidemic struck the area near the end of the summer, and on August 6, 1878, all work was suspended by the jetty company.

Eleventh Report- May 19, 1879

Two reports were issued in 1879: one dated May 19, 1879, the other dated June 30, 1879. The reason for this is unclear. The report issued in May indicates that work was behind schedule because of delays from a yellow fever epidemic that broke out in August of 1878. All work was stopped and the town was evacuated except for four people who had previously survived the fever and were presumably immune (*Brown 1879; Secretary of War 1879*).

Mr. Eads' assistants arrived on November 24th. The use of cement mortar blocks for capping jetties was discussed. Repairs to Kipp dam and wing dams were made. About 40 men were employed in the construction and repair of barges, the construction of various houses at Port Eads, and in the task of preparing the entire plant, as Port Eads was called, in readiness for active operations in spring. A hospital was constructed one mile north of Port Eads. The wharf, built with a projecting pier ending in a T-head, storehouse and unnamed minor buildings were constructed at station 102, 10,200 feet below East Point, for the east jetty. A second wharf, this one without the T-head, was built across the channel on the west jetty. Both of these structures were built to store raw materials for construction of cement blocks or caps for the jetties. The tops of jetties were also prepared for the installation of cement caps. From February to April, an elevated railroad was

constructed over each jetty to serve two small home-made locomotives that pulled seven cubic yard hoppers filled with dry cement mix from storehouses to the work area. At the work area, the mix was dumped into a cap mold over the jetties and mixed with water.

No map of the jetties or Port Eads East and West was located with the eleventh report. This is probably because the next, or twelfth, report, which has an accompanying map, was produced only one month after the date of the eleventh.

1879 Annual Report - June 30, 1879

The annual report dated June 30, 1879 is the twelfth in this series of reports on South Pass and follows by only one month the appearance of the eleventh report, which is dated May 19, 1879. Accordingly, Captain Brown states that much of the material in the twelfth report quotes from the earlier volume (*Brown 1879*).

In addition to previously discussed work, stone was added to various spots on both jetties, and the wharf and storehouse pertaining to the east jetty were made ready for use. As noted, preparations for the construction of cement blocks were made, and an elevated railroad over jetties was constructed by April. A storm caused damage to the jetties and considerable efforts were devoted to their repair.

A discussion of the sinking of the jetties concluded that the blocks were sinking at a rate of from one-half to one foot each year. However, it was noted that most of the depression occurred during severe storms. Other notes in this report concern the purchase of a new towboat and the completion of repairs to the dredge *Bayley*.

The map accompanying the June 30, 1879 report adds identifying titles to some of the structures. On the east bank, shops and an office are shown; three additional structures are also depicted on the east bank. On the west bank, a new warehouse is depicted, and a group of structures are identified as boarding houses.

1880 Annual Report

Captain M.R. Brown's last report was that dated 1879. The 1880 Annual report was authored by W.H. Heuer, Captain of Engineers (*Heuer 1880*).

Work on the jetties continued during this year, focusing on building up the structure by placing concrete blocks, building a parapet wall on concrete blocks, and sinking crib work, the latter undertaken to strengthen and protect the sea ends of the jetties. The cribs were piles laid in alternating horizontal courses held together by drift bolts and iron straps. They were constructed on ways and then floated into position and sunk. The locations of the cribs are presented in tabular form, and these can be keyed to the accompanying map, but neither the cribs nor the ways are shown on the map.

During periods of the year when the winds and rough seas prevented work on the jetties, the work force of 70 was employed distributing ballast discharged from vessels. Also, work was undertaken to repair wharves, walks, and buildings. It was during this period that the wharf in front of the hotel was rebuilt and enlarged.

A small structure depicted on the 1879 map west (riverward) of the office is no longer shown. Also, a wharf, or ways, shown north of East Point is no longer present.

1881 Annual Report

Work during the year was essentially the same as that of the previous year, including the construction and sinking of crib works, distributing gravel among the concrete blocks, and plastering the concrete parapet. No work was done on the west jetty. A storm in February caused some damage to the jetties in 16 different locations; this damage, however, was quickly repaired (*Heuer 1881; U.S. Army Corps of Engineers 1881*).

During the year pilings were driven above East Point to serve as moorings. Also, an addition was made to one building. As was the case in the previous year, a work force of 70 individuals, including officers, mechanics, and laborers, was employed. During periods of heavy seas, the workers distributed ship ballast "to raise the surface adjacent to dwellings and other buildings above the tide-water" (*Heuer 1881*).

Several changes are present on the accompanying map. Most structures are labeled. On the east bank, the same number of structures are present, but a wharf, or ways, shown previously on the 1879 map, was added north of the shops. Several improvements to the walkways were made, and an office is identified near the headquarters building. On the west bank, a small wharf is missing, and the structures south of the lighthouse are labeled "Boarding Houses."

1882 Annual Report

Apparently work on the jetties was winding down at this time. During the year 16 cribs were built and placed, "some little masonry work was added, and a few wing dams ... were placed in position" (*Heuer 1882:1329*) on the east jetty. On the west bank, a levee was built to close small bayous caused by water coming over the jetty.

Eighty-seven days of dredging were completed, primarily between the jetties and the mouth of the pass. Two dwellings were thoroughly repaired, and a kitchen was built onto the "hotel." This is the same building that was labeled "Headquarters" on the 1881 map. The most dramatic change is on the west bank. The new lighthouse is present for the first time, and the only vestige of the old lighthouse and its associated structures is a plot of cleared land behind the present structure. A new building is depicted north of the lighthouse. Other changes are minor. An average of 60 men was employed at various tasks relating to maintenance of the jetties and the pass, and distributing ballast.

1883 Annual Report

This report contains a detailed account of a hurricane force storm that occurred on September 8, 1882. Maximum recorded winds were 108 miles per hour. Inhabitants were sheltered in the hotel where they had to wade through knee deep water. A record tide was recorded and all of Port Eads was underwater for a time. The storm damaged 3,000 feet of jetty and washed away all of the boardwalks. The primary damage to the jetties was the over turning or skewing of sections of the concrete cap. However, no sections were washed away and they still performed their task so that only minor work was done in 1883 (*Heuer 1883*).

Most of the work accomplished during the year, other than repairing storm damage, focused on the construction of the inner east jetty. This jetty, discussed in Chapter Six, consisted of two rows of piles, six feet apart, filled with willow courses. Also, five new wing dams were added.

Over one foot of subsidence was recorded on the jetties in three years. Only 17 days of dredging were done for the fiscal year. Work on Port Eads included rebuilding a carpenter's shop that was struck by lightning and burned to the ground. Two dwellings were constructed, and a house and wharf were built for the pilots. A portion of one structure was moved and converted into a school house, and several structures were repaired. In addition, the work force, totalling 67, spent spare time distributing ballast over the area.

Several changes on the accompanying map are apparent. On the east bank, the three clustered workshops at the south end are gone, and a building of similar size to two of these is in their place. This could be the schoolhouse described in the report. The only difference along the west bank is the addition of another structure along the big wharf. The newly constructed pilot's house and wharf are shown approximately two miles south of the lighthouse.

1884 Annual Report

The 1884 report was authored by Thomas Turtle, Captain of the Engineers. The report for 1884 states that work continued on the lengthening of the inner east jetty. Also, a large wing dam was constructed. There is no discussion of work on the west jetty, and there was no dredging undertaken. In 1884, the work force continued to dwindle, with only 34 individuals employed (*Turtle 1884; U.S. Army Corps of Engineers 1884*).

The primary activities concerning Port Eads included the construction of a boathouse, repair of several structures, and the sinking of 26 mooring piles in front of the coal yard. In their spare time, the crews distributed ballast. The 1884 report also notes that a coal yard was built, but its location is not shown on the accompanying map. Changes on the accompanying map include the disappearance of the structure on the big wharf, thought to be the pilot house on the west bank. On the east bank, a structure and wharf, or ways, north of East Point are absent.

1885 Annual Report

Between 1883 and 1885, Captain Heuer was promoted to Major, and, in 1885, he once again authored the annual report. Work described for the year continues the trend of decreasing activity at South Pass. The major focus was upon continued construction of the inner east jetty, but only 605 linear feet were added, considerably less than during the previous two years. Repair of a wing dam is the only other work of consequence noted. With the work force reduced to 30 individuals, this report mentions only boat repair and distributing ballast as additional tasks for the year. The map is essentially unchanged from the year before, except that a new structure is shown on the east bank between East Point and the headquarters (*Heuer 1885*).

In the 1884 report it is noted that a record was made of seven vessels drawing 24 feet or more making passage to sea through South Pass. In 1885, either record keeping became more precise or the volume of traffic increased dramatically, for in that year 733 vessels are recorded as having made passage to sea through South Pass, 37 of which drew 23 feet or more.

1886 Annual Report

The bulk of this report is a description of the condition of the jetties. The east jetty was completely buried by deposits to 5,000 feet south of East Point or Pile #1. The next 1,300 feet was just above average flood tide and was well-ballasted. The 3,040 feet of concrete cap still protected the inner jetties. However, the report notes that probably nothing will ever be done to improve the original jetties. During February, work commenced on the inner west jetty. The purpose of this jetty was threefold: 1) to prevent the escape of water over the concrete blocks at flood tide, 2) to prevent material accumulated between the wing dams from washing into the channel, and 3) to constrict the water way and increase scouring. Also during this year, wing dam construction and repair continued (*Heuer 1886*).

The only other work mentioned is the repair of barges and the sinking of mooring piles at different points. On the west bank, a riverside structure, previously depicted southeast of the lighthouse, is no longer present.

1887 Annual Report

Very few changes are presented in this report. The inspecting officer for the 1887 annual report continued to be Major W.H. Heuer. However, rather than authoring the report, Major Heuer prepared a brief introductory letter, followed by a detailed report written by M.C. Donovan, assistant engineer (*Heuer 1887*).

An October storm with 100mph winds damaged the jetties and caused substantial flooding. Mr. Donovan writes "by noon the highest point of landfall was flooded, walks were carried away, and the rapidly rising waters soon began to flood our homes. Danger seemed imminent and retreat

was necessary, so that residences were vacated and the inhabitants sought the safest retreat here—the hotel" (*Heuer 1887:1349*).

Work during the year consisted of repairing storm damage, repairing the inner east jetty, extending the inner west jetty some 480 feet, and building three wing dams. There was no dredging on the pass between 1883 and 1887. The primary work of the 34 person crew was boat repair and the sinking of eight pilings. Their spare time was spent repairing dwellings and distributing ballast. The map is the same as the previous year.

1888 Annual Report

The report of 1888, again lists Major W.H. Heuer as an Inspecting Officer; this is the last year his name will be appear on these reports. The co-author, also listed as an Inspecting Officer, is Captain W.L. Fisk, the preparer of the report of 1888 (*Heuer and Fisk 1888*).

No work of consequence was done on the inner west jetty, but willows and stone were added where needed to the inner east jetty. Repairs to wing dams were also made. In addition to this work, boats were repaired, piles were driven, dwellings and walks were repaired, and ballast was distributed in the crew's spare time. The pass was not dredged. By this time, the staff employed at South Pass had shrunk to 26 individuals. The map shows no change on the east bank, but several structures at Port Eads West are no longer present.

1889 Annual Report

In this year the jetties were finally repaired. The author, W.L. Fisk, goes into great detail to explain why the original concrete caps failed and why the design improvements to the new caps were expected to survive other storms like those in 1882 and 1886. This new cap was added via a concrete barge rather than by building an elevated railroad. Over 1,900 feet of the east jetty was repaired, utilizing over 1,600 yards of concrete and bringing the total height to two feet above flood tide. Considerable repair to the west jetty and construction of six wing dams was also accomplished. The dredging of South Pass, totaling 55 days, was reinstituted for the first time since 1883. However, not much improvement to the port area was recorded. Work accomplished included the repair of three barges, construction of two small flat boats, and general repairs to structures. The work force totaled 54, a substantial increase over the years between 1884 and 1888 (*Fisk 1889*).

An act to prevent the obstruction to navigation in the South Pass of the Mississippi and any injury to the works therein constructed was passed by Congress. The act outlined specific rules for navigating South Pass. These rules included guidelines for dumping ballast at Port Eads and in the Gulf of Mexico, granting of exclusive right-of-way to the dredge boat *G. W. R. Bayley*, and similar navigational rules. The report further states that no vessel encountered any problems sailing the pass, but numerous violations were cited. The 1889 map shows details of the new construction and repairs to the jetties. No significant changes are shown in the Port Eads area.

1890 Annual Report

Work during the 1889-1890 fiscal year concentrated on making repairs to the inner east jetty and the outer east jetty. Little was done on the inner west jetty. Three wing dams were also constructed (*Fisk 1890*).

Perhaps the major event of this year was the explosion of the dredge boat on November 5. The starboard boiler exploded, killing two crew and almost sinking the vessel. Up until that time, dredging continued as weather permitted. The work force, now at 52, made repairs to boats and wharves, but there is no mention of work on structures or on the distribution of ballast.

The map accompanying the 1890 report is essentially the same as that for the preceeding year, with the exception of the addition of a diminutive structure on the east bank.

1891 Annual Report

On the east jetty, work was confined to continuing crib work, continuing work on the inner east and west jetties, and the construction of wing dams. The west jetty is reported as being almost completely buried. Dredging was conducted during 82 days. Mention is made of the driving of piles and construction of a barge, but there is no notice of work on buildings or distributing ballast. Once again, the work force was reduced, this year to 41 (*Quinn and Fisk 1891*).

The map depicts no changes.

1892 Annual Report

In 1892, Major James B. Quinn became the lone inspecting officer, although the previous year he shared that duty with Captain W.L. Fisk. As in the past several years, the report was prepared by Mr. C. Donovan, assistant engineer (*Quinn 1892*).

As in the preceding year, work on the east jetty consisted of continuing the crib work and repairing the jetty. Additional repairs continued on the inner east and west jetties, and additional wing dams were constructed. Dredging was sporadic. The work force of 45 conducted these operations, but there is no mention of work on living quarters.

The map remains essentially the same as that for 1891.

1893 Annual Report

Events are similar to the two previous years. One barge and one flat boat were built, and others repaired. A tool house was built and a corrugated roof was put on the carpenter's shop and storehouse. No significant changes were made from the previous year's map. There were 73 days of dredging in the pass (*Quinn 1893*).

1894 Annual Report

In 1894, there was no work done on the outer east or west jetties or the inner west jetty (*U.S. Army Corps of Engineers 1894*). A small quantity of willows and stone were placed on the inner east jetty, and several wing dams were repaired. The work force had shrunk to 20, and there is no mention of work on the plant other than boat repair. Dredging continued in the pass, but 10 steamers were grounded at the head of South Pass from August 1893 through June 1894. Other activities included repair to a launch and several barges. Structures are the same as on the previous map.

1895 Annual Report

Construction projects during the year included a new blacksmith's shop and storehouse for machinery. Other activities consisted of repair of the jetties and vessels. Events of the year included the storm of October 7 and 8, which delayed construction of one of the wing dams, and the foundering of the bark *Mari Vizeu* at the mouth of the jetties. Despite the construction activities noted in the annual report text, no changes from the previous year's map are present on the accompanying 1895 map.

1896 Annual Report

Only routine activities were conducted during the year; boats were repaired and two wharves were rebuilt. There were no changes in the map (*Quinn 1896*).

1897 and 1898 Annual Reports

During the years covered by these two annual reports all work dealt with repairs to the jetties and wing dams, maintenance dredging, and boat repairs. Obviously all major construction had been completed, and the work force, which varied from 40 to 47 men, was engaged in the aforementioned activities. There are no discussions of consequence concerning the living or industrial structures at Port Eads East or West.

The maps accompanying the reports for 1897 and 1898 are identical to the map for 1896. In fact, there were no changes of consequence to the map of Port Eads East or West between the years 1888 and 1898.

1899 Annual Report

In reviewing the Corps annual report for 1899, we located no report on improvements at South Pass and found no map. It may have been our oversight in failing to find a section of the report dealing with South Pass in 1899, but two separate volumes were examined, and neither discussed South Pass nor was a map present. It is, of course, possible that the section on South Pass in the two volumes reviewed had been removed at some point during the 97 years since its publication.

1900 and 1901 Annual Reports

During the years 1900 and 1901, repair and maintenance activities continued as they had in previous years (*U.S. Army Corps of Engineers 1900*). As in the previous few years, there is no mention of new construction relating to the plant, i.e., the dwellings, shop, boarding houses, wharves, etc. However, there are substantial changes in the map at both Port Eads East and West. Suddenly in 1900, many new structures appear on the east and west banks. These are discussed in detail in the review of the two sites.

1901 - 1910 Annual Reports

After 1900, data in the annual reports concerning the activity at South Pass became less detailed as the focus of activity had already shifted to maintenance dredging and the efforts devoted to repairs and maintenance were reduced. Even though repairs on the wing dams and jetties continued, less detail is supplied in the reports, and, since the work force was greatly reduced, these efforts were not on the same scale as in earlier years.

An example of the importance of dredging is presented in the annual report for 1902, where the only new event of importance was the arrival of the dredges *Sabine* and *Beta*. As noted above, during this period, the work force was greatly reduced. The report of 1902 states that the work force included only 14 men and consisted of an overseer, a master, three steam engineers, one carpenter, one stoker, one leadsman, four deckhands, one gauge observer, and one watchman.

The reduction in maintenance efforts and the reduced detail in reporting is illustrated in the annual report for 1908. In that volume, it is noted that only the inner east jetty and several wing dams required attention. During that year, it is reported that they were repaired as usual.

Also during this period, there are consistently few references to "the plant" and activities there. In 1904, the structures are numbered for the first time; unfortunately, there is no legend to correlate the number to building function. One of the reports that does make such references is the report for 1906. In that volume, it is reported that three dwellings were raised and repaired, a fourth repaired, and three new dwellings built to replace some that had become untenable. These structures cannot be identified on the map.

1911 - 1916 Annual Reports

The map accompanying the 1909 annual report depicted the jetties and the mouth of the pass. Upstream, however, the map terminated at East Point, the southern end of Port Eads East. This reduction in map detail was the precursor of what was to come.

In 1910, the map once again encompassed both Port Eads East and West, but after 1910, the maps included in the annual reports terminate at the southern edge of Port Eads. Consequently,

during this period there is no useful cartographic information in the annual reports insofar as Port Eads is concerned.

During the years between 1911 and 1916, the annual reports present minimal detail on activities at South Pass. As in the previous decade, the work force was greatly reduced, and activities included only routine maintenance. The greatest concern at this time lay in continuing dredging so as to prevent shoaling in the pass.

Only occasionally do the reports make mention of the plant. The 1916 report, for example, states that 33 houses were maintained to serve as an office, shops, and dwellings. Repairs are discussed, and, as earlier, structures are referred to by number. In most of the reports during this period, there is no mention whatsoever of the dwellings or other structures.

1916 - 1919 Annual Reports

Beginning in 1916, detailed maps of South Pass ceased to be included in the annual reports. They were replaced by much larger scale maps that showed not only the pass, but also extended well out into the Gulf of Mexico.

1920 Annual Report and Following Years

Beginning in 1920, maps of the South Pass area no longer accompanied the annual reports.

Summary

The Corps status reports contain general information on the construction activities at Port Eads and more specific data on construction and repair of the jetties. As the jetties were the primary focus of the reports, detailed plans and accounts of work accomplished usually accompanied the reports. Work at Port Eads was usually summarized in general terms; construction and demolition of buildings mentioned in the text are usually not reflected on the accompanying maps. In addition to construction details, these reports occasionally include information helpful in interpreting the archaeological record. For example, the frequent mention of the distribution of ballast at Port Eads explains its abundance on the eastern shore. Also, the mention of significant events such as storms and boating accidents periodically provides information of archaeological value.

The annual reports have provided information that we have also incorporated into discussions of construction and abandonment sequences in the individual site descriptions. However, prior to discussing the individual sites, comments on general field procedures are necessary.

General Procedures for Terrestrial Fieldwork

Fieldwork for the terrestrial portion was begun in July and completed in August of 1995. The terrestrial fieldwork immediately emerged as a logistical problem of some magnitude. Three

of the sites under investigation, 16PL49, 16PL62 and 16PL123, are completely overgrown in roseau cane. The height of the cane varied from with the average being about 10 to 12 feet. At all of the sites, the cane was extremely dense, forming a virtually impenetrable wall of vegetation. Only at one of the sites, 16PL49, were any trees interspersed among the cane.

In order to maneuver about these sites and in an effort to improve surface visibility, an airboat was used to cut transects through the cane (Figure 47). At each of these three sites, a grid was established with grid north at 310°, an orientation generally paralleling the shoreline of South Pass. Linear transects, aligned with the grid, were then cleared with the airboat. These long, grid north-south transects measured 10m and were crossed by grid east-west transects spaced at approximately 50m intervals.

Although an effort was made to align the transects with the grid, several problems were encountered that led to alterations in some of the transects. At Port Eads East, 16PL49, the sporadic occurrence of trees caused the airboat to veer off the desired alignment. Sporadic encounter with pilings had the same effect.

The cane is so tall and thick that no reference points could be established to provide the airboat with a target along which to align the transect. The only way a cut could be initiated was by taking a compass reading and showing the driver the direction in which to proceed. However, once started, the boat could not stop to make back sightings because to do so inevitably resulted in the boat becoming entrapped by the cane. With the boat thus stalled and with reverse impossible, the boat had to be freed manually. This was accomplished by the crew crawling onto the gunnels of the boat and stomping, with their feet, on the cane that was engulfing the sides of the vessel. Then, removing a plywood sheet that normally served as part of the boat's decking, the crew would place it vertically against the wall of cane at the bow. With the plywood set vertically, two of the crew would hurl their bodies against the wood, much like football players going at a blocking dummy. After achieving some give in the cane near the top of the plywood, we would jump off the bow of the boat, feet first, maintaining balance on the wood and stomp and jump until the cane gave and was flattened. This procedure gained about two feet of progress and would be repeated until the boat had about six feet of clearance. Then the transect could be resumed.

In the less dense stands of cane, the boat could make progress easily and, once the initial line was cleared, additional passes could be made with the boat until the transect alignment was correct. However, in the thick areas, once started, the driver had to continue until trapped. On occasion, in an effort to avoid becoming stuck, the driver proceeded even though the cut had veered off the desired angle. In view of the procedure for manually freeing the airboat when stalled, we deemed it prudent to accept these deviations from strict alignment with the grid.

In addition to using the airboat to clear transects at the sites, the boat cleared lines of sight and cultural features along the shoreline (Figure 48). This procedure assisted in taking instrument readings for mapping and in providing suitable exposures for photography of the wharf, pilings, etc.



Figure 47. Photograph of airboat cutting transect in roseau cane.



Figure 48. Looking north across 16PL62 along transect cut through roseau cane.

Subsurface testing was not practical over most of the project area due to the fact that most of it is wet. However, in areas where subsurface tests were possible, 50cm by 50cm test units were excavated. Most tests were placed judgmentally, primarily in areas of high ground. The water table was, however, routinely encountered in each unit.

SITE DISCUSSIONS

16PL49—Port Eads East

Port Eads East originated with the stroke of a pen in 1875 when Congress approved James Eads' proposal to build the South Pass Jetties. As is evident from the literature, it grew into a bustling little river town with over 30 structures, including a large hotel, dwellings, shops, and a post office; the settlement stretched for almost half a mile along the pass. Ultimately, the town died piecemeal as it was abandoned by its residents between the 1940s and 1950s.

Previous Research

During his visit to Port Eads East, Weinstein (*1984*) found the site to have scattered artifacts, structural remnants, portions of a collapsed cement ramp or dock, offshore pilings, a wooden bulkhead, and foundation remnants. The surface examination also produced large quantity scatters of foreign stone that represented ballast offloaded from ships to lessen their drafts before heading up the Mississippi River. Weinstein also reported an area of coal which he assumed to represent the coal yard depicted on an 1879 map of the port (*Weinstein 1984:48*).

Weinstein offered several observations on the collection from this site. One notable aspect was the absence of much in the way of domestic remains. Despite the overall low incidence of domestic goods, the existing collection was interesting. Well represented were ceramic tiles, metal, and sewer pipe. Of the 22 ceramics found by Weinstein (*1984*), 10 were identified as pre-1800s types—faience and other soft paste wares. The remaining ceramics date to the late nineteenth to early twentieth centuries. The presence of the eighteenth century ceramics was puzzling since there is no evidence of a significant occupation of the area at that time. Weinstein (*1984*) submitted that the early materials were likely ballast. He commented that it was not uncommon for ships to load and unload ballast at various ports around the world; these eighteenth century remains could easily represent part of the ballast picked up elsewhere and deposited at Port Eads East.

Other artifacts collected by Weinstein include metal, brick, ceramic tiles, sewer pipe fragments, pipe fragments, glass, and stone. At the time of the initial investigations of this site by Weinstein (*1984*), there was hardly a trace of the town. No standing structures were found, though some structural remains were observed along the shoreline. The ruins of a possible dwelling and two cement platforms or docks were found on the south end, and a wooden bulkhead was noted at the center of the site. All of these remains were in the water.

Construction and Abandonment Sequence

The combined effects of storms, subsidence, and artificial alterations have transformed the landscape of Port Eads East over the last 100+ years. Examining early maps and aerial photographs, we are able to trace modifications to the site, both in terms of settlement and landform change.

An 1838 map of South and Grand Passes shows the original 1831 light tower on the spit at the mouth of South Pass (Figure 49). It shows nothing at Port Eads East.

An 1874 map of the Delta of the Mississippi River from the U.S. Coast Survey also shows the light near the mouth of South Pass, but, again, there is no development at Port Eads (refer to Figure 12).

An 1875 Coast and Geodetic survey map, completed just before Eads began construction of the South Pass jetties, depicts the site of Port Eads as uninhabited. No structures are present. The old lighthouse is shown on the west bank at the mouth of the Pass (Figure 50).

The 1875 plat map from the Office of the Surveyor General, District of Louisiana, shows the old 1831 lighthouse and what appear to be several structures located at the mouth of South Pass (Figure 51). In addition to the lot set aside for a new lighthouse being labeled, the identification of "Eads Port" is shown south of the lighthouse in Section 50 and 51.

An 1875 Corps map of the mouth of South Pass showing the location of jetties proposed by the Board of Engineers shows no structure nor does it show the lighthouse.

Finally, a U.S. Coast Survey map made in 1875 shows the jetties and depicts "East Point" as well as a structure labeled "Headquarters" in the same location as the headquarters located at Port Eads East on later maps (Figure 52). Apparently, the headquarters building was the first structure built at Port Eads.

The earliest Corps map accompanying the reports on South Pass improvements dates to June 9, 1876. The map of Port Eads East shows the coal yard, headquarters building, and the East Point wharf. The next Corps map, accompanying the fourth report, is dated September 20, 1876 and shows the same three structures. In the fifth report, dated November 18, 1876, the map shows no changes at Port Eads East, and there are no changes on a map published two months later on January 9, 1877. Likewise, the map dated April 5, 1877 shows no change.

By July 1877, however, the Corps report on improvements at South Pass indicates that the settlement contained 13 primary structures that extended for more than half a mile along the eastern shoreline (Figure 53). A large headquarters building (which was converted into a hotel in the 1880s) is shown on the map, along with a wharf at the south end of the site. Only the headquarters building, coal yard, and East Point wharf are identified. Also depicted are a number of walkways, the presence of which suggests all of the area between the structures may not have been terra firma.

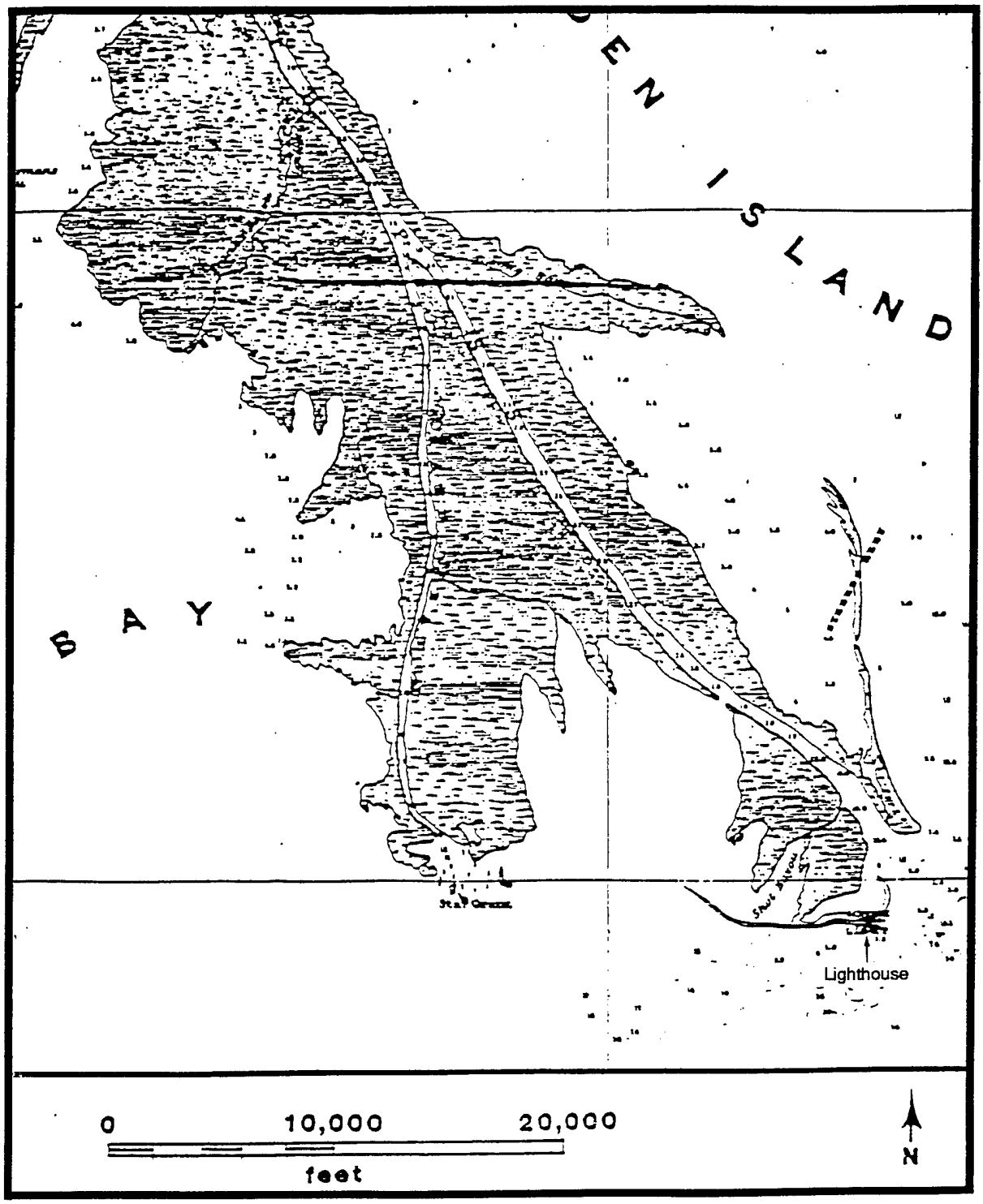


Figure 49. 1838 map of South and Grand passes.
(from *Weinstein 1984:Figure 6*)



Figure 50. 1875 Coast and Geodetic survey map.

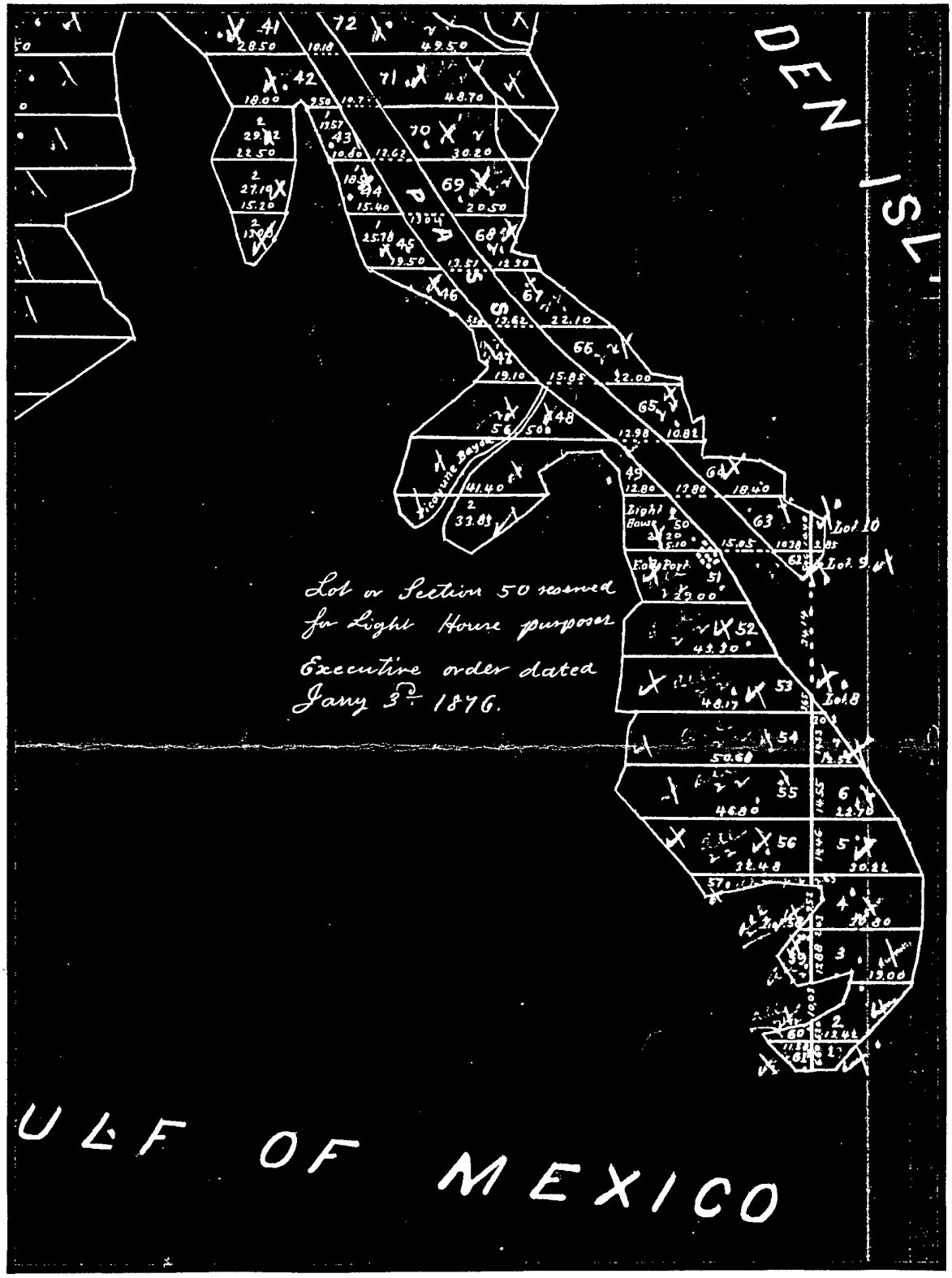


Figure 51. 1875 Plat map.

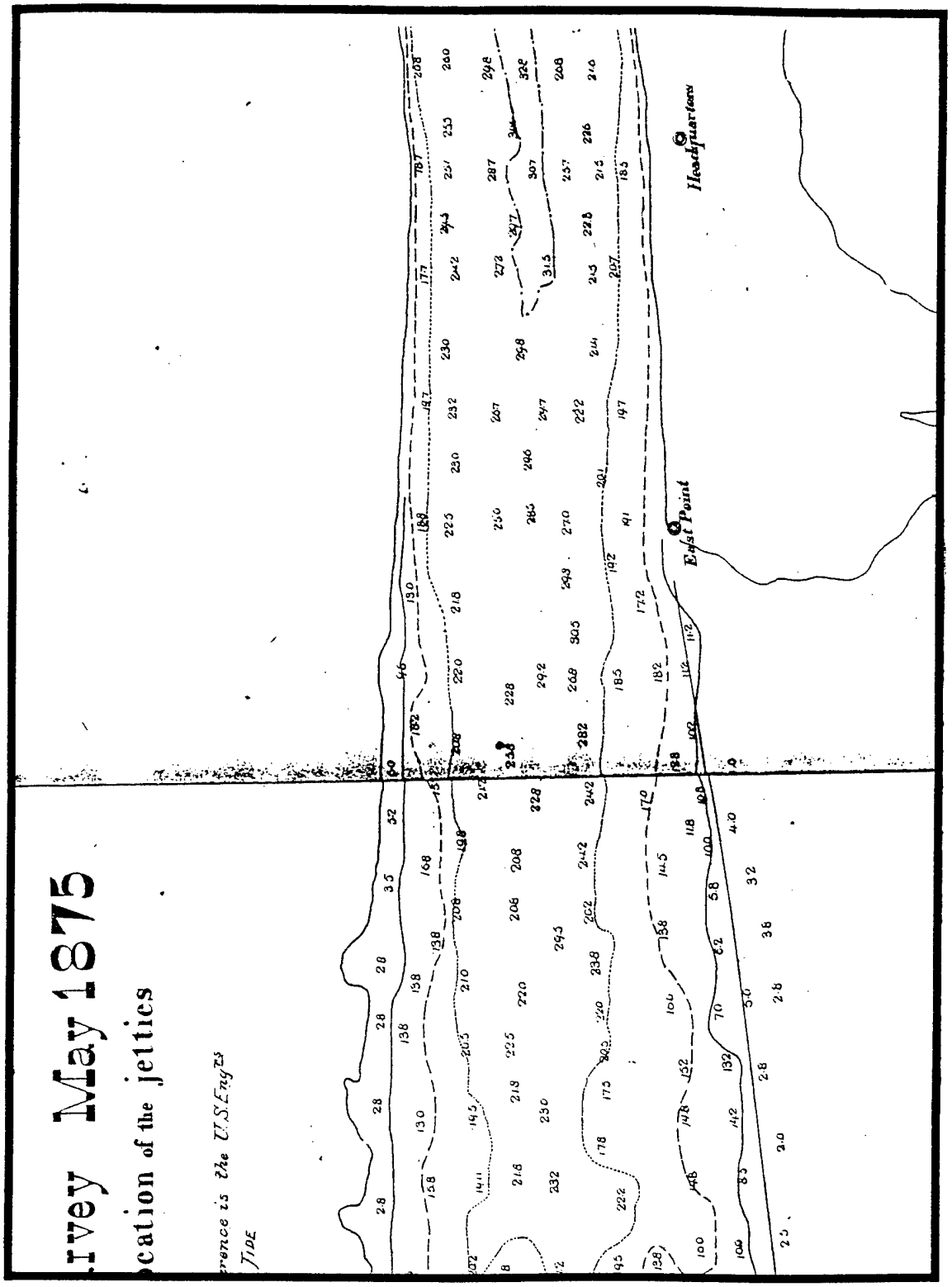


Figure 52. 1875 U.S. Coast Survey map.

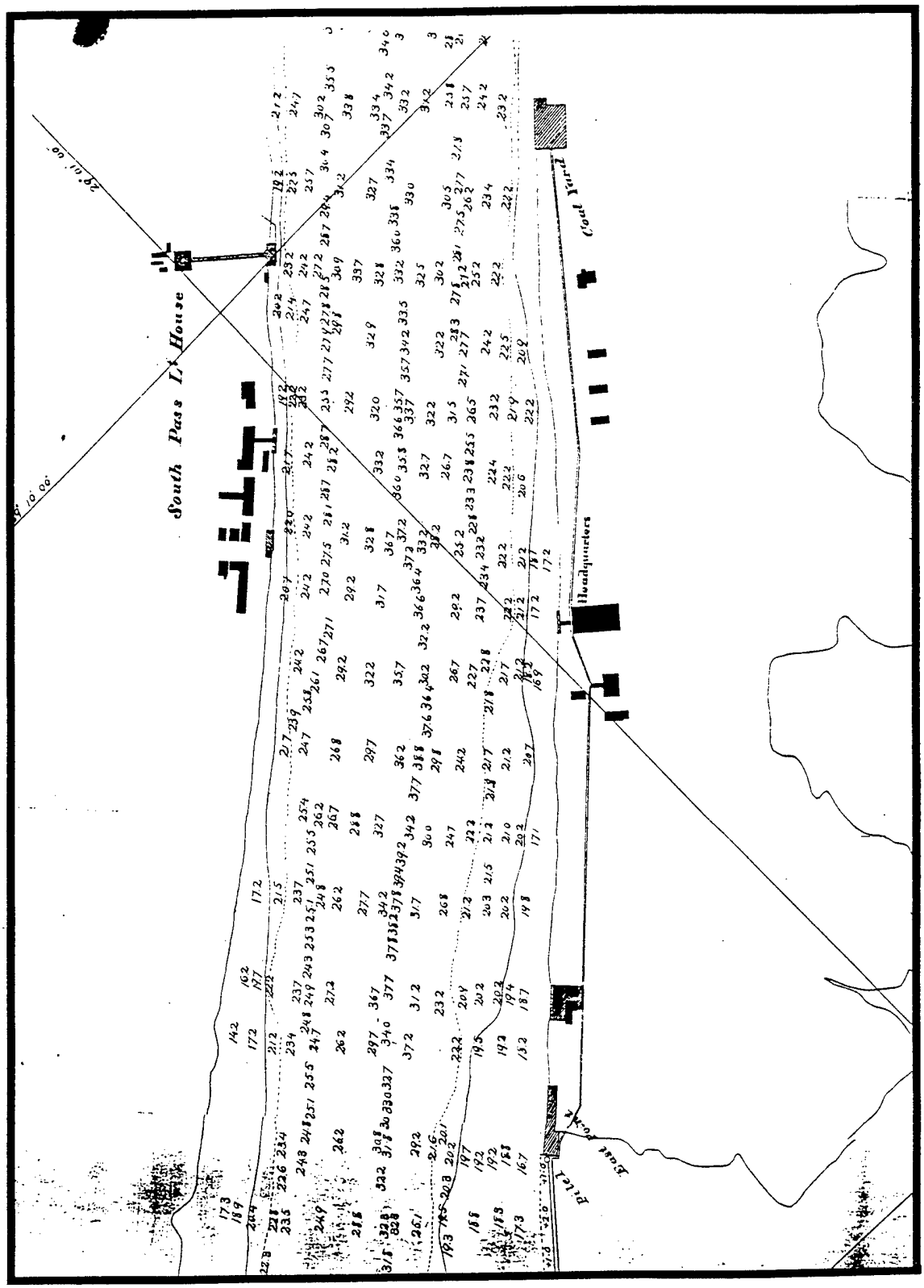


Figure 53. July 1877 Corps Annual Report map.

Several subsequent Corps reports of improvements dated December 15, 1877;May 31, 1878; and June 30, 1878 show no changes of consequence at Port Eads East.

We have located two maps dating to 1879. The first, from Corthell (*1881*), is a "Comparative chart of the mouth of South Pass" showing changes between May 1875 and June 1879 (Figure 54). This map presents data on areas of shoaling and scouring in the pass. It also shows Port Eads East.

This comparative map, dated June 1879, shows some changes from 1877. The coal yard remains the same, as does the headquarters and its dock, but three structures located between the headquarters and coal yard are now labeled on the map as "dwellings." Also, one of a cluster of three structures south of the headquarters is labeled "office." South of this cluster of structures is an elongated, rectangular structure paralleling the shoreline; it would appear to be a new wharf, the second at the site, or one of the ways used for constructing mattresses. The only discussion of a wharf in the annual report for 1879 refers to a wharf with a projecting pier and T-head which was located near the mouth of the jetties and which was also discussed in the previous year's report. There is no reference in the report to the new structure shown on the map south of the office paralleling the shoreline.

Still further south, two new structures appear at East Point near the wharf that marks the southern end of the site. One or both of these are noted as "shops." In sum, the 1879 map shows 16 structures at Port Eads East, up from 13 in 1877.

A second 1879 map, this one dating to July and included with the Corps annual report, is identical in terms of the structures depicted to the comparative map produced in June of that year.

The July 1880 Corps map (Figure 55) shows less detail and fewer structures than did the 1879 comparative map (refer to Figure 54). Figure 56 overlays the 1879 map over the 1880 map for comparison. In the 1880 map, the only structures identified are the headquarters and East Point. By 1880, however, the dock fronting the headquarters had been enlarged considerably, with new measurements of 133ft long and 38ft wide. The total number of structures drops from 16 to 14. Gone is the second wharf, or ways, that first appeared on the 1879 map, as is one structure from the cluster of three where an office had been depicted on the earlier version. The relative size and position of the other structures remains unchanged.

A new building was built on the wharf at East Point. This structure, which housed crews of the dredge boat *Bayley*, measured 24ft long and 20ft wide. The report for 1880 also notes that repairs were made to two dwelling houses and the hotel. Also, three houses were repainted.

On the 1881 Corps map, 15 structures are represented (Figure 57). As on the 1879 map, the headquarters, office, other dwellings, and shops are labeled. All structures are the same in terms of size, location, and orientation as they appeared on the 1880 map, but the second wharf, or ways, shown in 1879 and deleted in 1880, reappears on the 1881 map.

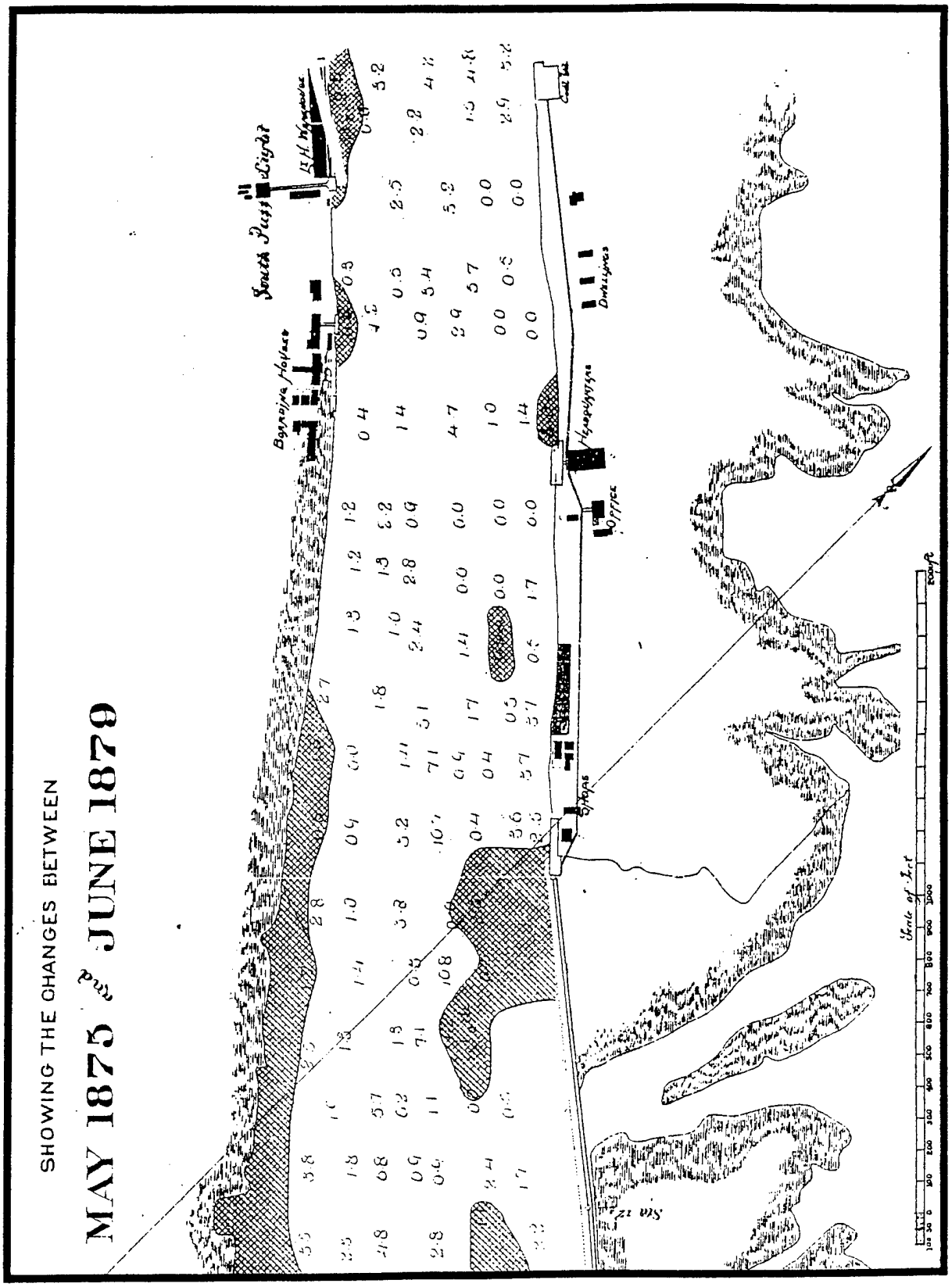


Figure 54. June 1879 map showing the Port Eads settlement between 1875 and 1879.
(From *Corthell 1881:Plate G*)

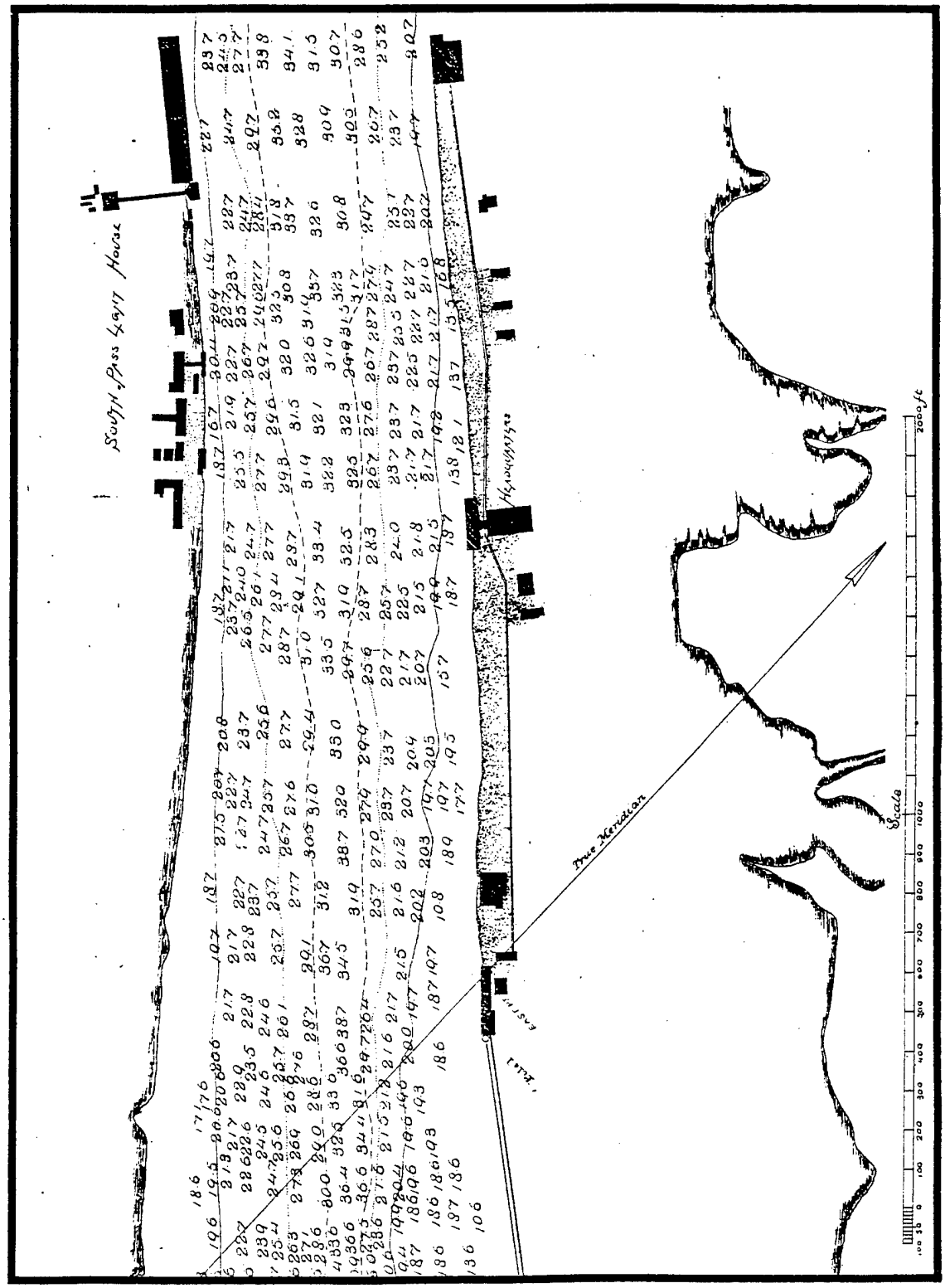


Figure 55. 1880 Corps Annual Report map.

(1)

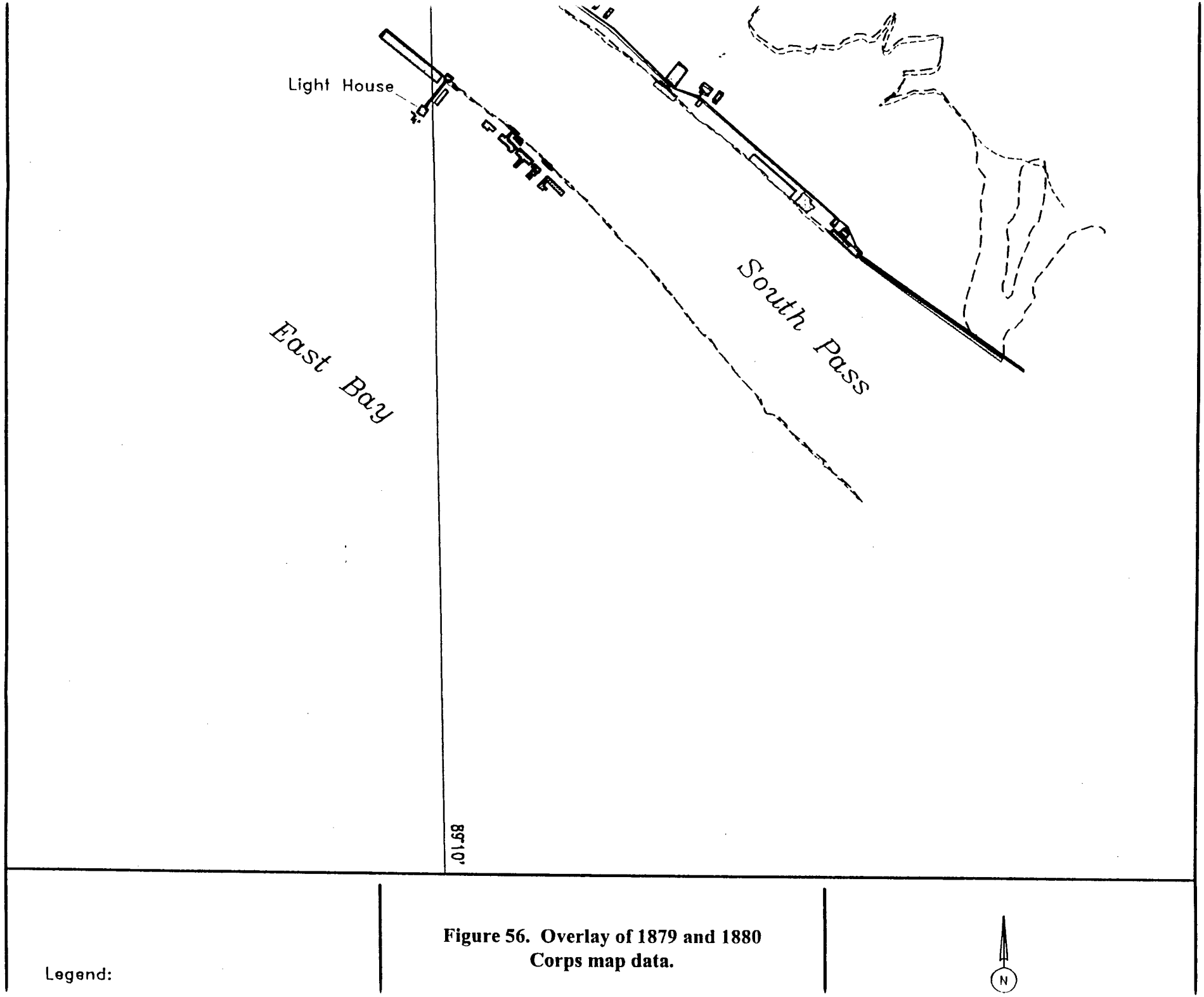


Figure 56. Overlay of 1879 and 1880 Corps map data.

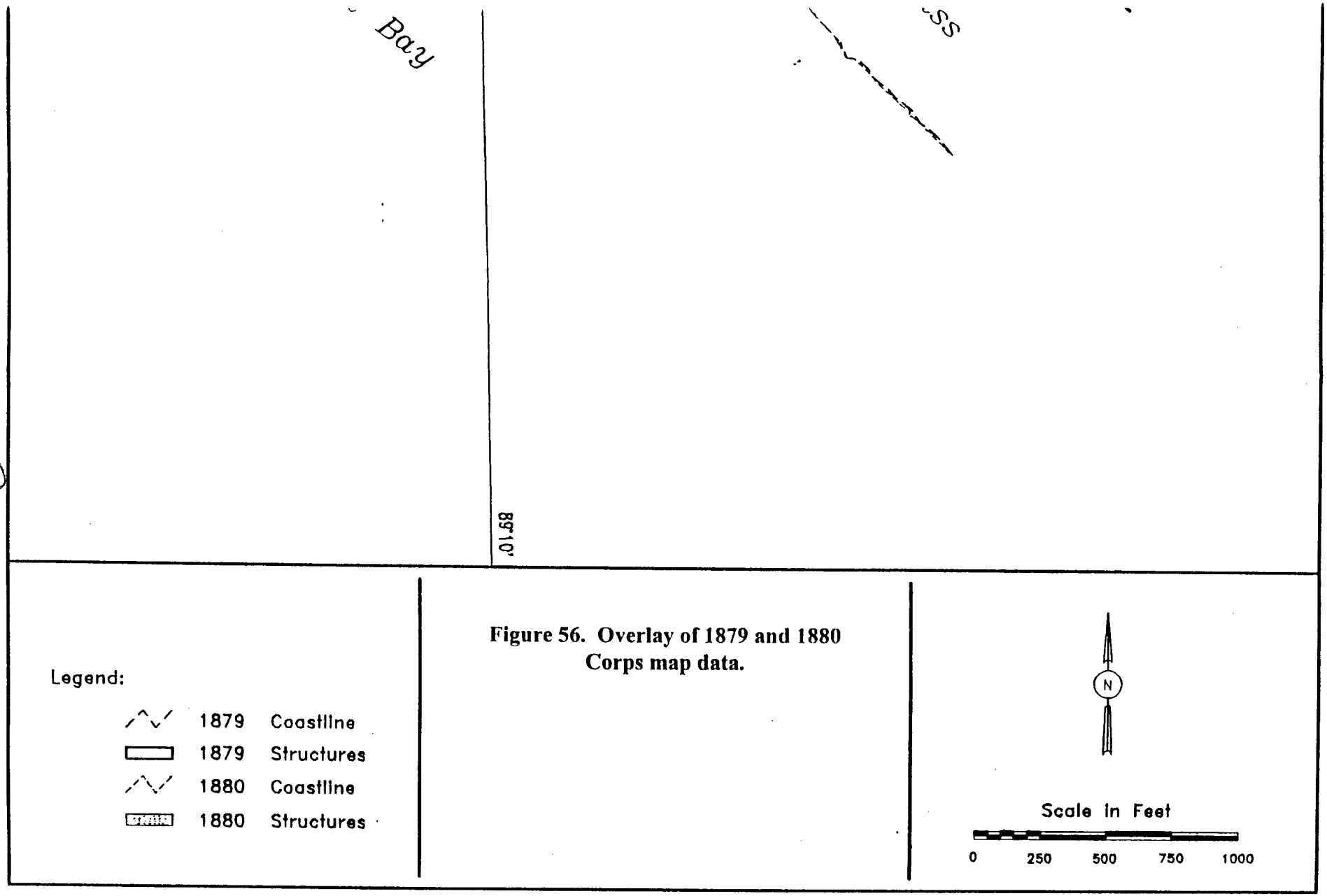


Figure 56. Overlay of 1879 and 1880 Corps map data.

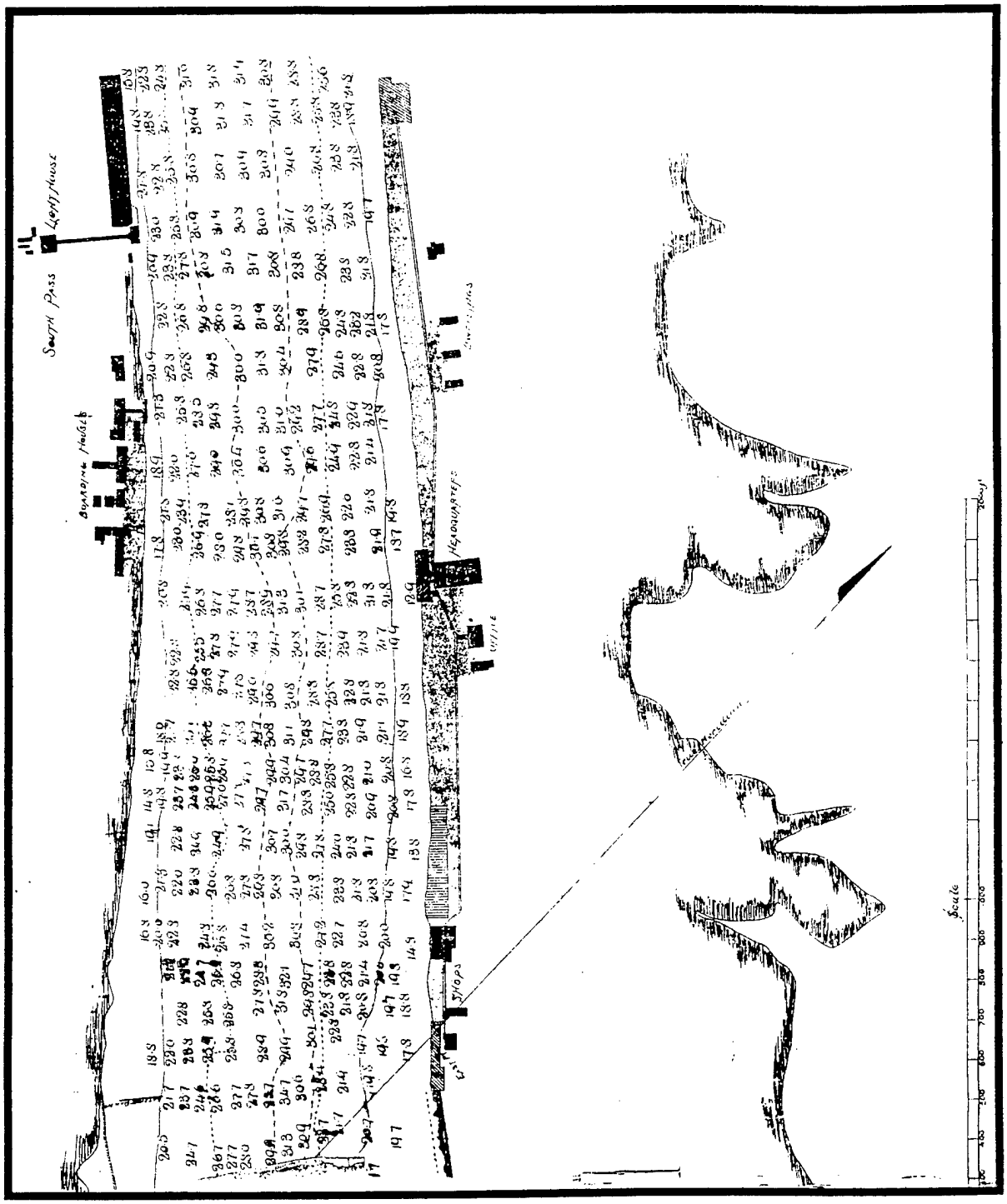


Figure 57. 1881 Corps Annual Report map.

The 1882 Corps map shows 16 structures, the addition over 1881 being a structure represented as an empty square just east of the southern wharf (Figure 58). Continuing to be identified are the three dwellings, headquarters, office, and work shops. The wharf and the second wharf, or ways, are present, although the latter, which over the years variously disappeared and reappeared, is depicted as a rectangle along the shoreline without the diagonal line shading used for the main wharf to the south. The only other change is at the coal yard where its area is enlarged over previous years and for the first time is depicted as rectangular in plan. Also, it is no longer identified as a coal yard, but the distinctive line shading used in previous years persists. These changes are apparent in the digitized overlay of the 1880 and 1882 data shown in Figure 59.

The 1883 Corps map shows 13 structures (Figure 60). The three structures consistently shown on earlier maps, but never identified as to function, are reduced to one. This group was located between the southern wharf and work shops, and the questionable, occasionally disappearing wharf, or ways. Also gone on the 1883 map is the unidentified square structure located immediately east of the southern wharf on the 1882 map. On the 1883 map, only the headquarters is identified.

On the 1884 Corps map, the wharf, or ways, located between the shop area and office is again gone (Figure 61). In addition, the three structures shown in association with this wharf, which were reduced to one on the 1883 map, are now completely absent. The 1884 Corps map depicts only 11 structures at Port Eads East. Figure 62 shows an overlay of the 1882 and 1884 data, highlighting the change.

The 1885 map differs from the 1884 map only in that there is a new structure on the east bank between East Point and the headquarters.

The 1886 map is almost identical to that of 1885 (Figure 63). The southern wharf, headquarters, and coal yard remain, and other structures are unchanged. In contrast to the maps of the previous few years, the coal yard is once again identified. Curiously, this is the only structure or feature identified by text on this map.

A small black square representing a diminutive structure appears for the first time on the 1886 map. This structure, probably an outbuilding, is located adjacent to and at the southeast corner of the third structure south of the headquarters. Since this small square consistently appears on maps over the following 10 years, it seems clear that it was a recognizable structure at Port Eads East, regardless of its small size.

The small structure discussed above may have first appeared on the maps a year earlier, in 1885; however, our copies of the map for that year are rather unclear, and it is not certain whether the structure in question is represented.

The map of 1887 shows only one change from the previous year's map and that is in the location of a section of walkway north of the headquarters.

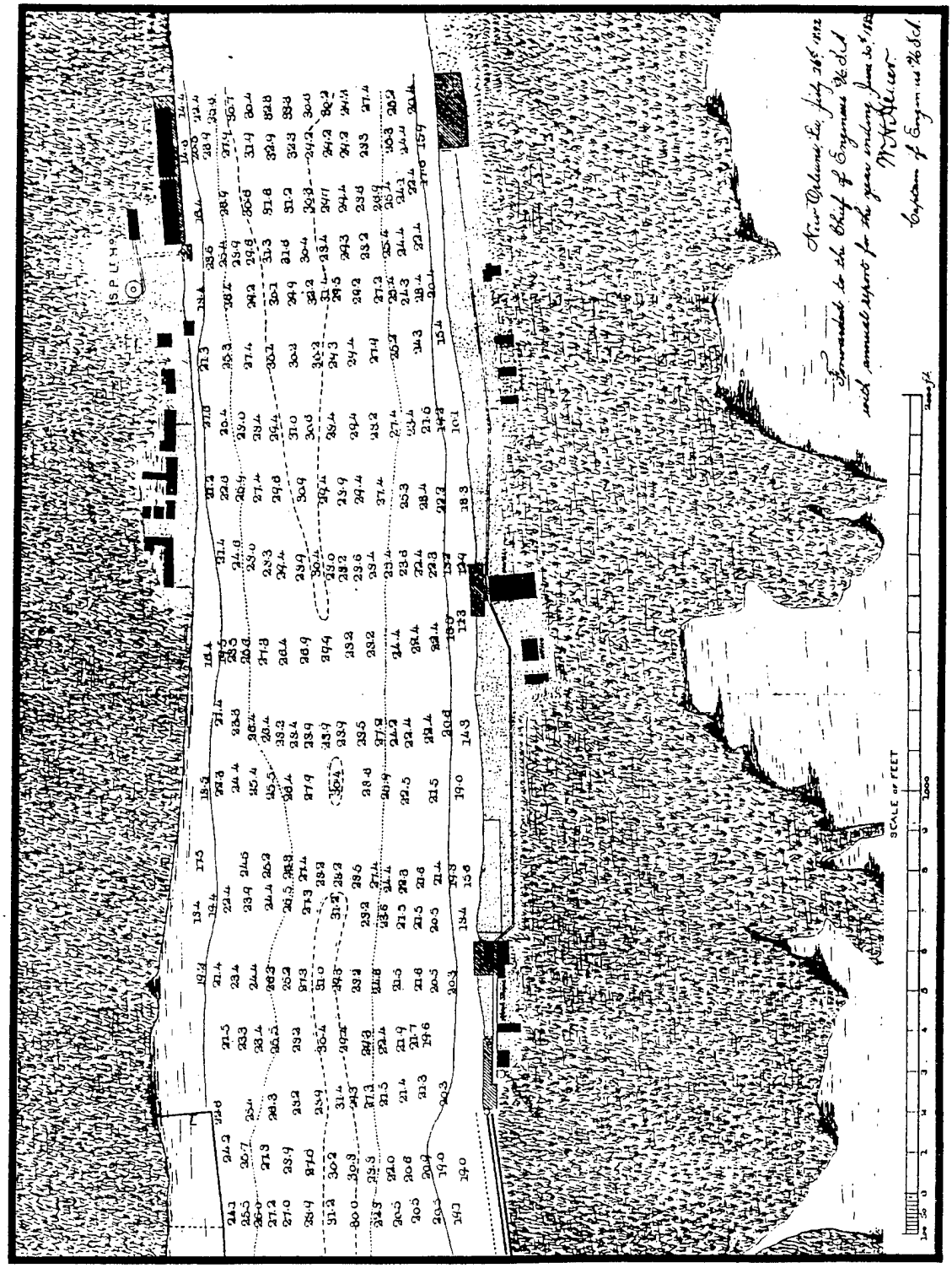
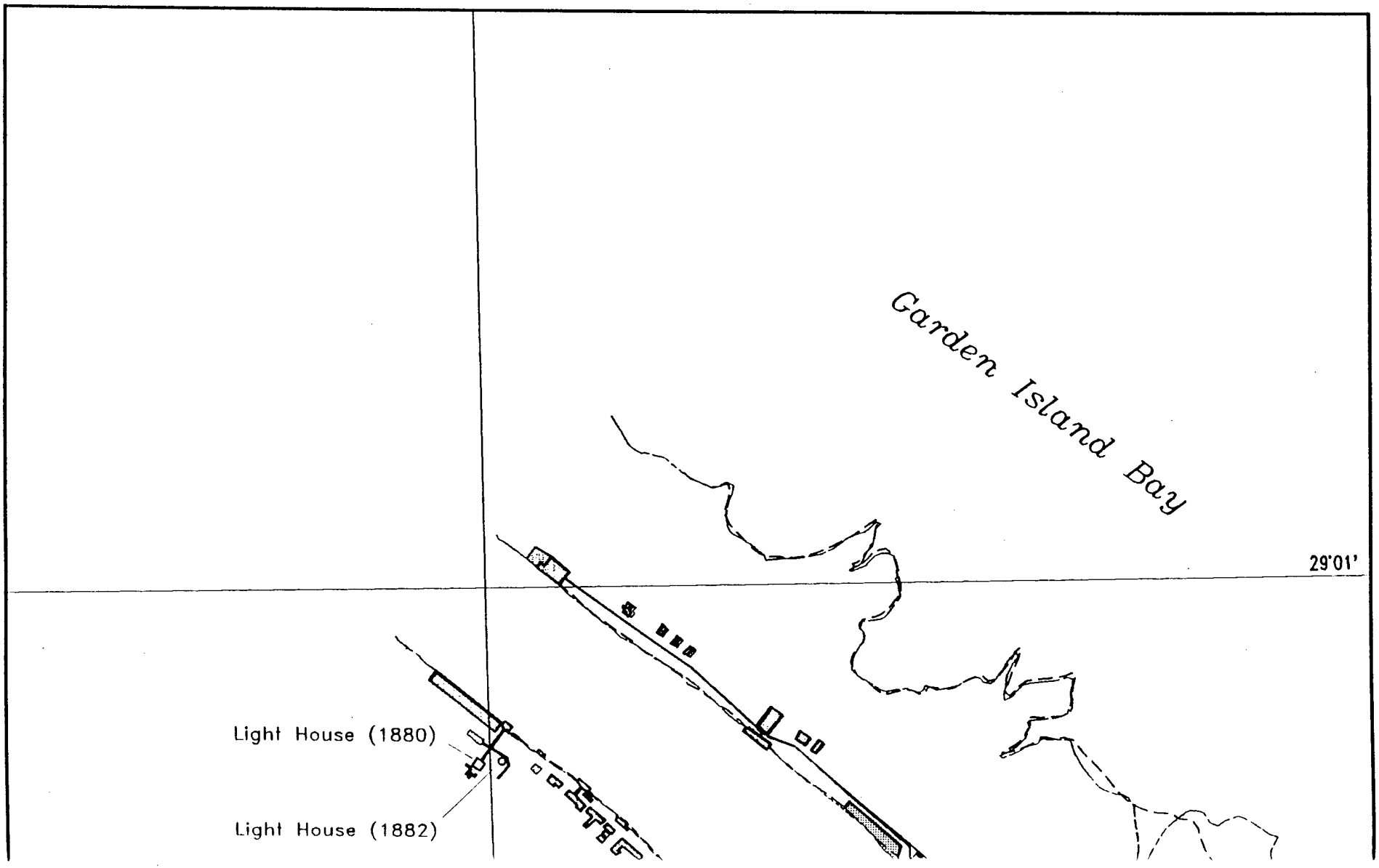
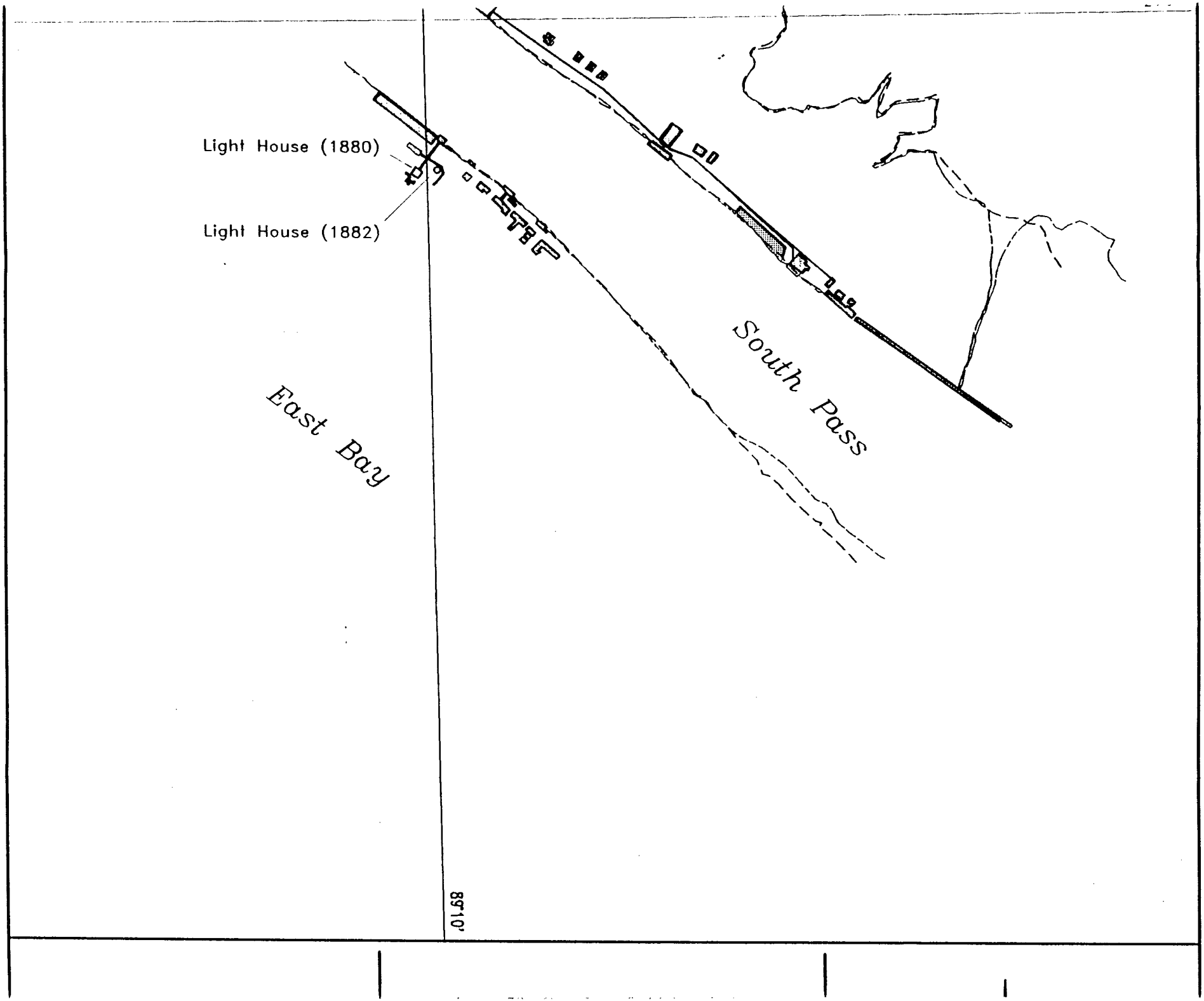


Figure 58. 1882 Corps Annual Report map.


143
Garden Island Bay
29°01'
Light House (1880)
Light House (1882)


Light House (1880)
Light House (1882)
East Bay
South Pass
89°10'

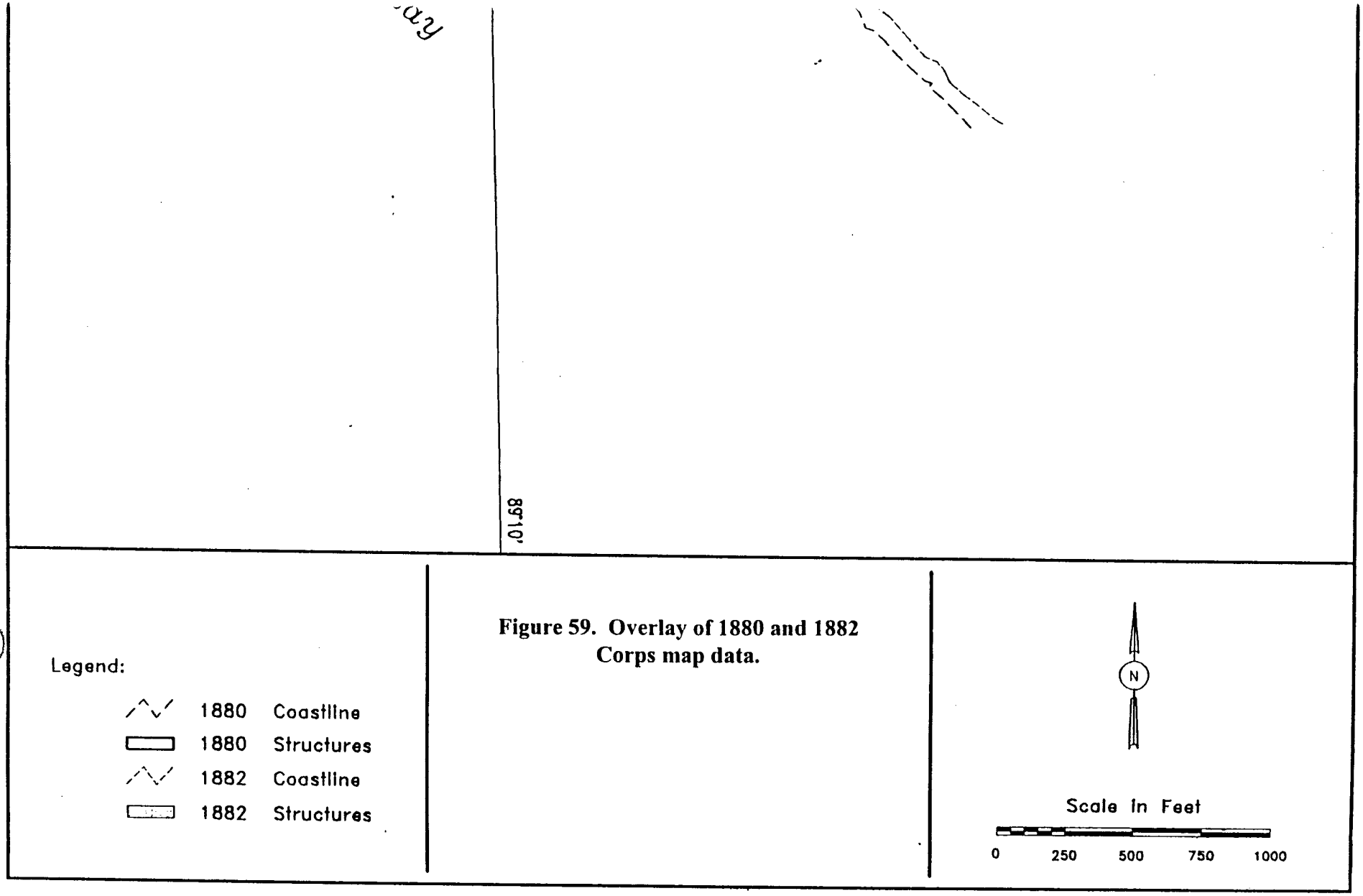


Figure 59. Overlay of 1880 and 1882 Corps map data.

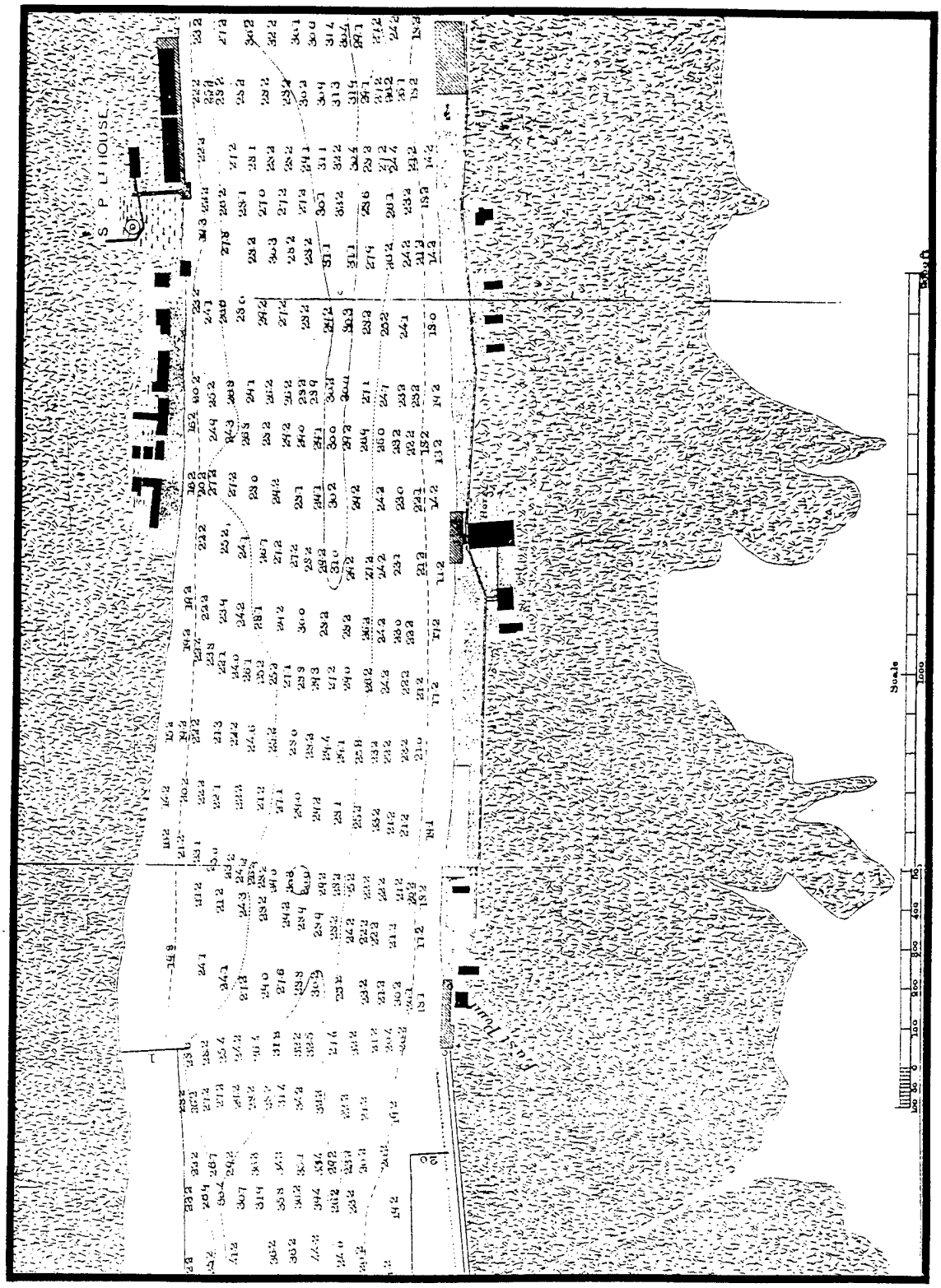


Figure 60. 1883 Corps Annual Report map.

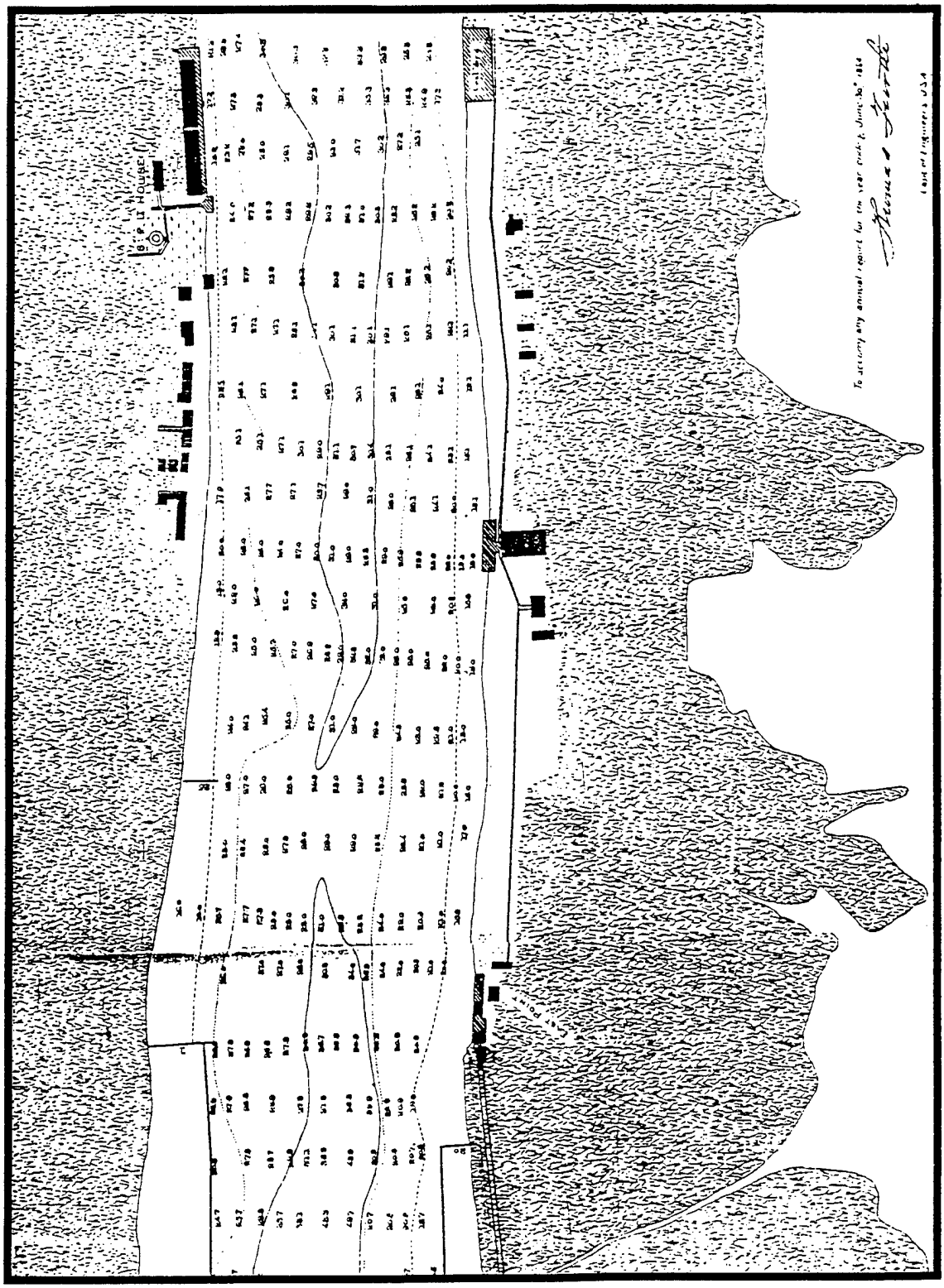


Figure 61. 1884 Corps Annual Report map.

(1)

29°01'
South Pass
89°10'
Light House
East Bay

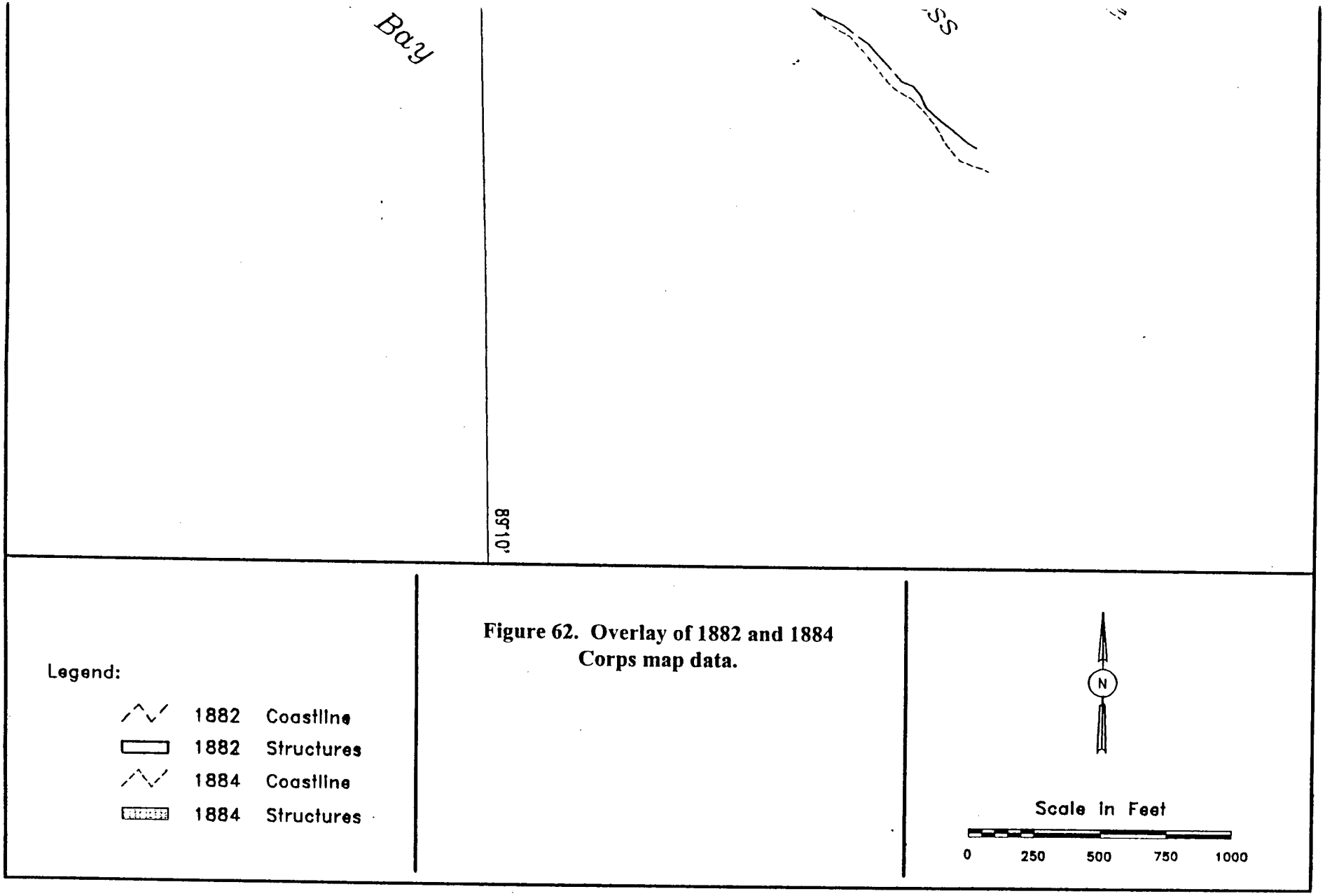


Figure 62. Overlay of 1882 and 1884 Corps map data.

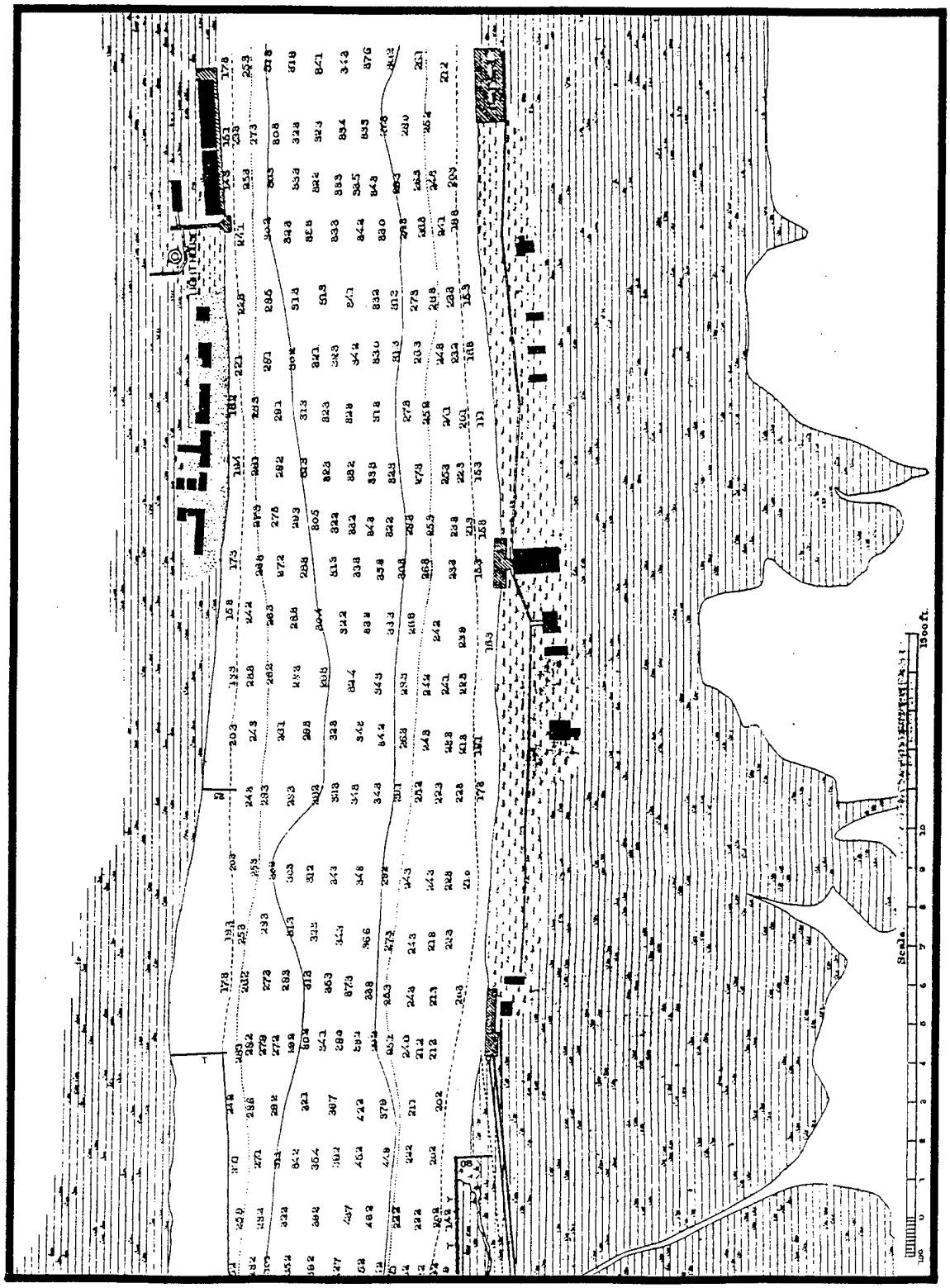


Figure 63. 1886 Corps Annual Report map.

The maps accompanying the annual reports for 1888 through 1898 show virtually no changes at Port Eads East.

The maps of Port Eads remained essentially unchanged over the ensuing years. For example, the only map change between the 1890, 1896 and 1898 maps is the orientation of three "dwellings," located between the headquarters and the coal yard. Otherwise, these maps are identical. Illustrating minimal change over the last decade, Figure 64 presents the 1896 data overlaid on the 1884 map data. Figure 65 illustrates the 1890 Corps map, while Figure 66 shows the 1898 Corps map.

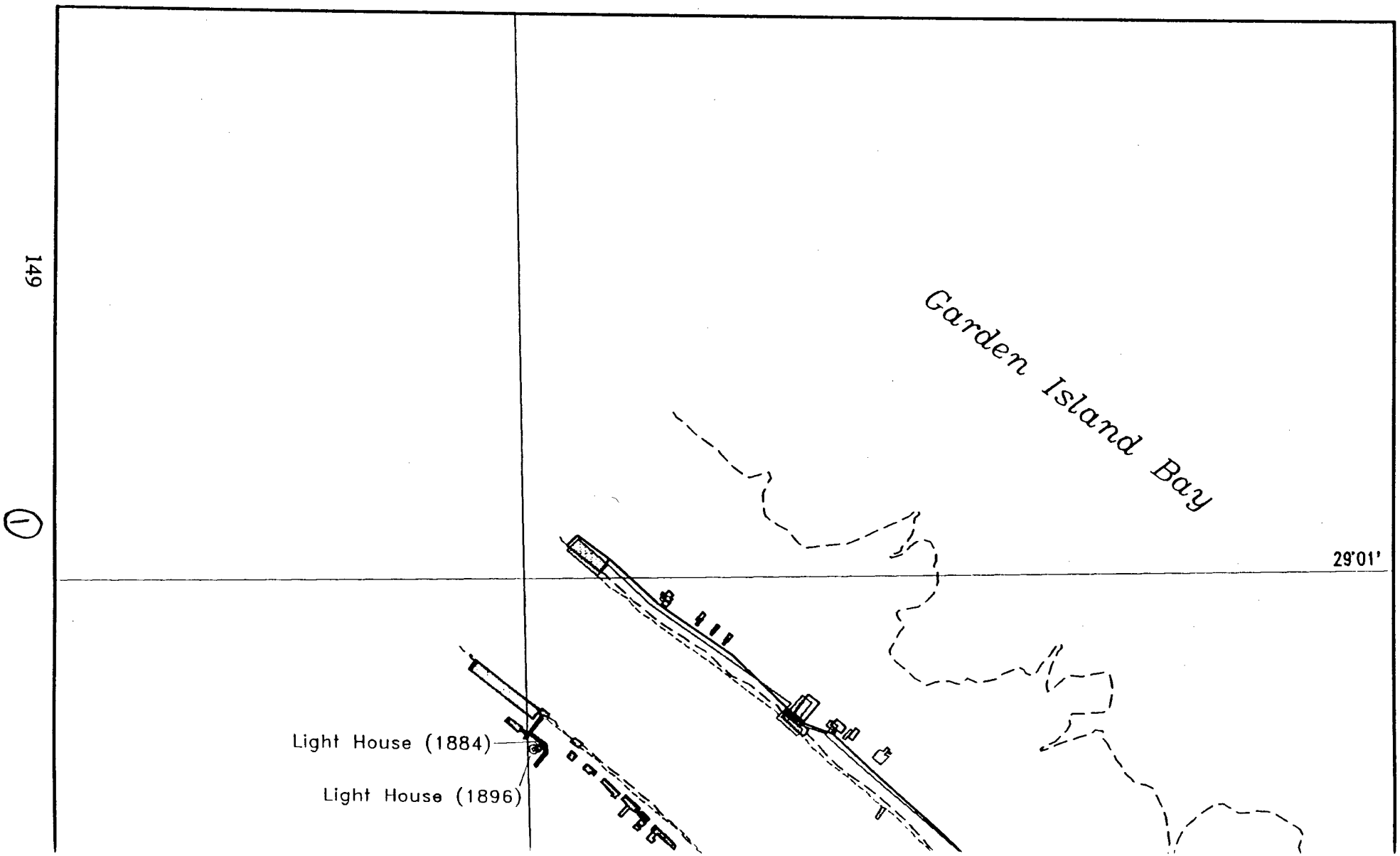
The 1893 East Delta quadrangle map shows Port Eads with eight structures depicted on the East Bank (Figure 67). However, the scale of 1:62,500 is so large that it is impossible to correlate with any confidence the location of structures with the earlier Corps maps.

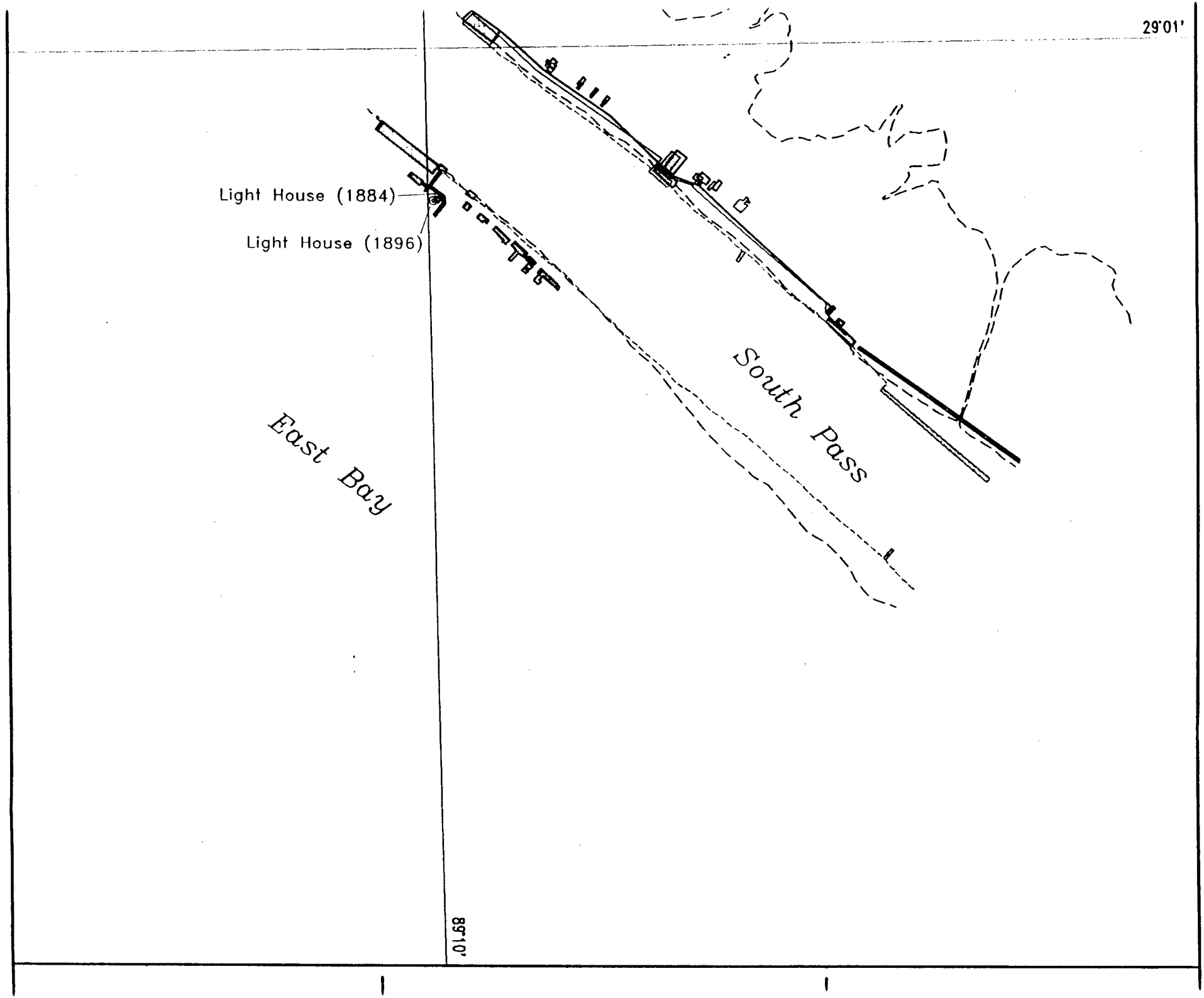
The 1900 map shows a substantial increase in the number and complexity of structures at Port Eads East (Figure 68). However, there is no information in the map legend or in the labeling that gives a clue as to the function of these new structures. The 1900 map shows the coal yard and headquarters as they were depicted on the 1898 and all earlier maps. For the first time, however, an apparent dock appears in the river adjacent to the coal yard. Between the coal yard and headquarters, there are now nine structures as opposed to four shown in 1898. Immediately to the south of the headquarters, three large and one small structures are shown as before, but their plan and orientation are different. The very small rectangular structure is similar to the one that first appeared in 1885 or 1886, but it is now adjacent to a different building than before.

On the 1900 map, two of the structures appear to be represented as if surrounded by raised land, perhaps agricultural fields or orchards, denoted by dotted lines. The area of East Point, formerly mapped as a wharf with two adjacent inland structures, appears as a complex in 1900. Extending into the river, there are two wharves and a structure, the latter with a pier extending inland to the north-south walkway. In addition, five structures are adjacent to and inland from the wharves. None of these structures are the same, either in terms of location or orientation, as the structures near East Point shown on earlier versions of the map. Finally, at the north end of the East Point complex, a large pier extends from the north-south boardwalk into the river. Curiously, none of the new construction depicted on the 1900 map is mentioned in the annual report.

From 1900 to 1902 the maps remained unchanged. The 1903 map shows all of the structures unchanged, but on the map for that year boardwalks are shown leading from most of the structures toward the main north-south walkway.

In 1904, for the first time, the structures are numbered. The numbering sequence proceeds from south to north, beginning with structure 1 at East Point and concluding with structure 20 near the coal yard. The coal yard, which appears reduced in size, is not numbered, nor are the two wharves and three small outbuildings at East Point. There is a long boardwalk extending east into the roseau cane from structure 9.


149
1
Garden Island Bay
29°01'
Light House (1884)
Light House (1896)


29°01'
Light House (1884)
Light House (1896)
East Bay
South Pass
89°10'

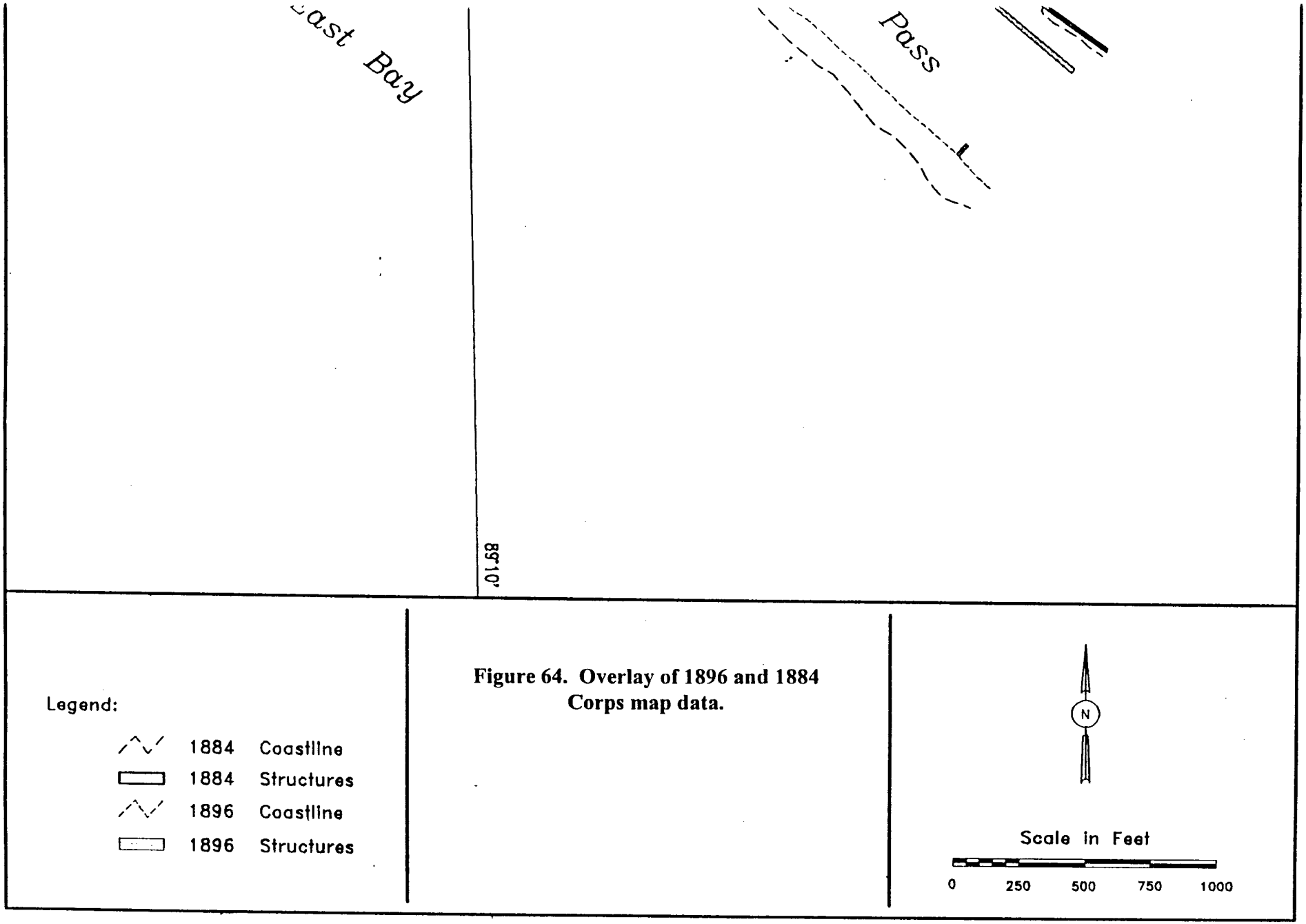


Figure 64. Overlay of 1896 and 1884 Corps map data.

(3)

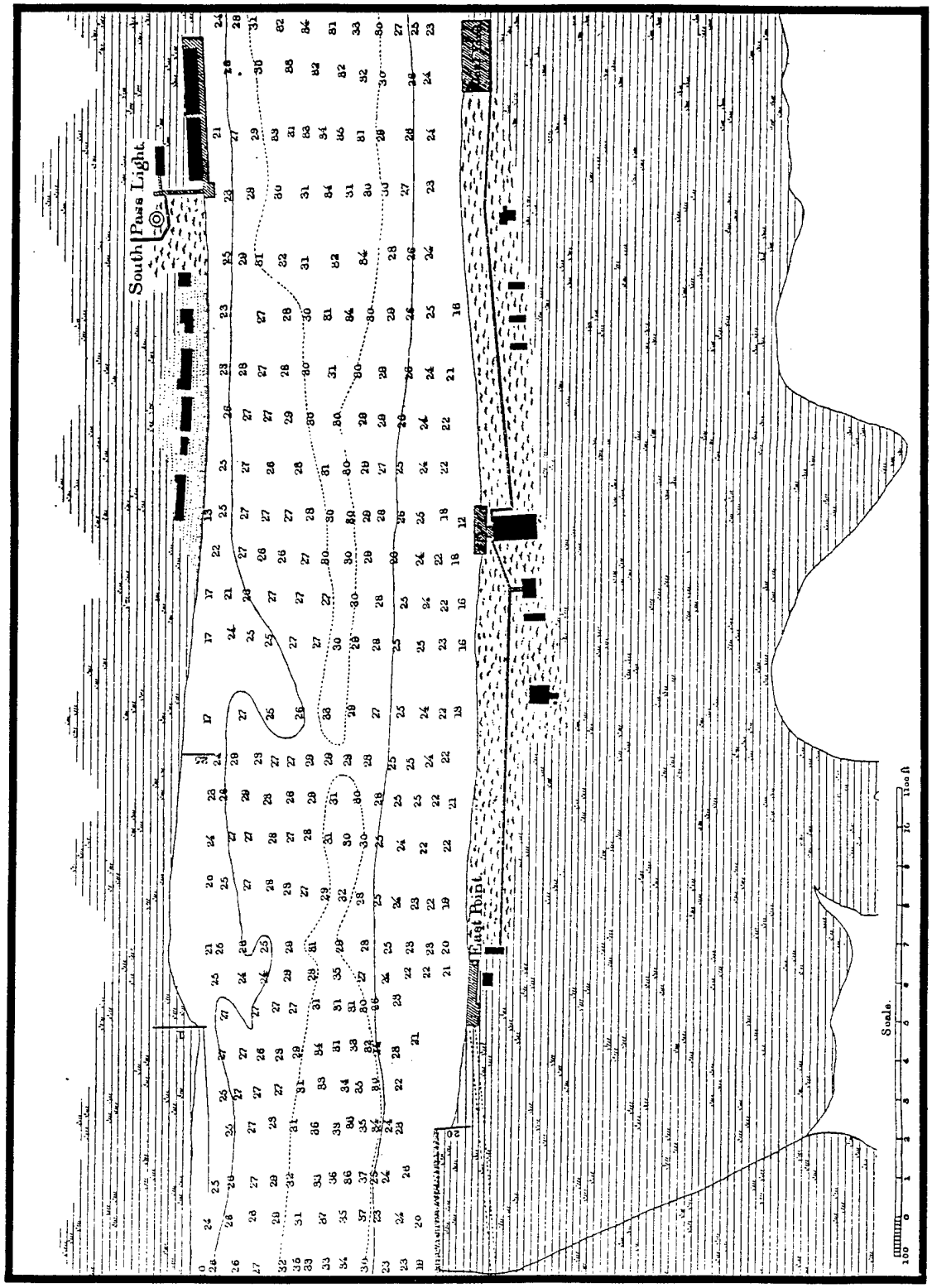


Figure 65. 1890 Corps Annual Report map.

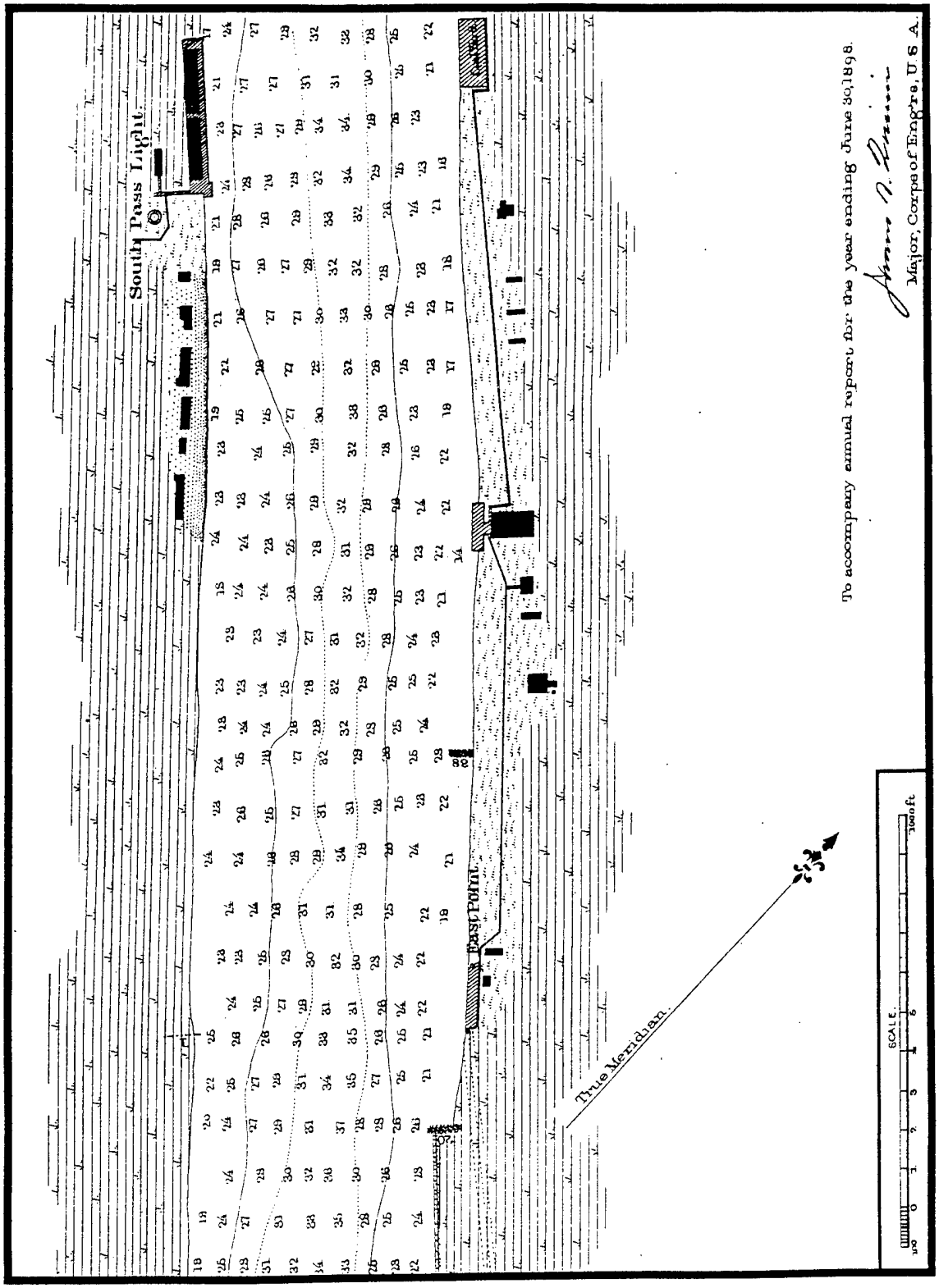


Figure 66. 1898 Corps Annual Report map.

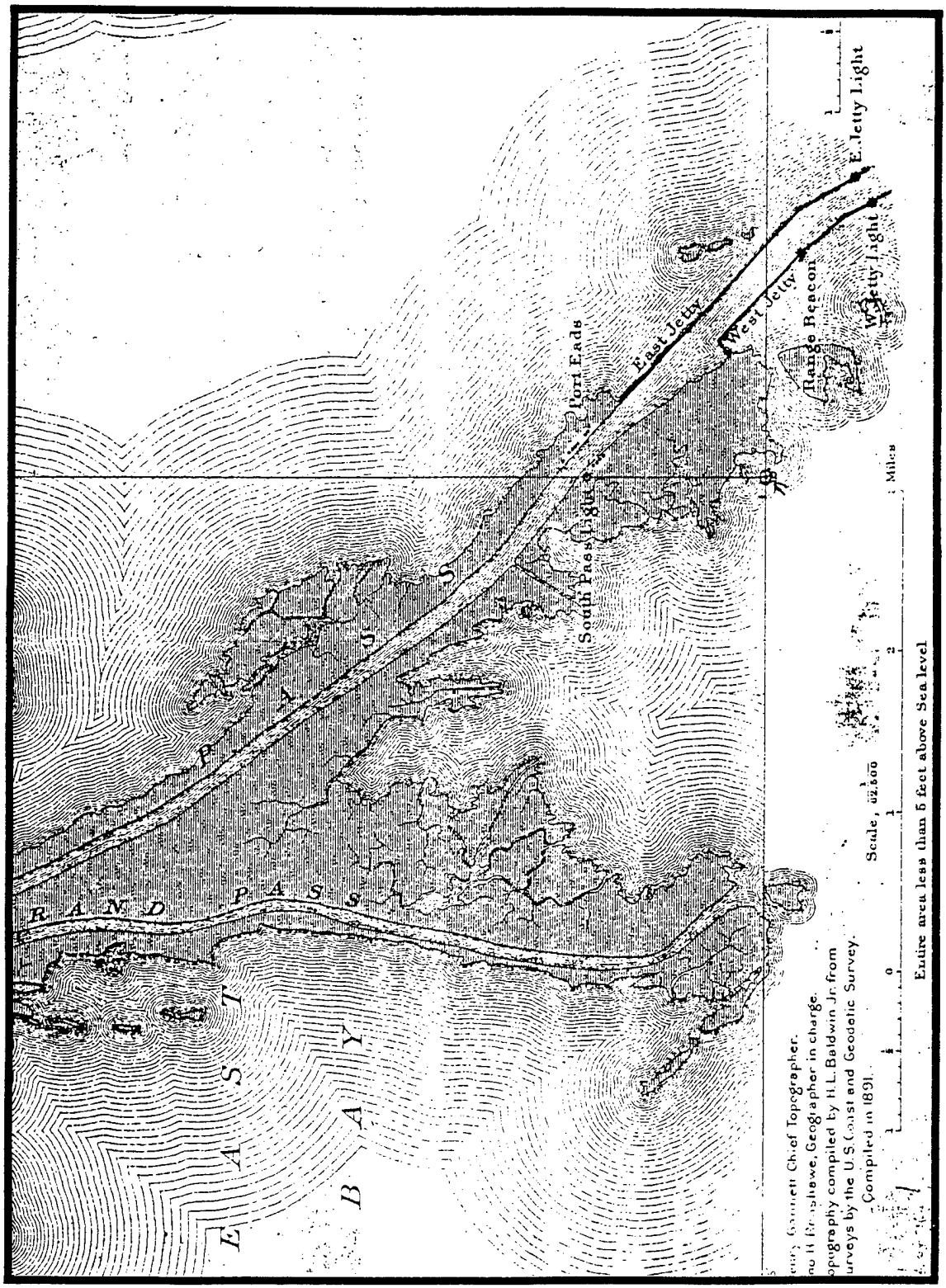


Figure 67. 1893 East Delta quadrangle.

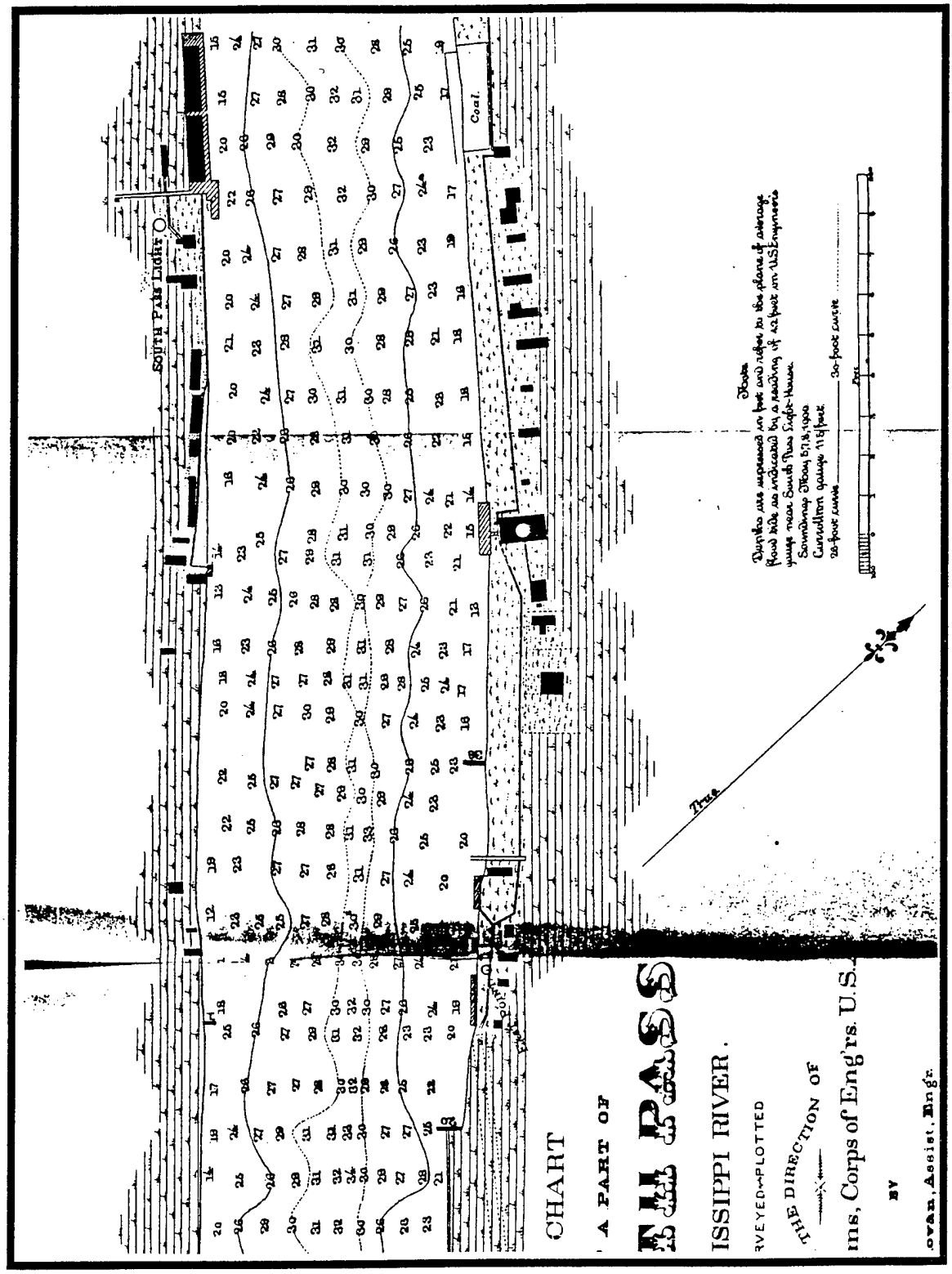


Figure 68. 1900 Corps Annual Report map.

The 1905 map is somewhat more artistic in its representation of Port Eads, although 20 structures appear numbered as on the preceding year's map (Figure 69). Several structures appear with small outbuildings added nearby. Also, five walkways are shown extending toward the east, with one approximately 1000 feet in length. The apparent docking facility at the coal yard is represented in such a way on the 1905 map as to confirm its function.

The 1905 annual report mentions repairs to buildings and wharves by number. For example, it is reported that houses number 7 and 14 were raised and repaired. New shingles were placed on houses number 7, 10, and 19, and minor repairs were made to houses number 17 and 20. Twelve of the houses were painted. Wharf A, the mooring wharf at the shops, was rebuilt, and wharves B and C were filled in with sand on the shore side. The wharves are not lettered on the accompanying map.

We were unable to locate a map for 1906.

In the map for 1907 considerable detail is omitted from the southern end of Port Eads East. The southernmost wharf at East Point is omitted, for example, but it reappears in the map for the following year. Also not shown are structures 1 and 2, although structures 3 through 20 do appear. A long walkway extending northeast from structure 20 was added to the map.

The map for 1908 once again shows the wharf and structures 1 and 2 at East Point, so it seems clear their omission in 1907 was erroneous.

For reasons unclear to us, the 1909 map did not extend upstream as far as the community of Port Eads. The 1910 map does encompass Port Eads East and West, with no changes from the 1908 map (Figure 70), but the 1910 map is the last map in this series which does so. Thereafter, the maps cut off at East Point, the southern end of Port Eads East. Consequently, there ceases to be cartographic details on the structures at Port Eads.

Extensive changes are illustrated on the 1922 U.S. Coast and Geodetic Survey map (Figure 71). The land and habitation area are equivalent to that shown on the 1893 map, but a sanitation canal is shown east of the site and at least 30 structures are depicted. This map marks the earliest representation of the sanitation canal that we have found. However, as with the 1893 quadrangle map, the scale of the 1922 map is such that detail on structure locations cannot be determined with precision. In 1921, the annual report mentions that the ground level of all of the site was raised one foot with dredge fill, but no maps were found for that year.

A 1935 15' quadrangle map essentially duplicates the 1922 map.

The 1933 Coast and Geodetic Survey map has a scale of 1:20,000. Although the detail is very poor, approximately 24 structures are discernable in Port Eads East (Figure 72).

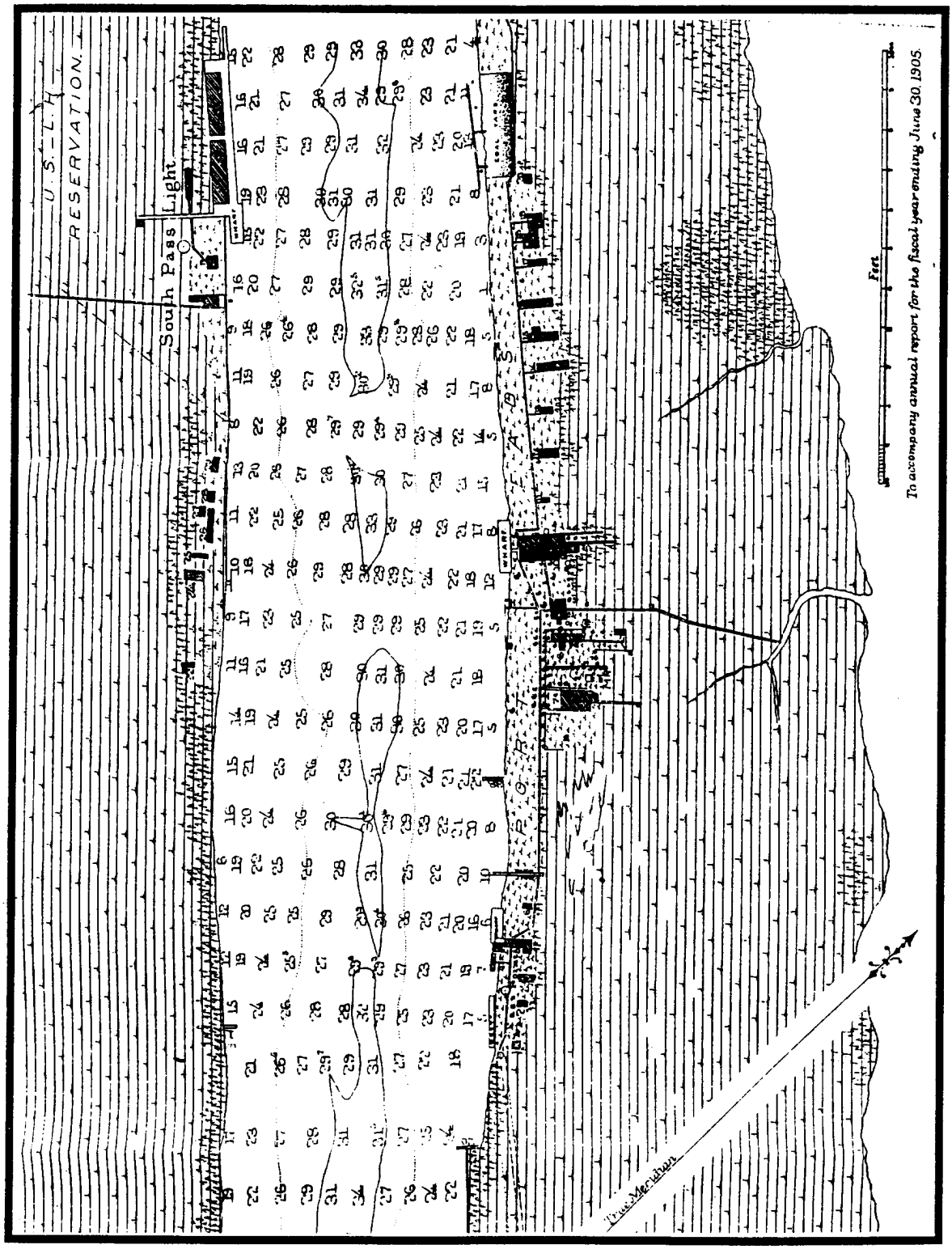


Figure 69. 1905 Corps Annual Report map.

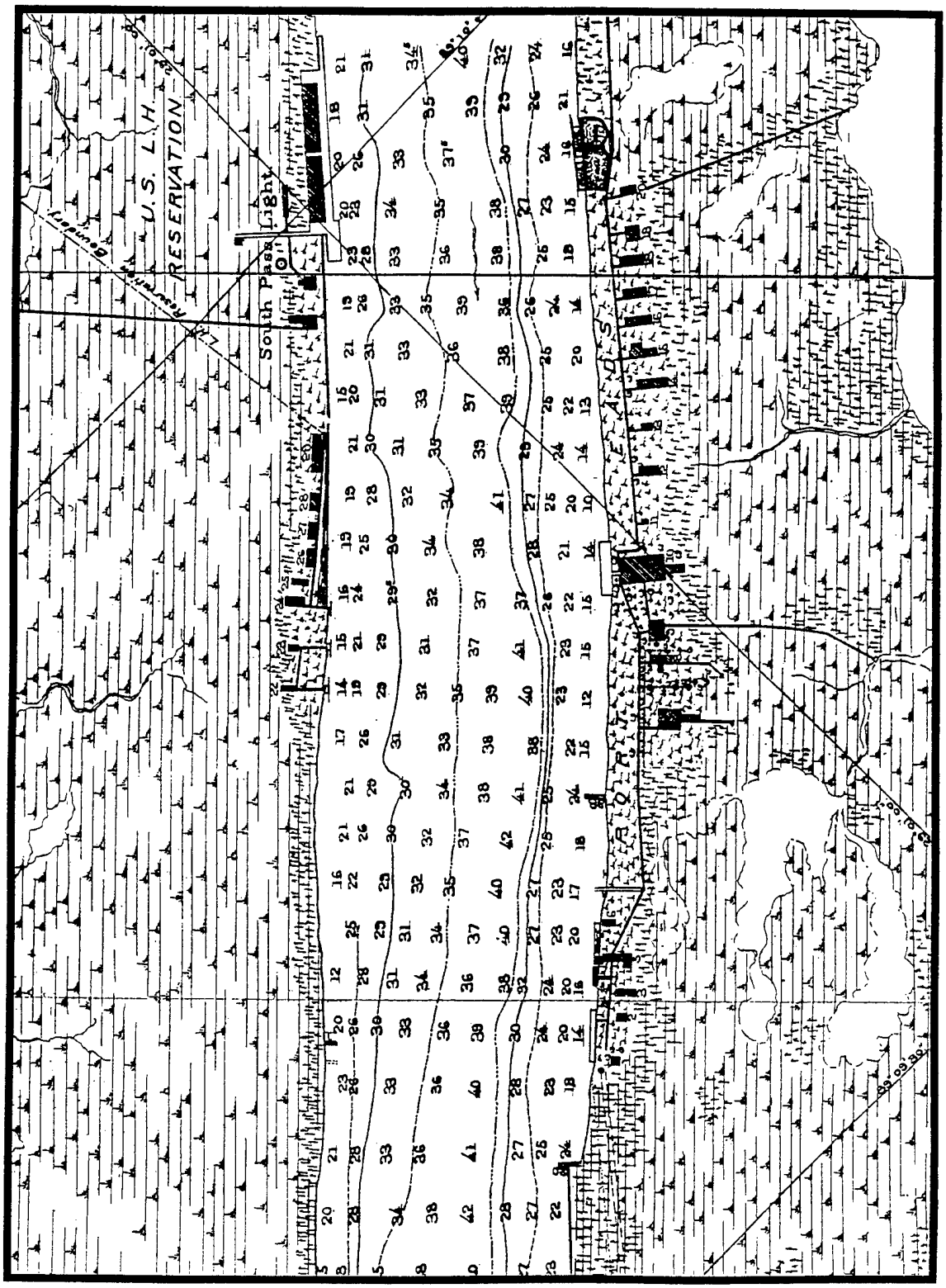


Figure 70. 1910 Chart of South Pass.

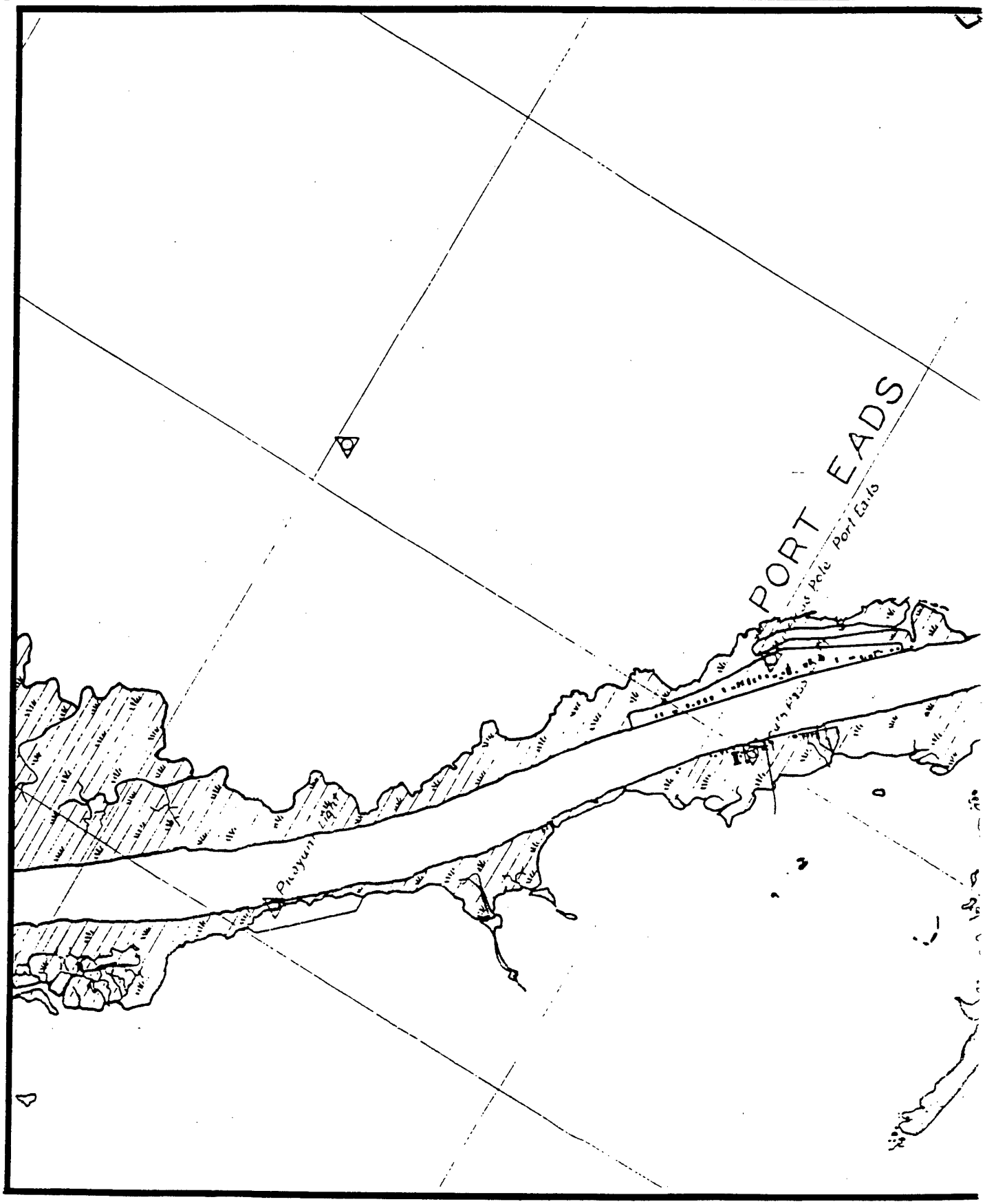
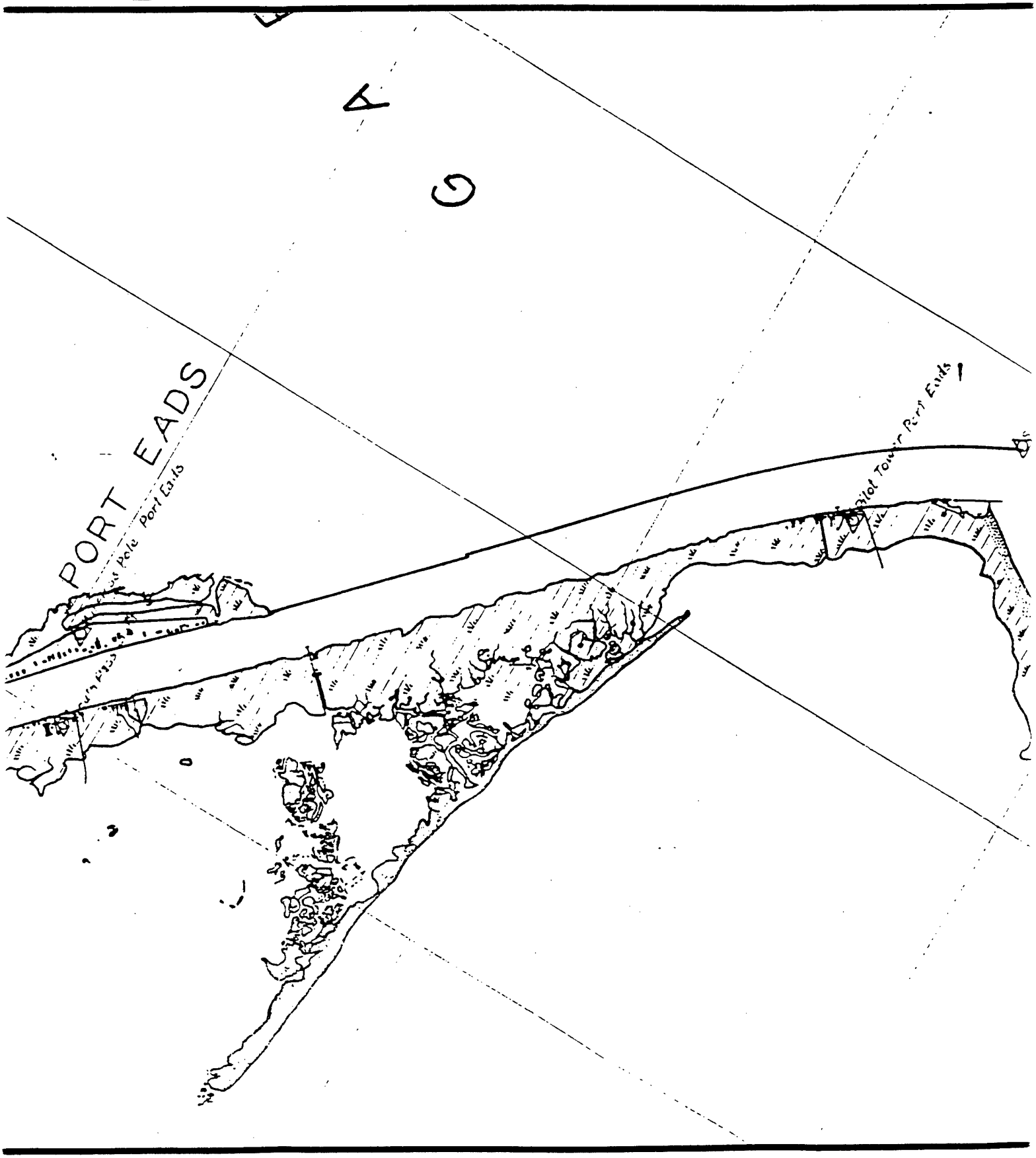
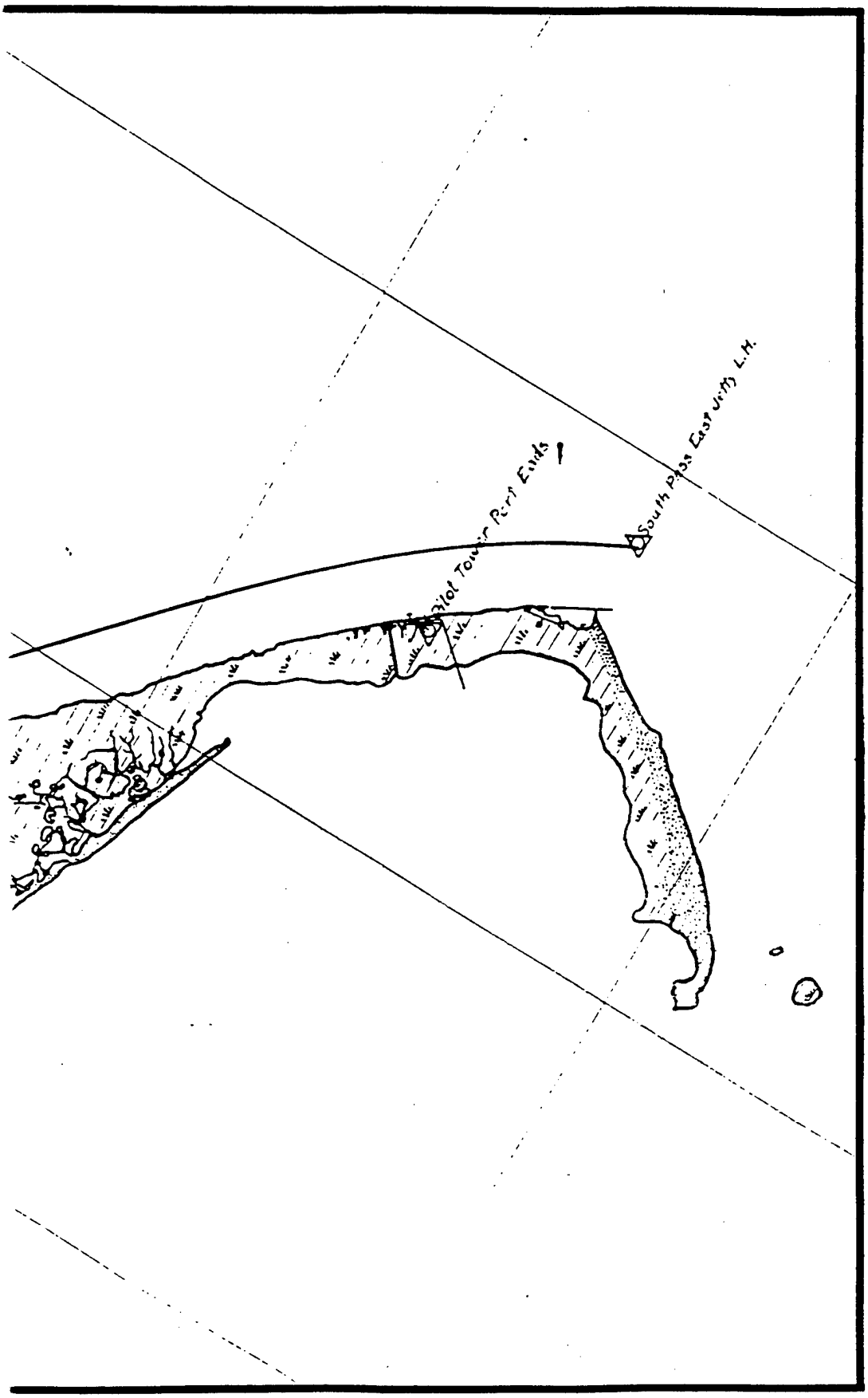


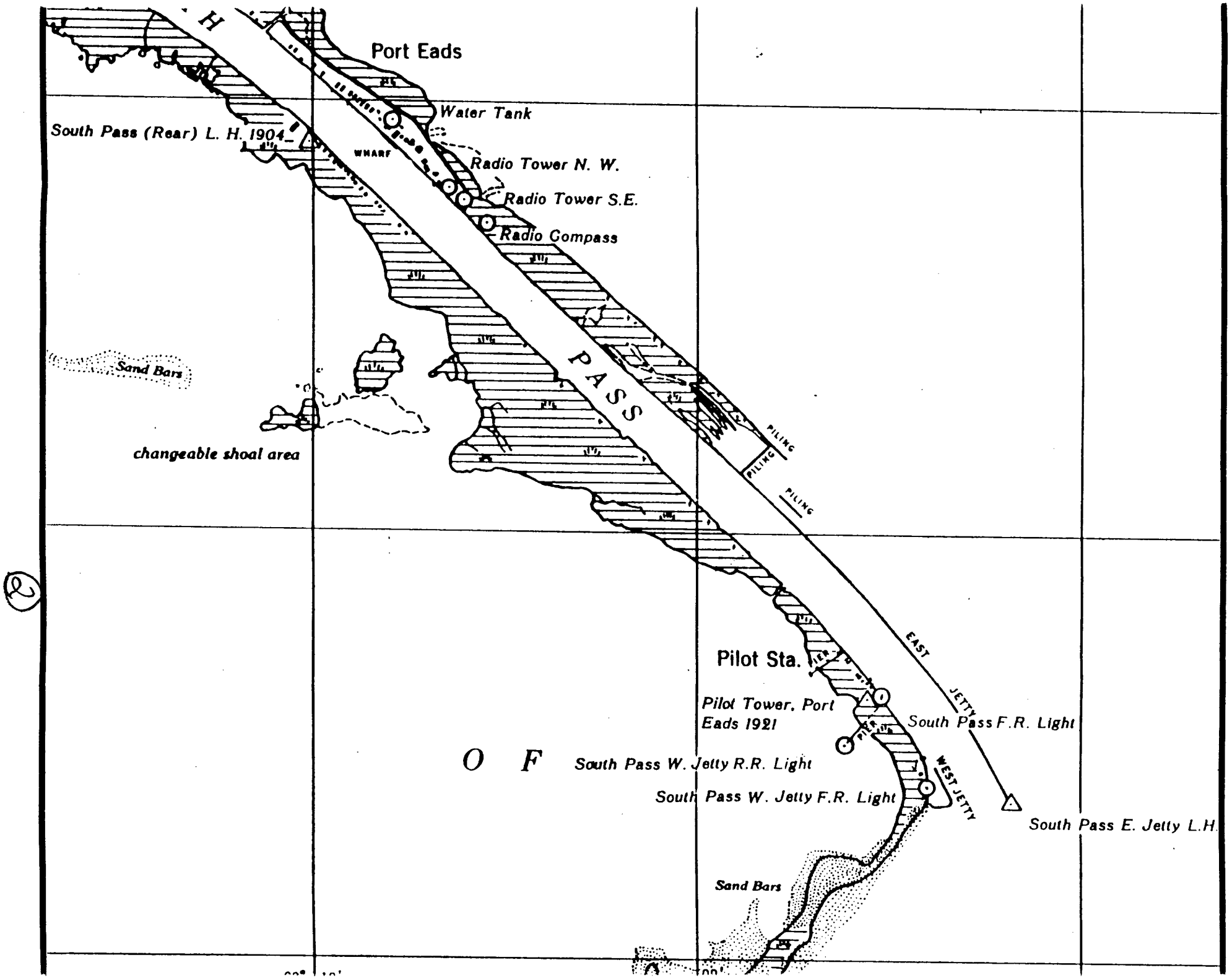
Figure 71. 1922 U.S. Coast and Geodetic Survey map.


PORT EADS
Pilot Tower Port Ends


Pilot Tower Port Ends
South Pier East Jetty L.H.

G A
changeable shoal area
Port Eads
Water Tank
Radio Tower N. W.
WHARF
SOUTH
South Pass (Rear) L. H. 1904

(1)


Port Eads
Water Tank
South Pass (Rear) L. H. 1904
WHARF
Radio Tower N. W.
Radio Tower S.E.
Radio Compass
Sand Bars
changeable shoal area
PASS
PILING
PILING
PILING
EAST JETTY
Pilot Sta.
Pilot Tower, Port Eads 1921
South Pass F.R. Light
O F
South Pass W. Jetty R.R. Light
South Pass W. Jetty F.R. Light
WEST JETTY
South Pass E. Jetty L.H.
Sand Bars

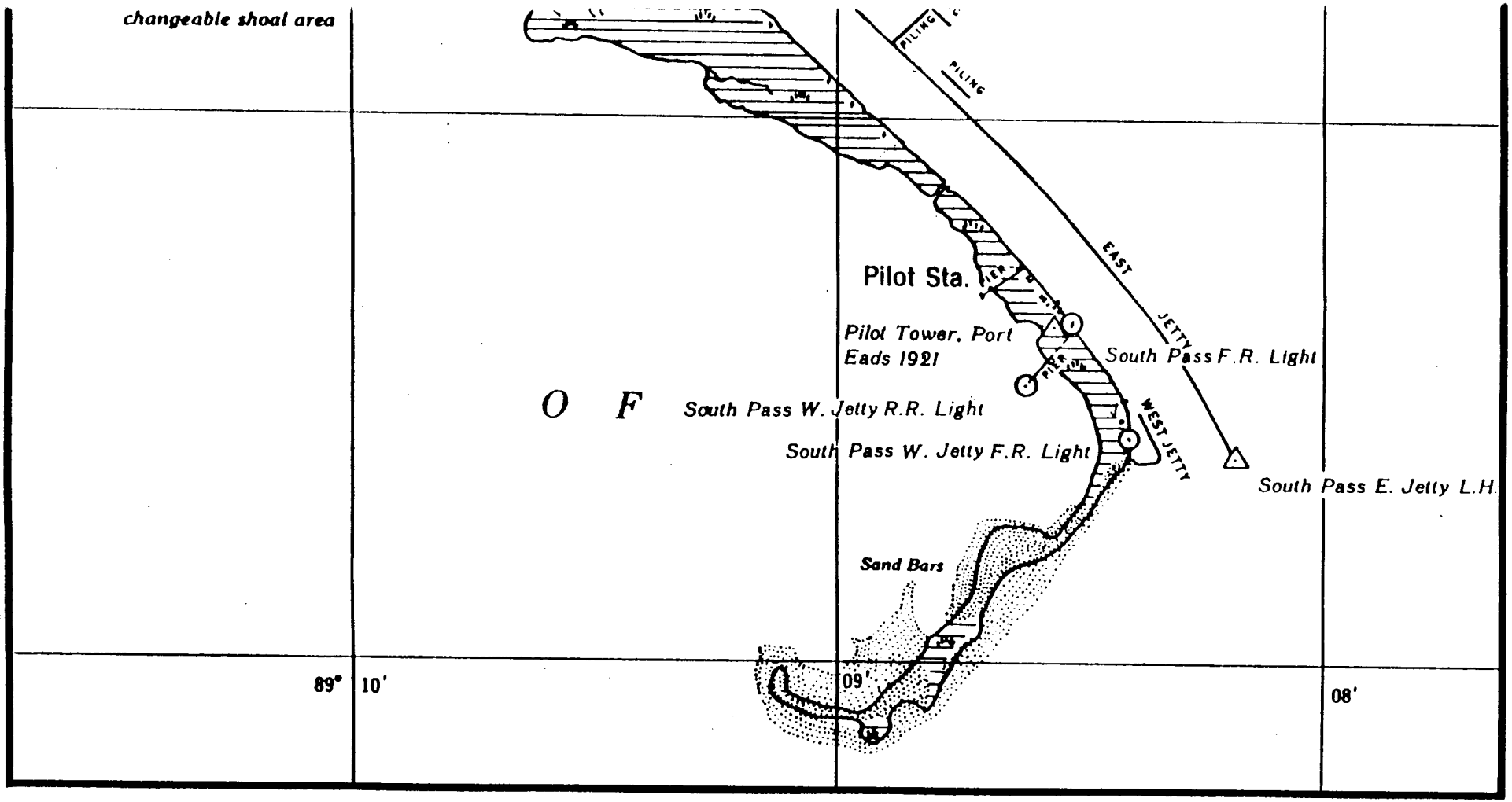


Figure 72. 1933 U.S. Coast and Geodetic Survey map.

The 1942 Proposed Lease map shows only 12 buildings plus two wharves present (Figure 73). An overlay of the 1896 Corps map and the 1942 Corps lease map shows virtually no overlap in structure location. The overlay also suggests that the location of the coal yard may have been eroded away by the river (Figure 74). The large headquarters-hotel in the center of the site is gone as is as the coal yard. The map also depicts the pattern of planted trees or bushes.

Abandonment was almost complete by 1951, evidenced by an aerial photograph taken that year (Figure 75). Only one or two possible structures remain. The central and southern docks are intact, and the seawall can be seen. The land area is essentially unchanged. Some of the inhabited area appears to be dry grass land, but the rest is in roseau cane. The pattern of planted vegetation is still evident. The 1957 and 1961 aerials reflect much the same.

On the 1973 aerial photograph, we see that almost all evidence of occupation is gone (Figure 76). No structures are present, and the canal has almost been obliterated. At the southern end of the inhabited area, near the barges, remains of some dock facilities can be seen (probably Features 6, 8, and 9—see below). This area has suffered considerable erosion or subsidence, but the land area in the north has increased as evidenced by the dredge plumes on the aerial photograph.

Few changes were observed on the 1981 aerial, but the land area had almost doubled two years later. Again the presence of at least four dredge plumes in the north and south indicates that this was made land. On the 1983 aerial photograph, the remains of two structures (our Features 2 and 12) can be seen in water in the center of the site; remains of two others (Features 8 and 9) are in the water at the south end (Figure 77). On the 1992 aerial, no structures are shown and there is no trace of the canal except for the northern channel (Figure 78).

Environment

Today, most of the site area is a tidal marsh (Figure 79) covered with impenetrable stands of roseau cane with some clumps of rattle bush, oleanders, and tallow trees. However, the site environment is subject to rapid change from natural and man made forces due to its location at the mouth of the Gulf. At the time of our investigation, up to 90% of the site was flooded to an average depth of 18 inches at high tide, and 60% was flooded at low tide to an average depth of one foot of water. The only areas above water at high tide are a narrow strip of levee, one to five meters wide and a maximum of 50cm above the water, and a few low relief knolls, averaging five meters wide and up to 20cm above high water.

The vegetation consists of very dense to extremely dense roseau cane averaging 10 to 15 feet high and covering 85% of the site. About 10% of the site area is composed of dense stands of oleander and rattle box bushes which average about eight feet in height. These bushes are present on the higher ground along the river bank and in a few isolated clusters, also on higher ground. About five percent of the site is either composed of open meadows of low marsh grass with widely scattered roseau cane or a few small pot holes and alligator wallows (five to 10m in diameter) of deeper (up to one foot deep) water and no vegetation.

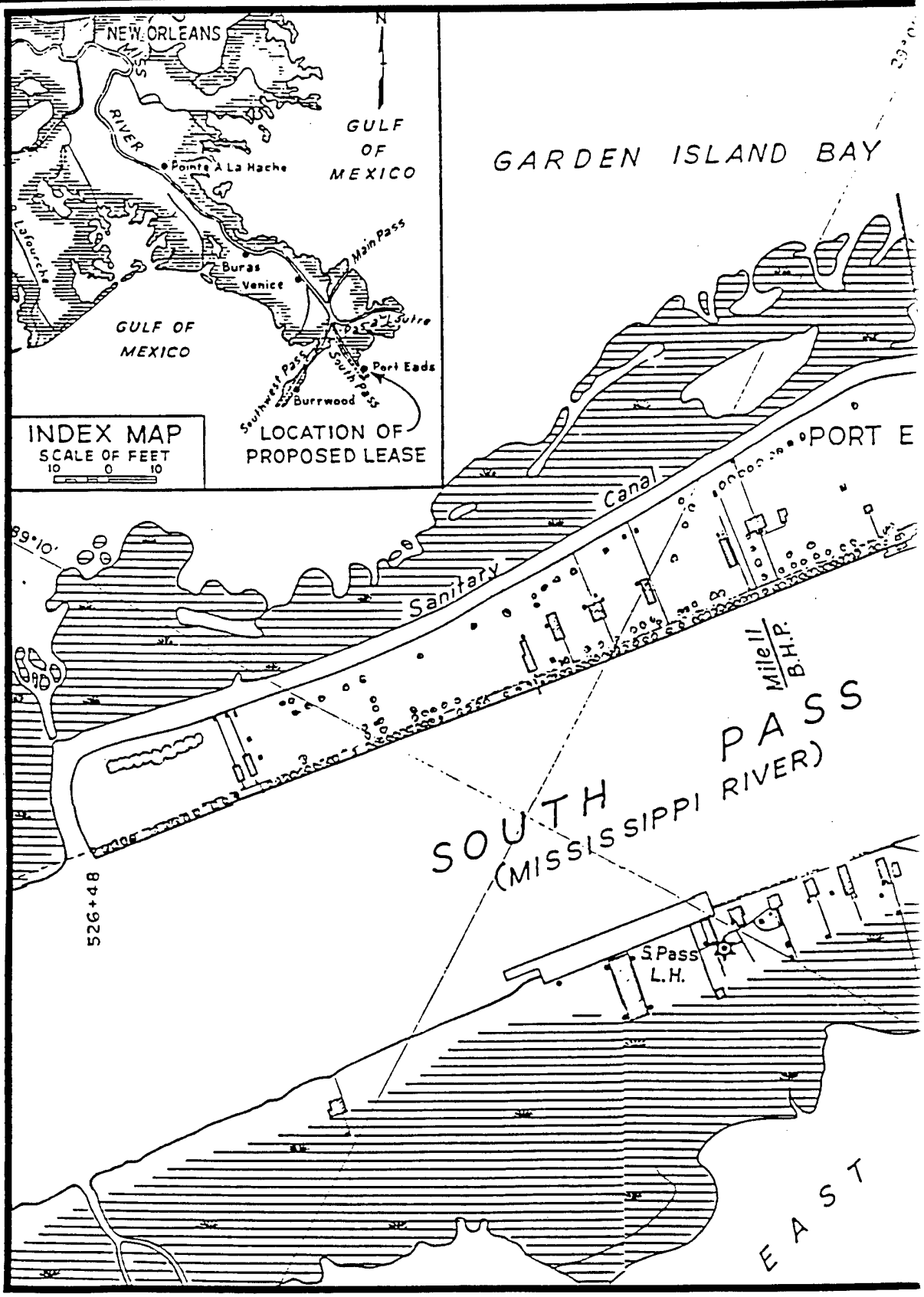
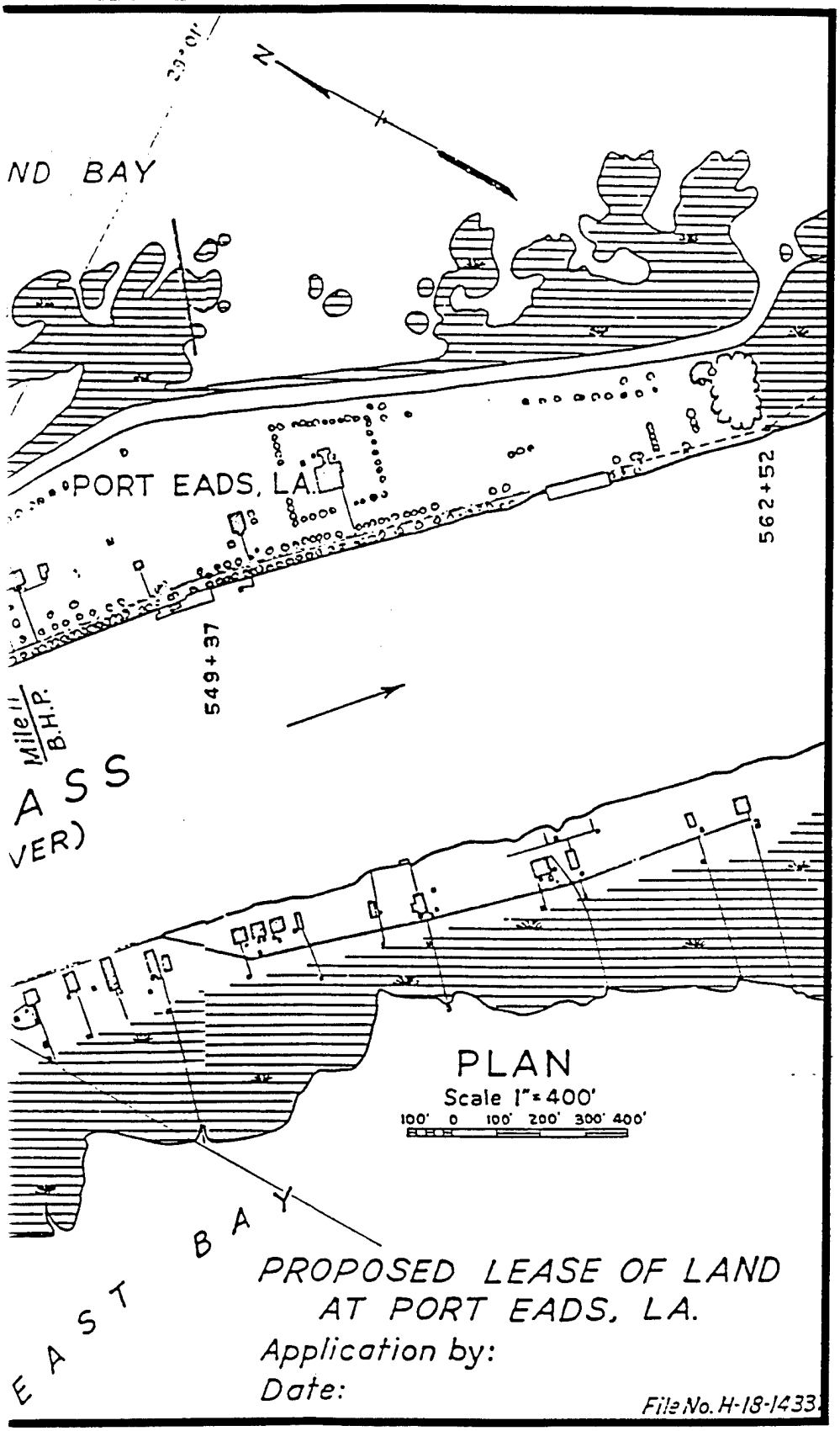
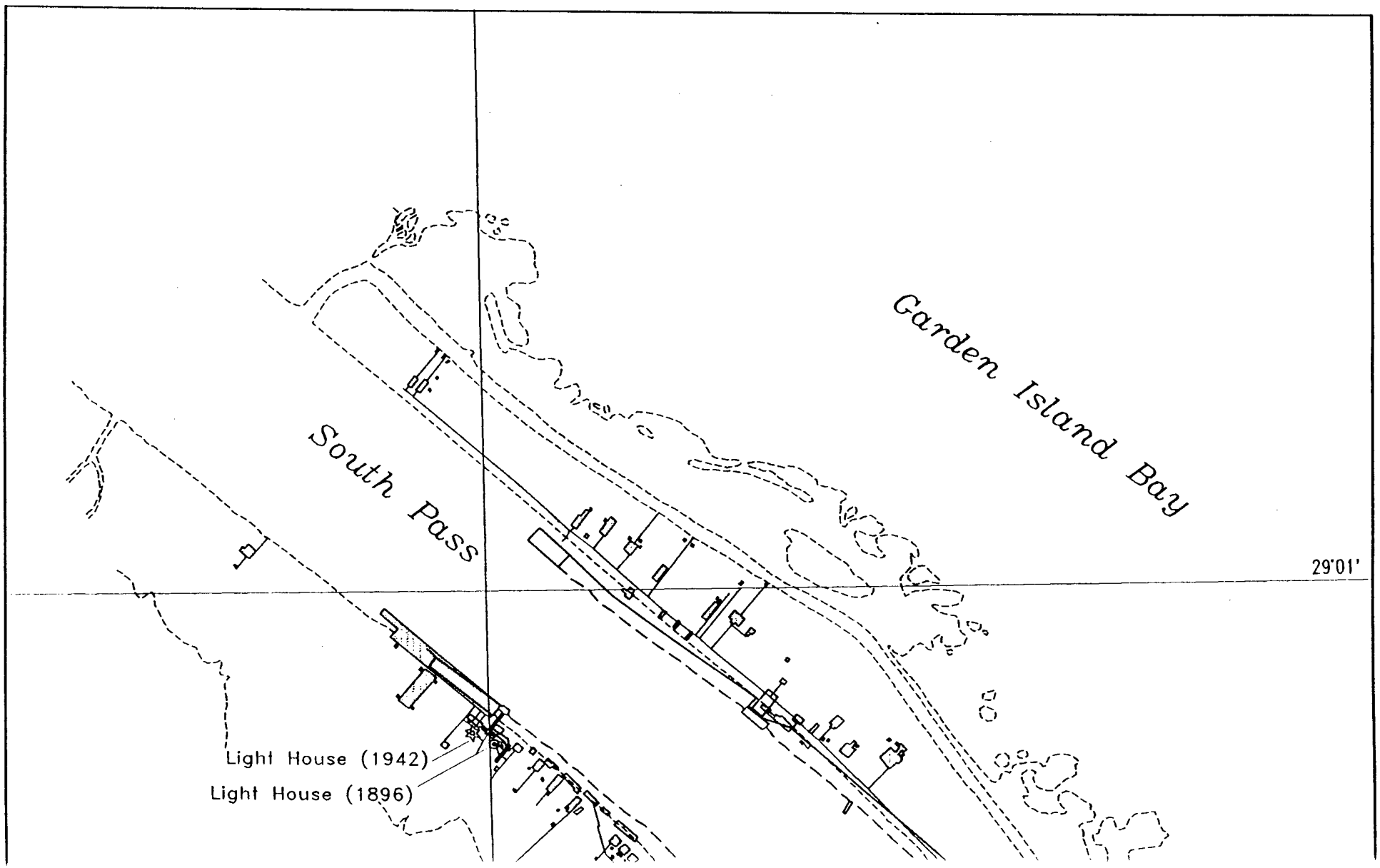


Figure 73. 1942 Proposed Lease map.

①


ND BAY
N
PORT EADS, LA.
562+52
549+37
Mile 11
B.H.P.
A S S
VER)
PLAN
Scale 1"=400'
100' 0 100' 200' 300' 400'
E A S T B A Y
PROPOSED LEASE OF LAND
AT PORT EADS, LA.
Application by:
Date:
File No. H-18-1433

(2)


161
Garden Island Bay
South Pass
29°01'
Light House (1942)
Light House (1896)

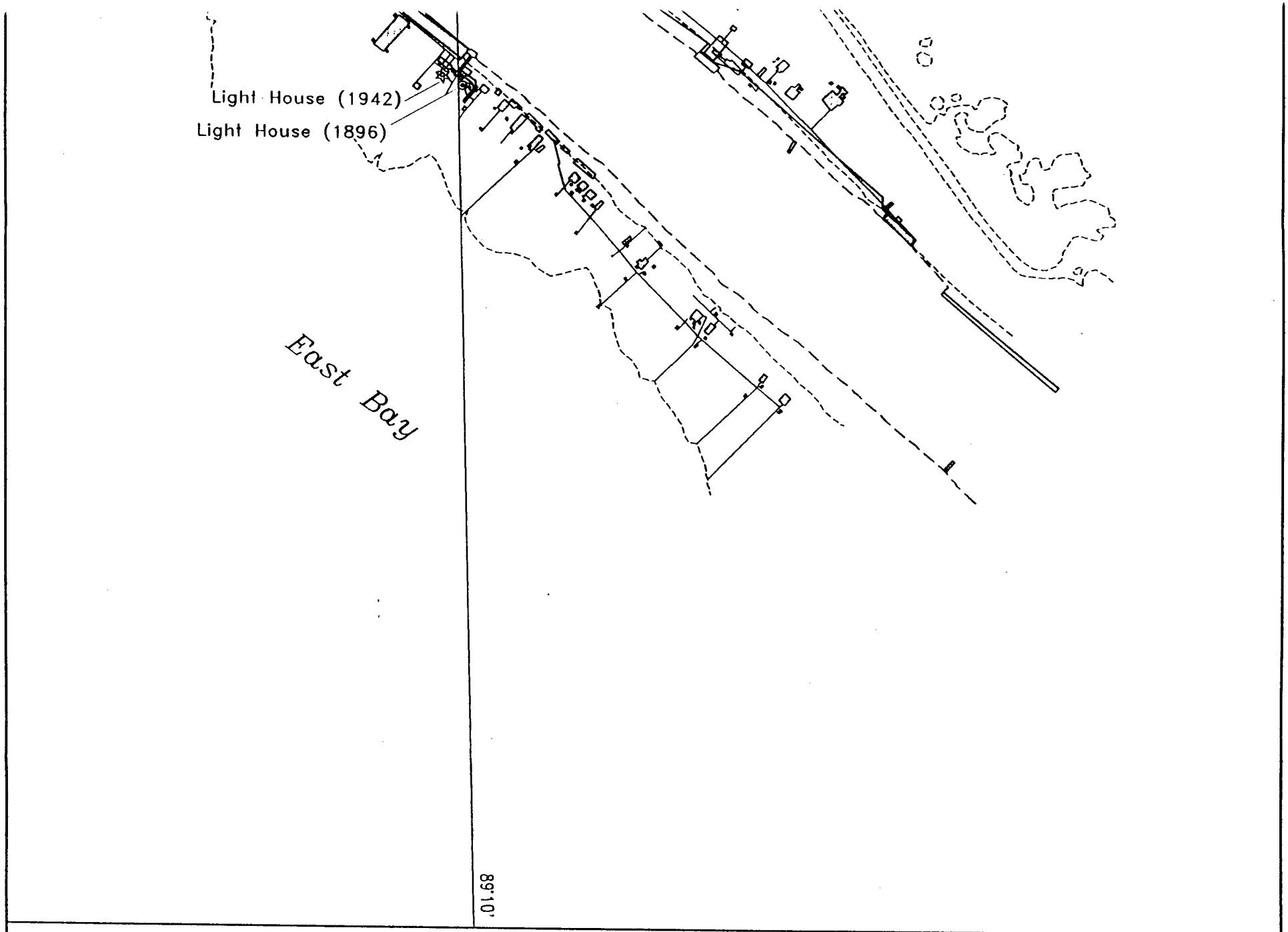


Figure 74. Overlay of 1942 and 1896 Corps map data.

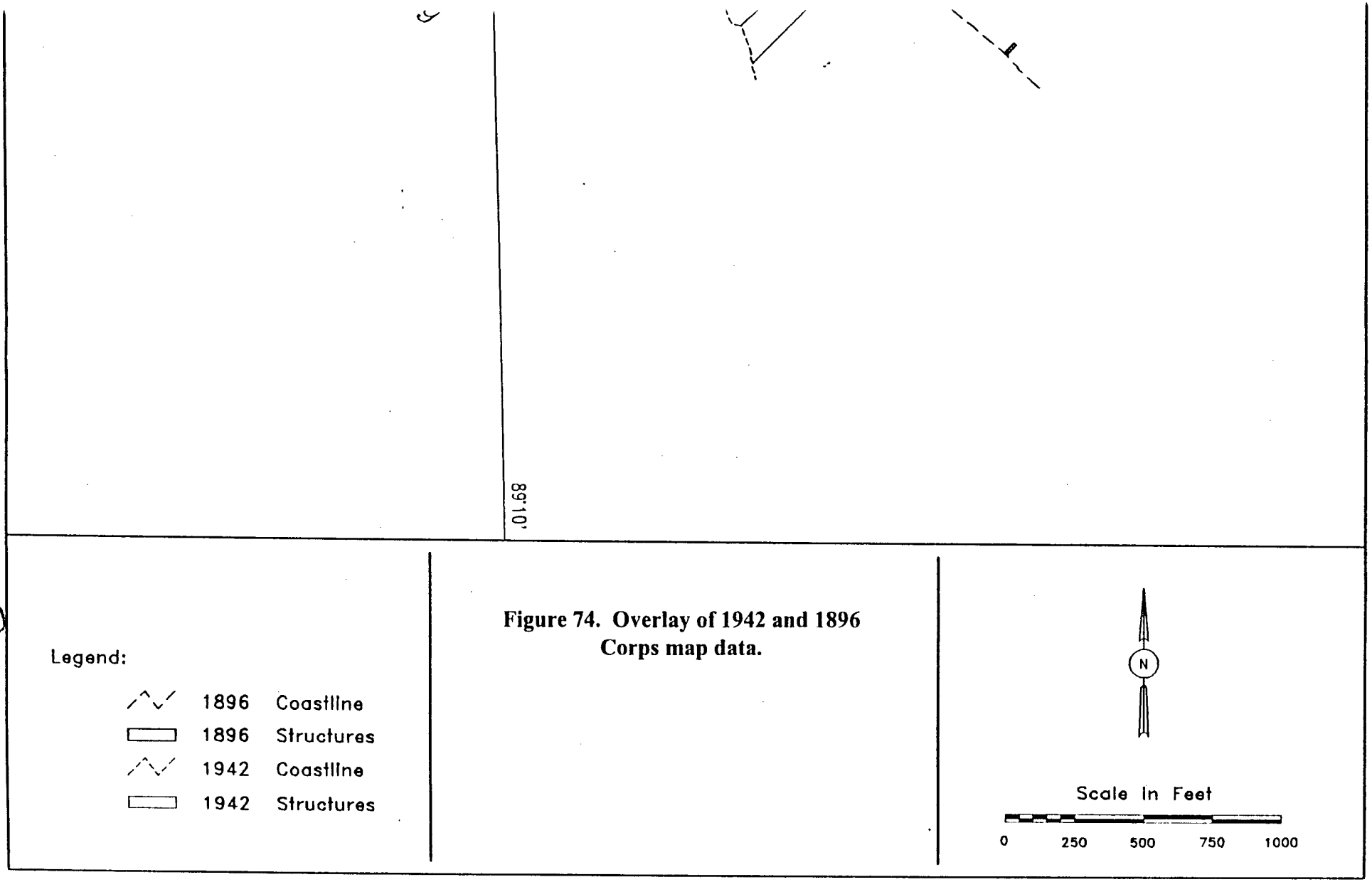


Figure 74. Overlay of 1942 and 1896 Corps map data.



Figure 75. 1951 Aerial photograph.

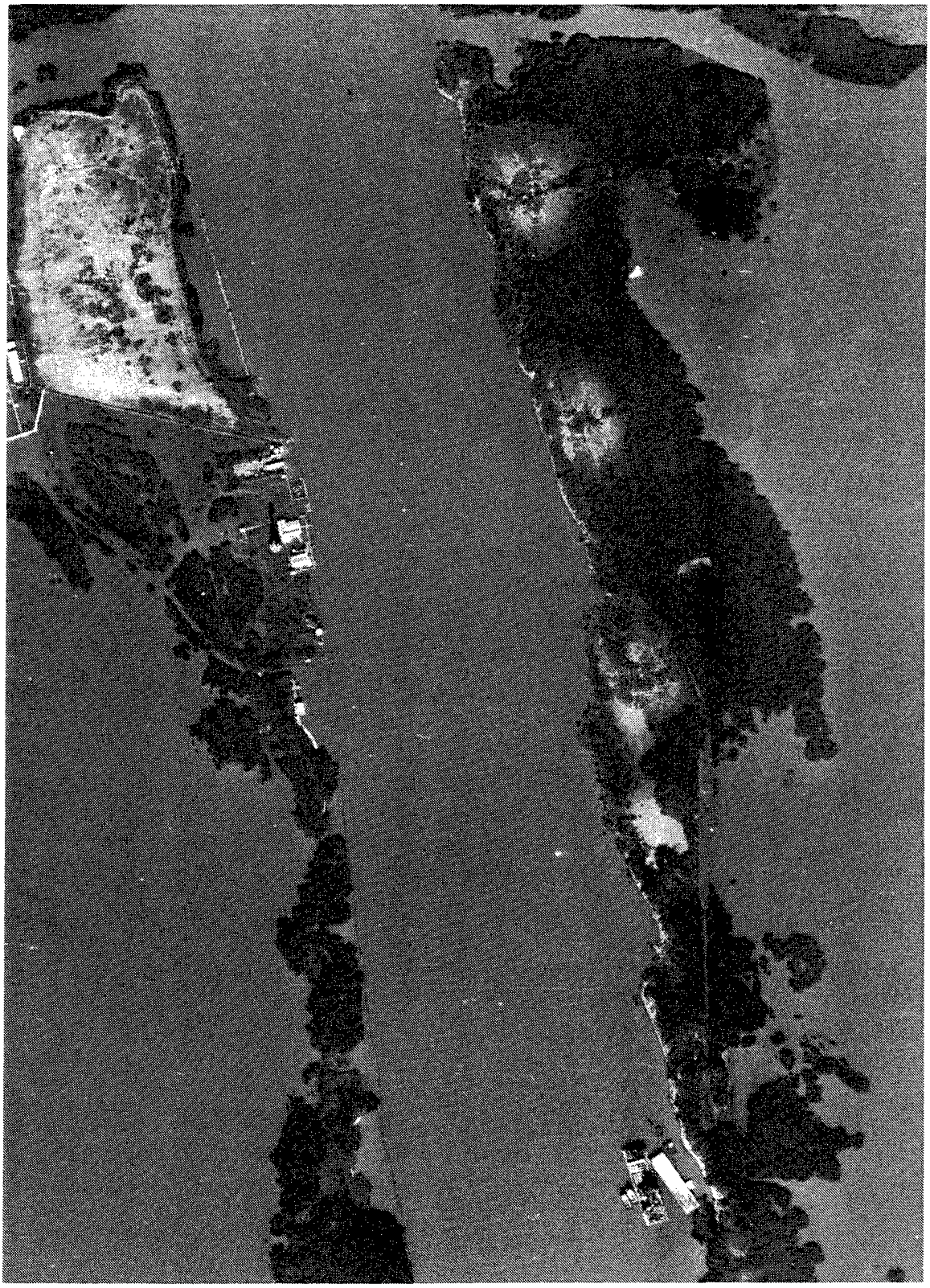


Figure 76. 1973 Aerial photograph.

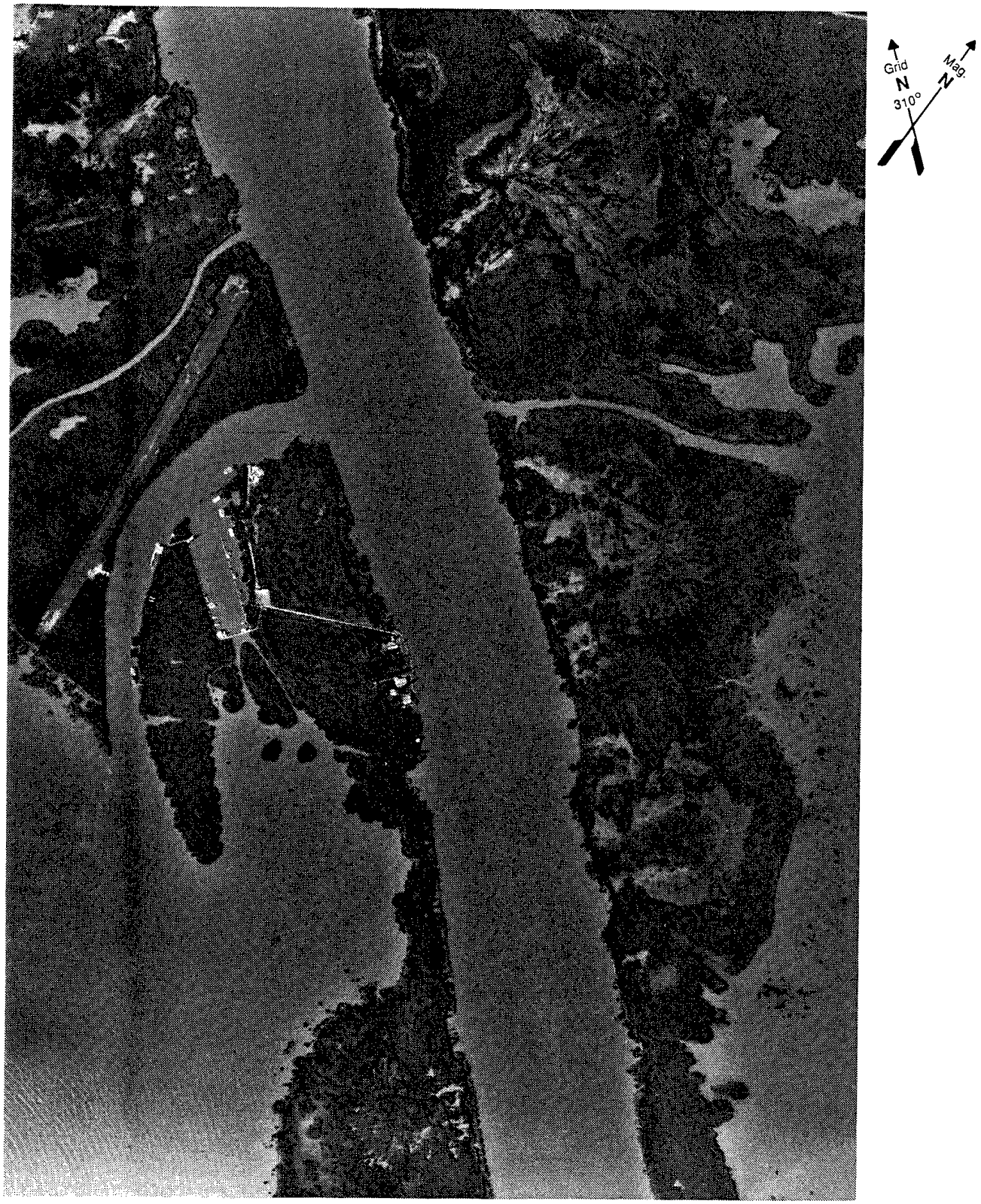


Figure 77. 1983 Aerial photograph.

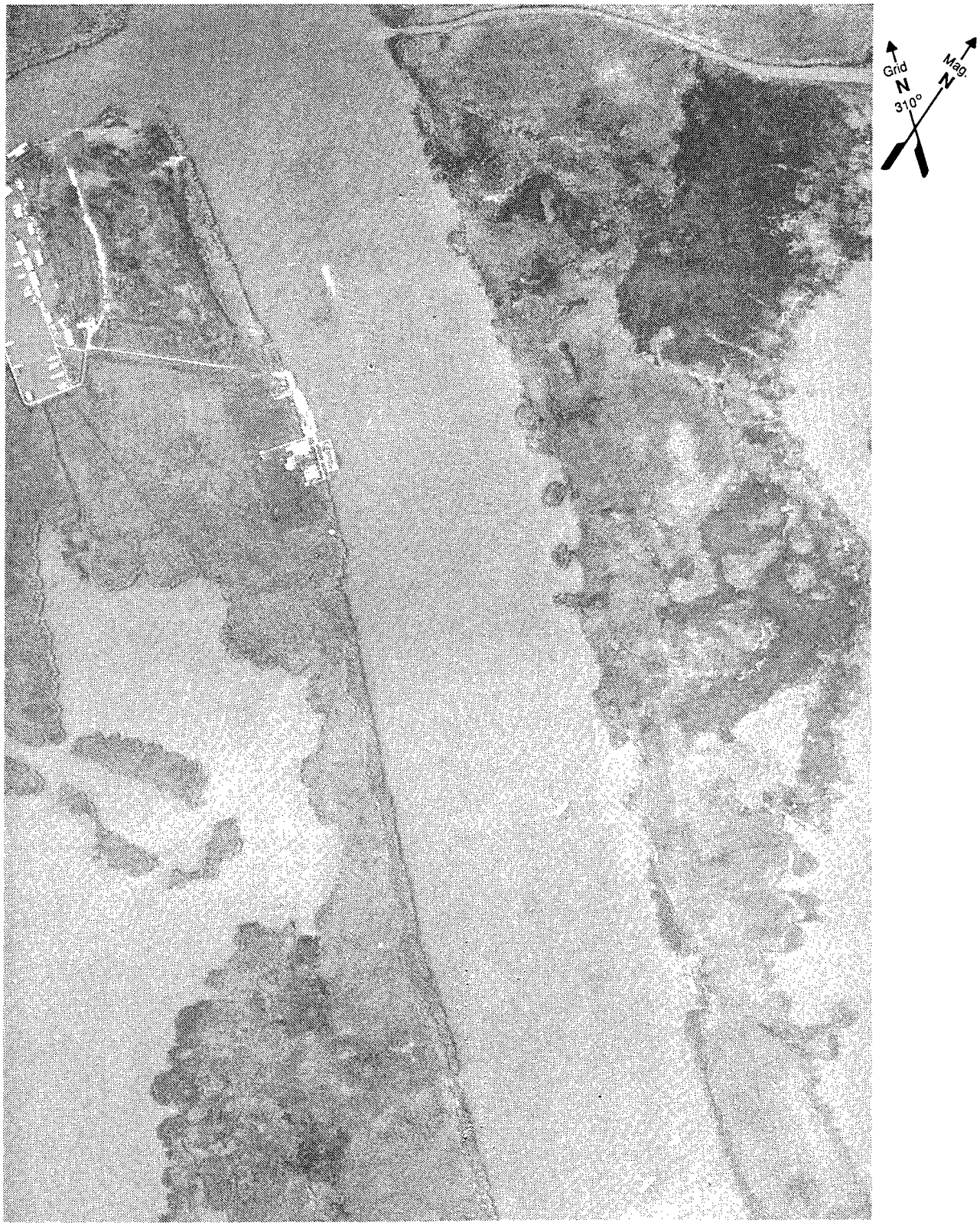


Figure 78. 1992 Aerial photograph.



Figure 79. Photograph of 16PL49 facing east from west bank.

The bank of the river is low and covered with large cobbles of ballast (Figure 80) and rip-rap along the outside edge. The ballast is largely composed of European chert, while the rip-rap is mostly granite. About 85% of the bank is above water at low tide, and 70% is above water at high tide. The river channel is 15 to 20m out from the bank and slopes gently to the bank so the shoreline can only be approached by a shallow-draft boat in most areas.

The sanitary canal, which once encircled the site, has filled in and is overgrown, making it difficult to identify in several areas. The northern end now forms a small channel about seven meters wide extending to the bay to the east. The north-south section is mostly covered in sediment and overgrown with extremely thick roseau cane. The southern section is now a shallow inlet that extends westward from the bay to the east, terminating 50m from the river bank.

Subsidence and Countermeasures: Several studies have identified subsidence as an acute problem in coastal Louisiana (*Gagliano et al. 1970, 1981; Gagliano 1981a, 1981b; Van Beek and Meyer-Arendt 1982; Bowman and Landreth 1988*). These and other studies have distinguished two distinct factors in apparent or net subsidence. One of these is sea level rise; the other is actual subsidence which in turn has both natural and human components. The first factor, sea level rise, has not remained constant over the Holocene, but varied considerably; the current rate of increase is commonly estimated to be in the vicinity of 0.32ft (9.75cm) per century (*Saucier 1994:53*).

The second factor, true subsidence, may be the result of natural causes such as crustal sinking or, as in the project area in particular, compaction of loosely consolidated deltaic sediments, as well as tidal and wave erosion and human activities. The life cycle of the Garden Island Bay subdelta of the Balize complex illustrates how rapidly subdeltas may grow and deteriorate (*Gagliano et al.*

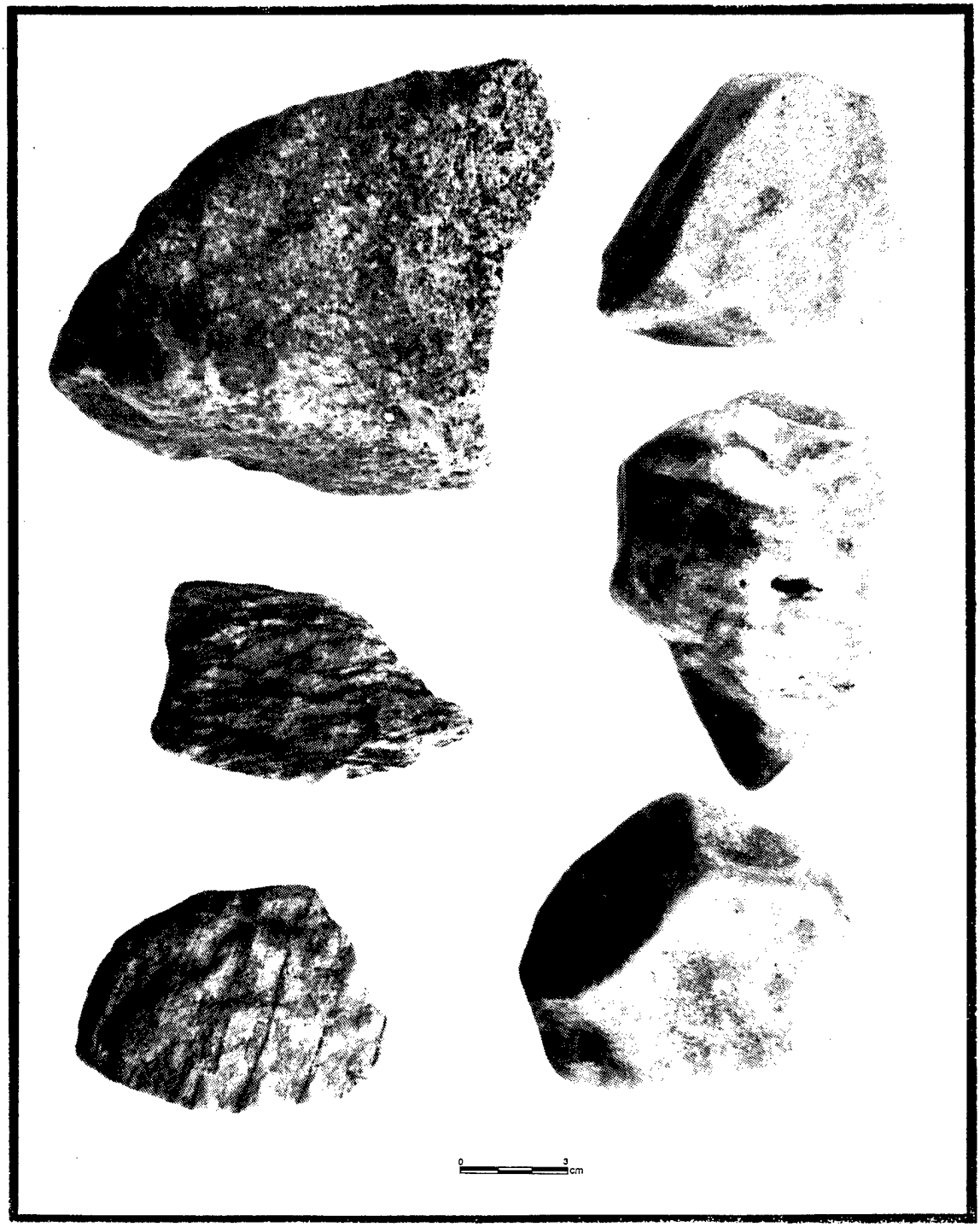


Figure 80. Ballast picked up from 16PL49.

1970:Figure 7). Consolidation rates are highly localized, consequently subsidence varies from 0.7 to four feet (ca. 20-120cm) per century (*Gagliano et al. 1981; Saucier 1994*) with the greatest rates being associated with human activity.

Human activities which have accelerated this include dredging, the confinement of the Mississippi River behind flood-control levees resulting in a lack of fresh sediment—most of which now plunges into deep water, and the construction of navigation and drainage canals (*Gagliano et al. 1981; Van Beek and Meyer-Arendt 1982*). The latter activity has hastened the intrusion of saltwater into the interior which kills freshwater swamps (cypress-gum-tupelo) and some fresh and brackish marsh leaving mudflats and—ultimately—open water in their place (*Gagliano et al. 1981; Van Beek and Mayer-Arendt 1982; Gagliano and Wicker 1988*). Net land loss rates have been found to be in excess of 600 acres per year a few miles north of the project area (*Gagliano et al. 1981:Figure 5*) and losses per square mile for 1955-1978 were documented to be about four acres per year over the entire Balize delta lobe (*Van Beek and Meyer-Arendt 1982:Figure 12*). These effects were noted in the field phase of work on this project in that granite rip-rap lining the Mississippi River channel which was about one foot above high water in 1973 is now below water at high tide. This may be seen in microcosm by comparing a 1983 aerial photo, with one taken nine years later in 1992, by which time the central landform was nearly bisected.

Dredge spoil was added to the project area in 1921, raising the level by one foot, and has been added periodically since that time. The plumes from dredge spoil are clearly evident in aerial photographs of the project area (i.e. Figure 76). In addition to this, it has been proposed that subsidence may be best counteracted by controlled freshwater diversions (*Gagliano 1981a, 1981b; Van Beek and Meyer-Arendt 1982*).

Considering both subsidence and the addition of dredge spoil to the project area, it is highly likely that the vast majority of sites are not only beneath the water table, but are likely to be buried beneath dredge spoil. The presence of levees in the general project area makes it a superior location for sites, particularly historic sites (*Bowman and Landreth 1988*). However, finding such sites without considerable background research and an extensive coring program is apt to be problematic.

Landform Change: It is evident from historical documentation, maps, and photographs that there was a constant battle with weather and subsidence for claim of the site area. Historical accounts mention subsidence as a problem with settlements on the Mississippi delta as early as the eighteenth century. Though sedimentation from floods built up the land somewhat, at Port Eads most of the loss was compensated for by dredge and fill. Keeping ahead of the subsidence and erosion was a continuing task. From the Annual Reports and aerial photographs, it is evident that the land was periodically raised by distributing ballast and dredge and fill techniques. The Annual Reports also state that the forces of erosion were kept in check while the town was occupied by continually repairing sea walls, wharfs, and rip-rap. Once the site was abandoned in the 1950s, wave erosion and scouring began claiming the wharves, sea walls, and some structures facing the pass. This is evident from a comparison of the 1951 and 1992 aerial photographs. However, the periodic dumping of dredge fill did compensate for these effects to some extent.

Research Objectives

According to the maps and other documentation, this site extends at least 3,700 feet, or 1,150m, along the shoreline. The research objectives were to accomplish the following: 1) identify areas of structural remains; 2) identify areas revealed through background research; 3) assess chronology, including the elusive question of whether eighteenth century occupation occurred; 4) assess NRHP eligibility; and 5) determine if the significance of remains varied across the site.

Field Investigations

The procedures have been documented in the prefatory comments to this chapter. At the time of survey, the only structural remains visible at the site from atop the lighthouse across the pass were several clusters of pilings in the water, about an acre of bushes in the northern portion, and scattered smaller clumps of bushes that could indicate high ground. Otherwise, most of the site was obscured by roseau cane that had to be cleared by use of an airboat.

A grid was established with north at 310°. Again, this orientation runs approximately parallel to the river bank in this portion of South Pass and was selected because all historic maps depict the settlement at Port Eads as a ribbon strip paralleling the shoreline. East-west transects were then cleared perpendicular to long north-south transects. These transects were set at approximately 50m intervals. A total of 28 east-west transects were cleared using the airboat.

Surface collection was accomplished by dividing the site into three collection areas, 1, 2, and 3. Collection area 1 is in the northern portion of the site, 2 in the central, and 3 at the southern end. These areas were arbitrarily established to provide some control in the event that patterns with regard to chronology, activity, or other interpretive issue began to emerge.

Subsurface investigations at the site were especially limited by the tides. Even at lowest tide, the majority of the site was inundated, precluding successful subsurface testing. In the southern half of the site, where most of the nineteenth century structures were located, only a few patches of high ground were exposed during low tide. In the areas of high ground, the water table at low tide was encountered at about 70cm, though the soil was so saturated that water was commonly first encountered between 30 to 40cm. Despite these problems, 21 50cm by 50cm test units were excavated; 13 of these were positive.

Results

The field investigations resulted in the identification of remains of 12 possible structures or activity areas and a large collection of surface artifacts from the site (Figure 81). The great majority of surface artifacts found at the site were located along the natural levee. Chunks of coal were common in the northern portion of the site, likely reflecting the location of the former coal yard depicted on the 1879 map. This area was similarly identified by Weinstein (*1984*). Additionally, some rocks and brick fragments were found in association with the inland structural features.

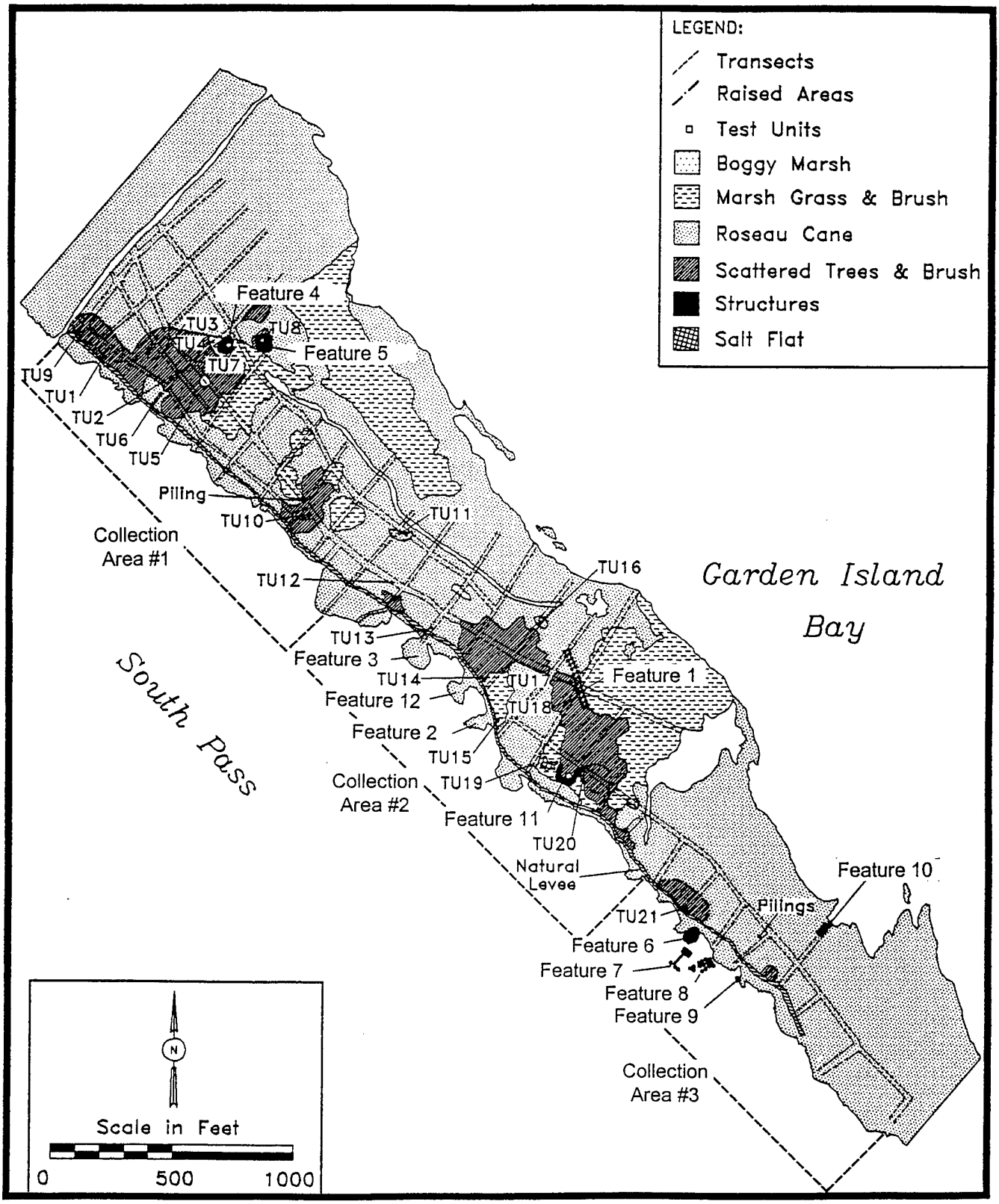


Figure 81. Site map, 16PL49.

Typical unit profiles contained a fluid silty loam to 30cm which was barely distinguishable from the next stratum, a brown (10YR 5/3) fluid and generally homogeneous silty loam sedimentation from 30-70cm on top of what may be the 1940s surface. Artifacts in this layer were a mixture of recent flotsam and jetsam and redeposited artifacts from the nineteenth and early twentieth century occupations. Below this recent alluvium was a dark brown (10YR 4/3-3/3) silty loam stratum that was commonly striated with iron oxide stains and continued to the bottom of the unit. Very few artifacts were found in this layer. A typical profile is illustrated in Figure 82.

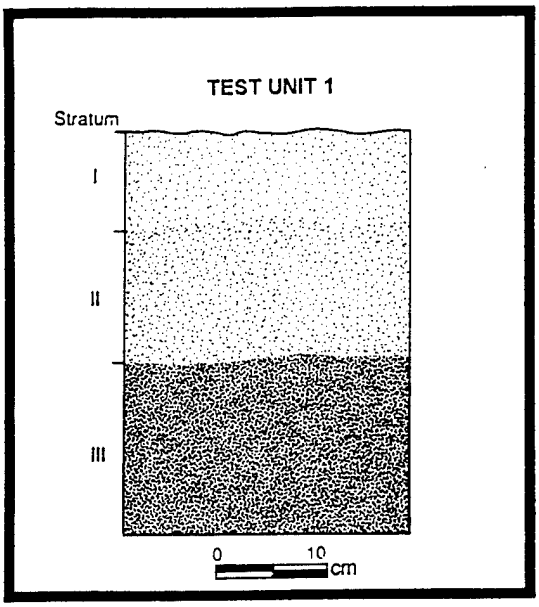


Figure 82. Representative profile, test unit 1 at 16PL49.

No standing structures were found, but structural remains are represented by clusters of pilings cut off near the present ground and river level. In addition, there are three low berms with scatters of bricks and rocks, all associated with small ponds. Some of the locations of these remains correspond with structures on the early maps, but at least four do not relate to any mapped structures. Elaboration is provided below in the individual feature descriptions.

Structural Features

Feature 1 - Walkway Pilings: Located in the interior of the southern portion of the site, this is probably the remains of a raised walkway, although it could not be confidently identified on any of the early maps or aerial photographs. The feature consists of pairs of 12" round creosote pilings set three meters apart and spaced at approximately three meter intervals extending for at least 177 feet and crossing transects 11 and 12 (Figure 83). Only the stubs of some pilings are presently visible as all were sawed off at ground level when the structure was razed. The tops of many are presently buried by up to six inches of sediment. No other cultural evidence was visible in the area.

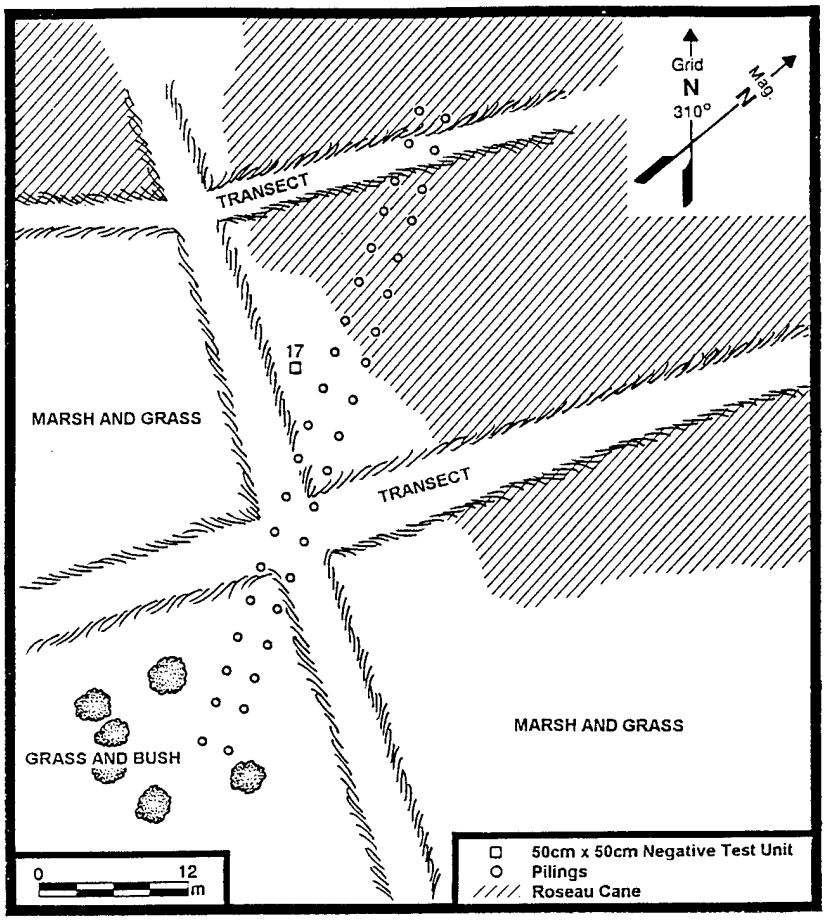


Figure 83. Sketch map of Feature 1 at 16PL49.

Test unit 17, excavated nearby, was negative, but it exposed a profile somewhat different from the norm at the site. The upper portion was a brown (10YR 5/3) fluid silty loam to a depth of 20cm. However, between 20 and 40cm was a layer of yellowish brown (10YR 5/4) fluid silty loam, underlaid by the dark brown (10YR 3/3) fluid silty loam typical of most areas of the site. We have no interpretation for the presence of the mid-stratum. In the complete absence of artifacts associated with any strata in the test unit, further comment is unwarranted.

Feature 2 - Remains of a Seawall in River: At the end of a 30m by 15m peninsula in shallow water and covered by roseau cane are the remnants of a wooden seawall (Figure 84). Six 12"-diameter, round pilings are also visible around the peninsula, but these are cut to the water level near the shoreline. These remains appear in the vicinity of the central dock that is illustrated on the 1942 map.

Test unit 15 was excavated on the back side of the levee in this area, but it produced no cultural remains. The stratigraphy was typical of that previously described for the site as a whole.

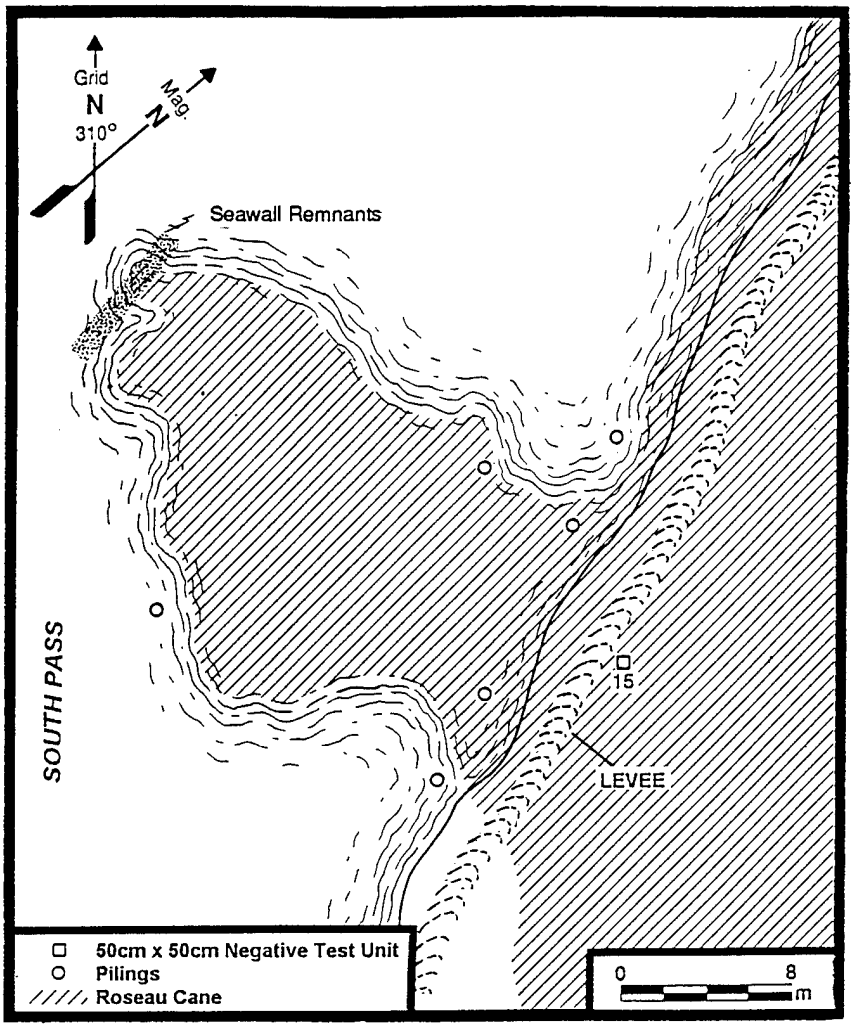


Figure 84. Sketch map of Feature 2 at 16PL49.

Feature 3 - Cluster of Piles in River: This is a mushroom-shaped expanse of roseau cane extending 36m from the shoreline (Figure 85). Eleven round and square 12" pilings were found clustered in a 40 feet by 60 feet area in the vicinity of a structure of similar size depicted on the 1942 map. This structure is well inland on the 1942 map, but the present shoreline is only 10m east of this set of pilings.

Test unit 13 was excavated in the area of Feature 3 and produced five artifacts. The collection includes one common brick and one clay tile from 10-20cm and three clay tiles from 20-30cm. The stratigraphy was typical of the site overall.

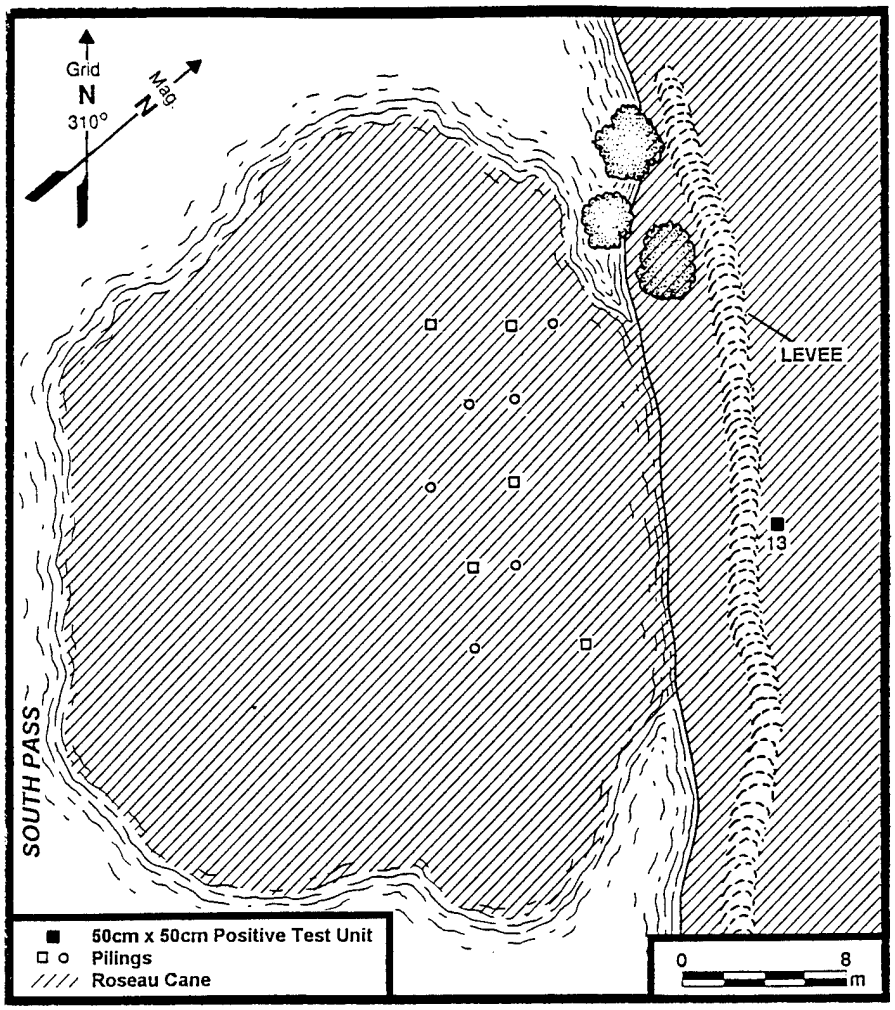


Figure 85. Sketch map of Feature 3 at 16PL49.

Feature 4 - Inland Berm Around Small Pond: Situated in the northern portion of the site, Feature 4 is a low crescent-shaped berm of rock, shell, and brick fragments around a small pond approximately six meters in diameter (Figure 86). Test unit 7 was excavated near the berm, producing a dense layer of rock, shell, and brick, extending to the water table at 60cm. Artifacts were found between the surface and 40cm. Recovered materials include clay tile fragments and unidentifiable metal, ceramic, and glass fragments. The most notable were fragments of a fluted Coca Cola bottle, a style produced after 1915.

While artifacts were recovered in association with this feature, the configuration is typical of a scour hole and accumulated berm that is left at the outflow of a dredge pipe. This feature is located near the head of dredge plumes which are apparent on both the 1973 and 1983 aerial photographs. Consequently, it is likely that the artifacts were dredged up and secondarily deposited, along with the cobbles, from the river bed.

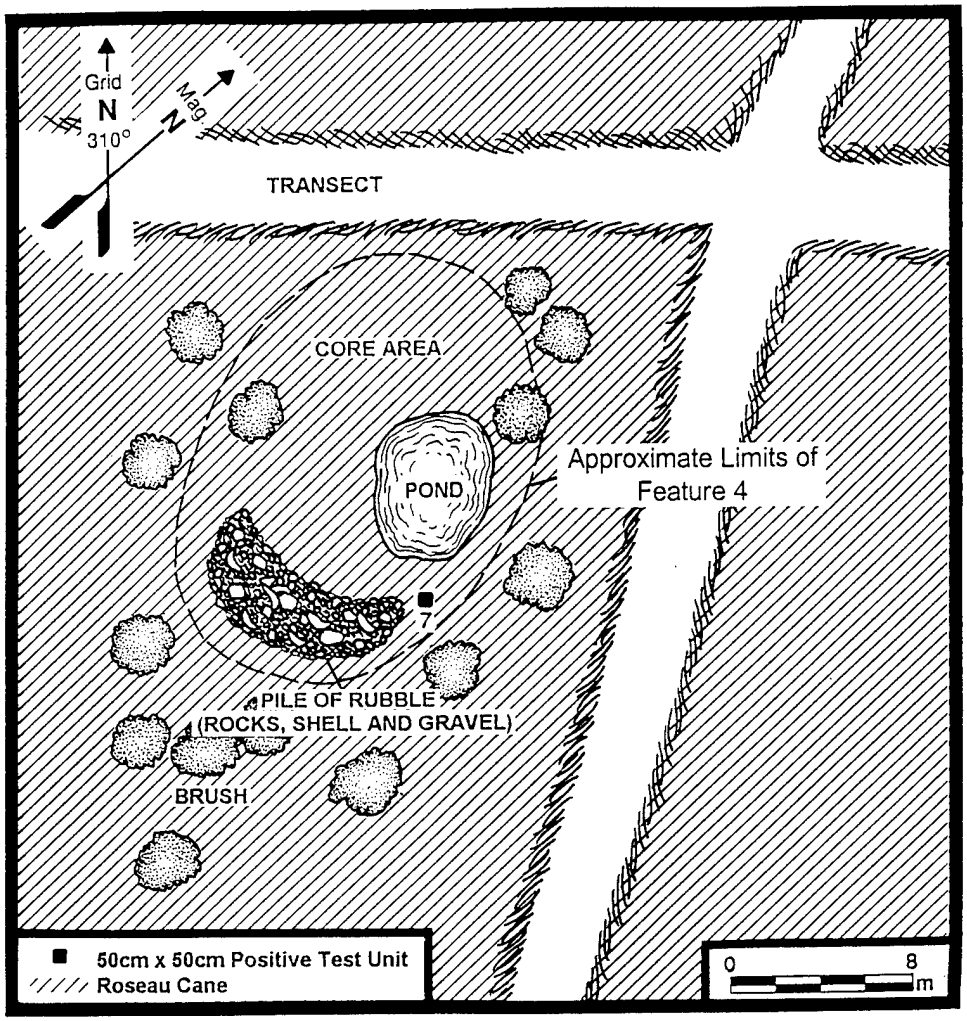


Figure 86. Sketch map of Feature 4 at 16PL49.

Feature 5 - Inland Berm Around Small Pond: This feature is located less than 50m east of Feature 4 and is almost identical in form (Figure 87). In test unit 8, excavated in the area of Feature 5, the profile contained a shallow top layer of gray (10YR 5/1) rocky silt loam to a depth of 10cm, below which was a brown (10YR 5/3) stratum of silty loam between 10-30 cm. This stratum was underlaid by a dark brown (10YR 3/3) silt loam layer with fewer rocks; the third stratum continued to the water table at 60cm.

Artifacts, including ceramics, glass, and metal, were recovered between 20 and 50cm. The sample included a wide range of late nineteenth to early twentieth century materials. Examples include olive wine bottle fragments, clay tiles, a drinking glass fragment, and a portion of an alligator jaw. Like Feature 4, it is probable that this configuration is also an outwash from dredging and that the artifacts are secondarily deposited.

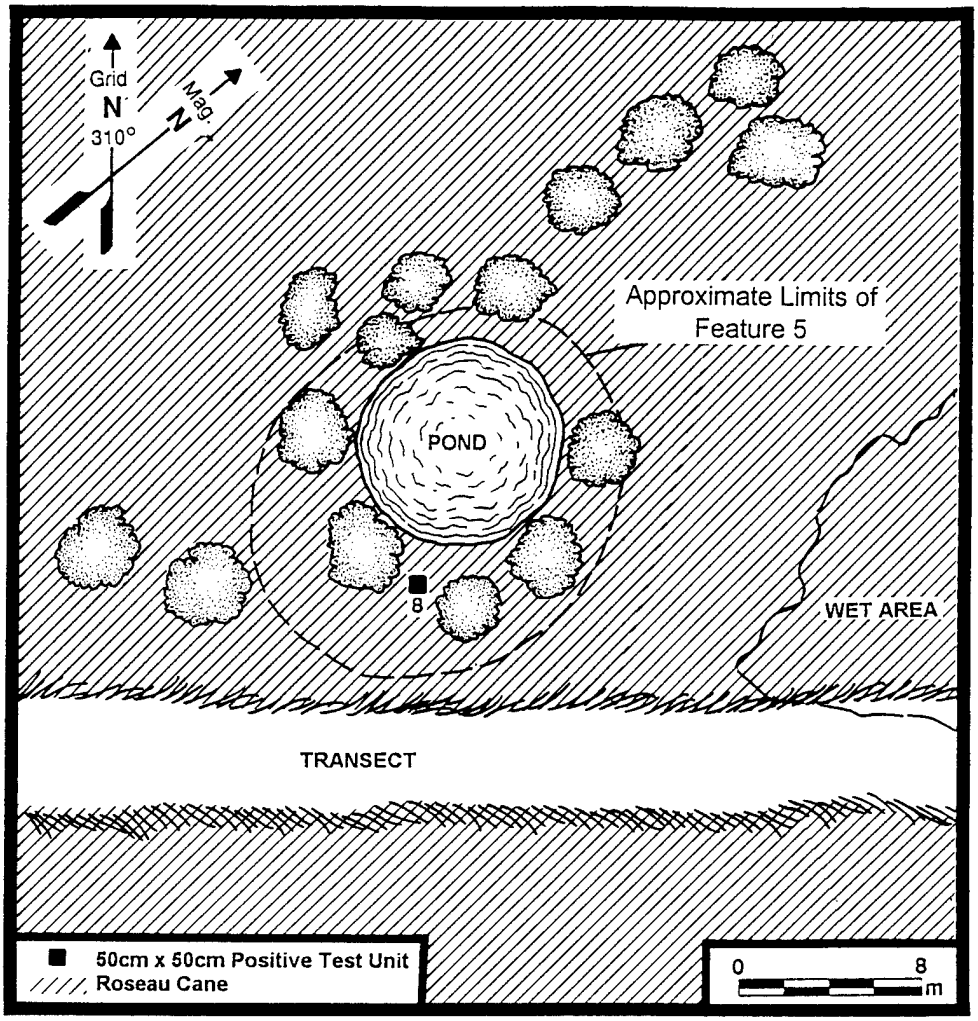


Figure 87. Sketch map of Feature 5 at 16PL49.

Feature 6 - Cluster of Pilings in River: This is large cluster of mainly submerged pilings east of the valve station, Feature 7 (Figure 88). It is probable that the pilings are part of a dock complex, which first appears on 1957 air photos, but appears as ruins on the 1973 aerials. On the 1983 aerial, the area is also shown as ruins, by then being claimed by the river. It should be noted, however, that these pilings are also in the vicinity of the southern dock and shops present on the 1879 map.

Feature 7 - Valve Station: This is a small building on pilings at the southern end of the site between Features 6 and 8 (Figure 89). The station is on an elevated platform over open water. It is first visible on the 1973 aerial and is presently abandoned. Likely associated with Feature 8, this valve station appears to have been constructed during the second half of the twentieth century.

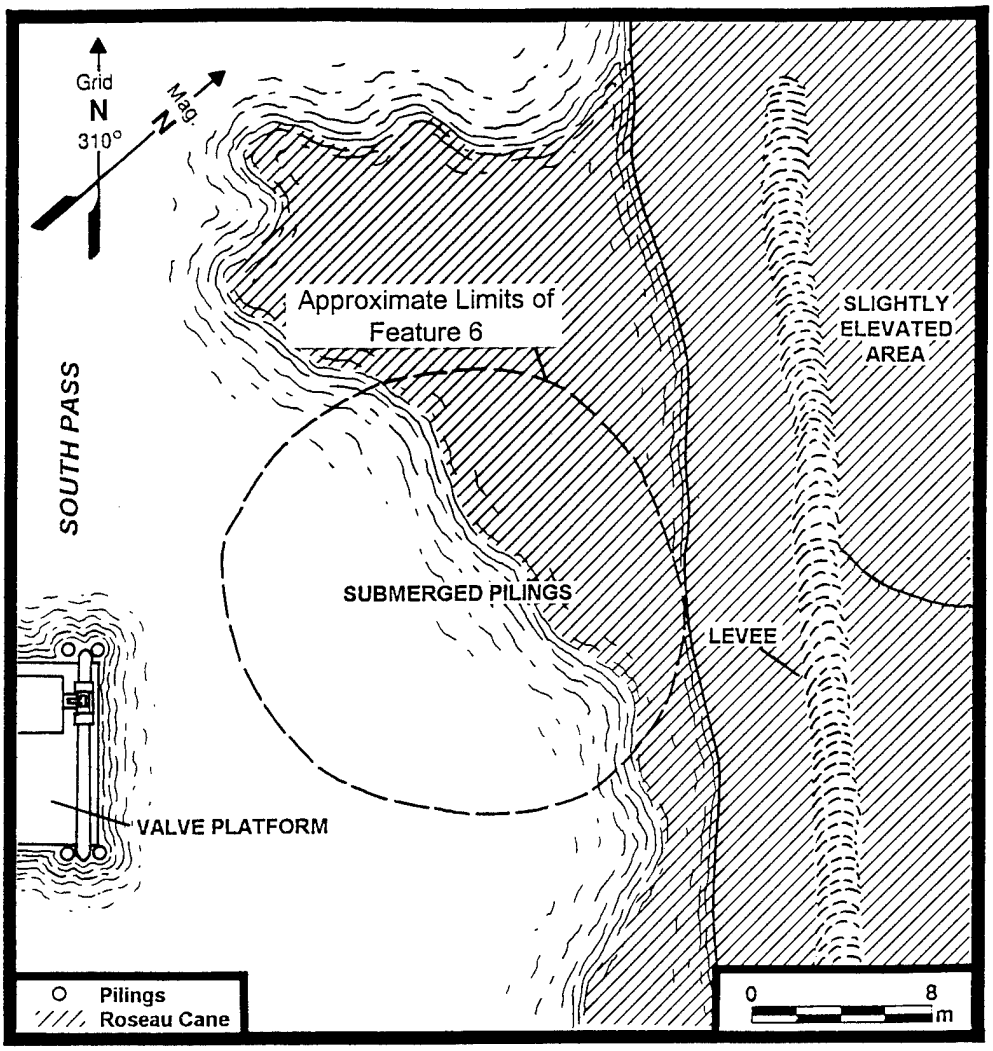


Figure 88. Sketch map of Feature 6 at 16PL49.

Feature 8 - Cluster of Pilings in River: This is a cluster of at least 21 pilings in the river extending out 30m from the shoreline (Figure 90). All are cut off at water level or are submerged. The cluster is 20m south of the southern dock and shop area shown on the 1879 map, but they are likely part of several buildings that first appear on a 1957 aerial and are in ruins by 1973. This feature may be associated with Features 7 and 9. Feature 6 could also be associated, but it has a potential for greater age since it is in the same area as the southern docks and shops shown on the 1879 map.

Feature 9 - Concrete Foundation in River: This is a concrete and wood platform at the south end of the site (Figure 91). The remaining portions of the platform, measuring 10m by 9m, are probably the wharf mentioned by Weinstein (*1984:48*). However, it is located several hundred meters south of the wharf depicted on the 1932 map or the southern dock on the maps from the nineteenth century. It could not be located on the 1951 aerial, but appears to be one of the three structures on the 1957 aerial.

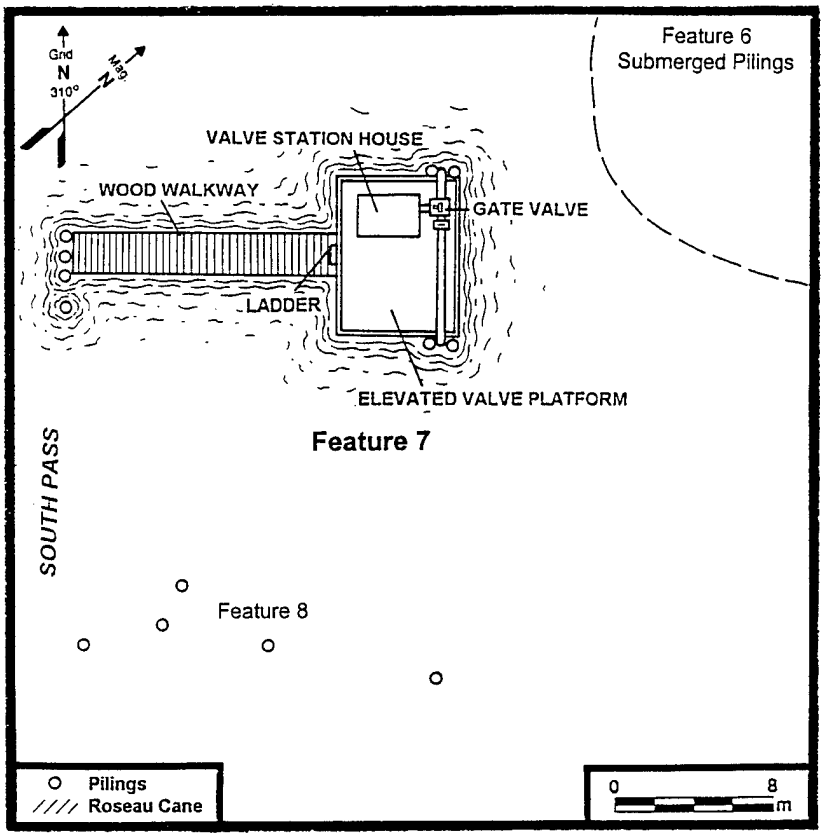


Figure 89. Sketch map of Feature 7 at 16PL49.

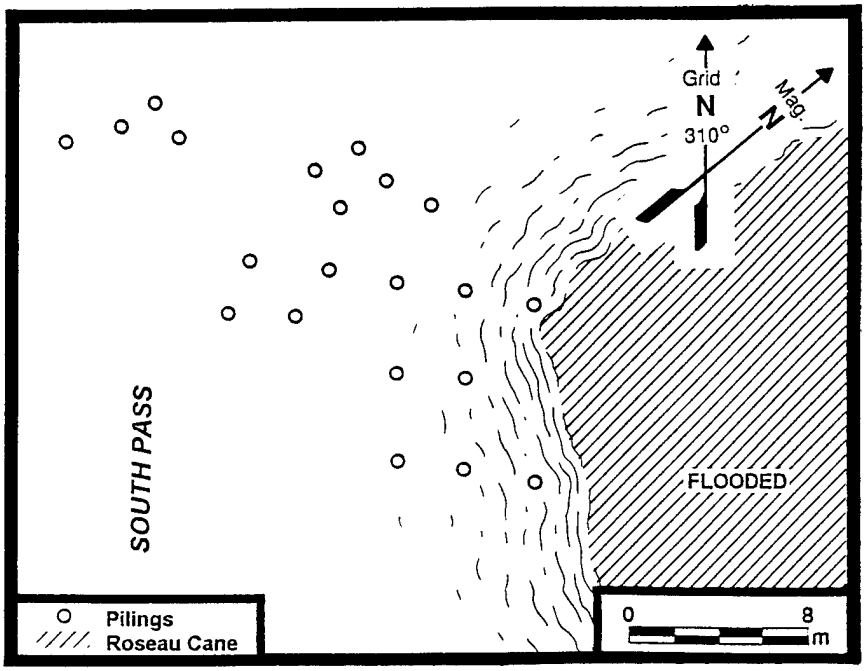


Figure 90. Sketch map of Feature 8 at 16PL49.

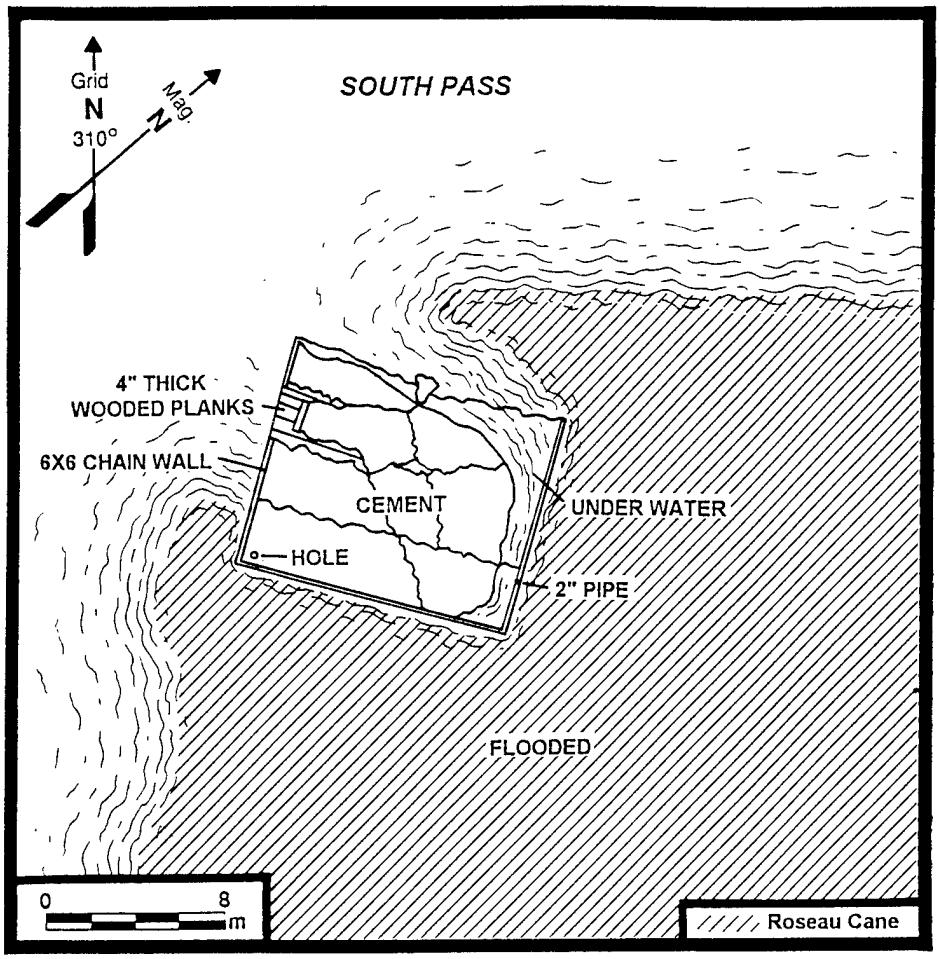


Figure 91. Sketch map of Feature 9 at 16PL49.

The feature is 19.6 feet by 16.4 feet in area and 30m out from the present shoreline. Weinstein (*1984:48*) reported pilings and floor timbers as being adjacent to the wharf, but just offshore. These were assumed by Weinstein to be the remains of a camp or house. We found no evidence of these remains, but it is possible that the pilings were submerged or hidden by the thick roseau cane.

Feature 10 - Cluster of Inland Pilings: Located in the flooded southeastern portion of the site, this cluster of eight parallel, round piles covers a 19.7 feet by 26.2 feet area (Figure 92). The pilings are one foot in diameter and cut off at water level. Feature 10, only 12m west of a small inlet of open water, could not be identified on the aerials or early maps. Its association with early Port Eads cannot be ruled out.

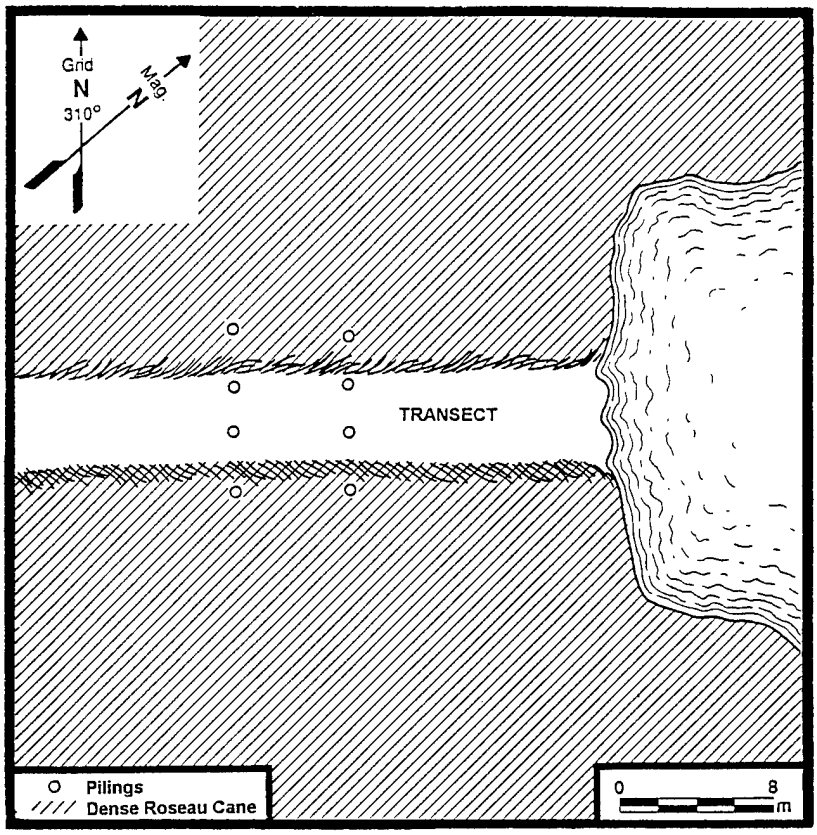


Figure 92. Sketch map of Feature 10 at 16PL49.

Feature 11 - Inland Berm and Pond: This is an earthen berm that is oriented north/northwest of magnetic north. It is elevated up to two feet above low tide, 2.5 to three meters in width, and measures 52.5 feet by 65.6 feet (Figure 93). Although roughly rectangular in orientation, only three sides of the berm are present so the area is estimated with the assumption that four sides were originally present. Feature 11 is in the vicinity of what is depicted on the 1942 map as a large structure enclosed by a perimeter of vegetation. It may be associated with that structure. Test unit 21, excavated in the area, was negative. An alternative explanation is that this is another dredge pipe outwash like Features 4 and 5.

Feature 12 - Concrete Bulkhead in River: This is on an area of land covered in roseau cane that projects into South Pass. A large concrete bulkhead at the western end is first visible on a 1961 aerial. The bulkhead is partially submerged (Figure 94). The age and function of this feature is uncertain, but it is located in the vicinity of the nineteenth century central wharf.

Test unit 14 was placed inland of the feature, producing artifacts to a depth of 30cm. Recovered materials include a square cut nail, soda and beer bottle glass, a clay tile fragment, a brick fragment, and scattered levee rock. The square nail is no doubt related to the nineteenth century occupation; however, the artifacts recovered are likely redeposited.

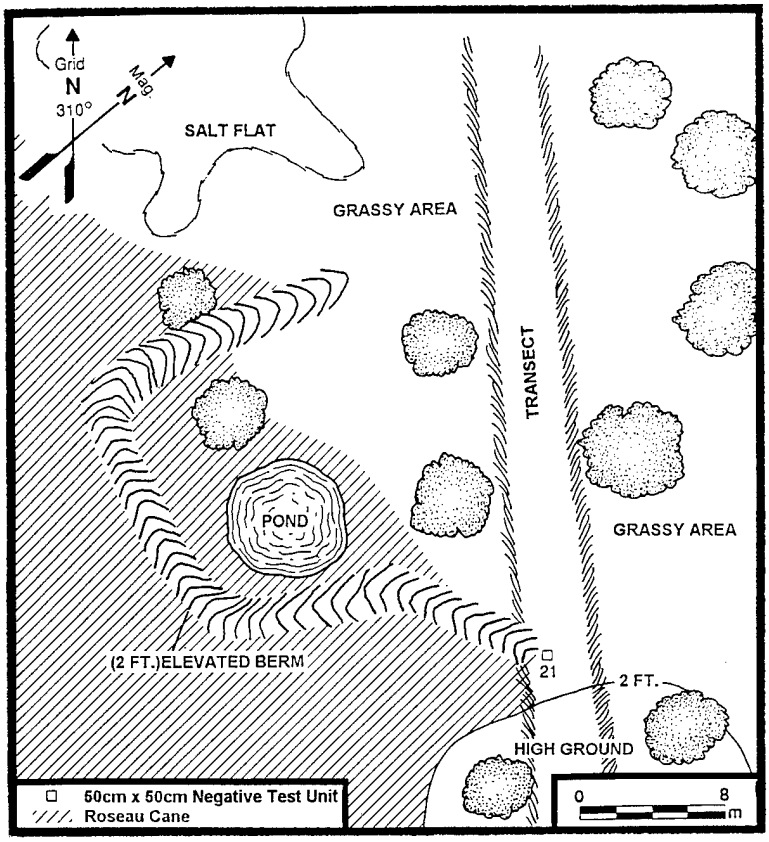


Figure 93. Sketch map of Feature 11 at 16PL49.



Figure 94. Photograph of Feature 12 at 16PL49.

Cultural Remains

As mentioned previously, artifacts were largely restricted to the shoreline levee and in association with some features. The recovered sample (n=448) is a mixture of eighteenth to twentieth century domestic, architectural, marine, and industrial materials (Table 6). The condition of the sample was variable. Preservation is fairly good; perishable materials, including a few fragments of textiles, fibers, and wood, were recovered. However, most of these were less than 40 years old. Surprisingly, only about 30 percent of the artifacts were seriously wave eroded. This suggests that the majority of the materials was only recently exposed.

Ceramics: The ceramic collection includes 52 sherds. Consistent with Weinstein's findings, eighteenth century ceramics are present, representing about 17 percent of the collection, somewhat lower than Weinstein's reported 45 percent. These early ceramics and those dating to the nineteenth and twentieth centuries are discussed below.

Faience: Two examples of blue-on-white soft paste tin glazed wares were recovered. Both are rather wave worn, but considering the fragility of these soft-bodied wares, it is likely that they were exposed fairly recently. One has a solid painted line, while the other has a floral-like design, bordered by a double line (Figure 95a). Both of these styles are most common to Brittany Blue on White wares that were produced between 1750-1765 (*Walthall 1991:88-89*). In view of the small size of the sherds, however, this classification is provisional.

Redwares: This is a generalized term covering several different types of seventeenth to nineteenth century ceramics with a soft paste (Mohs 2-3) and a lead glaze. Steponaitis (*Brain 1979:44*) divides these common utilitarian wares into several types and varieties which are compatible with the Port Eads collection.[2] Examples of manganese glazed, lead, and slipped lead glazed as well as unglazed types are present in the collection (Figure 95b-d).

Six pieces of redware were recovered. One of the sherds is unglazed, whereas another has a reddish yellow (5YR 6/6) paste and overall white slip with a clear lead glaze on the interior and a green lead glaze on the exterior. These parameters are equivalent to Type C (*Brain 1979:57*). Three other varieties were recovered. One is a Type C rim sherd from the brim of a medium pot or bowl with a reddish yellow paste, a slipped interior and an overall clear lead glaze. The second, equivalent to Type D, is a heavily eroded, applied handle fragment with a coarse reddish yellow paste and only a few remaining flecks of a light greenish lead glaze. One redware piece has a brown (7.5YR 5/2) paste and clear lead glaze and is equivalent to Type E (*Brain 1979:71*). An untyped specimen, probably later, exhibited a dark brown (10YR 3/3) manganese glaze.

[2]The source for Steponaitis' classification is a report on the Tunica Treasure. While comparable for analysis, the Port Eads collection is probably decades later than the Tunica Treasure.

Table 6. Artifacts from 16PL49.

	Surface Collection				Test Unit 1			Test Unit 2				Test Unit 3		
	Area 1	Area 2	Area 3	Str #11	10-20	30-40	50-60	10-20	40-50	50-60	60-70	20-30	30-40	50-60
CERAMICS														
Faience - Blue and white	1		1											
Redware - unglazed			1											
slipped/lead glazed			3											
manganese glazed	1													
coarse/lead glazed			1											
Creamware (late) - plain	1													
Whiteware - plain		2												
banded		2	1											
transfer print, blue		1												
Ironstone - plain		1												
underglaze blue														
Stoneware														
fine														
ginger bottle	1													
unglazed		1												
coarse														
unglazed		1												
lead glaze														
brown glaze			1											
manganese glaze														
alkaline glaze														
Bristol/Albany glaze	1													
Alkaline/Bristol glaze		10												
Bristol slip			1											
Albany slip		1												

Table 6. Artifacts from 16PL49. (Continued)

	Test Unit 4		Test Unit 5			Test Unit 6				Test Unit 7			
	10-20	30-40	0-10	10-20	20-30	0-10	30-40	50-60	70-80	0-10	10-20	20-30	30-40
CERAMICS													
Faience - Blue and white													
Redware - unglazed													
slipped/lead glazed													
manganese glazed													
coarse/lead glazed													
Creamware (late) - plain													
Whiteware - plain				1									
banded													
transfer print, blue													
Ironstone - plain											1		
underglaze blue													
Stoneware													
fine													
ginger bottle													
unglazed													
coarse													
unglazed													
lead glaze													
brown glaze													
manganese glaze													
alkaline glaze													
Bristol/Albany glaze													
Alkaline/Bristol glaze													
Bristol slip													
Albany slip													

Table 6. Artifacts from 16PL49. (Continued)

	Test Unit 8			Test Unit 9		TU10	Test Unit 11		Test Unit 13		Test Unit 14		TOTAL
	20-30	30-40	40-50	0-10	10-20	30-40	10-20	20-30	10-20	20-30	10-20	20-30	
CERAMICS													
Faience - Blue and white													2
Redware - unglazed													1
slipped/lead glazed													3
manganese glazed													1
coarse/lead glazed													1
Creamware (late) - plain													1
Whiteware - plain			1										4
banded													3
transfer print, blue													1
Ironstone - plain													2
underglaze blue			1										1
Stoneware													
fine													
ginger bottle													1
unglazed													1
coarse													
unglazed													1
lead glaze				1									1
brown glaze													1
manganese glaze	1												1
alkaline glaze			1										1
Bristol/Albany glaze													1
Alkaline/Bristol glaze													10
Bristol slip													1
Albany slip													1

Table 6. Artifacts from 16PL49. (Continued)

	Surface Collection				Test Unit 1			Test Unit 2				Test Unit 3		
	Area 1	Area 2	Area 3	Str #11	10-20	30-40	50-60	10-20	40-50	50-60	60-70	20-30	30-40	50-60
CERAMICS (Continued)														
Porcelain														
European - plain			3											
underglaze blue	1													
molded			1											
Oriental - plain		1	2											
Button - 2 hole	2													
Hotelware - plain			1											
SUBTOTAL	**8**	**20**	**16**											
GLASS														
Wine bottle - olive	4		1											
black			1											
Beer bottle - amber			2											
Soda bottle - clear		1												
aqua			4											
lt. green			1											
Coca Cola														
Patent medicine - clear			1											
aqua			3											
amber			1											
Unidentified bottle - clear			1											
aqua			1											
Mason Jar - aqua	1													
Cold cream jar - milk	2													
Tableware - clear													1	

Table 6. Artifacts from 16PL49. (Continued)

	Test Unit 4		Test Unit 5			Test Unit 6				Test Unit 7			
	10-20	30-40	0-10	10-20	20-30	0-10	30-40	50-60	70-80	0-10	10-20	20-30	30-40
CERAMICS (Continued)													
Porcelain													
European - plain				1									
underglaze blue													
molded													
Oriental - plain													
Button - 2 hole													
Hotelware - plain													
SUBTOTAL				**2**							**1**		
GLASS													
Wine bottle - olive			1		1								
black													
Beer bottle - amber													
Soda bottle - clear													
aqua													
lt. green													
Coca Cola													3
Patent medicine - clear													
aqua													
amber													
Unidentified bottle - clear													
aqua													
Mason Jar - aqua													
Cold cream jar - milk													
Tableware - clear													

Table 6. Artifacts from 16PL49. (Continued)

	Test Unit 8			Test Unit 9		TU10	Test Unit 11		Test Unit 13		Test Unit 14		TOTAL
	20-30	30-40	40-50	0-10	10-20	30-40	10-20	20-30	10-20	20-30	10-20	20-30	
CERAMICS (Continued)													
Porcelain													
European - plain													4
underglaze blue													1
molded													1
Oriental - plain													3
Button - 2 hole													2
Hotelware - plain													1
SUBTOTAL	**1**		**3**	**1**									**52**
GLASS													
Wine bottle - olive		1											8
black													1
Beer bottle - amber											1		3
Soda bottle - clear													1
aqua													4
lt. green											1		2
Coca Cola							1						4
Patent medicine - clear													1
aqua													3
amber													1
Unidentified bottle - clear													1
aqua													1
Mason Jar - aqua													1
Cold cream jar - milk													2
Tableware - clear	1		1										3

Table 6. Artifacts from 16PL49. (Continued)

	Surface Collection				Test Unit 1			Test Unit 2				Test Unit 3		
	Area 1	Area 2	Area 3	Str #11	10-20	30-40	50-60	10-20	40-50	50-60	60-70	20-30	30-40	50-60
GLASS (Continued)														
Windowpane - clear (2.5mm)			1											
aqua (1.5mm)			1											
aqua (2.0mm)			1											
Electrical insulator - aqua			2											
Unidentified - clear	3	2	8							4	2			
amethyst	1									2	2			
aqua	3	2	13											
lt. green	3	2	1											
olive			3											
green										1				
amber	3		3							2	2			
blue			2											
cobalt	3													
opaque - pink			1											
opaque - milk														
SUBTOTAL	**23**	**7**	**52**							**9**	**6**		**1**	
METAL														
Nails - square	1		1											
round	1													
Stove parts			1											
Hardware and parts														
iron collar			1											
rebar			1											
wire														
mast cap			1											

Table 6. Artifacts from 16PL49. (Continued)

	Test Unit 4		Test Unit 5			Test Unit 6				Test Unit 7			
	10-20	30-40	0-10	10-20	20-30	0-10	30-40	50-60	70-80	0-10	10-20	20-30	30-40
GLASS (Continued)													
Windowpane - clear (2.5mm)													
aqua (1.5mm)													
aqua (2.0mm)													
Electrical insulator - aqua													
Unidentified - clear			2	1							1		7
amethyst			1										
aqua													
lt. green													1
olive													
green													
amber			3				1						
blue													
cobalt													
opaque - pink													
opaque - milk		1											
SUBTOTAL		**1**	**7**	**1**	**1**		**1**				**1**		**11**
METAL													
Nails - square													
round													
Stove parts													
Hardware and parts													
iron collar													
rebar													
wire													
mast cap													

Table 6. Artifacts from 16PL49. (Continued)

	Test Unit 8			Test Unit 9		TU10	Test Unit 11		Test Unit 13		Test Unit 14		TOTAL
	20-30	30-40	40-50	0-10	10-20	30-40	10-20	20-30	10-20	20-30	10-20	20-30	
GLASS (Continued)													
Windowpane - clear (2.5mm)													1
aqua (1.5mm)													1
aqua (2.0mm)													1
Electrical insulator - aqua													2
Unidentified - clear			5	1	1		1						38
amethyst		2			3								11
aqua			1	1			1						21
lt. green	1		2		1		1	1					13
olive													3
green													1
amber							1	1					16
blue													2
cobalt													3
opaque - pink													1
opaque - milk													1
SUBTOTAL	**2**	**3**	**9**	**2**	**5**		**5**	**2**			**2**		**151**
METAL													
Nails - square											1		3
round													1
Stove parts													1
Hardware and parts													
iron collar													1
rebar													1
wire		1											1
mast cap													1

Table 6. Artifacts from 16PL49. (Continued)

	Surface Collection				Test Unit 1			Test Unit 2				Test Unit 3		
	Area 1	Area 2	Area 3	Str #11	10-20	30-40	50-60	10-20	40-50	50-60	60-70	20-30	30-40	50-60
METAL - Hardware (Continued)														
reinforcing bracket			2											
Brass survey marker		1												
Toy - pewter WWI soldier	1													
Miscellaneous - fragment			7											
brass strip			1											
flat iron	1		12											
iron strapping														
SUBTOTAL	**4**	**1**	**27**											
BUILDING MATERIALS														
Brick - common		1		1										
fire			1											
Ceramic pipe - drain		1	3											
Lumber					1		1		1			2		
Clay tiles														
Flat - plain														
hollow		1												
hexagonal	2	3	6											
rectangular/square	1	7	3											
glazed														
rectangular/square		2												
red slipped														
unidentified	1		1											
Curved - plain														
decorated	2	28	5											

Table 6. Artifacts from 16PL49. (Continued)

	Test Unit 4		Test Unit 5			Test Unit 6				Test Unit 7			
	10-20	30-40	0-10	10-20	20-30	0-10	30-40	50-60	70-80	0-10	10-20	20-30	30-40
METAL - Hardware (Continued)													
reinforcing bracket													
Brass survey marker													
Toy - pewter WWI soldier													
Miscellaneous - fragment											6	2	2
brass strip													
flat iron													1
iron strapping										1			
SUBTOTAL										**1**	**6**	**2**	**3**
BUILDING MATERIALS													
Brick - common							1						
fire													
Ceramic pipe - drain													
Lumber							4						
Clay tiles													
Flat - plain													
hollow													
hexagonal													
rectangular/square													2
glazed													
rectangular/square													
red slipped													
unidentified													
Curved - plain											2	2	
decorated													

Table 6. Artifacts from 16PL49. (Continued)

	Test Unit 8			Test Unit 9		TU10	Test Unit 11		Test Unit 13		Test Unit 14		TOTAL
	20-30	30-40	40-50	0-10	10-20	30-40	10-20	20-30	10-20	20-30	10-20	20-30	
METAL - Hardware (Continued)													
reinforcing bracket													2
Brass survey marker													1
Toy - pewter WWI soldier													1
Miscellaneous - fragment	2												19
brass strip													1
flat iron		6	1										21
iron strapping													1
SUBTOTAL	2	7	1								1		55
BUILDING MATERIALS													
Brick - common	1		2						1			1	8
fire													1
Ceramic pipe - drain													4
Lumber													9
Clay tiles													
Flat - plain													
hollow													1
hexagonal													11
rectangular/square						3	2	2					20
glazed													
rectangular/square													2
red slipped													
unidentified													2
Curved - plain									1	3			8
decorated												1	36

Table 6. Artifacts from 16PL49. (Continued)

	Surface Collection				Test Unit 1			Test Unit 2				Test Unit 3		
	Area 1	Area 2	Area 3	Str #11	10-20	30-40	50-60	10-20	40-50	50-60	60-70	20-30	30-40	50-60
BUILDING MATERIALS (Continued)														
Unidentified tiles			1											
SUBTOTAL	**6**	**43**	**20**	**1**	**1**		**1**		**1**			**2**		
MISCELLANEOUS														
Bakelite - washer		1												
Nylon twine													2	
Plastic												1		1
Cellophane wrapper														
Monofiliment line													1	
Netting														
Coal					2	1		3				3		
Coal slag														
Faunal - bone	1		3											
shell			12						1		7			
Lithics - flint			3											
levee rock	11									2				
pea gravel			6											
SUBTOTAL	**12**	**1**	**24**		**2**	**1**		**3**	**1**	**2**	**7**	**4**	**3**	**1**
TOTAL	**53**	**72**	**139**	**1**	**3**	**1**	**1**	**3**	**2**	**11**	**13**	**6**	**4**	**1**

Table 6. Artifacts from 16PL49. (Continued)

	Test Unit 4		Test Unit 5			Test Unit 6				Test Unit 7			
	10-20	30-40	0-10	10-20	20-30	0-10	30-40	50-60	70-80	0-10	10-20	20-30	30-40
BUILDING MATERIALS (Continued)													
Unidentified tiles													
SUBTOTAL							5				2	2	2
MISCELLANEOUS													
Bakelite - washer													
Nylon twine													
Plastic	2												
Cellophane wrapper									1				
Monofiliment line													
Netting								1					
Coal			1		1	1							
Coal slag	2		1	1		2							
Faunal - bone													
shell			1										
Lithics - flint													
levee rock				1							1		
pea gravel													
SUBTOTAL	4		3	2	1	3		1	1		1		
TOTAL	4	1	10	5	2	3	6	1	1	1	11	4	16

Table 6. Artifacts from 16PL49. (Continued)

	Test Unit 8			Test Unit 9		TU10	Test Unit 11		Test Unit 13		Test Unit 14		TOTAL
	20-30	30-40	40-50	0-10	10-20	30-40	10-20	20-30	10-20	20-30	10-20	20-30	
BUILDING MATERIALS (Continued)													
Unidentified tiles			1										2
SUBTOTAL	**1**		**3**			**3**	**2**	**2**	**2**	**3**		**2**	**104**
MISCELLANEOUS													
Bakelite - washer													1
Nylon twine													2
Plastic													4
Cellophane wrapper													1
Monofiliment line													1
Netting													1
Coal													12
Coal slag			1										7
Faunal - bone		1					1						6
shell													21
Lithics - flint													3
levee rock											6		21
pea gravel													6
SUBTOTAL		1	1				1				6		86
TOTAL	**6**	**11**	**17**	**3**	**5**	**3**	**8**	**4**	**2**	**3**	**9**	**2**	**448**

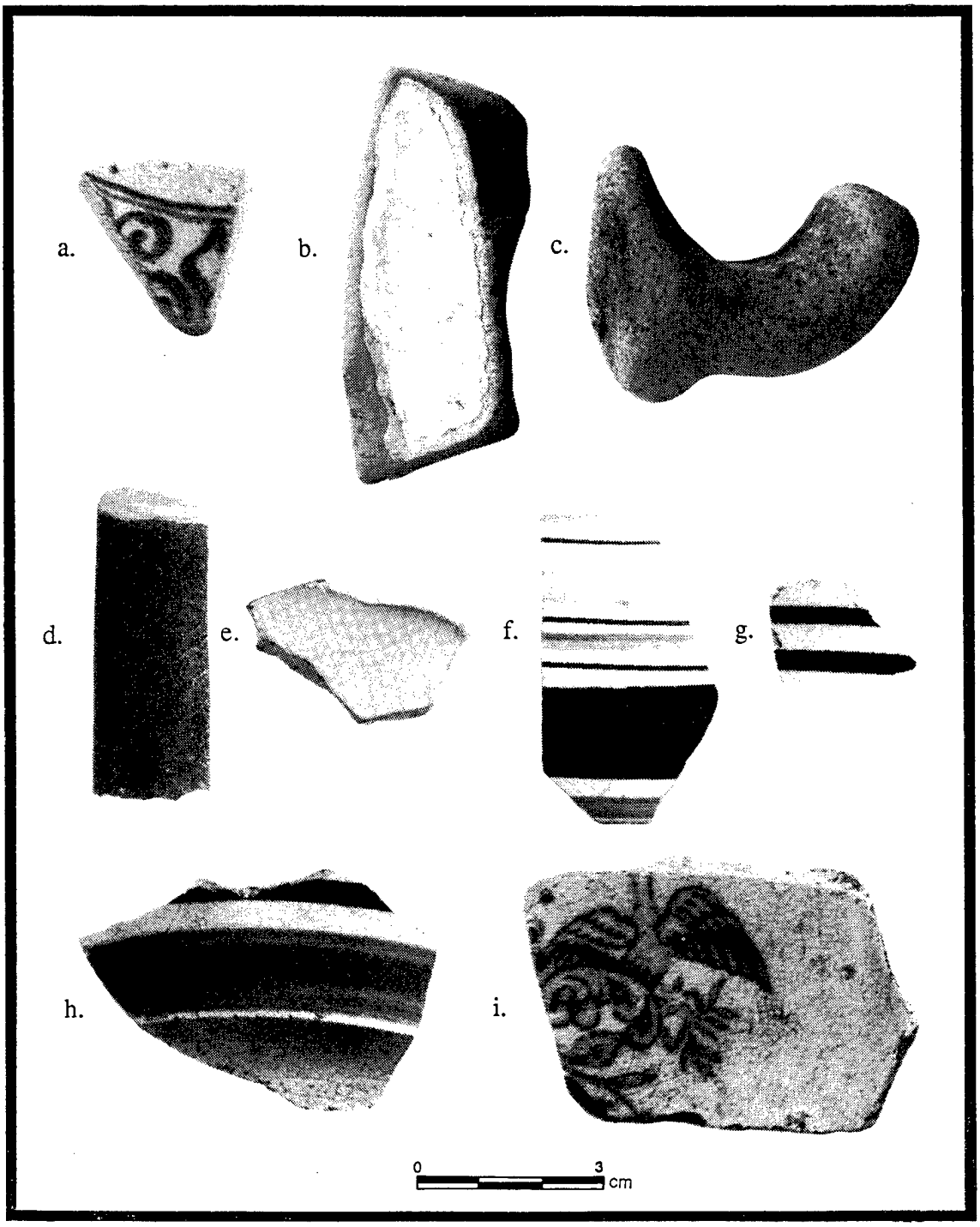


Figure 95. Selected ceramics from 16PL49.
a. faience; b. slipped glazed redware; c. unglazed redware handle; d. redware handle; e. creamware; f.-h. banded whiteware; i. blue transfer whiteware.

Creamware (Light Tinted): This ware represents a trend towards whiter wares that was begun by the 1770s. Light tinted creamwares are distinguished by a pale yellow glaze tint and a medium yellow fluorescence under short wave ultraviolet light. By the early nineteenth century manufacturers had completely eliminated the yellow cast from the glaze and paste and creamwares were superseded by whitewares. One undecorated example was recovered (Figure 95e).

Whiteware: This name is usually used as a cover term for any white-bodied, refined wares produced between the 1820s and the present. Here, whitewares are defined as generally clear glazed, white-bodied, non-vitreous earthenwares, having a Mohs hardness of 3-5 and fluorescing a bright white under shortwave ultraviolet light. As a general rule, whitewares produced between 1820 and 1860 were commonly decorated and thin bodied, while those after 1860 were essentially poor quality ironstones and only occasionally decorated. However, this rule applies more to assemblages than individual sherds.

Eight sherds were classified as whitewares. Four of these are decorated—three are banded and the other is blue transfer print (Figure 95f-i). This small sample is typical of early whiteware assemblages. The most notable specimen is a large fragment of the bottom of a large plate or platter that has a blue transfer printed rendition of a pelican or other bird on the interior surface (Figure 95i). Such emblems are common on service sets from hotels and ship's china.

Ironstones (White Bodied): Also called stone china or granite ware, these ceramics are distinguished from whitewares and earlier ironstones by their semivitreous (Mohs 5-6), white fabric and thicker walls; the type is less commonly decorated. White-bodied ironstones, essentially a white-bodied stoneware (*South 1977:211*), were first produced in the 1840s, over took whitewares by the 1850s, and are still the most common tableware produced to this day (*Miller 1980:18*).

Despite the heavy nineteenth and early twentieth century occupations at the site, only three ironstone sherds were found. One sherd has an underglaze light blue slip, which could be a fragment of bandedware, and the others are plain.

Stonewares: These primarily utilitarian, semivitreous wares have a long history. Possibly because of their mundane functions, stonewares are rarely decorated and have coarse textured bodies. Fine textured stonewares are also occasionally used as tablewares. The majority of eighteenth and nineteenth century assemblages are salt glazed, while late nineteenth and early twentieth century assemblages usually possess a wide variety of glazes as with this sample.

The stoneware collection of 20 sherds includes 18 coarse-textured and two fine-textured examples (Figure 96). All but three sherds were recovered from surface contexts. One of the fine-textured sherds is a brown-slipped ginger bottle fragment, common during the mid to late nineteenth century. The second is an unglazed specimen. Overall, the coarse-textured sample is typical of late nineteenth to early twentieth century collections. A wide variety of glaze treatments are represented, including lead, bristol, and Albany slips, as well as manganese and alkaline glazes.

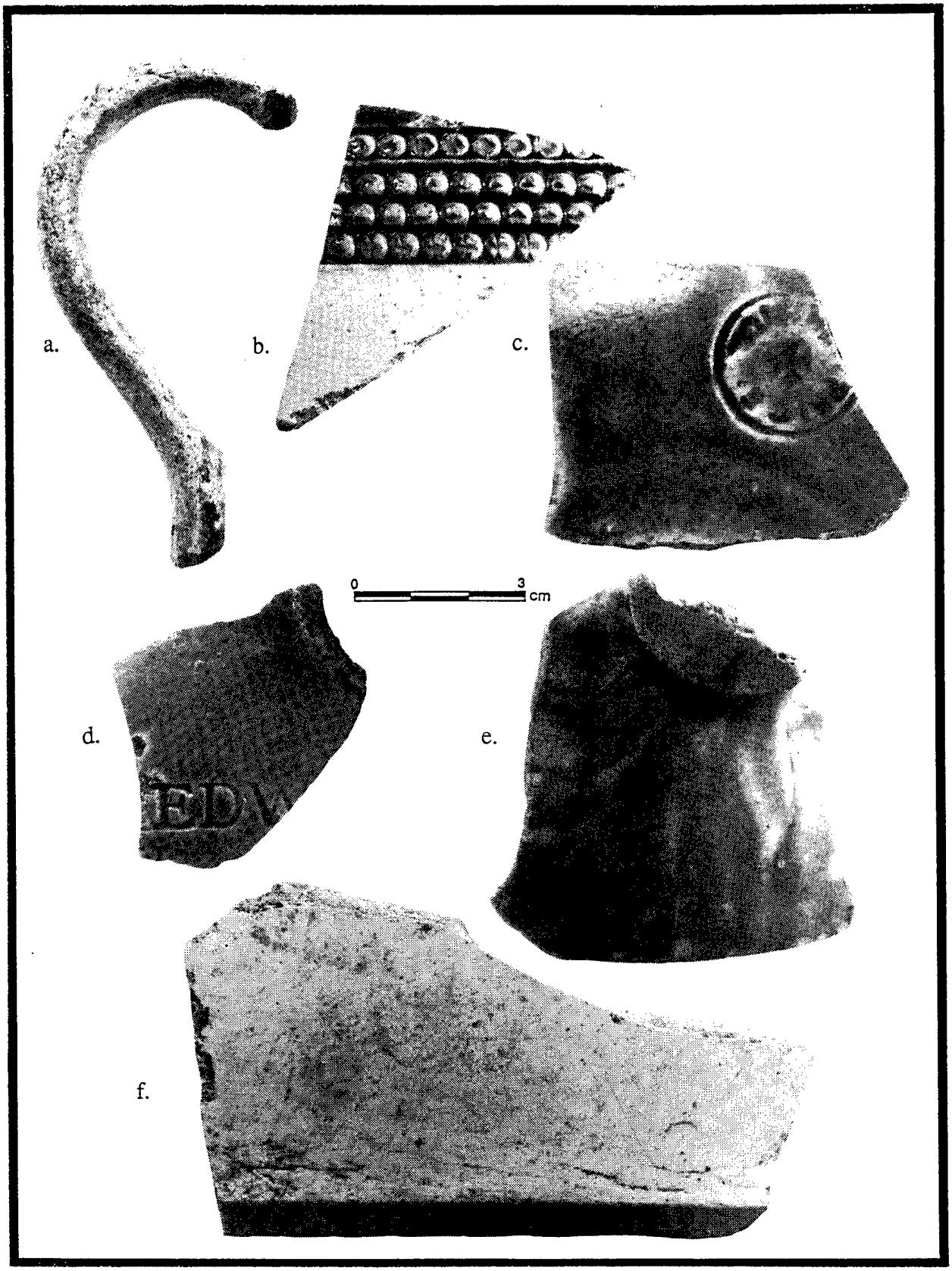


Figure 96. Selected stoneware from 16PL49.
a. stoneware pitcher handle; b.-e. stoneware jug fragments;
f. stoneware jug base fragment.

The identified vessel forms are utilitarian shapes, such as jugs and large bowls. The most notable of these are fragments of at least two brown and bristol glazed jugs with a potter's mark (Figure 96c-d). These were produced by Edward Price of Hardeman Co., Tennessee, a firm that was in operation between 1870 and 1880 (*Smith and Rogers 1979:105-106*).

Hotelware: This is a vitreous, thick-bodied ware otherwise called semiporcelain or porcelaineous ironstone. It was introduced at the end of the nineteenth century. As the name implies, this type is highly durable, designed to stand up to continued use. One piece of hotelware was recovered from the surface of Port Eads East.

Porcelain: Eleven items of this vitreous ceramic were recovered. This sample includes nine fragments of tablewares and two buttons. Six of the tableware specimens were probably of European origin and three possess attributes of oriental porcelains. Although these criteria are not guaranteed, oriental porcelains usually have a slight blue-gray cast, while European porcelains are generally white. Also, the paste of Oriental specimens fluoresces a light blue under shortwave ultraviolet light, and the fabric of porcelains known to have been produced in Europe fluoresces a light yellow under the shortwave lamp. One rim sherd of an under glaze blue painted cup, classified as oriental porcelain, does have the blue-gray cast, but fluoresced yellow. This example is similar to eighteenth century wares. One sherd of probable European manufacture is a pitcher of a child's china set with a decoration of embossed panels, a motif common on late nineteenth to early twentieth century ironstones (Figure 97a). A plain sherd of a saucer possesses a partially illegible overglaze printed potter's mark with the letters "M_ (C or G)e..." and "...MANY." This is probably the mark of an unidentified German manufacturer. "GERMANY" is present on marks after 1881 (*Kovel and Kovel 1986:229*).

Two porcelain buttons of the two-holed variety were also recovered (Figure 97b-c). These could date as early as the eighteenth century, but there are no attributes that could indicate a period of manufacture.

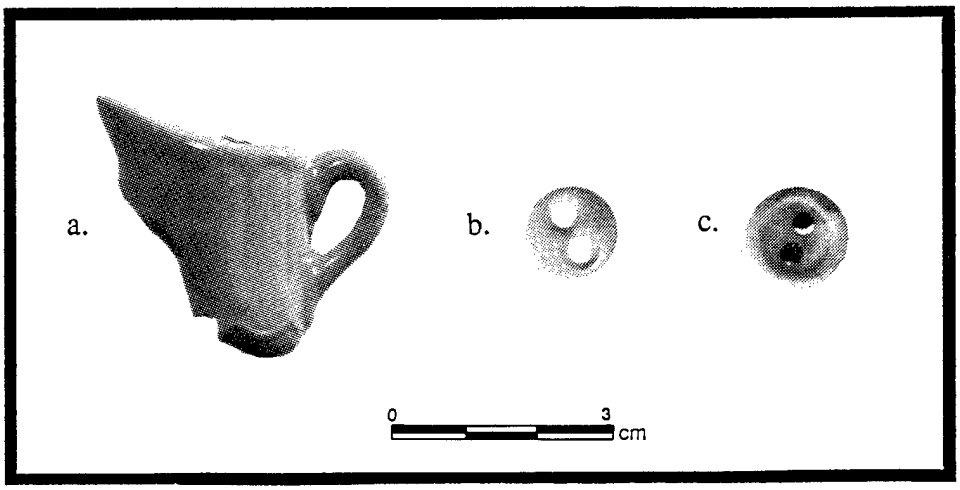


Figure 97. Porcelain toy tea set pitcher (a) and porcelain buttons (b-c).

Glass: The majority of 151 glass fragments from this site were from the surface (n=112), specifically from the shoreline which was substantially eroded from wave action. A variety of glass types were found.

Beverage Bottles: The bottle collection includes 23 fragments from bottle types generally associated with wine (n=9), beer (n=3), and soda beverages (n=11). Olive colored wine bottles were most common from the eighteenth through the nineteenth century. Very dark olive or black glass bottles were most popular between the 1820s and 1850s (*Munsey 1970:37; Jones and Sullivan 1989:14*). Eight of the sample of nine sherds were olive colored, while one large fragment of a black glass base was found (Figure 98a). One of the amber beer bottle fragments, also a basal sherd, has a date of 1892 (Figure 98b). Both bases were blown in a mold and lack pontile marks. The soda bottle fragments are all characteristic of popular twentieth century brands such as Coca Cola (Figure 98c-d).

Patent Medicine Bottles: The small collection of identified proprietary medicine containers (n=5) include bitters, sarsaparilla, and Florida Water bottles. The bitters fragment is from a square or rectangular amber bottle embossed with ...TTE../...ERS (Figure 98e). This is probably a variant of "Dr. J. Hostetters Stomach Bitters" that was produced from 1853 to 1958 (*Fike 1987:36; Watson 1965:136-137*). This was one of the most popular and enduring proprietary medicines. In its original form this product contained 47% (94 Proof) alcohol, but was reduced to 25% after the Pure Food and Drug Act of 1906.

A second popular remedy during the nineteenth century was extract of sarsaparilla. This preparation was much more concentrated than the fountain version and frequently contained additional herbs and other components. It was usually hawked as a blood purifier and cure for a variety of diseases including Scrofula, King's Evil, and Cancers (*Fike 1987:214*). A fragment of an extract of sarsaparilla bottle, found on the surface, is a portion of a flat panel from an aqua colored container with embossed lettering reading "...A_T OF/.....PARILLA" (Figure 98f.). Several dozen companies sold extract of sarsaparilla preparations throughout the nineteenth and early twentieth century.

Another glass sherd is a portion of a smaller diameter round aqua bottle with "...LORID..." embossed (Figure 98g). This is undoubtedly a portion of a "Florida Water" bottle. Florida Water was a perfumed spirit that was first marketed in the 1820s and still has limited popularity in Canada (*Sullivan 1994*). It was most popular in America, though European and even oriental manufacture has been documented (*Sullivan 1994:80-81*). Florida water was sold by both perfumers and druggists and was used both as a toilet water and panacea like eau-de-cologne. The primary scent base was usually essence of lavender and bergamot dissolved in alcohol, but other ingredients such as orange, cloves, and balm also were added (*Sullivan 1994:79-80*). The origin of the name is uncertain. Suggested uses by manufacturers include application to the forehead to soothe a nervous headache, addition to the bath to soothe the weary body and over taxed brain, inhaling from a handkerchief to impart exquisite enjoyment, and sprinkling in sick rooms to soothe the restless invalid (*Sullivan 1994:84*).

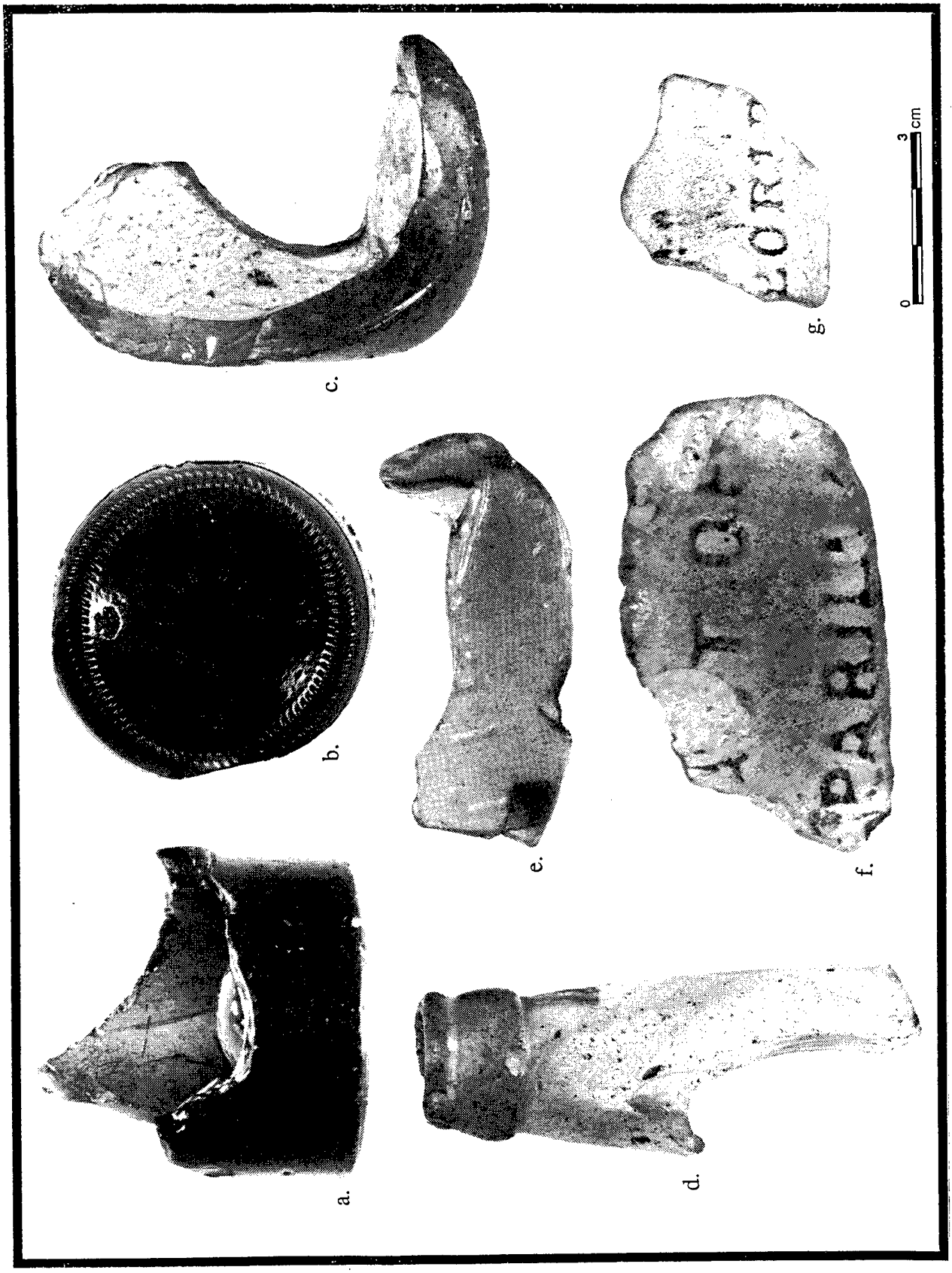


Figure 98. Selected glass from 16PL49.
a. black wine bottle base; b. amber bottle base with 1892 date; c. light green bottle base; d. soda bottle neck; e. bitters patent medicine bottle; f. extract of sarsaparilla patent medicine bottle fragment; g. Florida Water patent medicine bottle fragment.

Mason Jar: This popular jar type was used for home preservation of foods from the 1850s on. One aqua colored rim fragment of a screw type mason jar was found.

Cold Cream Jars: Portions of two small milk glass jars of this type were found at the site. Both have a seam across the base and no identifying marks. Cold cream jars are usually interpreted as gender-related artifacts, in this case female.

Tableware: Considering that a hotel was at the site, notable minorities of glass tablewares, such as wine glasses, drinking glasses, and salad bowls should be expected. However, only three fragments of common clear drinking glasses were found: two in test unit 8 near Feature 5 and one in test unit 3.

Windowpane: This was another item that was expected to be fairly common in view of the dozens of structures at the site. Yet only three specimens were collected and none in association with a structural feature. The fragments range between 1.5-2.5mm in thickness, widths common to the late nineteenth century.

Electrical Insulators: Two early twentieth century style aqua colored insulators were found on the surface of the site. One has the remains of the metal support yoke (Figure 99). These could be related to the 1920s radio plant noted in Chapter Three and located in the southern portion of the site on a 1921 map.

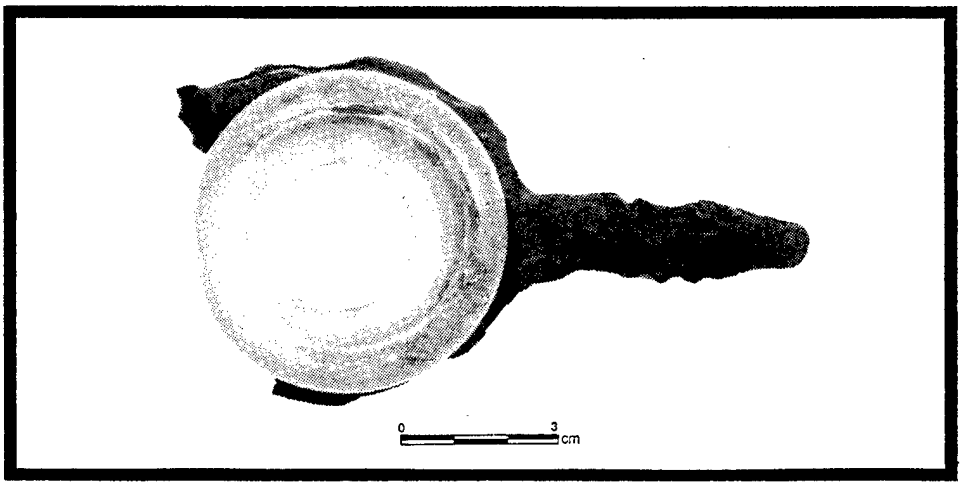


Figure 99. Glass electrical insulator.

Unidentified Glass: As with most historic sites, the majority (n=110) of the glass sample is too small to identify or the fragments lack identifying attributes. The unidentified sample includes a wide array of colors and a significant minority of amethyst glass, characteristics typical of nineteenth and early twentieth century assemblages.

Metal: A total of 55 items are included in the metal collection. Although metal items were fairly common along the shoreline, most of these were unidentifiable lumps that were not collected.

***Nails*:** Only four nails were recovered—three machine made square cut and one round or wire nail (Figure 100a). The square cut specimens are probably related to the nineteenth century component.

Hardware and Parts: The most notable of these artifacts are a 3-inch iron collar and an end cap with a loop. Both could be vessel parts or portions of construction equipment. Other items include wire, mast casing (Figure 100b), and reinforcing brackets.

Stove Part: One piece of a stove was recovered from the site's surface (Figure 100c).

Toys: One almost complete toy soldier of pewter was found at the site (Figure 101). The style of uniform and accouterments are typical of the World War I period.

Miscellaneous: Unidentifiable metal lumps and sheet metal fragments (n=42) largely compose this category and are of minimal interpretive value.

Building Materials: This class is comprised of base materials used in the construction of a structure.

Bricks: Nine brick fragments, including eight common and one fire brick, were collected. Brick fragments were common on the shoreline, but only diagnostic portions were collected. The common bricks are primarily of red clay with no brand names present. The fire brick did have a brand reading "ST LOUIS/V.& F.B. Co./STANDARD" (Figure 102). Sources indicate that the St. Louis Vitrified and Fire Brick Company was in operation between 1921 and 1927 (*Gurke 1987:298-299*).

Ceramic Drain Pipe: Four fragments of a six inch clear glazed drain pipe commonly used in field lines and plumbing were found on the surface.

Lumber: Nine fragments of dressed pine lumber were recovered from test unit 6.

Clay Tiles: A wide array of clay tile fragments (n=82) were found at the site. Representative tiles are depicted in Figures 103 through 108. These were very common along the shoreline and only a diagnostic sample was collected. The main types are flat floor tiles and decorative architectural tiles. The floor tiles are of red (2.5YR 5/6) to yellowish red (5YR 5/6) on the Munsell chart (orange to the naked eye) earthenware. A few examples of a pale brown (10YR 6/3) sandy paste were also present. Primary shapes are hexagonal and square or rectangular; the majority of these are unglazed with very smooth flat exteriors or faces and ribbed or flat bottoms of rougher texture. A small proportion have a fine red slip or a very dark brown (10YR 3/3) manganese or blue glaze. Whole specimens of the hexagonal shape were commonly observed on the shoreline.

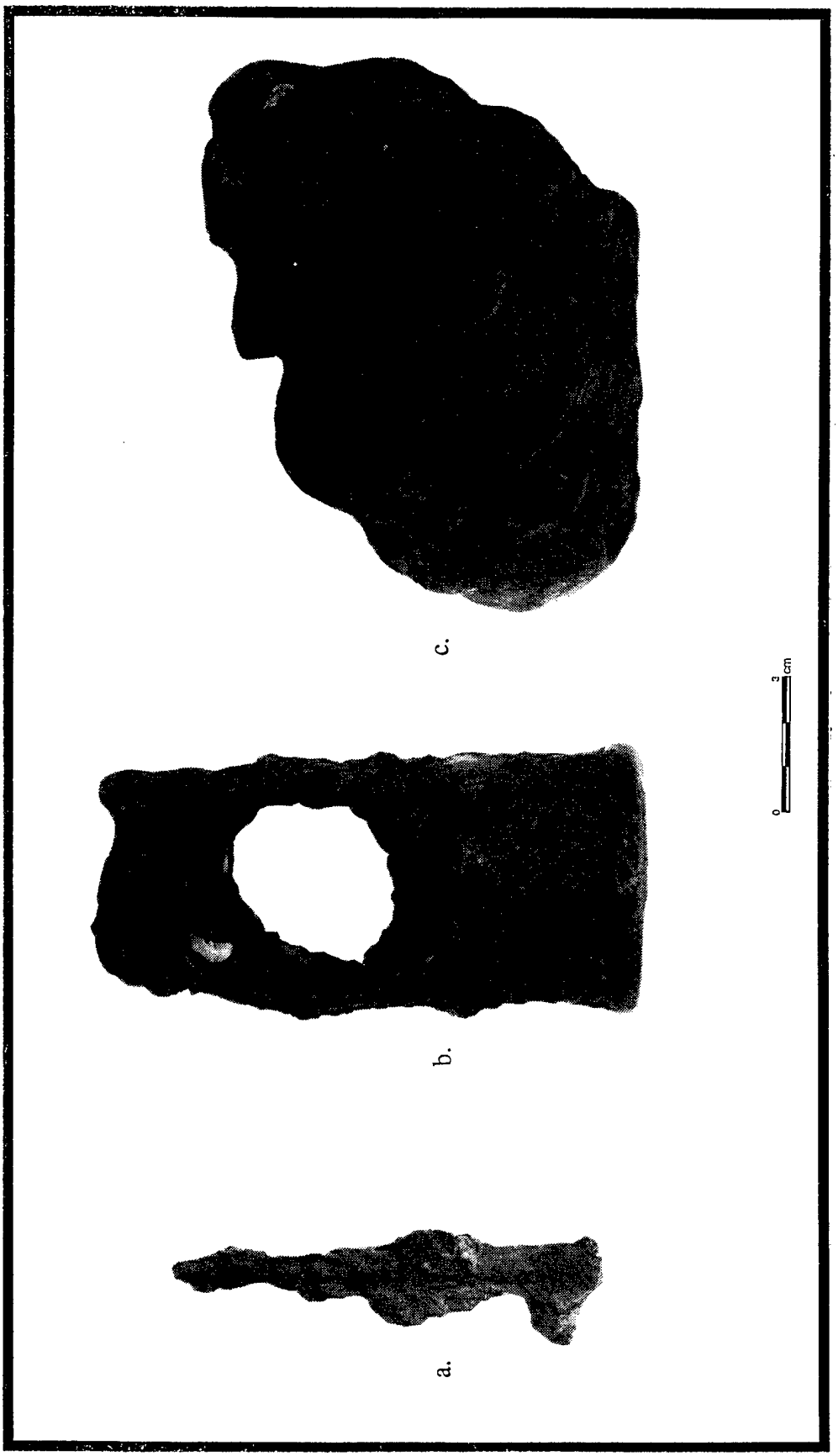


Figure 100. Selected metal artifacts from 16PL49. a. square nail; b. metal mast casing; c. stove part.



Figure 101. Pewter toy soldier piece from 16PL49.

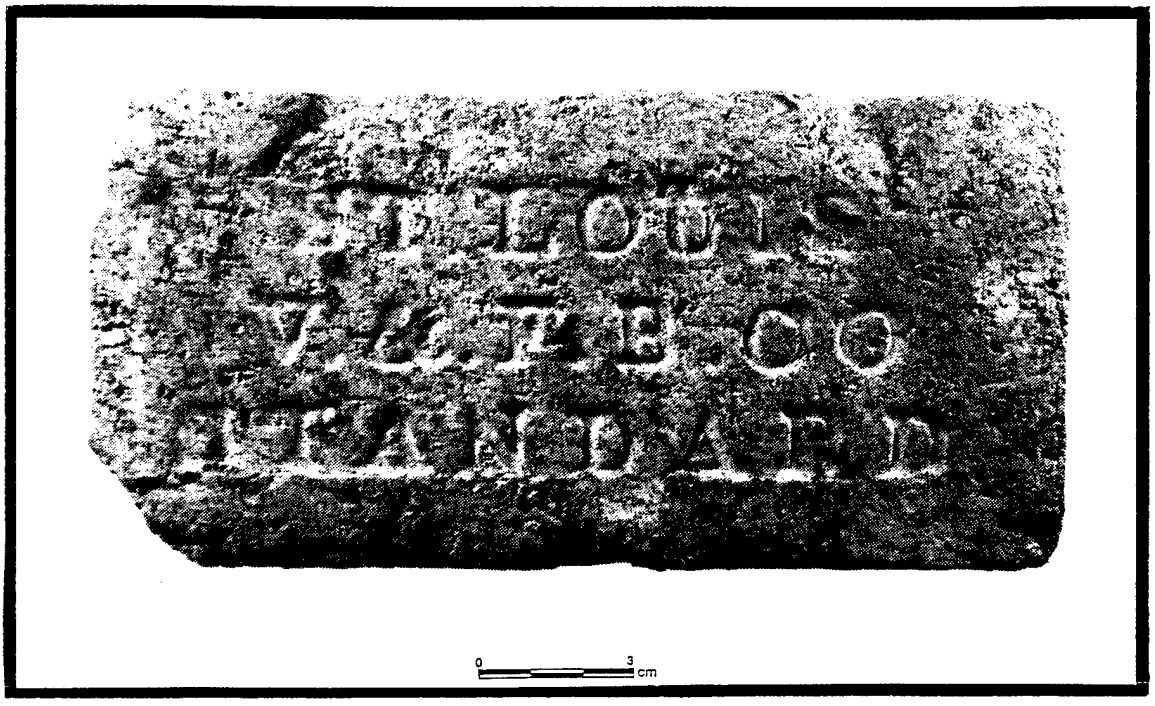


Figure 102. Fire brick from 16PL49.

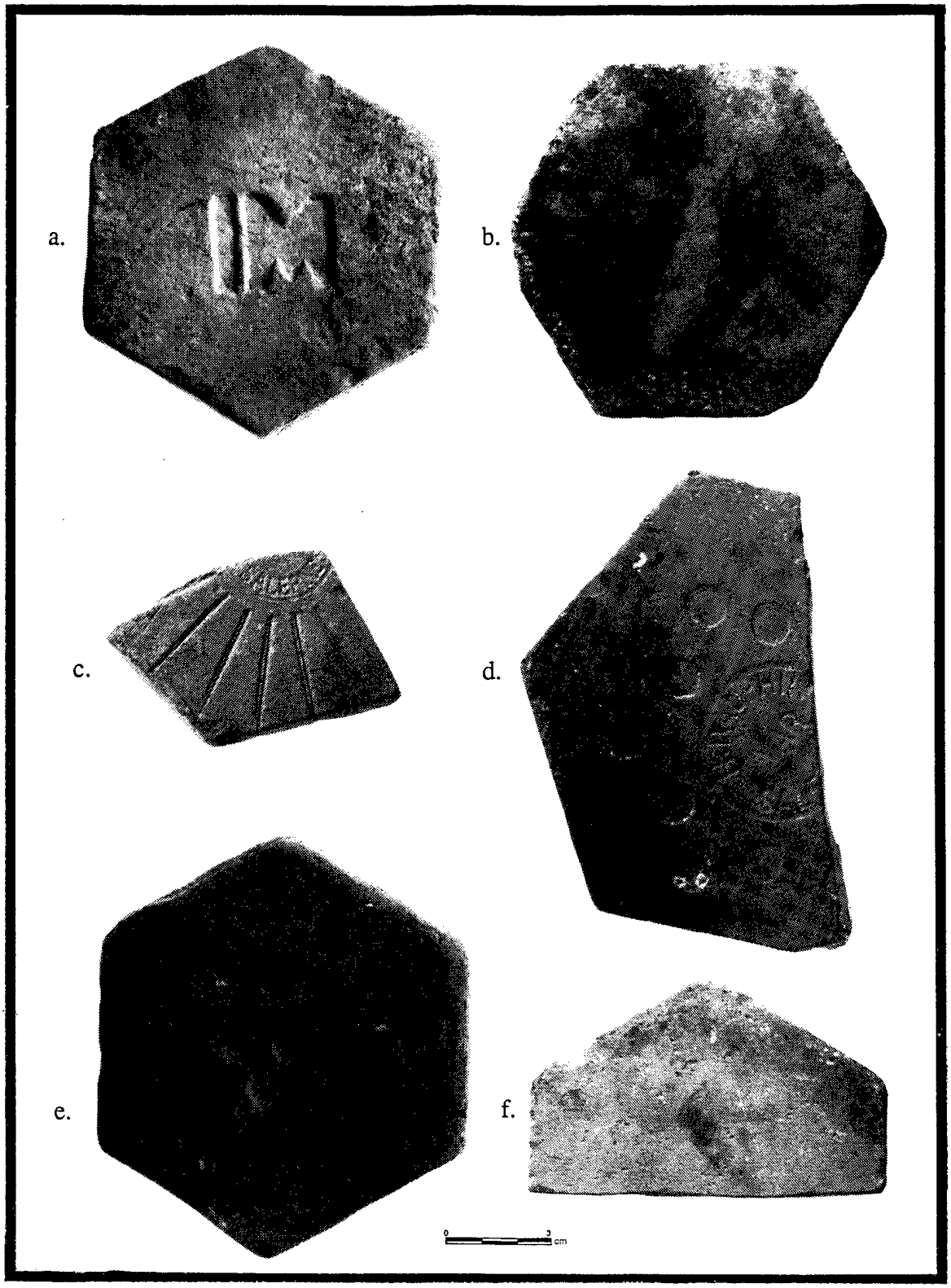


Figure 103. Selected tiles from 16PL49.
a.-d. underside of red hexagonal tiles with trademarks;
e.-f. top side of red hexagonal tiles.

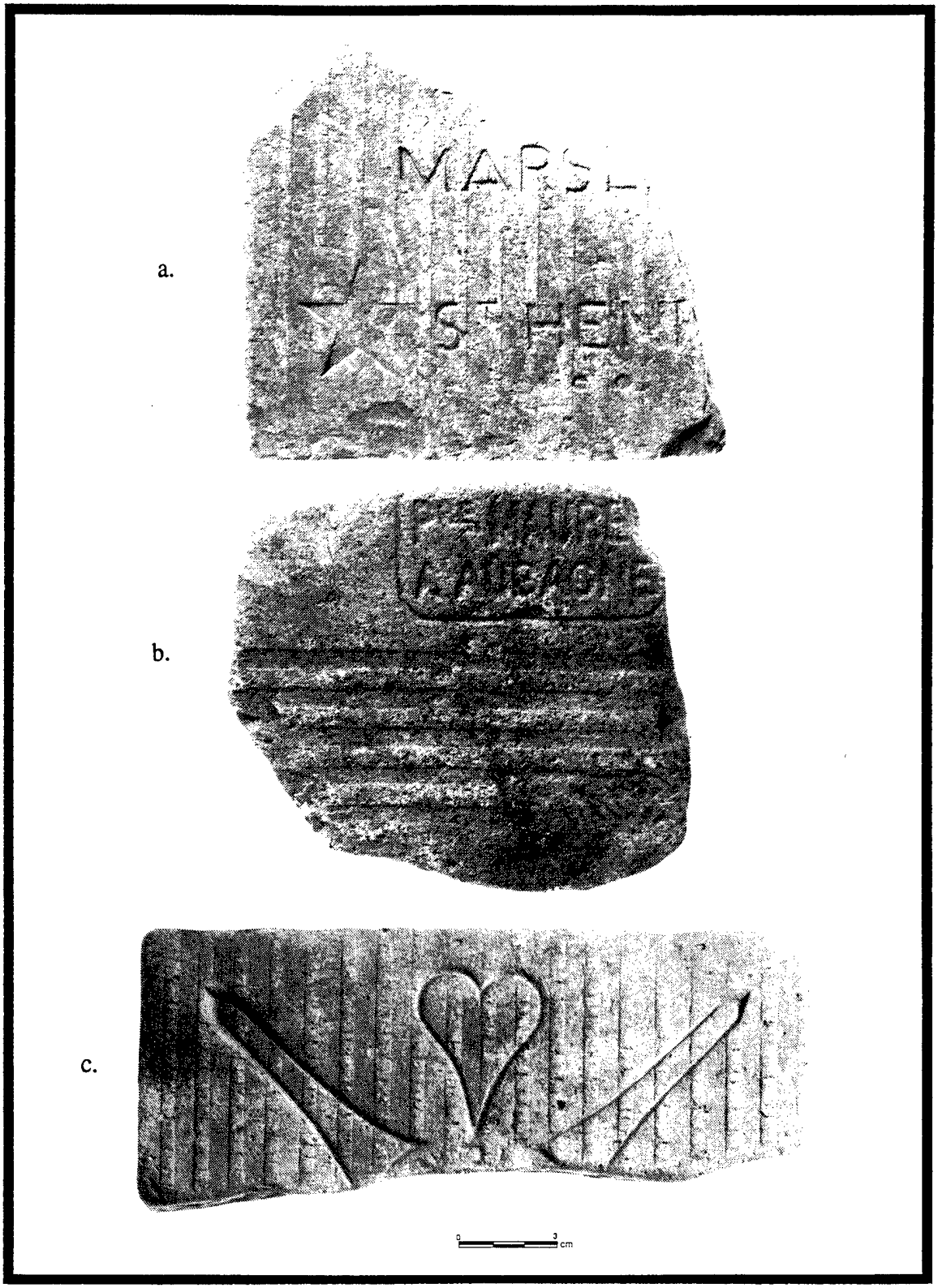


Figure 104. Selected tiles from 16PL49.
a.-c. undersides of rectangular or square red, flat floor tiles with portions of trademarks.

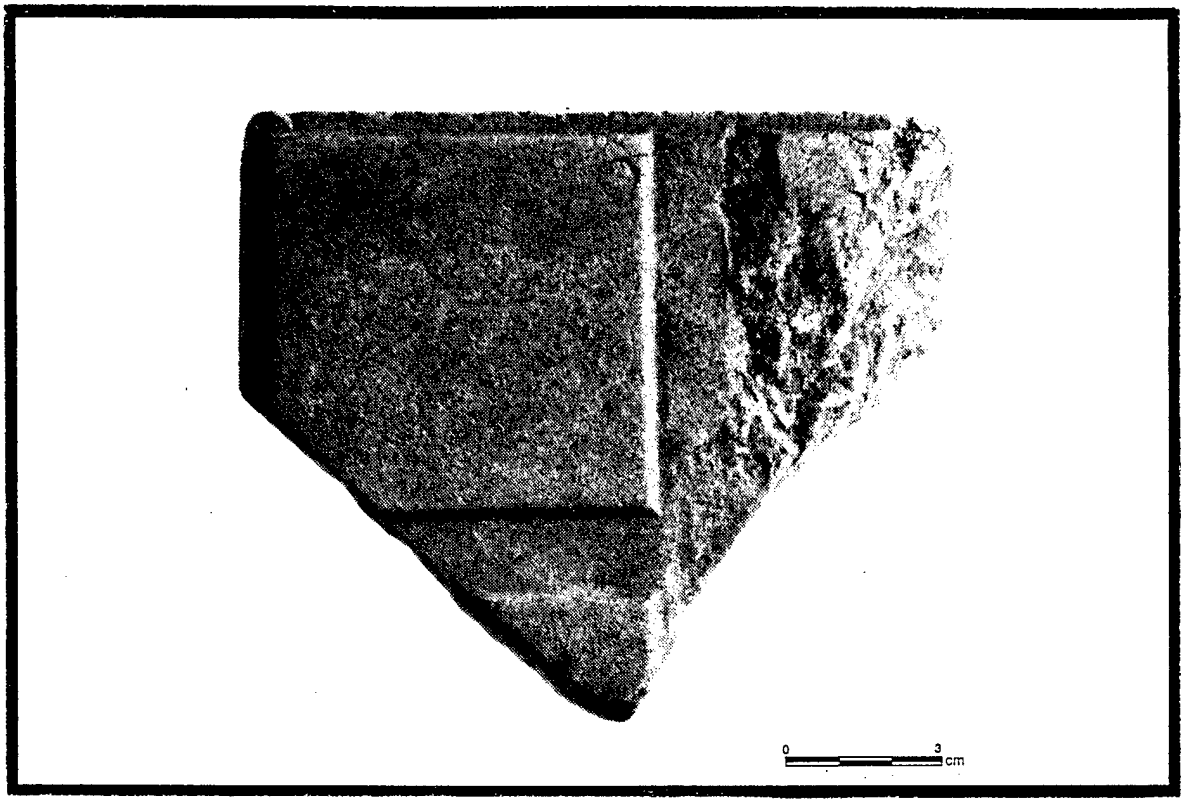


Figure 105. Light brown flat square tile with raised quadrants from 16PL49.

Most of the flat specimens possess some type of maker's mark impressed on the underside. These range from an elaborate heart shaped motif to an impressed dot or "C" (Table 7). Several tiles bear portions of "Marseilles" and "Salerne."

Table 7. Trade Marks on Clay Tiles.

Flat
H. DAUPHIN/VAR/SALERNE - 2
Pre. MAURE../A AUBAGNE - 2
MARSEILLES/St HENRY - 2
IM - 2
C - 1
Impressed dot - 1
Impressed "C" - 1
Impressed heart - 2
Impressed cross - 1

Curved
St HENRY MARSEILLES - 1
MARSEILLES (Portions) - 4
St MARTIN - 2
St ANDR... - 1
...RVIN Cie. - 1

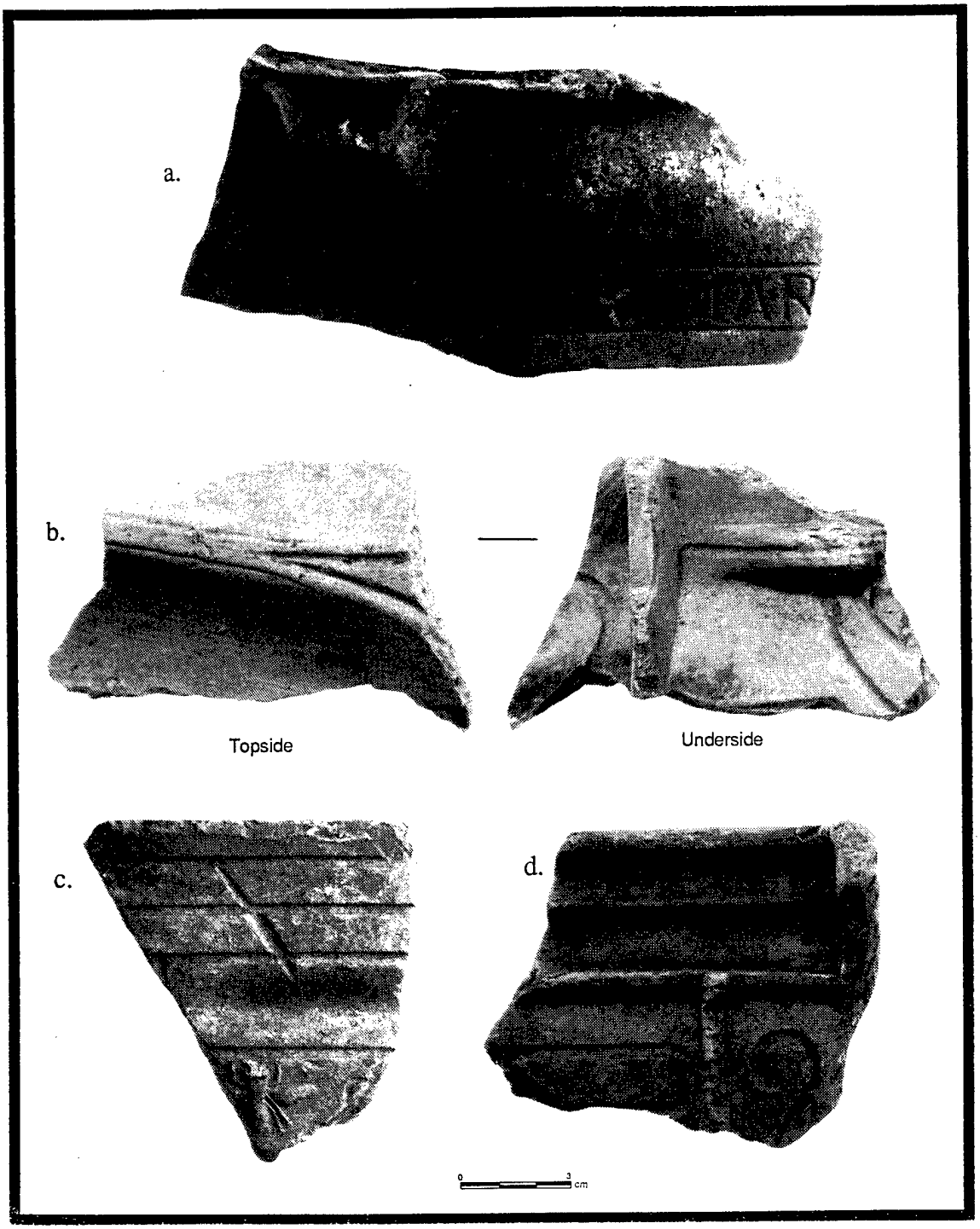


Figure 106. Selected tiles from 16PL49.
a. red curved tile with trademark; b. red curved tile, both sides decorated; c. red curved tile with bee trademark; d. red curved exterior clay tile.

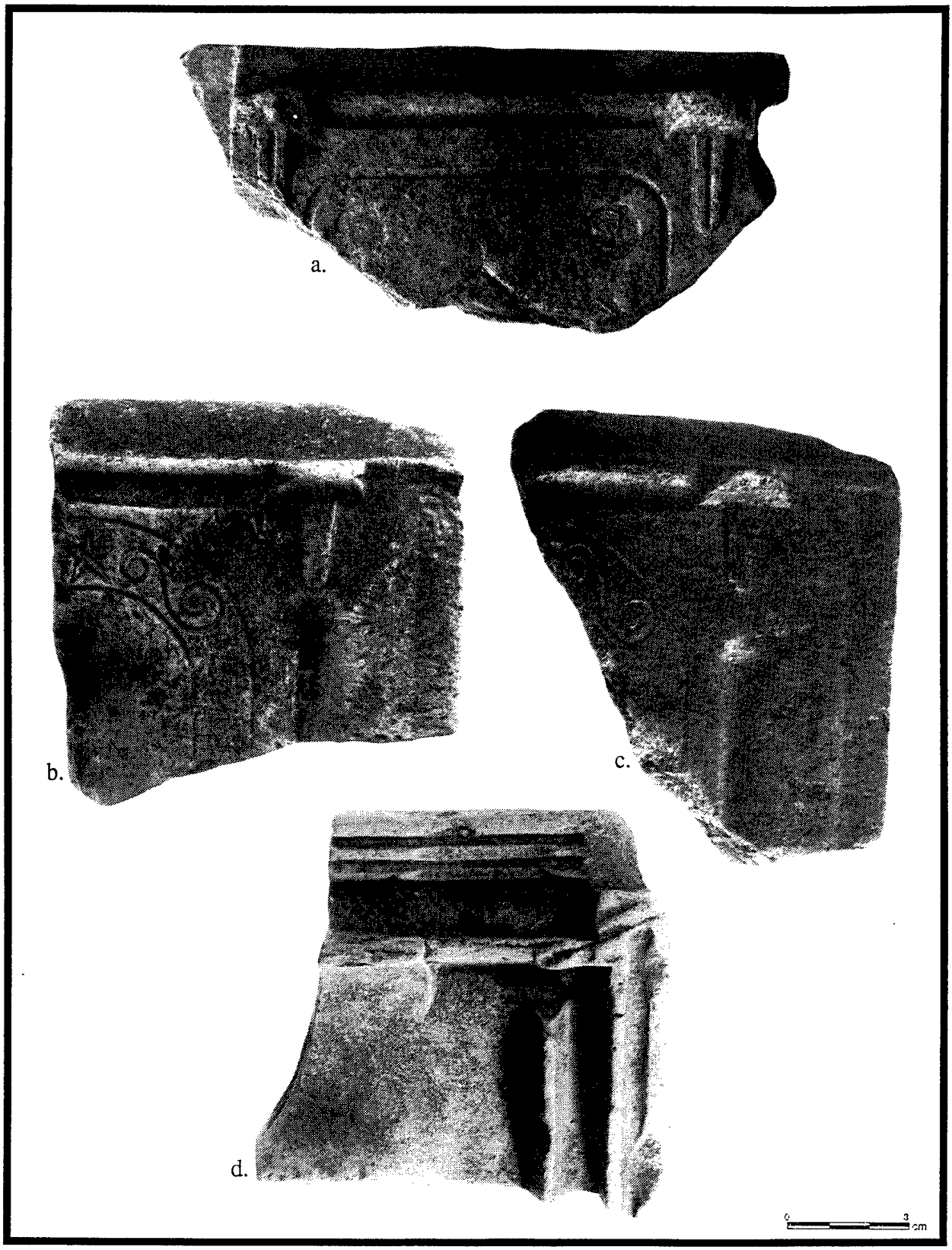


Figure 107. Curved tiles resembling oven doors from 16PL49. a.-c. exterior; d. interior.

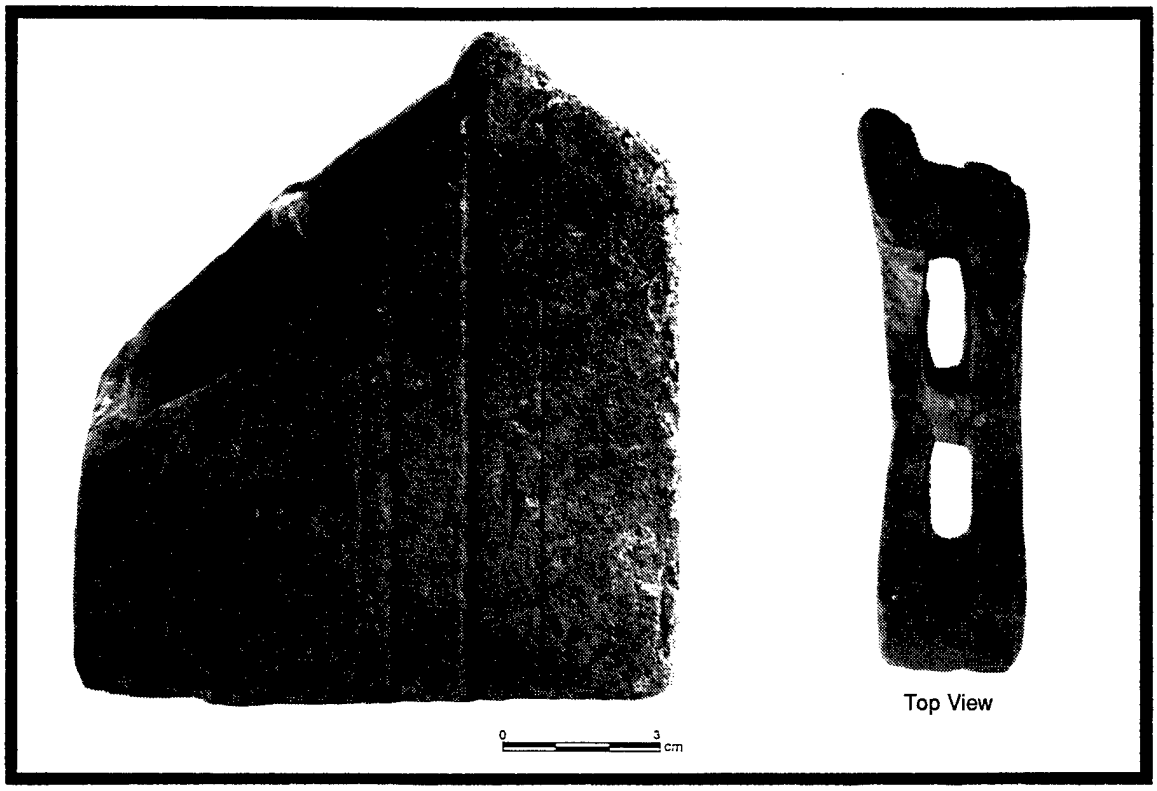


Figure 108. Red flat hollow tile from 16PL49.

The shape of the curved tiles are quite complex and most are ornately incised on at least one side; a few were decorated on both sides (refer to Figures 106 and 107). Many resemble portions of clay wood stoves that were very popular in France, having the shape of oven doors with impressed renditions of hinges. Several curved fragments have an impressed honey bee (Figure 106c), the symbol of Napoleon which was later adopted by his nephew, Napoleon III (*Lewis and Darley 1986:53*).

The words "Marseilles," "St. Martin," and "St. Henry" are also common. It is quite interesting, however, that Marseilles had 16 porcelain and pottery factories at the end of the eighteenth century, but these did not use marks (*Chaffers 1946*).

It is evident from the trade names that these tile were produced in France. However, their exact age and association with the site is still uncertain. They represent many styles and shapes, but no plain corrugated roofing tile were found. Also, no mortar or adhesive could be identified on any of the tiles recovered. Thus, it would appear that the tiles were never actually used for architectural purposes. More discussion of this issue will follow.

Miscellaneous: A total of 86 items of sundry materials were lumped into this category. These include artifacts that are probably associated with the occupation, such as levee rock, coal fragments, and recent flotsam and jetsam.

The most notable artifacts in this category are the levee rock that was very common along the shoreline. The surface collection includes nodules of chert or flint, mica schist, granite, diorite, alkaline feldspar, compact limestone, talc schist, gneiss, and marble. All of these rock types are common to both Europe and America.

Discussion

The investigations at 16PL49, Port Eads East, produced evidence of 10 structures at the site. Subsurface remains were identified at Features 4 and 5; however, these appear to features associated with dredging episodes and the artifacts are believed to be secondarily deposited. Four of the structural features (Feature 2, 3, 11, and 12) are probably remains dating to the late nineteenth/early twentieth century occupation. The features at the south end of the site (Features 7, 8, and 9) appear to have been part of a small docking facility constructed in the 1950s. Feature 6, located within this same area, could have been part of the nineteenth century dock and shops. Similarly, Feature 10 may have been a structural support for some building in early Port Eads. At this point, the age of Features 1, 6, and 10 is uncertain.

The relationship of the eighteenth century remains to the site has still not been determined with confidence. These materials, largely consisting of ceramics vessel fragments, were only recovered from surface contexts along the shoreline. Their association with the other ballast material may be a sign that the eighteenth century artifacts also have a similar origin. It is entirely possible that an eighteenth century occupation existed, but no evidence beyond the ceramics supports this. Several points argue for the vessel fragments having been ballast.

First, as Weinstein (*1984*) has argued, if an eighteenth century settlement did take place, it would likely have been a small one occupied by trappers and/or fishermen. Assuming this to have been true, one would not expect much variety in the types of ceramics and would, for the most part, expect them to be very utilitarian. Second, ceramics are the only eighteenth century artifact. If a post of some sort existed, other types of remains would be present. Third, there is no mention anywhere of an earlier settlement. The establishment of Port Eads was well documented. If an earlier settlement was known or evidence of it was left behind on the ground, some of this information would have surely been included in the historical record of Port Eads.

Fourth, the sherd fragments cannot be considered in isolation—there are also the ceramic tiles. Tiles were produced at porcelain and pottery factories. Among the tiles found at Port Eads were those decorated with a bee, which may indicate its manufacture during the Napoleonic era (1799-1815). Since the tile fragments found at Port Eads do not seem to have gluing material attached to the backs, this indicates two things: (a) they were never used; and (b) accordingly, they were most likely discards or rejects from French factories near the Port of Marseilles, where they were used as ballast in French ships bound for New Orleans in the nineteenth century. Later in the century, ballast that had been deposited on the shores of the canal was used to construct the sea wall and reinforce the shoreline.

It does not require a great leap of confidence to suggest that the tiles and eighteenth century ceramics were retrieved together from discard piles at various pottery factories. Unless any additional information comes to light and can shed doubt on this interpretation, we remain inclined toward the conclusion that the eighteenth century remains at Port Eads East represent ballast, not an earlier settlement.

Clearly the zenith of Port Eads was during the late nineteenth and early twentieth centuries when construction of the jetties promoted the development of the port town. As a result of this endeavor and its successful completion, the small community at the southern end of Louisiana was instrumental in the spiraling of the New Orleans economy. Some of the structural remains identified on this project seem to correspond to early documentation of the layout of Port Eads East. Most, however, are ruined remnants, but intact deposits may exist elsewhere at the site.

A comparison of maps and aerials indicates that about half of the inhabited area of the site has been severely impacted by shoreline erosion and the rest of the site is in eminent danger from this threat. However, as noted, the inland areas are protected by 30-70cm of recent alluvium.

16PL62—Lighthouse and Port Eads West

Documented settlement of this site begins about 40 years earlier than 16PL49 with the construction of the first South Pass Lighthouse in 1831. This lighthouse was replaced twice, once in 1848 and again in 1881. Settlement waxed and waned over the ensuing years. In its heyday in the late nineteenth and early twentieth centuries, this settlement contained dozens of habitations extending almost half a mile along the west bank of the pass. Then as now the splendid iron girdered lighthouse was the dominant presence both on the landscape and in the memory of those who have visited the site.

Previous Research

Excepting references in the literature to Port Eads West, the first research relating to this site was conducted in 1983, when the South Pass Lighthouse (16PL62) and nominal acreage was nominated to the NRHP by the Eighth Coast Guard District authorities. This effort focused primarily upon a literature search specifically concerning the lighthouse. Weinstein (*1984*) revisited the site during CEI's survey of South Pass. He noted that the site number originally referred only to the lighthouse, but the site description was expanded to include the entire occupation area on the west bank of the river.

At the time of Weinstein's (*1984*) visit, the site consisted of the 1881 lighthouse, two camps, a few sheds, and a trailer. Weinstein's attempt to relocate the 1848 lighthouse was unproductive due to the overgrowth. Weinstein (*1984*) reported the site to measure 400m along the bank, extending back about 130 to 200m at its widest point. The artifact collection was meager, consisting of a brick, ceramic tile fragments, several bone fragments (cow), a piece of asbestos, shoe heel fragments, a couple of ceramics, and three pieces of glass.

Construction and Abandonment Sequence

An 1838 map is difficult to read due to the scale, but it does appear that the 1831 lighthouse is present on the spit at the mouth of the pass (refer to Figure 49). It is also shown on an 1874 map of the Delta of the Mississippi River from the U.S. Coast Survey, which is likewise hard to read because of the scale (refer to Figure 12).

Only the lighthouse appears at the mouth of South Pass on the 1875 Coast and Geodetic survey map of Port Eads West (refer to Figure 50). On an 1875 plat map, the lighthouse is labeled as is Port Eads, but only on the west bank. The map reads "Lot on Section 50 reserved for Light House purposes. Executive Order dated January 3, 1876" (refer to Figure 51). A cluster of dots in Sections 50 and 51 adjacent to the area labeled "Eads Port" may represent structures, but they are not to scale and the arrangement is unstructured. The 1875 Corps map of the proposed jetties shows no structures at all.

The June 9, 1876 map shows the lighthouse, four small structures located west of the lighthouse, and a boardwalk and dock. Also shown, about 2000 feet south of the lighthouse, is a small rectangular structure identified as a slaughterhouse.

The September 20, 1876 map prepared by the Corps of Engineers shows the lighthouse, a dock and pier extending into the river, and three small structures adjacent to and west of the lighthouse. Not shown is the slaughterhouse shown on the June 9 map from the same year.

The Corps report for November 18, 1876 shows only the lighthouse, without the four adjacent structures, the pier, and the dock. New to the map is another pier and dock located south of the lighthouse.

The January 19, 1877 Corps report relates information about a court settlement for James B. Eads and includes a map dated January 9, 1877. This map shows only the lighthouse, pier, boardwalk, and four small structures adjacent to and west of the lighthouse.

The sixth report, dated March 16, 1877, contains a map dated April 15, 1877. This map is identical to the January 9, 1877 map.

The July 24, 1877 map shows the lighthouse and a boardwalk leading to a dock on the bank of the river (refer to Figure 53). In addition, two docks are shown as are 16 structures including four small ones just west of the lighthouse, two small ones adjacent to and south of the lighthouse dock, and 10 structures lined along the bank south of the lighthouse. The December 1877 map and May 1878 map show no changes.

On a June 1879 comparative map, the lighthouse, boardwalk, dock, and 17 structures are shown (refer to Figure 54). Most of the buildings are in the same locations and have the same configuration as shown on the 1877 map, but several additional structures appear on the comparative

map, indicating new construction. Other buildings shown on the earlier map disappear on the 1879 version, perhaps indicating these were demolished.

Appearing for the first time are two large, rectangular structures located on the river north of the lighthouse dock. These are identified as the lighthouse warehouse on the map. Another new structure is rectangular in plan, oriented east-west, paralleling the lighthouse boardwalk. Disappearing from the map are two small structures near the lighthouse, one west of the beacon and the other near the river.

The two small docks and cluster of structures at the south end of the site appear the same on both maps, but on the 1879 comparative map, the structures are, for the first time, identified as "boarding houses."

A second Corps map dating to 1879 is entitled "Chart of the Mouth of South Pass," surveyed by U.S. Engineers in July of that year. This map shows Port Eads West with only one change from the June 1879 comparative map. One of the small structures west of the lighthouse that appears on the 1877 map, but was not present on the June 1879 map, reappears on the July map (Figure 109). Rather than having been demolished, the structure was apparently omitted by error on the earlier map.

On the 1880 Corps map, the long rectangular structure paralleling the lighthouse boardwalk (immediately south of the boardwalk) disappears (refer to Figure 55). The sequence of maps indicate that this rather large structure was erected after 1877 and had been demolished by 1880, but after July 1879. None of the maps indicate its function. On the 1880 map, all labeling of the structures at Port Eads West disappears, except for the lighthouse. Remaining the same are the lighthouse, boardwalk, dock, the two docks to the south, the four structures west of the lighthouse, the boarding houses, and lighthouse wharf. In addition to the lighthouse, boardwalk, dock, and two other docks, 16 structures are shown.

The annual report for 1880 notes that a new slaughterhouse, 30ft long and 25ft wide, was built on the west shore opposite East Point. This structure does not appear on the map accompanying the 1880 report, but it is of interest that its location corresponds precisely with that of the slaughterhouse that appeared on the map accompanying the third report, dated June 9, 1876. Apparently, after 1876 the engineers didn't deem the slaughterhouse worthy of presenting on the map, even though it probably continued in use.

On the 1881 Corps map, everything remains the same as 1880 except for the fact that the boarding houses are once again labeled and the small structure and adjacent dock at the south end of the site disappear (refer to Figure 57). This structure and dock appeared on every map previous to 1881.

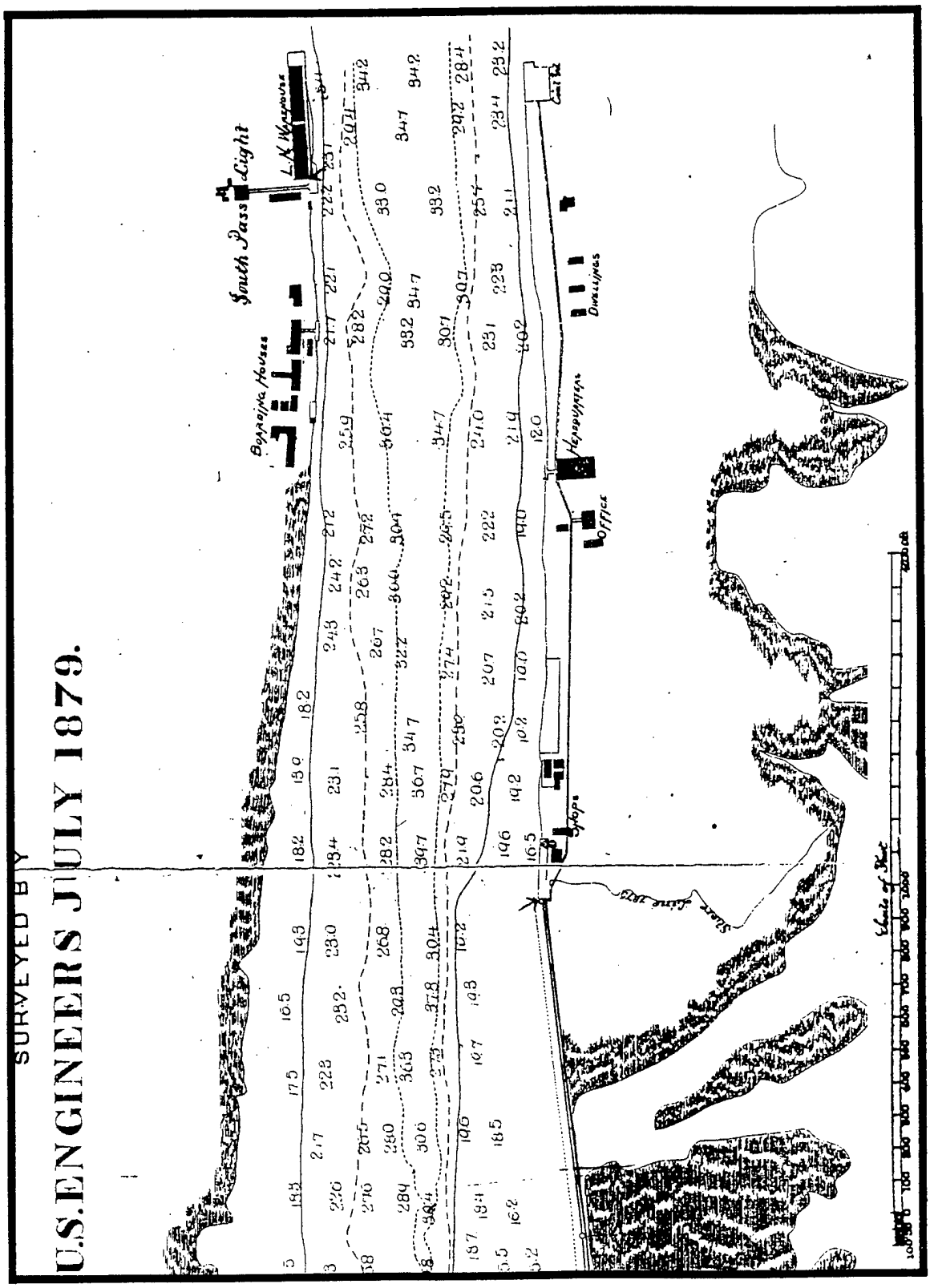


Figure 109. July 1879 Chart of the mouth of South Pass.

The 1882 map marks the first appearance of the lighthouse in its new location closer to the river and south of the old lighthouse boardwalk and dock (refer to Figure 58). The dock is modified to lead to the lighthouse. The four structures west of the lighthouse disappear, as does the one small structure adjacent to and south of the lighthouse dock. A new structure appears at the end of a new section of boardwalk leading north from the lighthouse. Between the boarding houses and lighthouse, two new rectangular structures appear. The dock and small structure along the river bank to the south (east of the boarding houses) disappear. The southernmost structure, previously shown as two separate structures, appears as a single building. In sum, the map shows the lighthouse, boardwalk, and dock plus 12 structures. Finally, this map is the first that shows the lighthouse as circular rather than as a square platform with circular light in the center.

The 1883, 1884, and 1885 Corps maps are essentially identical to the one produced in 1882. The 1886 map (refer to Figure 63) is also basically the same as the 1883 map except for the fact that one small structure on the river bank between the boarding houses and lighthouse disappears.

The map of 1887 shows no change of consequence at Port Eads West.

The 1888 map shows that several structures present in 1887 were no longer standing. All changes are at the southern end of Port Eads West. Two small structures disappear altogether, and westward projections of two other structures are deleted.

A map prepared by the Office of Surveyor General and dated October 24, 1889 shows the location of the old lighthouse and also shows the new lighthouse (refer to Figure 17). The new lighthouse, dock, and boardwalk are all shown. The warehouses are depicted as well. The lighthouse and warehouses are labeled "Occupied by Lighthouse Department." South of the lighthouse are six structures and a wharf labeled "Occupied by Eads & Co." Individual structures south of the lighthouse are labeled as to function. The majority are dwellings and tenements, with one boarding house shown and a store and market depicted in the location of the southernmost structure.

On the 1890 Corps map, the lighthouse, boardwalk, and dock are depicted, but as in 1888, fewer structures are present. The warehouses and rectangular structure at the end of the boardwalk that runs north from the lighthouse are the same. At the south end of the site, the group of structures consistently identified as boarding houses are reduced in number from nine to six, and the plan of one of the remaining structures is altered from a "T"-shape to that of a rectangle.

From 1888 through 1898 the maps accompanying the Annual Reports of the Chief of Engineers show no changes of consequence. Apparently during these years, stock maps were inserted into the reports with little new data from field survey incorporated onto them.

The 1893 East Delta quadrangle shows the lighthouse and four structures on the west bank. However, the scale is 1:62,500, which provides very poor detail (refer to Figure 67).

In the 1900 map of Port Eads West, substantial changes are shown for the first time in a decade (refer to Figure 68). To the north, the lighthouse, wharf, and structures on the wharf are unchanged, but the boardwalk to the lighthouse is shown in a different position. More dramatic, however, is the appearance of new structures. Whereas from 1888 to 1898, only six structures were shown south of the lighthouse, the 1900 map illustrates 13 rectangular structures, a dock, and a boardwalk. Five of these structures are in the same location as previously shown. One of the older structures does not appear on the 1900 map, indicating eight new buildings. All but one of the new structures are located to the south of any previous structures, and three of them are set well apart, being located about 1800ft from the lighthouse. Unfortunately, no details on the nature of these structures are presented in the annual reports.

The 1900 and 1901 maps for Port Eads West are essentially identical. However, in 1902, the three structures set well to the south of the lighthouse are no longer shown. Other details around the main concentration of structures are unchanged. There are no map changes for 1903, but although the 1904 map continues to show four boarding houses, one seems to have had its location shifted.

As noted in the discussion of Port Eads East, the 1904 map shows the structures numbered, with structures 22 to 30 on the west bank; however, the lighthouse, warehouses, and several other structures near the lighthouse are not numbered. Finally, there is a small T-shaped dock located approximately 1900ft south of structure 22.

By 1905, structures 23 and 30 had apparently been demolished, as they no longer appear on the map (refer to Figure 69). Also omitted is an unnumbered small structure at the west end of the lighthouse boardwalk. Other changes shown on the 1905 map include a long walkway proceeding to the west from one of the structures and another dock and long walkway located approximately 4500ft south of structure 22.

The map for 1906 was not located, but in 1907 some minor boardwalk changes appear. Two new structures appear near the dock and boardwalk located 4500ft south of structure 22. No longer shown is the small dock 1900ft south of structure 22. In 1907, structure 23 reappears. It is, however, in a different location than the earlier structure 23. Apparently a new structure was erected, and the structure number reassigned.

The 1908 map shows an additional very small structure 4600ft south of structure 22. Also, a walkway from structure 22 to the river was added. Not depicted is one of the boarding houses, structure 27.

The 1909 map does not show the community of Port Eads. The last map to do so in the Corps annual reports is the map of 1910. On that map, the boarding house cluster, structures 24 through 29, is shown, but with the structure locations somewhat different from those depicted in 1908 (refer to Figure 70).

A 1919 map entitled "Map of Lands in the Vicinity of Head of Passes" was prepared at a scale of one inch equals 60 chains. This shows no structures or other detail.

The 1922 Coast and Geodetic survey map shows the lighthouse and about 19 structures as well as boardwalks (refer to Figure 71). However, the scale is such that detail is difficult to discern.

The 1933 Coast and Geodetic survey map has a scale of 1:20,000. The detail is very poor, but it does show the lighthouse and approximately 22 structures (refer to Figure 72).

The 1935 South Pass quadrangle is at a scale of 1:31,680. It depicts the lighthouse and 18 structures, but not the warehouse or boardwalks; overall detail is poor.

A 1942 map of proposed land lease, prepared at a scale of one inch equals 400 feet, shows the lighthouse and boardwalk and the long structure that previously was labeled the warehouse (on this map it does not appear as two structures). In addition, this map shows 19 structures with a complex of boardwalks (refer to Figure 73). Five of the boardwalks run west to the shoreline in that direction. Also there is a boardwalk paralleling the shoreline providing access between 10 of the structures. In addition, this map shows the isolated structures, boardwalk, and dock south of Port Eads West that were also present on the 1910 map.

Adjacent to many of the boardwalks are small, darkened rectangles that may represent outhouses or other small structures, but there is no legend to indicate what they are. Similarities between the 1910 map, discussed above, and the 1942 map are depictions of the lighthouse, warehouse, two small structures (one northwest and one southeast of the lighthouse), and three of the boarding houses. All other structures are shown either in slightly different locations or in slightly different plans or orientations.

The overlay of 1896 and 1942 Corps map data previously presented as Figure 74 illustrates the extent of changes at Port Eads West. Although the warehouse is depicted in a similar though expanded area on the 1942 map, many former structures are no longer apparent and their locations appear to lie on the shoreline or within the river. Of note is that the location of the lighthouse varies in the two plottings. This is likely the result of two factors: the accuracy of early maps and the two point projection necessary to digitize the data.

The 1954 East Delta quadrangle, at a 1:62,500 scale, shows Port Eads and the pilot station, but there is no detail and no structures can be observed.

The 1959 East Delta quadrangle, produced at a scale of 1:62,500, provides little detail, but it does show the lighthouse and some structures. However, they are blurred together.

The 1971 South of South Pass quadrangle (1:24,000 scale) depicts the lighthouse along with a wharf and seven structures. Two of the structures are circular. There is also a boardwalk leading northwest across the roseau.

The aerial photographs previously depicted (Figures 75 through 78) depict the lighthouse and associated structures. On the 1973 aerial photograph, several of the larger structures have been destroyed. Three dolphins and a structure can be seen in a small cove (dolphins visible only through magnification). By the time the 1983 aerial was taken, fewer structures are apparent.

The photographs were useful in determining the origin of some structures, such as cisterns. Consequently, the data from aerial photographs is discussed in greater detail in the individual feature descriptions below.

Environment

There appear to have been some changes in the environment beyond those caused by the natural forces of nature on the land. Presently, roseau cane covers 90% of the site (Figure 110). However, Joe Yurt (*personal communication 1995*), a local informant, stated that it was only within the last 20 years that roseau cane has taken over the area. Before that time, most of the area away from the levee was covered with three-cornered-grass and duck potato.



Figure 110. Photograph of south end of 16PL62.

At this time there is very little natural dry land except for a narrow strip of natural levee that is discontinuous. This land is usually less than 10 feet wide and less than a foot above high tide. At high tide, 95% of the land is flooded, while only 10% to 15% of the land is above water at low tide. Several areas are over three feet deep in water, and a few alligator holes are present.

Landform Change: The 1951 aerial indicates that habitable land has been reduced by half with noticeable erosion along the pass shoreline to the south. The western shoreline, however, has increased somewhat. The habitation area is about the same on the 1973 aerial, but the majority of the land to the south has been inundated.

By 1983, the overall land mass has increased by one-third. The 1973 aerial reveals that roseau cane has covered cleared areas and is also growing along the jetty. 1992 aerials indicate some of the land to the south has been regained. During the time of our investigations, this area was covered in roseau cane and flooded most of the time.

In the lighthouse area, eight to 12 inches of water covers the land at high tide and the mud flat under the structures is exposed only at very low tide. There is also evidence of sedimentation at the site. For example, alluviation has covered the bottom two steps (20 inches total) of the lighthouse.

Research Objectives

As with 16PL49, the immediate requirements were to identify the extent of the site and to assess its current condition and NRHP eligibility. This site is similar to Port Eads East, except that standing structures are present and there are no eighteenth century remains. Research focused on identifying remains associated with the late nineteenth and early twentieth century occupations and providing an architectural evaluation of the standing structures.

Field Investigations

The field investigations of Port Eads West were organized like those at Port Eads East. Dense roseau cane covered 16PL62 and it was underwater most of the time, even at low tide. From atop the lighthouse, the only structural remains visible to the south were a metal water tank and a series of wooden survey platforms of recent age.

To identify structural features and to find areas of high ground for subsurface testing, an air boat was again used to clear transects at 50m intervals using the methods described previously. The site was mapped and any structural remains encountered were documented. The only high ground worth subsurface examination was associated with a *Rangia* shell beach in the southern portion of the site. Two test units were placed in this area.

Surface reconnaissance was hindered by the thick roseau cane, flooded conditions, and considerable sedimentation. The shell beach area was also the only locale with sufficient amounts of ground exposure for a surface collection.

Although the lighthouse is fairly well documented and has been nominated to the NRHP, it has not been listed and little was known about the other structures in the vicinity or their possible relationship to the lighthouse. As a result, an architectural evaluation of these structures was

necessary to determine their cultural significance. The evaluation consisted of documenting the main features of architecture, size, and construction, plus identifying the function and age, if possible. Each structure was also photographed.

Results

The field investigations resulted in the identification of 24 structural features, most of which were erected between 1950 and the 1970s and were ancillary to the operation of the lighthouse (Figures 111 and 112). Several of these structures were abandoned when the light became solar powered in the 1970s, and the light keeper's job was eliminated. Some deterioration to structures has resulted. The complex is presently owned by Plaquemines Parish and a portion is leased to the New Orleans Big Game Fishing Club.

The lighthouse itself and portions of the dock were found to be the only remaining features associated with the nineteenth and early twentieth century occupations. Two other buildings (Features 11 and 16) were probably built in the early 1940s, though they have been extensively remodeled over the years. A brick-silled concrete slab, Feature 14, is present in the location of the 1848 lighthouse. Whether this is a remnant of the old light or the remains of a later structure built over the spot is unknown.

Because all other areas were flooded, the subsurface investigations were restricted to the shell beach. Although historic artifacts were common on the beach, the two units placed on dry land behind the natural levee were both unproductive.

Test unit 1 was placed only a few meters behind the levee at one foot in elevation at low tide. The profile revealed a dark brown (10YR 3/3) fluid clay loam to 70cm at which point the unit began filling with water.

The stratigraphy of test unit 2, located 30m west of test unit 1, revealed a dark yellowish brown (10YR 4/4) recent alluvium of fluid silt loam to 40cm, underlaid by the original A horizon of dark grayish brown (2.5Y 3/2) fluid silt loam between 40 and 49cm. The basal level examined was a gray (10YR 4/1) fluid silt loam to a depth of 80cm where the unit began filling with water (Figure 113).

Structural Remains

Many of the features believed to be structural remains at Port Eads West are connected by a series of walkways. These walkways are referenced in the following feature descriptions. Photographs or sketch maps are included for appropriate features, and most are depicted on Figure 112.

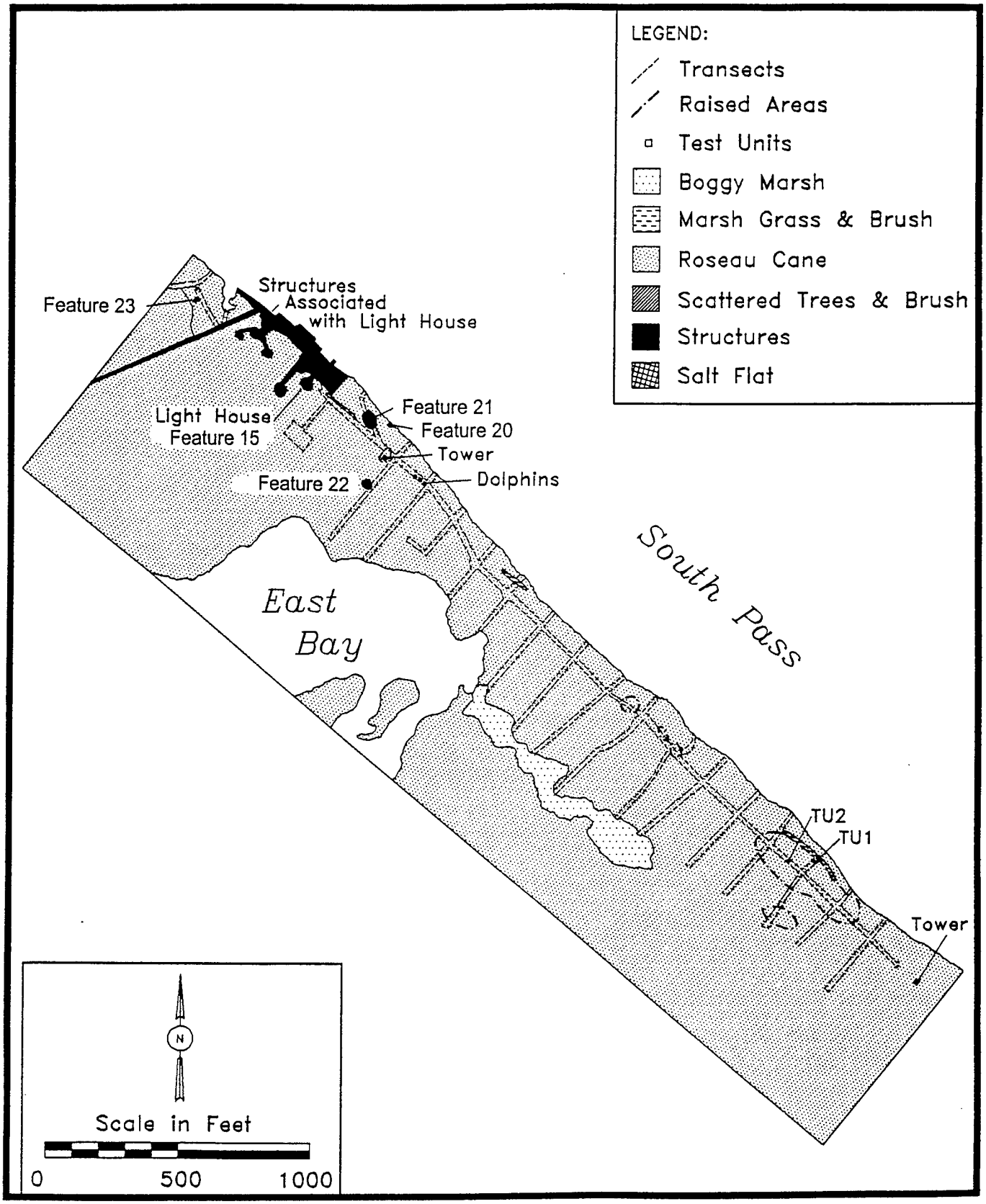


Figure 111. Site map, 16PL62.

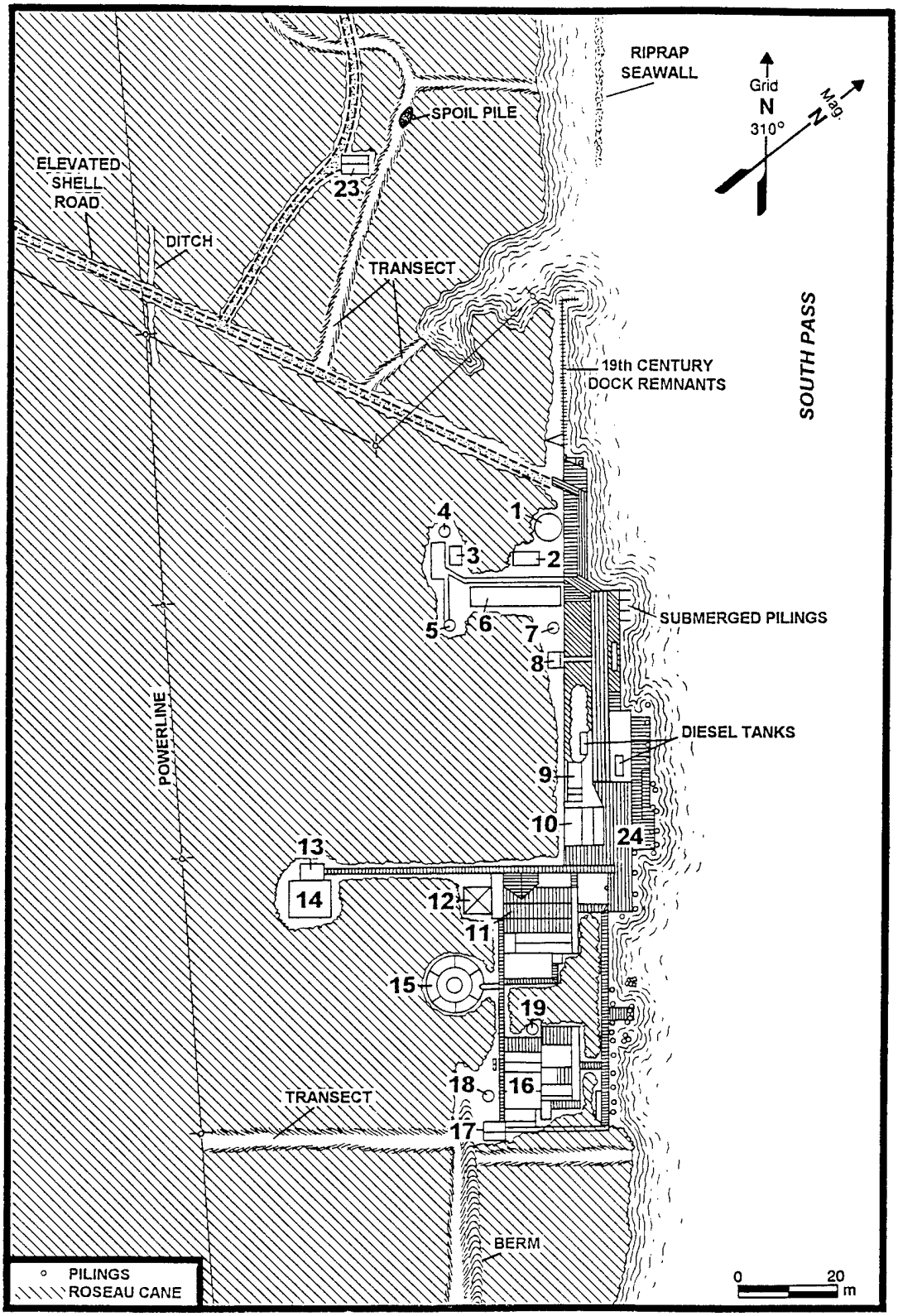


Figure 112. Detail of lighthouse and associated features at 16PL62, indicating structures by number.

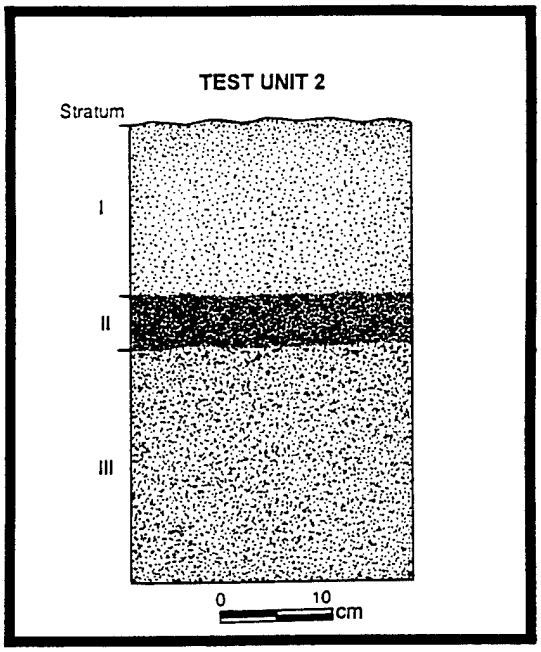


Figure 113. Profile of test unit 2 at 16PL62.

Feature 1 - Metal Water Tank: This feature (Figure 114) is the largest of four cylindrical tanks and cisterns which appear in association with the large warehouse that is present on the 1942 Proposed Lease map. It is a second generation structure, first appearing on a 1973 aerial, that replaced a smaller tank present on a 1951 aerial; it is not shown as being present in 1961.

It is one of several tanks which supply water to the lighthouse structures and the Port Eads Marina complex. It is 20 feet in diameter and 15 feet tall with an approximate capacity of 30,000 gallons. The main function is as a water storage tank. Overall construction is of riveted steel panels. The structure is in good condition and presently in use.

Feature 2 - Wooden Storage Shed: This medium-sized storage shed (20 feet by 12 feet) is associated with a mobile home (Feature 6) and deteriorating from lack of use and maintenance. It first appears on a 1973 aerial over the remains of the warehouse. Construction is wood frame with exterior plywood walls; the shed roof is of plywood sheets and rolled roofing. The post-1950 construction materials include round nails and trimmed lumber (2" x 4" or 1 1/2" x 3 1/2").

Feature 3 - Small Storage Shed: This post-1950 structure is located further west along the wooden walkway from the larger shed and appears on the same 1973 aerial. The shed is approximately 10 feet by 10 feet and is of similar construction and age as the large shed; it is also abandoned and deteriorating.



Figure 114. Photograph of Feature 1 at 16PL62.

Feature 4 - Metal Cistern: This cistern is similar in construction as Feature 1, but is somewhat smaller (10 feet in diameter and 12 feet tall) with an estimated capacity of 5,000 to 7,000 gallons; it has an open top to collect rainwater. Both this cistern and Feature 5 were associated with the large warehouse and first appear on a 1957 aerial. Feature 4 is in good condition and is apparently operable.

Feature 5 - Metal Cistern: This is also an open cistern of the same dimensions, age, and association as Feature 4 (Figure 115). As with Feature 4, it is in good condition and apparently operable.

Feature 6 - Mobile Home: This is a 12 feet by 60 feet trailer that is mounted on piers above the walkway. Construction and styling is typical of the 1960-1970 era with a corrugated metal skin and 1/1 louvered windows with decorative shutter trim. It first appears on the 1973 aerial, but has been abandoned for several years.



Figure 115. Photograph of Feature 5 at 16PL62.

Feature 7 - Metal Cistern: This is an open topped cistern of similar size and construction as Features 4 and 5. Like Feature 1, this may be a second generation construction because a cistern is identifiable in this location on the 1951 aerial, but does not appear again until the 1973 aerial. The structure appears in good condition and is probably still in use.

Feature 8 - Pumphouse: This small eight feet by 10 feet shed houses a water pump which transfers water from the storage tanks to the lighthouse and marina complexes. It first appears on the 1973 aerial in association with the initial construction of the Port Eads Marina complex. The construction is wood frame with a gabled asphalt-shingled roof and walls of grooved plywood siding. Round nails were used as fasteners and the roof joists are of trimmed lumber (1 1/2" x 5 1/2"). Feature 8 appears to have been built in the 1960s or 1970s and is still in use today.

Feature 9 - Generator Shed: This eight feet by 22 feet open fronted shed is attached to the north end of the Baithouse (Feature 10). It is first present on the 1986 aerial. Construction is of

wood frame with a gabled asphalt-shingled roof and grooved plywood siding on the rear. Two diesel powered 10kw generators are housed within the structure which is in use today. Two portable metal 1,000 gallon tanks, located nearby, hold the fuel supply.

Feature 10 - Baithouse: Now functioning as a tallyhouse and weigh station for the New Orleans Big Game Fishing Club, this half screened structure is first depicted on the 1983 aerial. The structure is of recent construction and covered by a gabled asphalt-shingled roof (Figure 116). Only the front or east wall is covered with plywood sheeting, while the other three sides have a screen on the upper portion and plywood sheeting below. Along the interior perimeter are gear stowage or bait boxes.

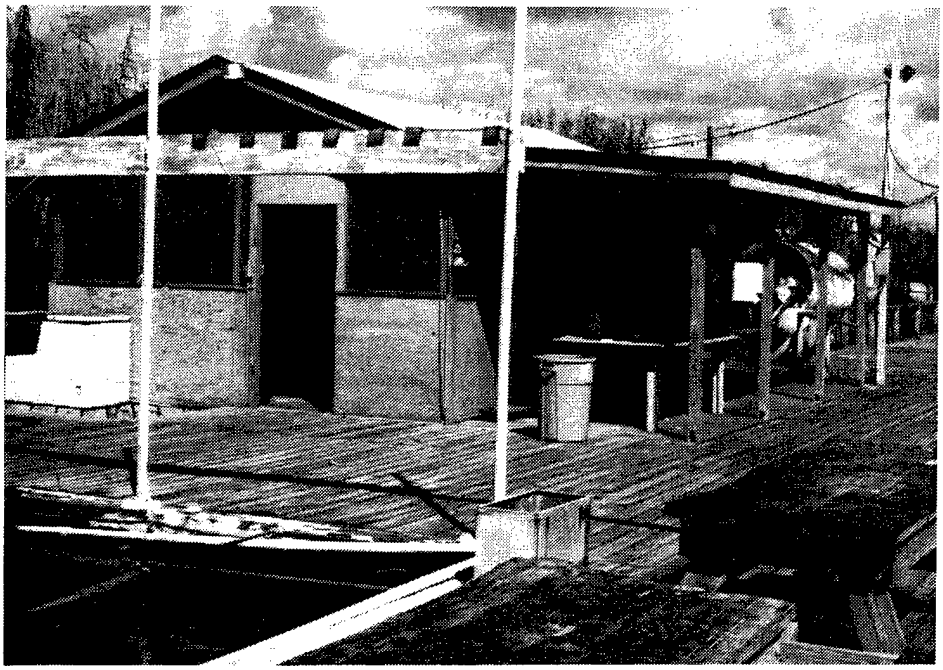


Figure 116. Photograph of Feature 10 at 16PL62.

Feature 11 - Light Keepers residence: According to Joe Yurt, this 40 feet by 60 feet building, oriented at 220°, was constructed during World War II. The building has undergone many improvements over the years and is now headquarters for New Orleans Big Game Fishing Club (Figure 117). It is estimated to be 25 feet by 60 feet on the 1942 survey map of the area. Until 1973, the structure remained basically the same shape, but by the time the 1973 aerial was shot, side and rear additions had been completed. Construction is wood frame with double gabled asphalt-shingled roof with an additional seven feet shed type front porch and 10 feet gabled rear addition on the north side (Figure 118). Other features include ship lap siding and double hung 6/6 windows. An eight feet by 50 feet shed addition is present on the south side with 2/2 aluminum double hung windows and asphalt shingles. Round nails and only under cut (1 1/2" x 3 1/2") lumber were used as building materials during a post-1950s period of modification. Structurally, this building is in very good shape.

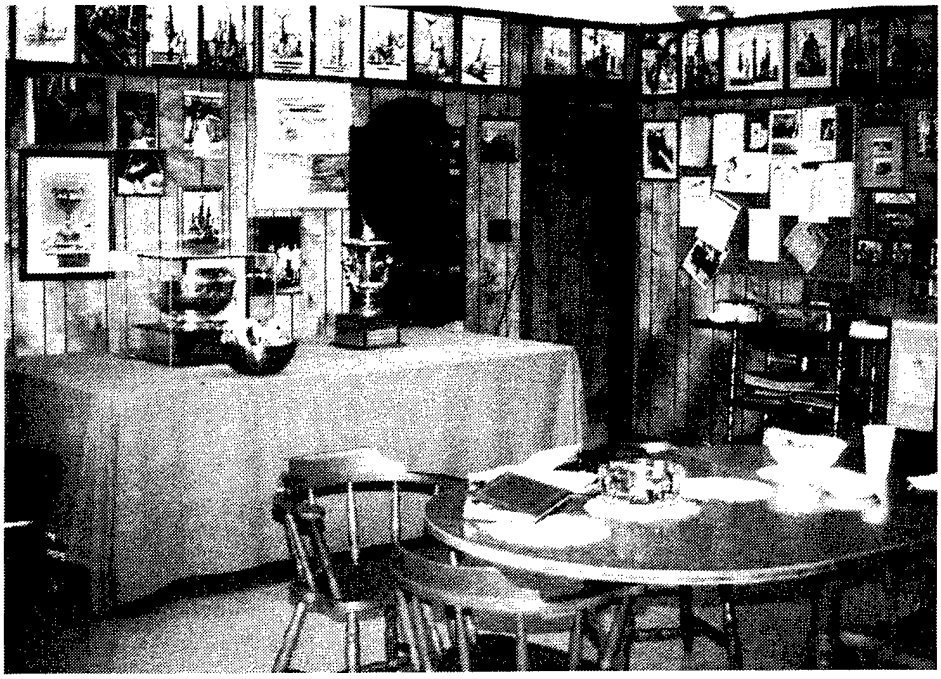


Figure 117. Photograph of the interior of Feature 11 at 16PL62.

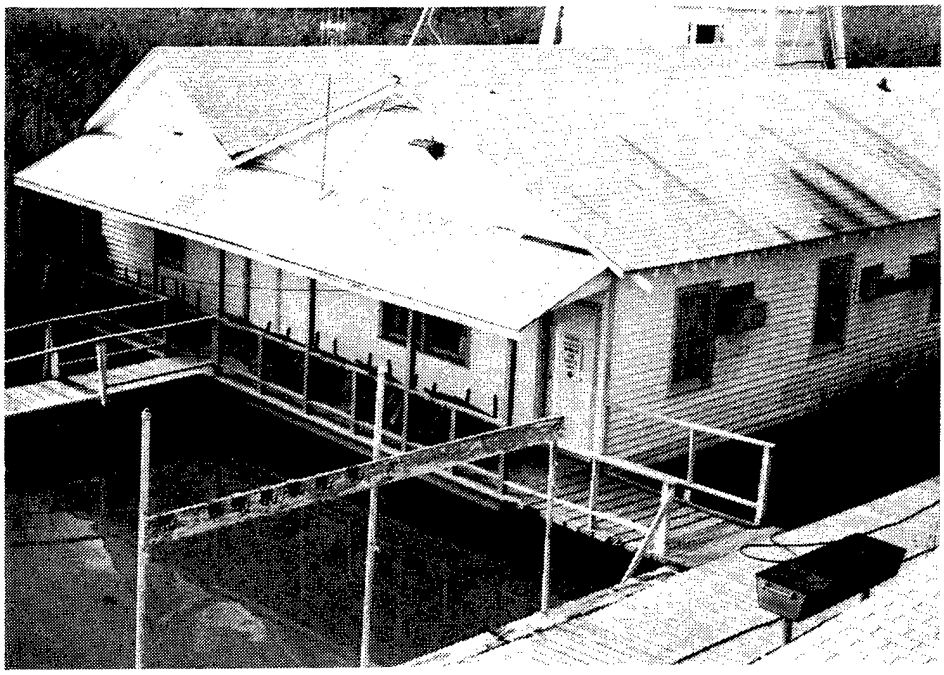


Figure 118. Photograph of the exterior of Feature 11 at 16PL62.

Feature 12 - Food Storage Building: This structure is of recent construction, first appearing on the 1986 aerial. The plan is square in shape (15 feet by 15 feet) and oriented at 220°. The main features include a hipped roof with asphalt shingles, plywood walls and one 2/2 double hung aluminum window. It is presently used to store dry goods, but may have had other functions in the past.

Feature 13 - Guest House: Located at the end of a 100 feet walkway west of Feature 11, this small, 18 feet by 12 feet building has a three feet by eight feet rear shed addition. It is first evident on the 1973 aerial, probably as a replacement to Feature 14 which is shown as demolished in the same photo. The architectural style and construction is typical of the 1960s. Architectural features include a gabled asphalt-shingled roof with grooved plywood siding and a structural orientation of 220°. The interior is plywood (5/32") paneled with 12-inch textured fiberboard tile ceiling. There is one 1/1 double hung window in the rear and a bath in the rear addition. The structure is in fair condition, but has been in disuse for several years and is now deteriorating.

Feature 14 - Concrete Slab with Brick Sill: This slab is deteriorating and appears much older than most structural features in area (Figure 119). A structure is present on the 1942 map and the 1951 and 1961 aerials, but had been demolished by the 1973 photo. According to the 1879 map, the old 1848 lighthouse was located in the exact spot as this feature. The remaining slab is 24 feet by 24 feet. The slab is bordered with a double width brick sill of bricks measuring 8" x 4" x 2" (Figure 120). It is one foot above present ground surface, oriented at 220°, and still in good condition except for the southwest corner which is settling.



Figure 119. Photograph of Feature 14 at 16PL62.



Figure 120. Close-up view of Feature 14 at 16PL62.

Feature 15 - Lighthouse: This impressive structure is 50 feet in diameter and about 120 feet in total height (Figures 121 and 122). Basics on this structure are provided on the NRHP form. It is supported by a central column and eight exterior tubular columns 12" in diameter. A stairway to the top spirals around the central column. The skin, stairway, and all major parts are made of iron. The only wood construction is the interior of the stairway and the second story floor. The lighthouse was elevated 10 feet above ground when it was built, but due to subsidence the bottom two steps are covered with alluvium (20" total). According to Joe Yurt, the lighthouse was renovated two years ago. Refurbishments included a paint job, new wooden floor, and maintenance.

The wood of the stairwell is 4" vertical slats and may be original. The new second story floor has 5¼" diameter wood flooring and the joists are 1½" by 7½" with a newly painted underside. The lighthouse is structurally sound and in very good condition.

The lighthouse tower is an example of a screw pile, metal frame lighthouse, a type first used in Great Britain in 1838. This type of structure reflects efforts in the nineteenth century to design lighthouses that could be easily and economically erected along sandy coastlines and remain capable of withstanding violent storms.

Broadly speaking, all lighthouses can be divided into two categories—those on land and those at sea that have been placed on rocks or sand spits, called wave washed lighthouses. It was difficult to provide a secure foundation for wave washed lighthouses where there was no rock surface on which to anchor them. Where the small inlet or sea floor was sand, some of the early eighteenth century lights had their foundations constructed inside caissons (walled chambers sunk

into the seabed from which water was pumped). The problem of placing a wave washed lighthouse on soft ground was solved by the British in 1838 when a "screw pile" metal frame tower was erected off the east coast of England on the underwater shoal known as "Haplin Sands."

The iron footings of the light tower were fitted with a metal flange screw, which by turning could be sunk more than twenty feet into the sand. A single metal member of such a tower would support up to sixty tons, with little likelihood of being dislodged by wave or current action, even in a violent storm. The greater number of pilings, the more weight that could be carried by the superstructure of the tower.



Figure 121. Photograph of Feature 15, the lighthouse, at 16PL62.

Skeletal towers were less expensive to construct, easier to maintain, and offered less surface exposure to the powerful storms and hurricanes that regularly threaten the Gulf Coast shoreline. The sandy coastline could still prove to be a problem in protecting the lighthouse from encroachment by the sea, even if it could withstand the assault of a hurricane, and a number of lights along the Atlantic and Gulf coasts have had to be abandoned or relocated. The lighthouse at 16PL62, however, is still in use today.

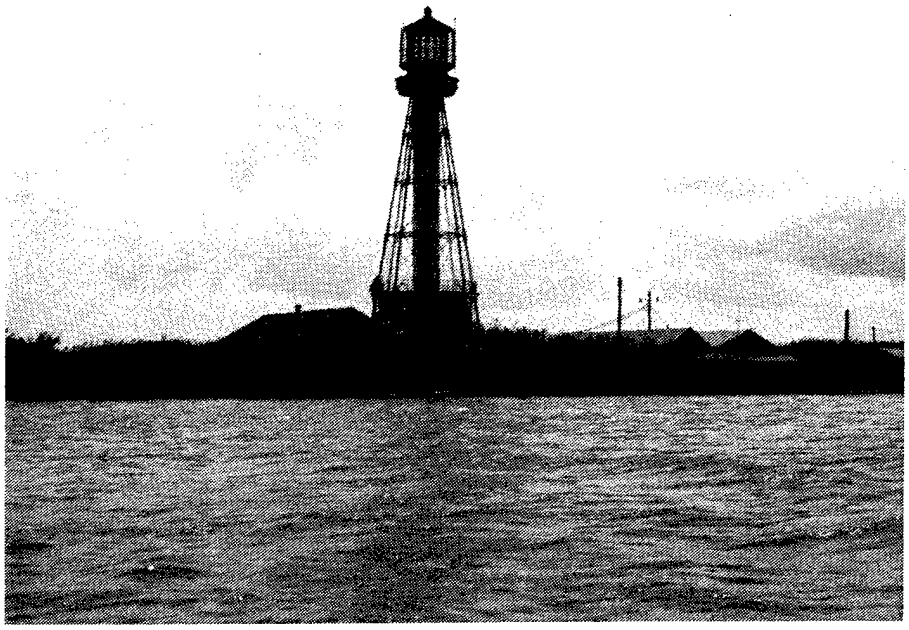


Figure 122. Lighthouse (Feature 15) and associated structures, 16PL62.

Feature 16 - Fishing Camp: This camp has had numerous additions, but it is possible that the northern portion of the structure is the building shown on the 1942 map in this location. If correct, it may have some association with Feature 11 and the operation of the lighthouse. On the 1942 map, the structure is T-shaped with overall dimensions of about 20 feet by 30 feet. Since that time, side and rear additions have been added, resulting in an east-west length of 45 feet and north-south extent of 50 feet. The building is presently owned by Plaquemines Parish and well maintained (Figure 123).

Feature 17 - Guest House: This structure is a 10 feet by 15 feet building with a gabled asphalt shingle roof and 6" ship lap siding; it is located southwest of Feature 16. The building is rather small with one room and no windows (Figure 124). This structure or one in the same location appears on the 1951 aerial and possibly the 1942 map. Feature 17 is in good condition and may be in use today as a periodic residence.

Feature 18 - Cistern: This is an open topped round cistern, located in the rear of Feature 16. It is eight feet in diameter and about 10 feet high. The tank is first detectable on the 1973 aerial. Its construction apparently dates from a post-1950s era.

Feature 19 - Water Tank: This closed top metal tank, adjacent to Feature 16, is present on the 1951 aerial. Like Feature 18, it measures eight feet in diameter and is 10 feet tall. Construction probably dates to the 1950s or late 1940s.



Figure 123. Photograph of Feature 16 at 16PL62.

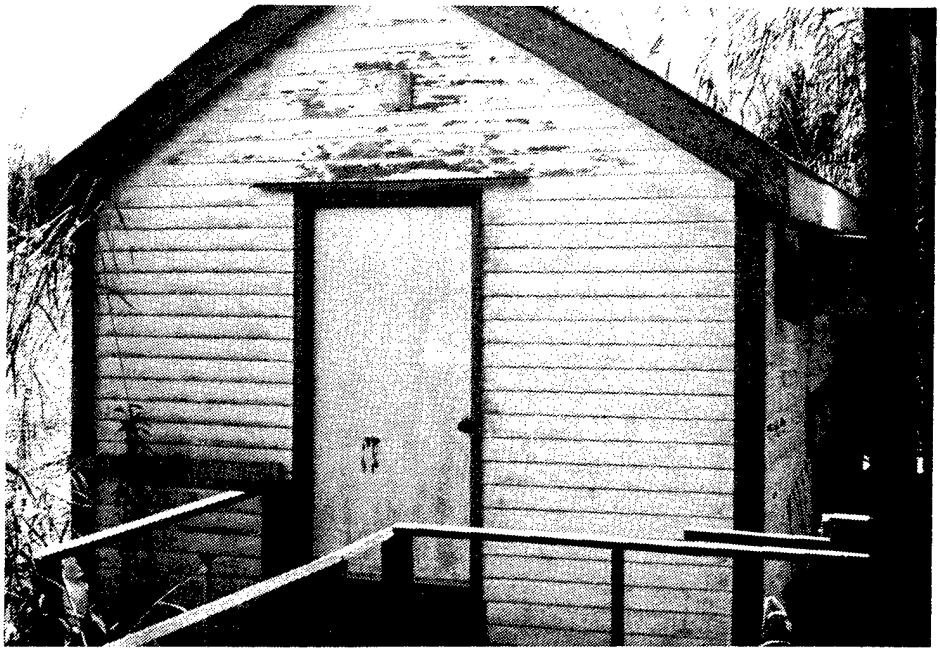


Figure 124. Photograph of Feature 17 at 16PL62.

Feature 20 - Water Tank: This tank is also eight feet in diameter and 10 feet tall with a closed top. This tank first appears on the 1973 aerial in association with Feature 21. It is still in good condition, but apparently unutilized. As with Feature 18, this water tank was probably constructed sometime after 1950.

Feature 21 - Remains of Fishing Camp: This is the ruins of a fishing camp located 80m downriver from the lighthouse. It appears on the 1973 aerial, but was partially in ruins in the 1986 aerial. The only remnants today are flotsam, including ship lap siding, fragments of a boat pier, a cast iron bathtub, and other domestic debris. All of the materials are of post-1940 vintage. The date of construction is likely between the 1960s and early 1970s.

Feature 22 - Collapsed Fishing Camp: These remains are from a small dwelling 40m west of a survey tower (see below) in thick roseau cane (Figure 125). It is first depicted on the 1973 aerial, still standing in 1986, and collapsed by 1992. Associated debris includes portions of 1½" by 7½" joists, window sills, plywood, and a small electric fan. Construction clearly dates to sometime after 1961 and before 1973.



Figure 125. Photograph of Feature 22 at 16PL62.

Feature 23 - Boat House: This 15 feet by 20 feet structure first appears on the 1973 aerial in association with initial Port Eads Marina construction (Figure 126). The open front faces north and the structure abuts an abandoned elevated road. Construction features include a gabled asphalt shingled roof and plywood siding; post-1950 construction materials are associated. Feature 23 is abandoned and in deteriorating condition.



Figure 126. Photograph of Feature 23 at 16PL62, lighthouse in background.

Feature 24 - Dock and Associated Walkways: These extend along the river's edge down the width of the inhabited area (about 120 feet). Wooden walkways branch out to the dwellings and ancillary structures (Figure 127). The wharf and walkways were originally part of the nineteenth century occupation, but have been repaired and remodeled many times. Some of the walkways are now in disuse or a state of deterioration. The wharf is constructed of creosoted lumber and pilings with one to two layers of 2" x 10" plank decking. It is mostly in good condition in the area of the two main dwellings (Features 11 and 16), but is in disrepair on the northern end. Recent repairs were made with pressure treated, rather than creosoted, lumber.

Judging by the types of nails and lumber used in the wharf, there are at least three episodes of repair or remodeling. Along the northern edge, square cut 10" spikes with rounded heads were used to fasten the decking. These nails could be from the original 1880s or pre-1900 construction. The northwest section is fastened with 8" galvanized square spikes of a later design, dating to the 1950s and before. Most of the other portions of the dock are fastened with 8" round galvanized spikes, indicating a still later date of repair.

Other Features in Area

Riprap Seawall: First present on the 1951 aerial, this is a line of piled angular boulders running north and south of the dock. These are mostly granite and are located 10 to 20m in the water from the present shoreline. At the time it was built, it was probably at the river bank, above water most of the time. Today, only small portions are exposed at lowest tide, and it is 10m or more from the present bank—more evidence of subsidence and bank erosion.

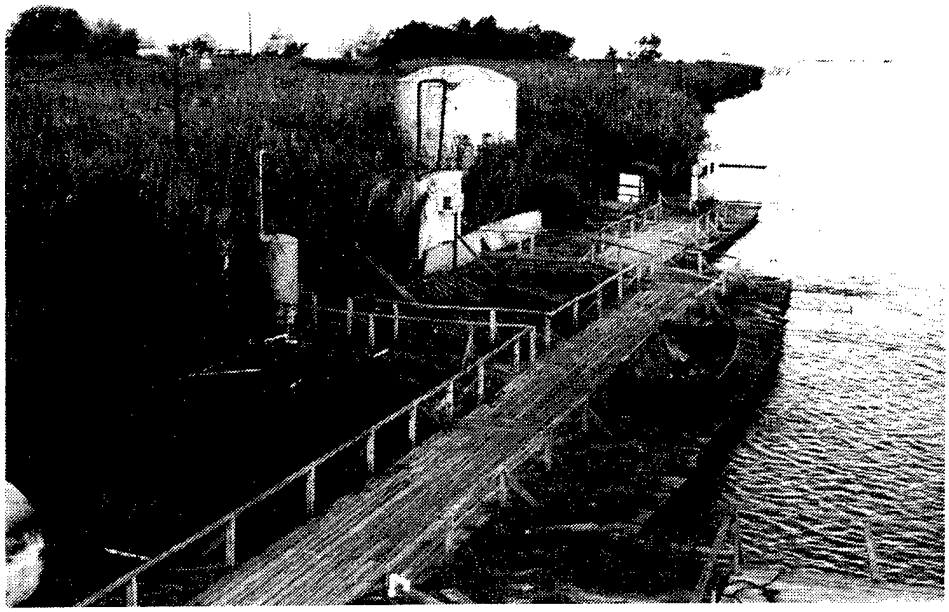


Figure 127. Photograph of Feature 24 at 16PL62.

Raised Earthen and Shell Roadways: This is an eight feet wide road, connecting the lighthouse to the Port Eads Marina and a series of fishing camps located one-quarter mile to the north on the south bank of a small pass out to East Bay. It is first present on the 1973 aerial. It was apparently constructed as a dike for containing dredged material pumped into the area sometime just prior to 1973. The main road, extending to the marina, is active and in good repair with a *Rangia* shell surface. An abandoned branch of this road, overgrown with bushes and roseau cane, extends to the north, past the boat shed (Feature 23) and toward the fishing camps to the north. Both roads are eight to 12 inches above high tide and have sedimented small ditches on either side.

Survey Towers: These are two of a series of wooden survey platforms spaced about one-half mile apart along the west side of the pass. These platforms, not visible until the 1973 aerial, are of creosote pilings and lumber and about 30 feet tall. Beneath each tower is a concrete survey marker.

Power Line: This simple power line extends south through the center of the site, roughly parallel with the shoreline 160m inland. The poles are about 100 feet apart. It is apparently operational and extends all the way to the old Coast Guard Station. One small isolated pole, possibly for a structure, is located 50m south of the northern survey tower. Although it may have been present earlier, the power line was not discernable until the 1973 aerial.

Dolphins: These are three heavy duty mooring pilings located south of the northern survey tower and aligned generally on a north-south grid, spaced six meters apart. They are constructed of one vertical and two angled support 18" pilings lashed together with 1" steel cable. Presently about

30m inland in thick roseau cane, they stand four feet tall and are visible in a small inlet next to a structure on the 1973 aerial.

Shell Beaches: Concentrations of *Rangia* shell along the natural levee were found in two areas (Figure 128). The northern shell beach is located east of the three dolphins about 200m south of the lighthouse. It may be associated with a structure that first appears on the 1973 aerial. Only recent flotsam and jetsam were observed in this area.



Figure 128. Photograph of *Rangia* beach at southern end of 16PL62.

The southern *Rangia* beach comprises the present shoreline which is 15m west of the sea wall. The 40 to 50m long beach is in thick roseau cane. It is in the same location as two structures on the 1942 map; however, these structures are no longer present on the 1951 aerial. The shell levee extends only five to six meters inland and forms a one-foot-high bank at high tide. A light to moderate surface scatter of 1930 to 1950 vintage domestic artifacts are associated. Two test units were placed nearby and the area was traversed, but no evidence of structural features or artifacts were found inland of the beach.

Cultural Remains

This collection (Table 8) is primarily comprised of artifacts found along the southern shell beach. A moderate density of mostly domestic materials was observed and a small diagnostic collection (n=11) was made. Also, a sample of loose spikes (n=4) were taken from the dock for analysis.

Table 8. Artifacts from 16PL62.

	Surface			TOTAL
	Shell Beach	Wharf North	Wharf Walkway	
GLASS				
Bottle - Whiskey, clear	1			1
Unidentified - clear	3			3
amber	3			3
green	1			1
cobalt	2			2
SUBTOTAL	**10**			**10**
METAL				
Spike - square var. 1		2		2
square var. 2			2	2
SUBTOTAL		**2**	**2**	**4**
BUILDING MATERIALS				
Tiles - Clay, decorated	1			1
SUBTOTAL	**1**			**1**
TOTAL	**11**	**2**	**2**	**15**

Glass: Most of the artifacts found on the shell beach were from glass bottles. This small collection of 10 items includes fragments of clear, amber, green, and cobalt blue bottles. The most notable of these are the marked bases of two unidentified amber bottles and a portion of a whiskey bottle. One of the amber bottle marks is an Owens-Illinois logo (Figure 129a) with a date mark equivalent to 1953 (*Toulouse 1971:403*). The other has an embossed crossed hammer and sword logo (Figure 129b), common about 1969 as the trade mark of the Veba Glas A. G. of Essen-Karnap in Germany (*Toulouse 1971:582*). This round bottle could have contained imported beer since this is the most popular German beverage in our country. The clear whiskey bottle fragment has "HAIG & HAIG/SCOTLAND" embossed (Figure 129c). No information concerning this firm could be located.

Metal: A total of four loose spikes were taken from the dock for analysis (Figure 130). Most of the dock was fairly new, being fastened with 6-8" round galvanized spikes. The four spikes collected represent two varieties of square spikes from older portions of the dock. Two of these, taken from older remnants north of Feature 1, are 8 1/2 " long, 7/16" square and appear to be wrought with a chisel point and rosette hammered rounded head. A spike of similar description is

advertised as a wrought boat spike in a 1876 hardware catalogue (*Knight and Leonard 1876:96 in Fontana 1965*). The second variety is a 6"-long, tapered machine cut galvanized spike taken from the walkway near Feature 3; the type is also illustrated in the 1876 catalogue, but the galvanizing leads us to believe it was manufactured later.

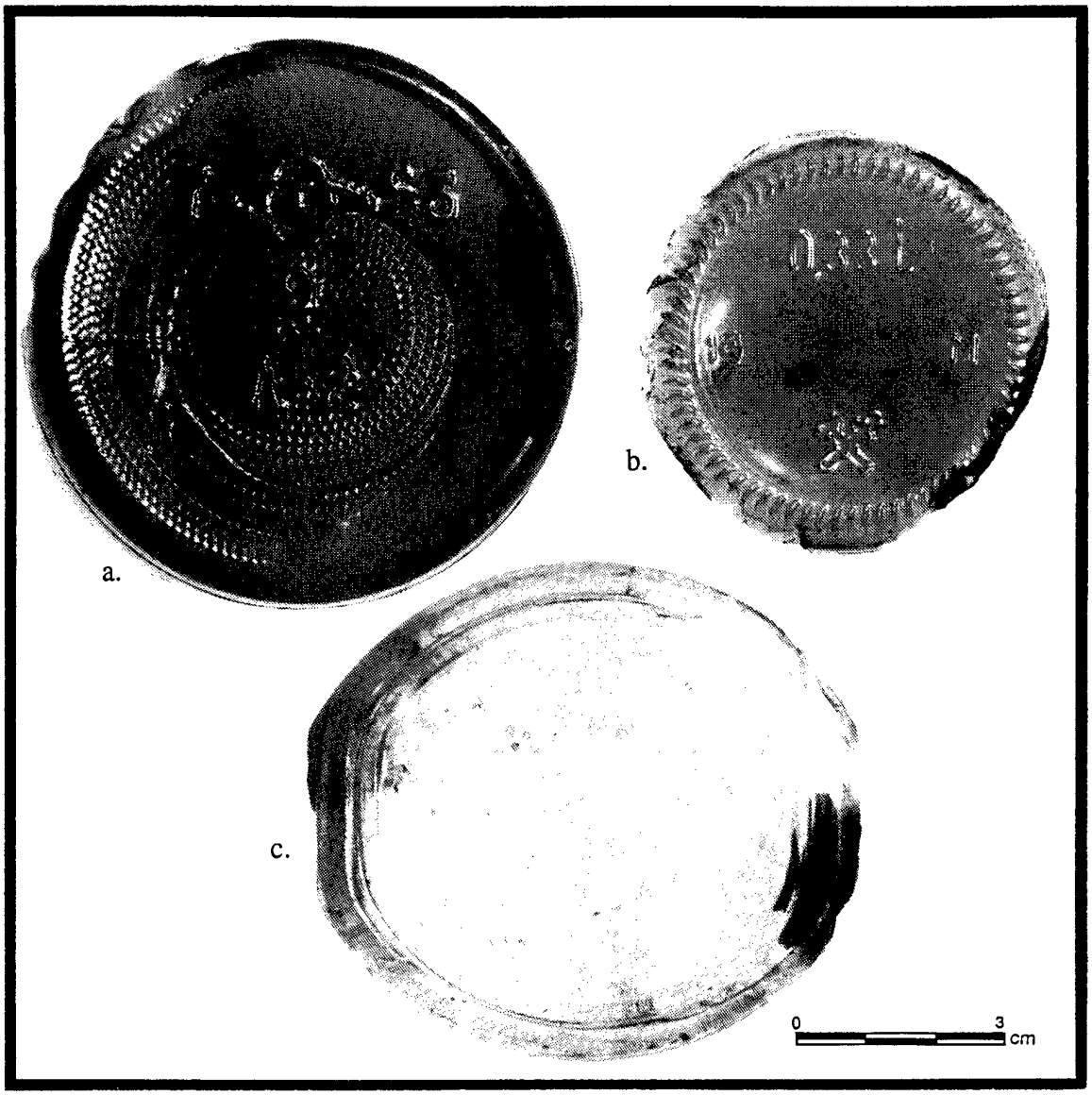


Figure 129. Bottle bases from 16PL62.
a.-b. amber bottle bases; c. whiskey bottle fragment.

Building Materials: One curved clay tile fragment, similar to those found on the east bank, was found on the *Rangia* beach. This fragment is incised with the number "16" which could represent batch numbers, product identification, or the year of production.

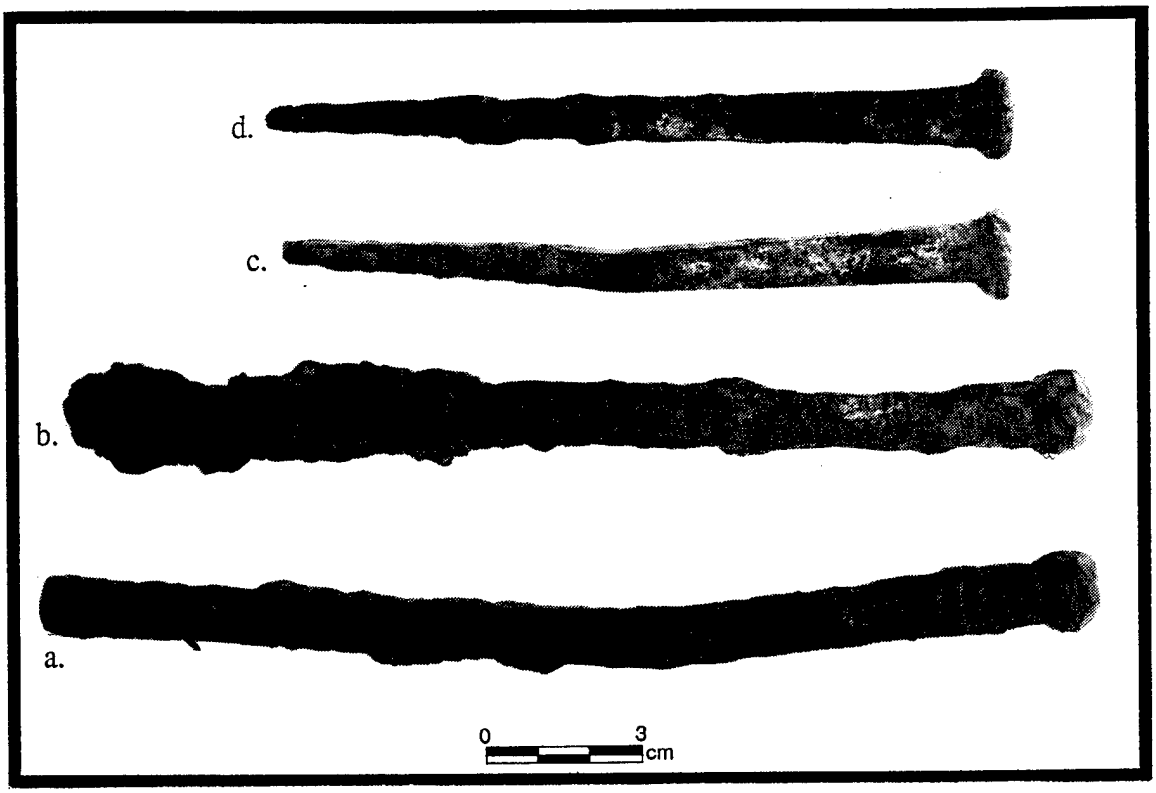


Figure 130. Spikes taken from dock at 16PL62.

Discussion

This section lacks the interpretive quality of the discussion on 16PL49 since there is really no controversial data. At the present time, there are two functional dwellings (Features 11 and 16) in the lighthouse (Feature 15) area. In addition, there are three standing, but unused dwellings (Features 6, 13, and 17); two ruined dwellings or fishing camps (Features 21 and 22); and one concrete foundation (Feature 14). Operational service structures include the bait house (Feature 10), food storage shed (Feature 12), generator shed (Feature 9), pump house (Feature 8), six metal cisterns or water storage tanks (Features 1, 4, 5, 7, 18, and 19), the wharf (Feature 24), and two portable 1,000 gallon diesel storage tanks with no structure designations. Disused service structures include a boat shed (Feature 23), one water tank (Feature 20), and two storage sheds near the mobile home (Features 2 and 3). Other man-made structures include a riprap seawall, raised earth and shell paths, and a telephone or power line extending to the area of the pilot house and Coast Guard station (16PL123).

The investigations of this site determined that the lighthouse and portions of the dock are the only standing remains of the nineteenth century occupation, though subsurface elements of the occupation may be preserved beneath recent alluvium. By an architectural review and examination of maps and aerial photographs, it was determined that the two main extant structures (Features 11

and 16) associated with the lighthouse and possibly one ancillary structure (Feature 17) were constructed as early as 1942.

16PL63—World War II Gun Batteries

This site consists of sets of pilings that are reported to be foundations for gun batteries installed during World War II to protect the pass from German submarines. The investigations into this site have produced conflicting evidence as to the origin of these pilings.

Previous Research

The site form states that 16PL63 was first reported in 1981. Later, in 1984, the site was visited, an updated state of Louisiana site form completed, and a report was prepared by Weinstein (*1984*) for his cultural resources survey of the proposed South Pass Bulk Terminal. The site was reported as consisting of four sets of wooden pilings inland of the west shore of the southernmost island of the pass. Three sets are similar in appearance and were believed to have served as foundations for World War II gun emplacements. The pilings are all creosote pine logs. In addition to these three sets of pilings, a fourth group, consisting of three tall pilings plus one shorter piling was suggested to represent the possible remains of an observation tower associated with the gun batteries.

The taller pilings were reported to be located about 30m north of the northernmost of the three sets of pilings. No artifacts were found in the vicinity of the pilings.

At the time the site was discovered it was described as being located on a sand beach with beach scrub vegetation. However, the spit of land at the southwest end of South Pass is a dynamic environment, as evidenced by the dramatic changes over relatively short periods of time documented in the aerial photographs discussed below.

Environment

The Gun Battery site is located on the west side of the southernmost island at the mouth of South Pass (Figure 131). The highest elevation on the island is five feet above high tide. Due to its location and low elevation, this island is subject to strong erosional and depositional forces so its topographic and biotic environment can change dramatically.

When the site was visited, it was found that the site environment had changed dramatically from the 1984 survey. At that time the pilings were located on dry land. Today, all of the pilings are located in a tidal flat with stands of marsh grass under one to two feet of water. All but the northernmost tall group of pilings are inundated, even at low tide. The southernmost set of pilings was in knee-deep water at low tide during the time of our investigations.

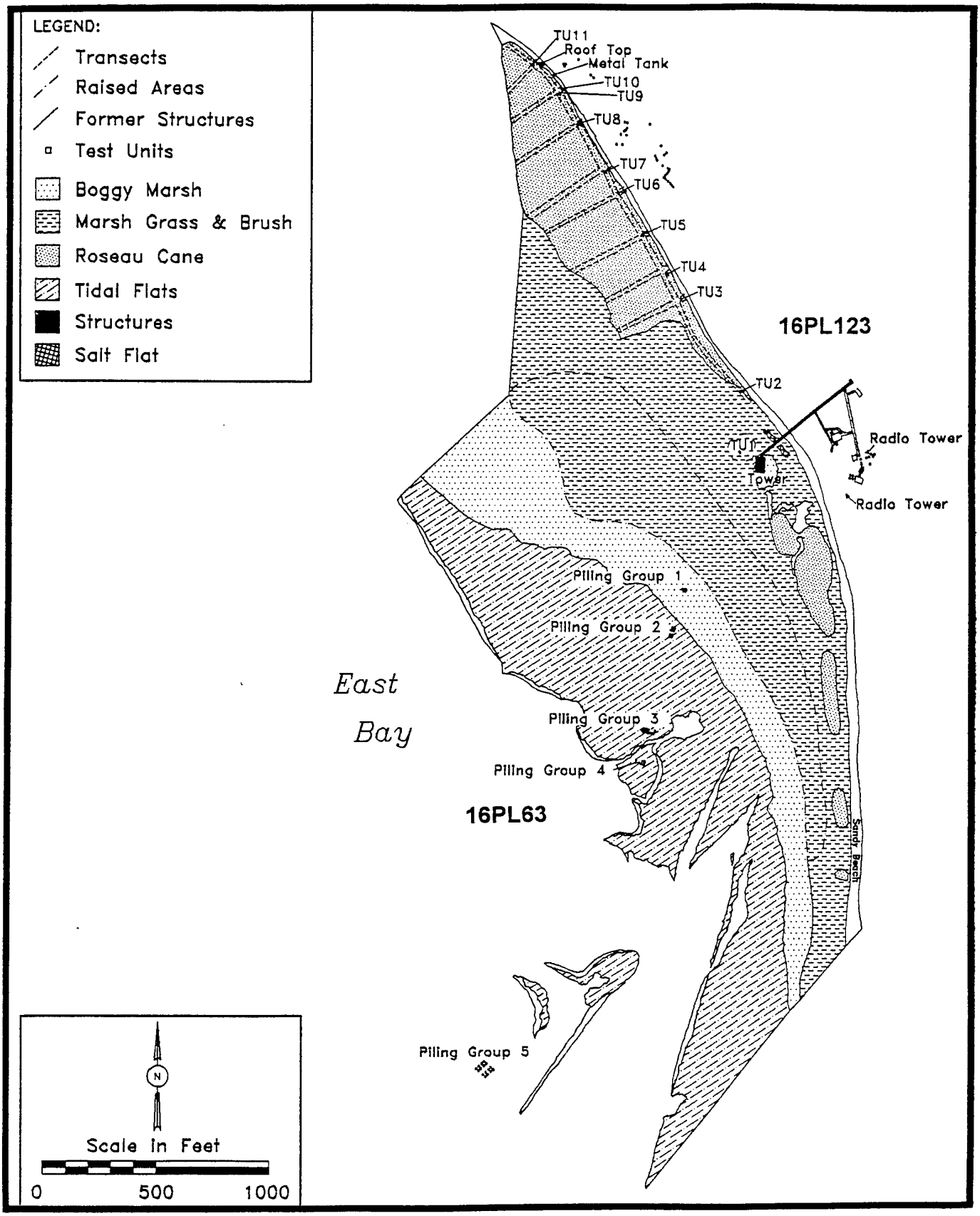


Figure 131. Site map, 16PL63 and 16PL123.

Landform Change: The turbulent history of this island is illustrated by the aerials dating from 1951-1992. On the 1951 aerial, the locale (pilings themselves not visible) of the northernmost set of pilings is on land, while the other locales are either in the water or along the shoreline. By 1973, the northern half of the island is mostly submerged and most of the piling groups were in open water. Over the next decade the size of the island more than doubled, and by 1983 most of the piling sets are several hundred meters inland. It is possible that some of this accretion could be due the accumulation of dredge fill as two large circular features resemble dredge plumes. On the 1992 aerial, the sea is again encroaching from the north and the south. The northern pilings are on land, but the southern sets are in a newly formed marsh.

Research Objectives

The site area is scheduled to receive most of the fill from the proposed dredging project so its fate depends upon its cultural significance. The goals concerning the Gun Battery site were to determine if all of these piling sets are related to the gun batteries, and to establish their history and configuration.

Field Investigations/Results

Except for the changing landform, there seems to have been no impact of consequence since the time the pilings were visited in 1984. They remain as described by Weinstein, except for the fact that they are in marsh instead of dry ground. However, one set of pilings were found to be composed of two clusters which represent separate structural features (Piling Groups 3 and 4). The pilings in Group 4 are considerably shorter than the others and do not rise above the surrounding marsh grass. Although not as prominent as the other groups in terms of elevation, this set of pilings is similar in overall appearance and probably associated with the other piling groups.

Each of the five sets of pilings was photographed, a plan drawing made, and measurements were taken. However, since the bases of all of the pilings are under water, no subsurface investigations were undertaken. A description of each group of pilings follows.

Structural Remains

Piling Group 1: Weinstein (*1984*) noted the presence of three tall pilings and one shorter piling. He suggested that these four pilings (Figure 132) might represent the foundation of an observation tower associated with the three sets of pilings believed to be World War II gun battery foundations.

The pilings rise to variable heights above the marsh. The taller pilings rise to a height of about 5.5m, whereas the shortest is 1.6m above the marsh (Figure 133). Although the locale in which the pilings later appear is evident as land on the 1951 aerial, the actual pilings are first apparent on the 1973 aerial in open water and just east of two circular constructions that look like bulwarks or seawalls.

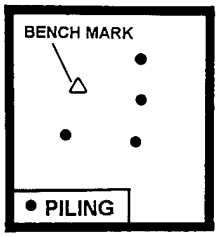


Figure 132. Configuration of Piling Group 1 at 16PL63.



Figure 133. Photograph of Piling Group 1 at 16PL63.

A benchmark set in concrete in the midst of this group of pilings reads:

TBM
0551W
1990

This set of pilings, which shows some charring from fires, is located in a tidal flat, vegetated in marsh grass. It is dry during low tide and wet during high.

Piling Group 2: Located about 30m southwest of Piling Group 1 is one of the sets of pilings reported by Weinstein. This set of pilings consists of two groups of nine pilings separated by six meters. The nine pilings in each group are arranged in a rectangle (in plan) with four piles on one side and three on the other three sides (Figure 134).

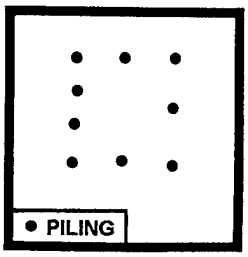


Figure 134. Configuration of Piling Group 2 at 16PL63..

This set of pilings is located in a tidal flat vegetated with marsh grass (Figure 135). It is damp and soggy even during low tide. Like the first group, these pilings have been charred by fire. The tallest piling is 1.1m, while the average height is 90cm. This group was not observed on any of the aerials.



Figure 135. Photograph of Piling Group 2 at 16PL63.

Piling Group 3: The group is about 100m and 218° south of Piling Group 2. They are aligned in two parallel rows, with the rows separated by 3.05m (center to center) (Figure 136). At the west end is a north-south oriented row. This group of 13 round creosote short pilings sticks up

only one meter above water at low tide in marsh land and about 1.5m above the bay floor (Figure 137). These are in poor condition and were originally about 33cm in diameter; some are now smaller due to exposure to fire. These pilings appear in open water on the 1973 aerial.

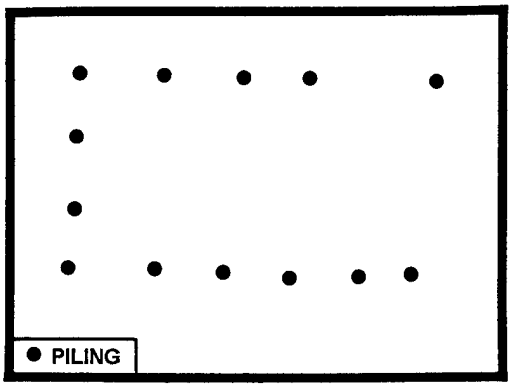


Figure 136. Configuration of Piling Group 3 at 16PL63.

The only attached hardware are metal spikes or sections of rebar up to 30cm in length which protrude from the top centers of some posts. There are no through bolts or metal plates as are present on Piling Group 5 (see below). The pilings are oriented 96°. Piling Group 3 is located in a tidal flat vegetated with marsh grass. It was inundated during our two visits, both of which were at low tide.



Figure 137. Photograph of Piling Group 3 at 16PL63.

Piling Group 4: This group consists of nine pilings, 28cm in diameter and averaging 65cm from the present marsh bottom about 40m south of Piling Group 3 (192°). These are hardly visible above the marsh grass. Note that Figure 138 illustrates the area of Piling Group 4 being examined by the archaeological crew; however, none of the pilings can be seen because of the marsh grass. Because of this situation, it was not possible to precisely map their configuration. These pilings are in very poor condition and have been burned to stumps— probably by marsh fires. No bolts or other hardware remain on this set of pilings. Overall length is 7.4m center to center and 3.2m wide center to center, oriented 114° east of north. Only nine of the pilings remain. The group is, however, visible on the 1973 aerial.



Figure 138. Photograph of crew in vicinity of Piling Group 4 at 16PL63.

Piling Group 5: This group is located in open water a considerable distance from the others (Figure 139). It is comprised of 16 creosote pilings in four rows of four pilings each, spaced six feet apart (Figure 140). The angle from the pilings to the lighthouse is about 345°. Each piling in this group has a rectangular metal plate with two large bolts attaching the plate to the piling (Figure 141). The diameter of each piling is about 33cm and they extend from the bottom of the bay floor to a height of 150cm. A small structure was spotted in the location of this group on the 1951 aerial, but it is destroyed in the 1961 aerial and, by 1973, only the pilings appear.

Cultural Remains

No artifacts were found in association with any of the piling groups. The only material remains are the pilings themselves and any associated metal hardware.

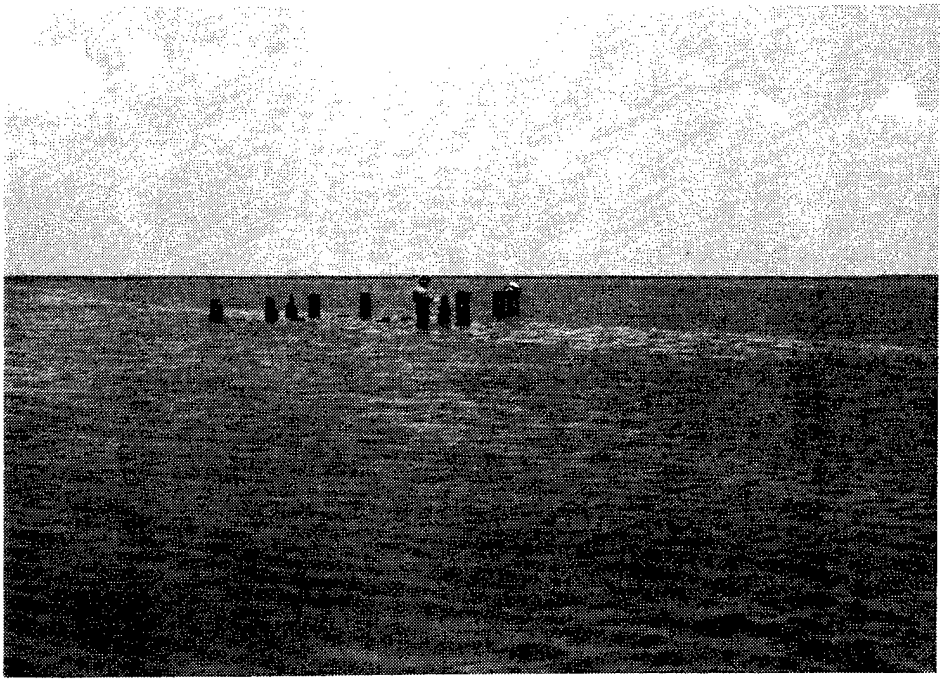


Figure 139. Photograph of Piling Group 5 at 16PL63.

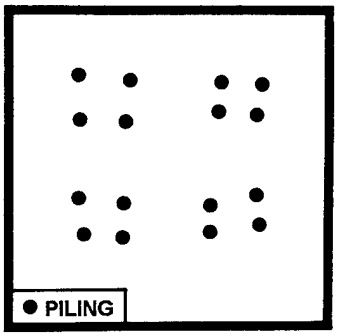


Figure 140. Configuration of Piling Group 5 at 16PL63.

Discussion

We noted at the beginning of this section that the investigations produced some conflicting data with regard to chronology. These conflicts arise from both informant interviews and our examination of the aerial photographs and other documents. In terms of documentation, gun batteries at South Pass are not illustrated on any maps nor are they discussed in definitive and comprehensive documents relating to World War II. This omission may be a reflection of their brief period of use, the need to keep their locations secret, or both.

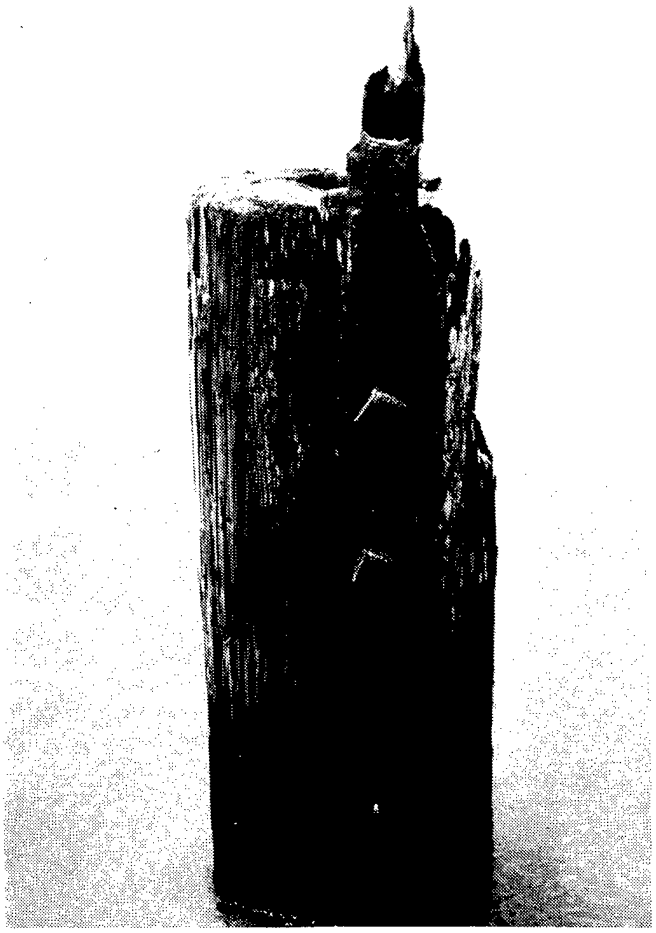


Figure 141. Photograph of piling from Piling Group 5 at 16PL63, showing metal plate and bolts.

Several knowledgeable informants do confirm that the gun batteries existed, but they disagree over their location and configuration. Two servicemen, who were on duty at Burrwood during the war, stated that the platforms were on pilings on the western shoal of the island. However, another local informant stated that the gun emplacements were concrete slabs, since covered by sand, only 300 feet southwest of the Coast Guard Station.

The locations of the pilings do not appear on any of the pre-1950s maps. On the 1951 aerial photograph, a structure appears in the general area of Piling Group 5, suggesting this group may have an origin more recent than World War II. This is also the group that is aberrant in that it is set some distance from the other four. The remaining four piling groups may be the remains of the gun emplacements. Local tradition documents their presence and William Harvey, with the U.S. Navy History Center, indicates such activity in the delta during World War II.

Weinstein (*1984*) has suggested that Piling Group 1 represents the remains of an observation tower and the other three piling groups (2-4) are the battery remains. We have no data to contradict this assumption. The aerial photographs depict no structures in the piling locales (except group 5) so there is no evidence to suggest that they are related to post-World War II construction. At this point, we have no reason but to concur that Piling Groups 1 through 4 represent remains associated with defensive activity in the delta during World War II. Piling Group 5 is probably the remains of a structure that appears on the 1951 aerial, but was evidently destroyed by the early 1960s since only the pilings appear in later aerials.

16PL123—Pilots' Station and Coast Guard Station

This site consists of the Pilots' Station and the Coast Guard Station, two installations that were strategically placed near lands at the mouth of the pass to serve their separate purposes. The pilot house was moved to Port Eads probably to lessen the travel distance to the vessels waiting offshore for pilots to bring them through the pass safely. The Coast Guard Station served as a base for communications, sea rescue, patrol, and for defense in times of war. Neither was in use after the early 1980s.

Previous Research

16PL123, the South Pass Bar Pilots' Station was reported in 1984 (*Weinstein 1984*). At that time the primary structures consisted of the Bar Pilots' Station and a detached kitchen and dining building.

Citing personal communication from Danny Meyers, at that time a member of the Associated Branch Pilots and a river pilot for 35 years, Weinstein (*1984:55)* reports that the Bar Pilots' Station was constructed in the 1920s. It had functioned as the main office and dispatch point for all pilots escorting ocean-going ships through the sand bars at the mouth of South Pass. The station continued in operation until 1983, even though its importance was diminished when the larger ships switched to Southwest Pass in 1973.

A severe winter storm in 1983 forced the evacuation of the station and, with most sea traffic being routed through Southwest Pass, it was not reoccupied. At the time of Weinstein's report, the station remained abandoned and was up for sale by the Branch Pilots' Association.

In addition to the Bar Pilots' Station, Weinstein noted the presence of several abandoned structures, which included some homes of bar pilots working in the area. Also noted is an old Coast Guard station that was abandoned in 1984. A photograph in Weinstein (*1984:57*) shows two structures north of the pilots' station that are the homes noted in the report. The old Coast Guard station, also visible in the photograph, is located south of the pilot station.

The only artifacts observed at the site were trash of very recent age (cans, plates, etc.). Weinstein suggests that earlier material is probably buried or in South Pass adjacent to the house.

Construction and Abandonment Sequence

The 1879 and 1880 Corps maps reveal no evidence of structures. The earliest appearance of the pilot's house is on the 1883 map accompanying the Annual Report of that year to the Chief of Engineers. That map illustrates a rectangular structure with a boardwalk that is labeled "Pilot's Quarters" (Figure 142). This structure remains, although it is unlabled, on the 1884 Corps map.

On the 1886 map, the pilot house appears again as a rectangular structure with a boardwalk leading to the river. It is still depicted as an isolated structure and essentially unchanged from the 1883 map. The 1886 map labels it simply "Pilot's."

On the 1890 map, the pilot house appears unchanged from 1886. It is an isolated structure and boardwalk labeled "Pilots" (Figure 143). Nearby is a "range light," noted south of the structure.

The pilot's house and boardwalk remain unchanged on the Corps map from 1886 through 1898. The range light shown earlier also remains. The landform does change, however, showing a larger area of marsh west of the station (Figure 144).

By 1904 the Pilots' House had been expanded with a new structure added adjacent to the boardwalk, and a complex of structures had grown up around the Pilots' House (Figure 145). Six additional structures appear along the shore north of the Pilot's House. All are connected by walkways, but there is no labeling to indicate their function. Approximately 4600ft north of the Pilots' House a walkway extends southwest from the river bank, terminating at a structure.

The following year, 1905, the map shows some changes in the walkways, but other details remain unchanged (Figure 146).

By 1907 a coal yard had been added to the complex. It was located north of the Pilots' House. The addition of the coal yard was the only change of significance between 1905 and 1907.

It is on the 1910 map that the "Pilots' Station" is labeled (Figure 147). Also depicted are 12 structures lined along the river bank including several small buildings that were not shown on earlier maps. Most of these are interconnected by boardwalks. In addition, there is a boardwalk extending from the area of the "Range Light" west to a "Post Light."

The 1913 map of the Pilots' Station complex shows things largely unchanged except that two structures adjacent to the coal yard, one north and one south, appear to have been enlarged.

There was no changed until 1915, by which time the Pilots' House was again enlarged (Figure 148). Also, by that year, the walkway leading west across the marsh from the Pilots' House was demolished. One additional small structure was added between the Pilots' House and coal yard. North of the coal yard, one structure disappeared, and another was added.

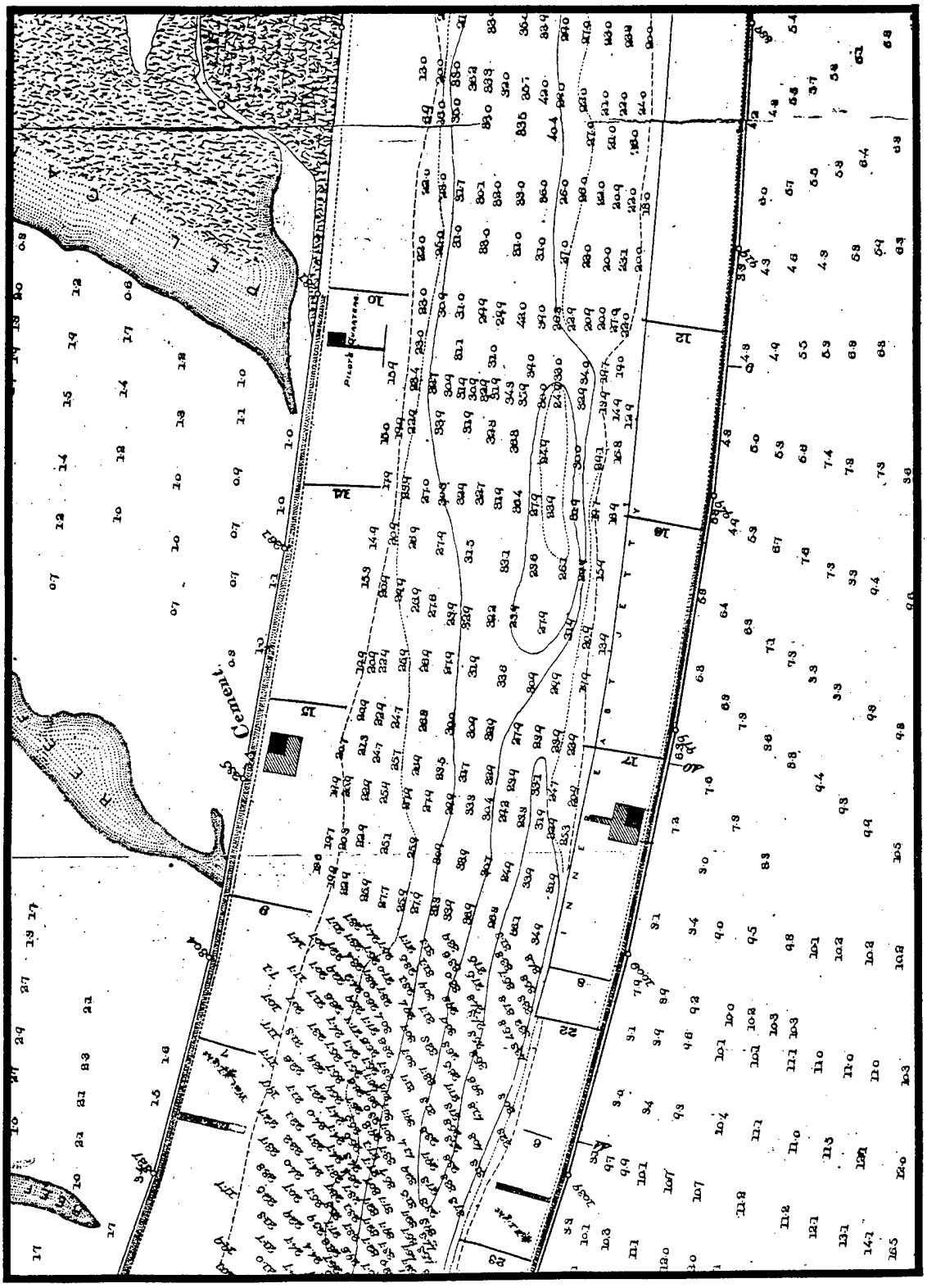


Figure 142. 1883 Corps Annual Report map.

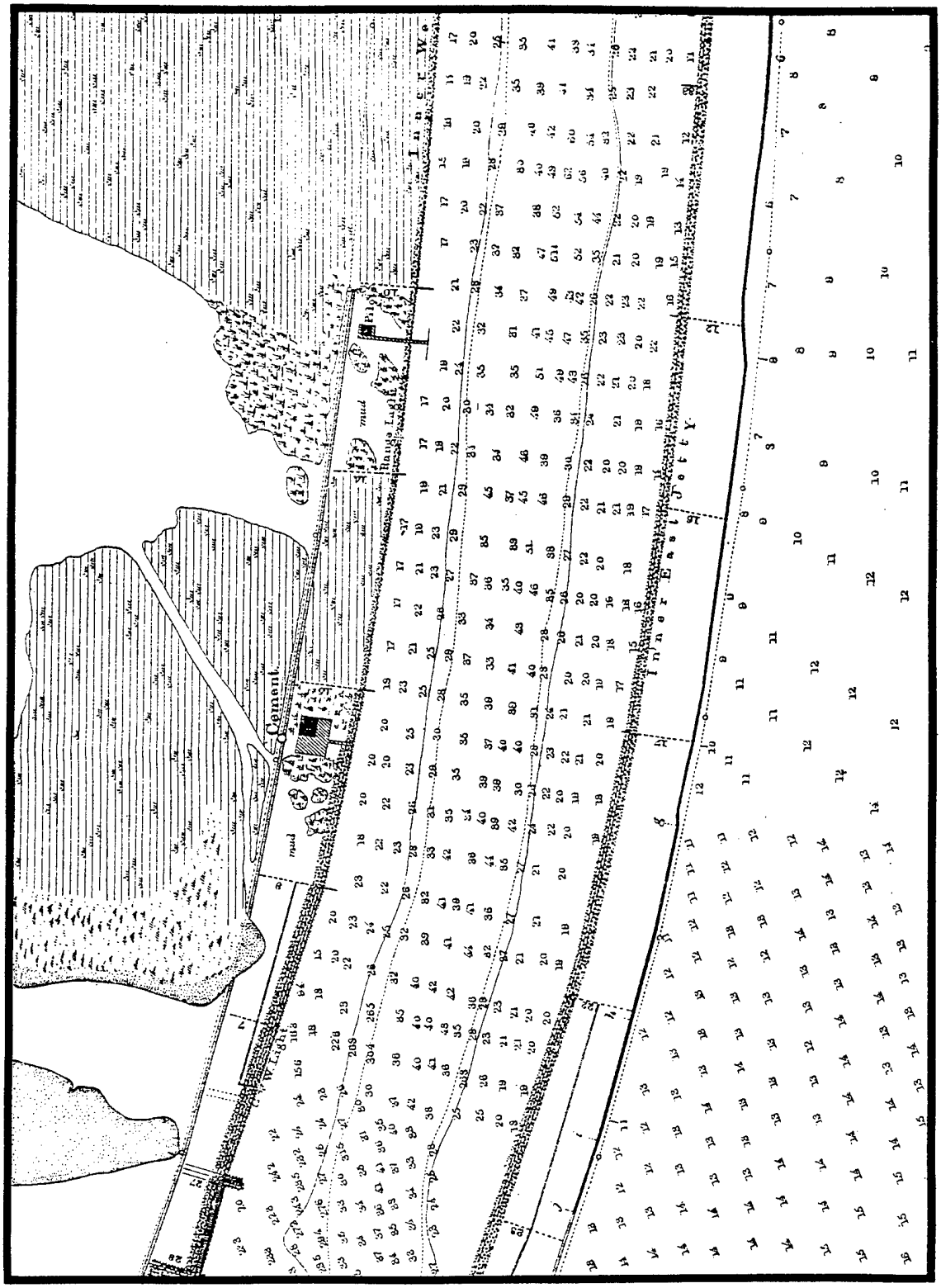


Figure 143. 1890 Corps Annual Report map.

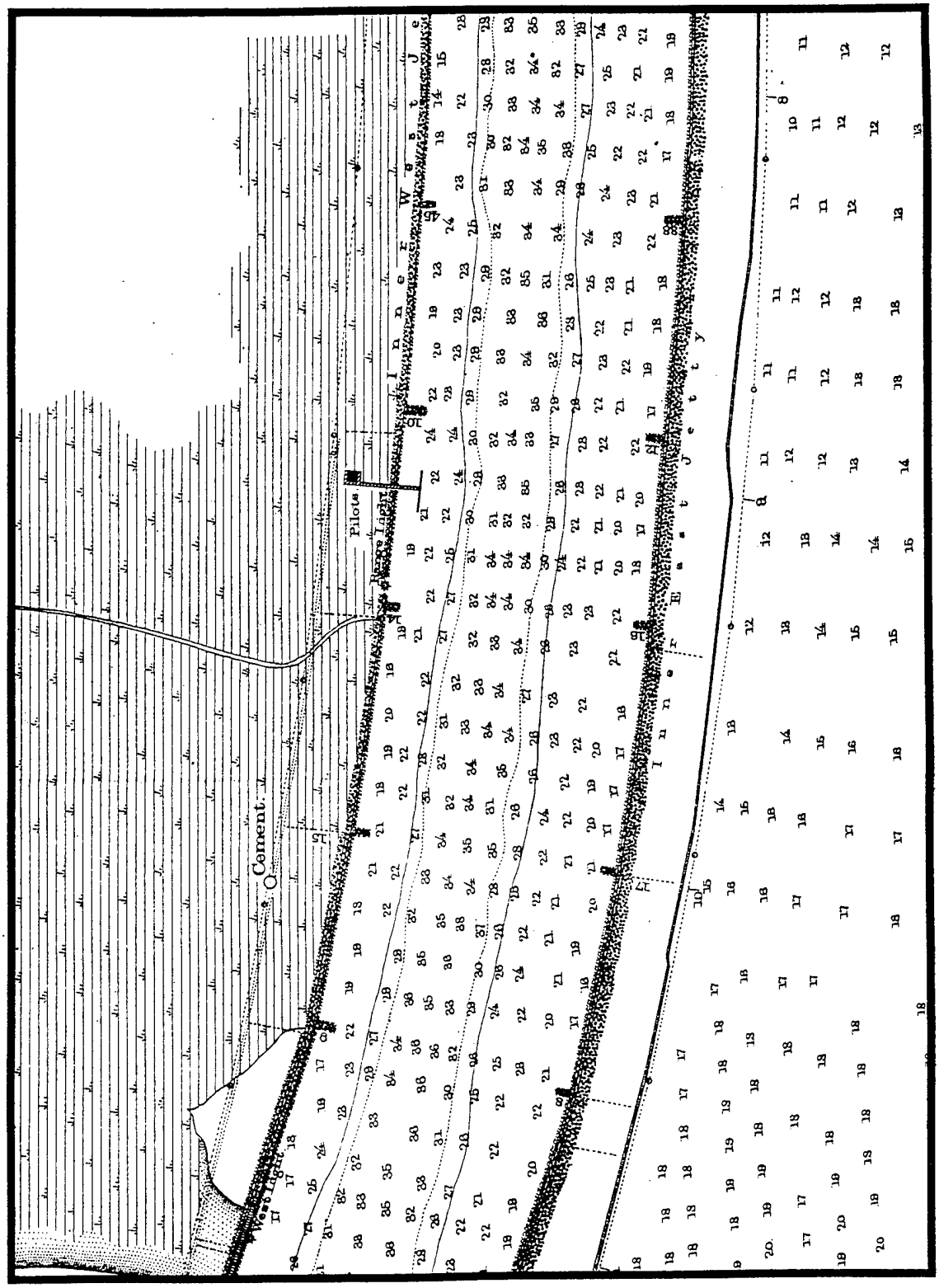


Figure 144. 1898 Corps Annual Report map.

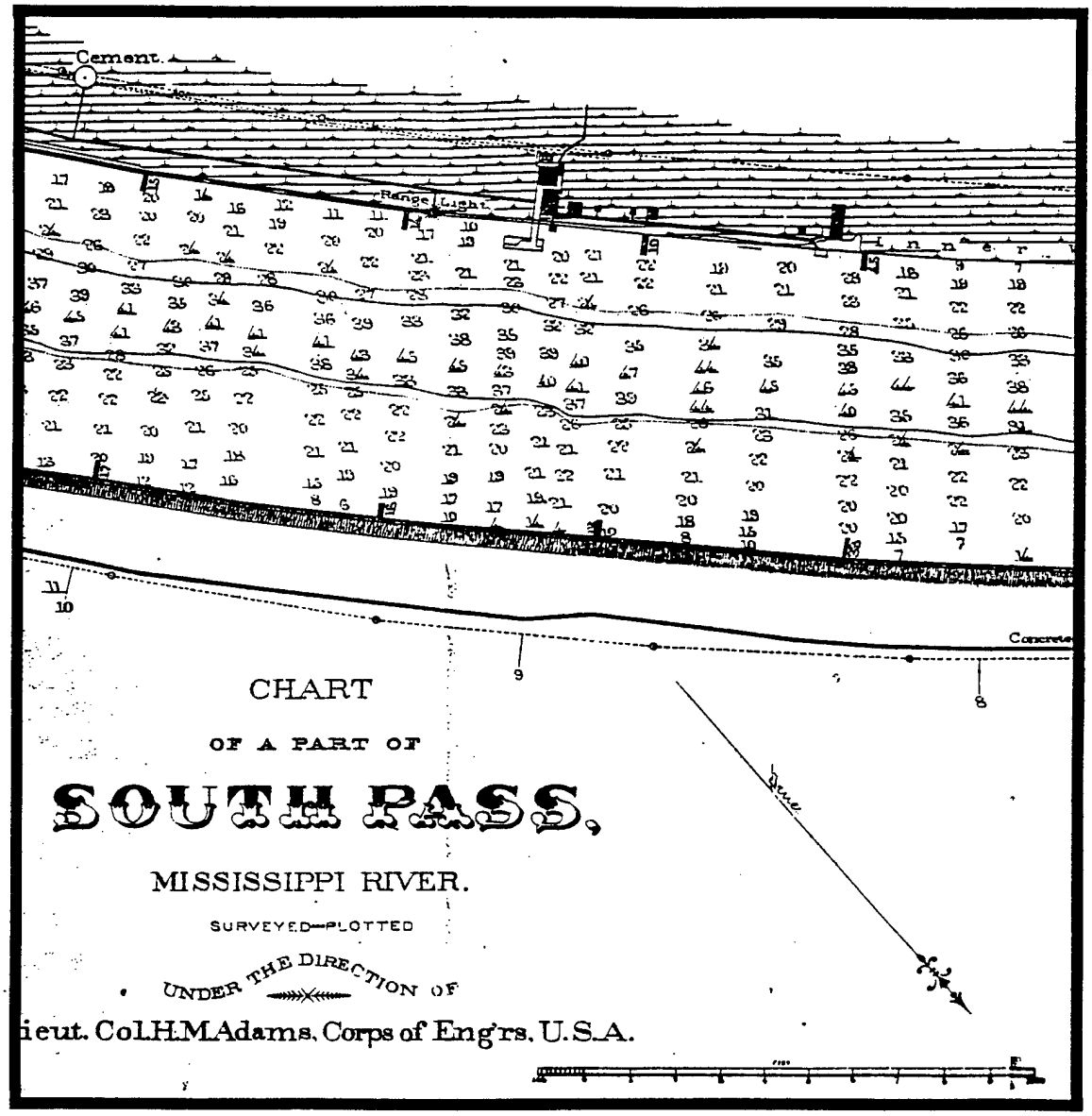


Figure 145. 1904 Corps Annual Report map.

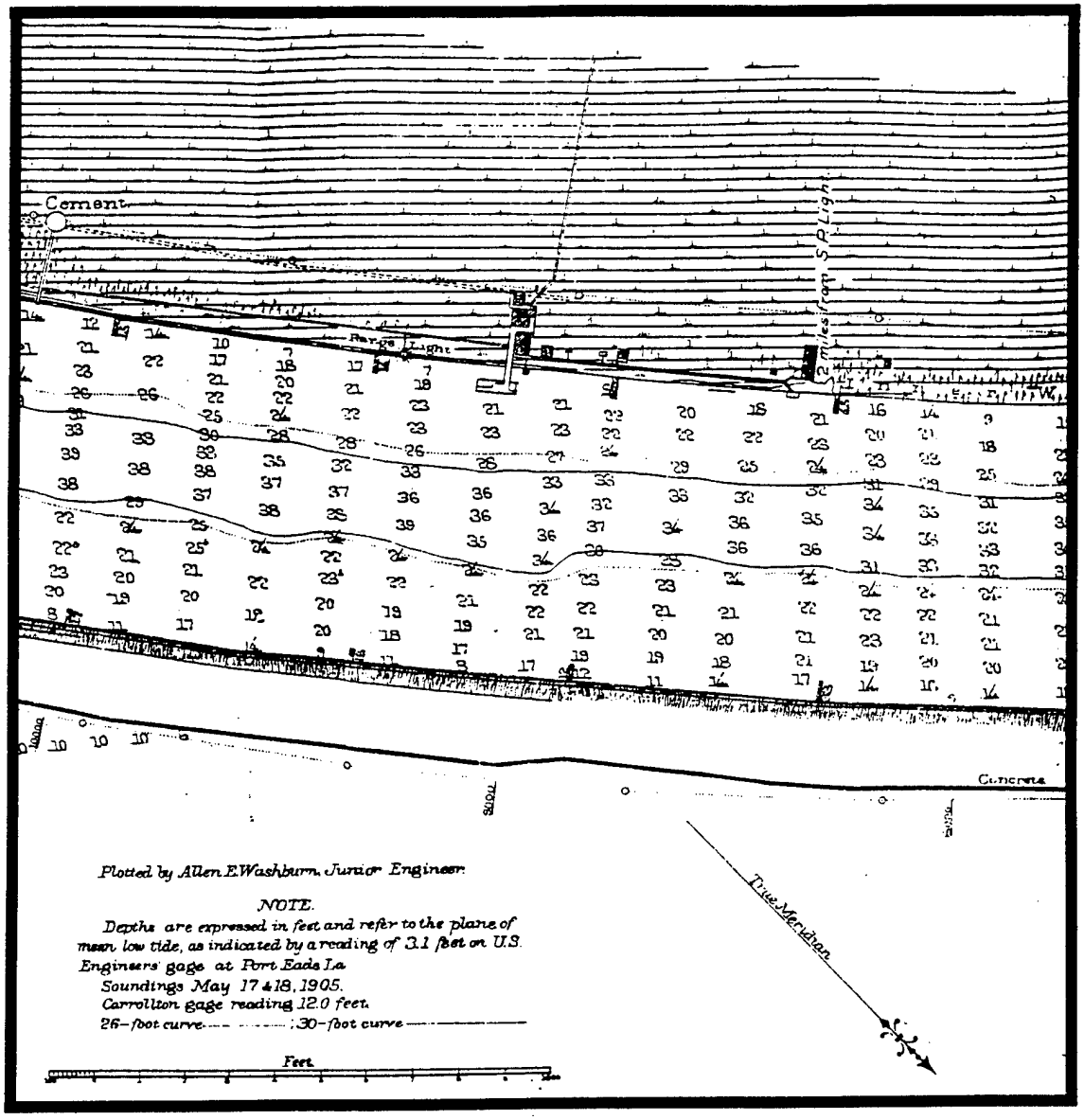


Figure 146. 1905 Corps Annual Report map.

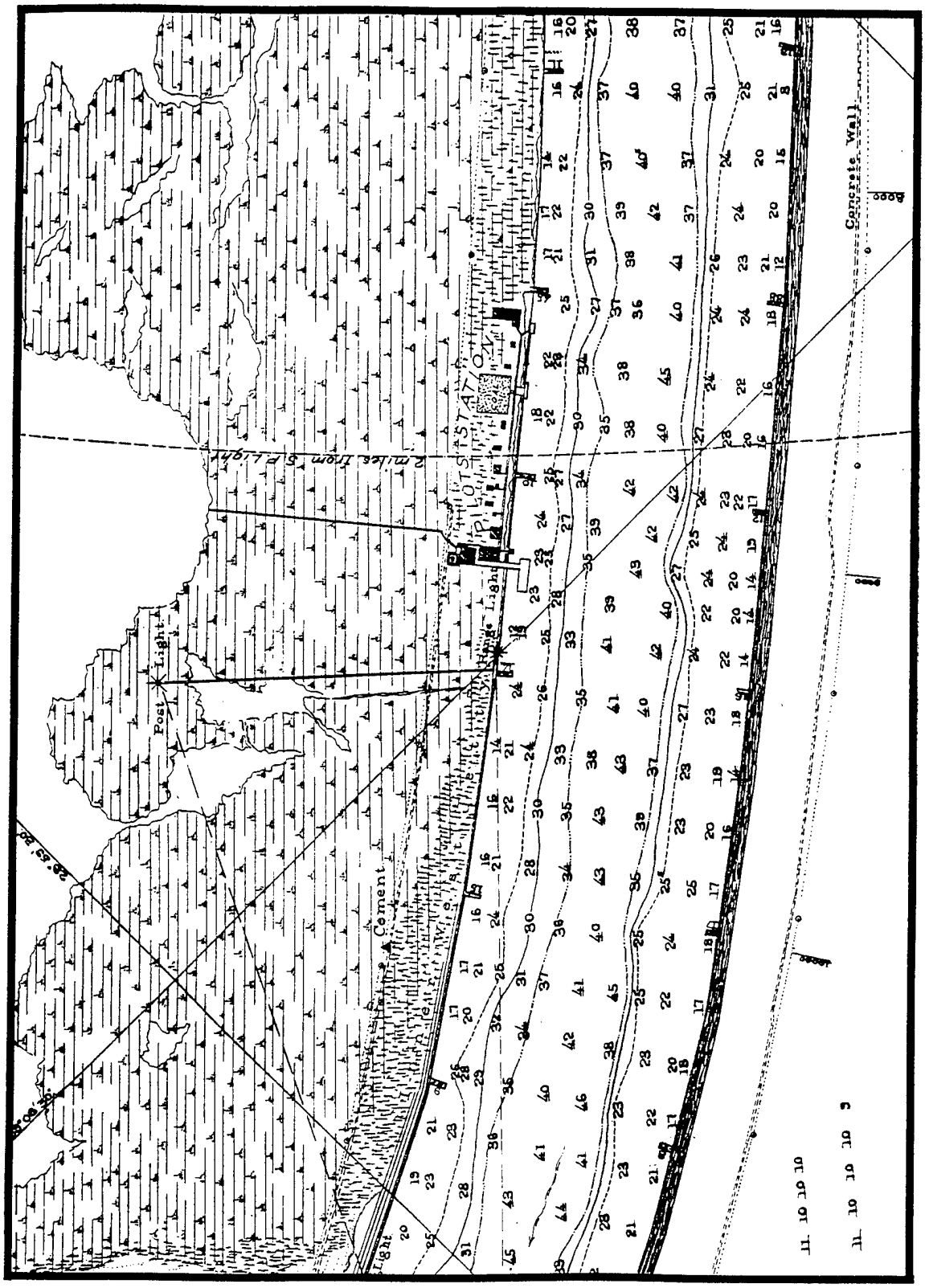


Figure 147. 1910 Corps Annual Report map.

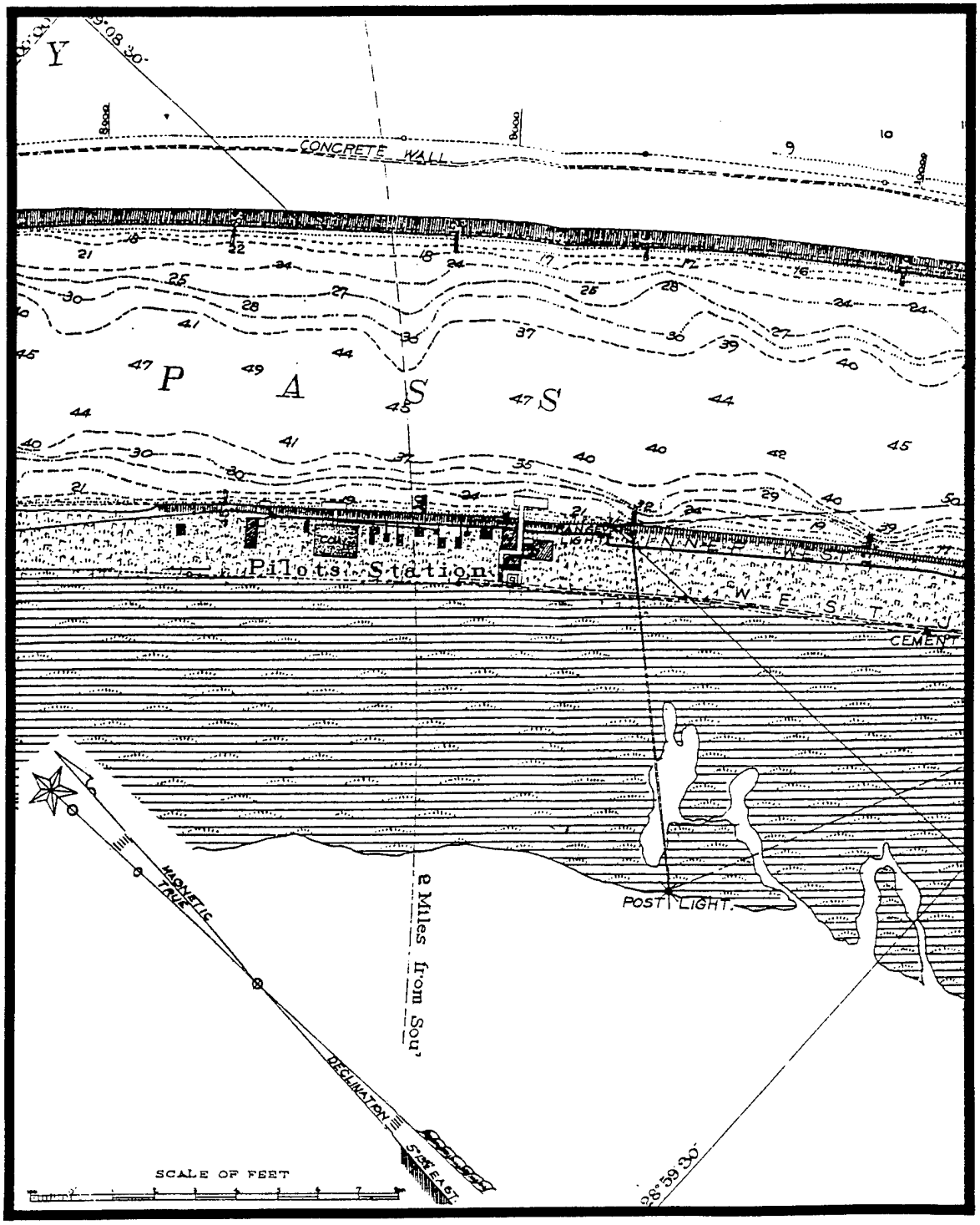


Figure 148. 1915 Corps Annual Report map.

The 1922 Coast and Geodetic survey map (refer to Figure 71) also shows the Pilot's House, two boardwalks and seven structures, but detail is poor. In addition, four structures and a boardwalk are depicted to the south in the area of the Coast Guard Station.

The 1933 Coast and Geodetic Survey map shows the "Pilot Tower," two piers and 10 structures (refer to Figure 72). Detail is terrible, but two structures are apparent in the vicinity of the Coast Guard Station.

On the 1935 South Pass quadrangle, the Pilots' Station and 23 structures are shown. Again, detail is poor and it is impossible to differentiate the pilot's house from other structures. Nevertheless, the period between 1933 and 1935 seems to match the time of peak activity at the Pilots' Station.

A 1948 Corps Hydro Survey map depicts the Coast Guard Station at the mouth of the pass, but does not show the area of the Pilots' Station to the north (Figure 149). This detailed map depicts four structures as well as a connecting boardwalk and two radio towers. The structures are identified as Coast Guard quarters, a warehouse, an engine house and a boat shed.

On the 1959 East Delta quadrangle, the Pilot Station is shown, but light symbols obscure the structures (Figure 150). There are six discernable.

By 1951, the Pilots' Station area is depicted as a substantial settlement on the aerial (Figure 151), with at least a dozen structures extending for over 1,500 feet along the shoreline. The Coast Guard Station is almost completely in the water.

In 1961, the Coast Guard Station appears unchanged, but the number of structures in the area of the Pilots' Station has increased to over 20 (Figure 152).

By the 1973 aerial (Figure 153), only six structures remain in the area of the Pilots' Station. The Coast Guard Station remains in the same configuration as in the previous years. Structures on the 1983 aerial of the mouth of the pass appear unchanged from the 1973 aerial, although the landform is considerably larger to the west (Figure 154). The two circular features on the 1983 aerial are typical of dredge outwash plumes in other areas of the delta, which would account for the dramatic increase in land area. The shape of these plumes suggests that most of the dredge fill was deposited behind or west of the remaining land.

Local informants stated that the owners of the Bar Pilots' Station, the Bar Pilots' Association, burned the structure to the waterline in 1986 as it was unsalable and an insurance liability. A 1986 aerial supports this, showing only two piers and two structures associated with the Coast Guard Station.

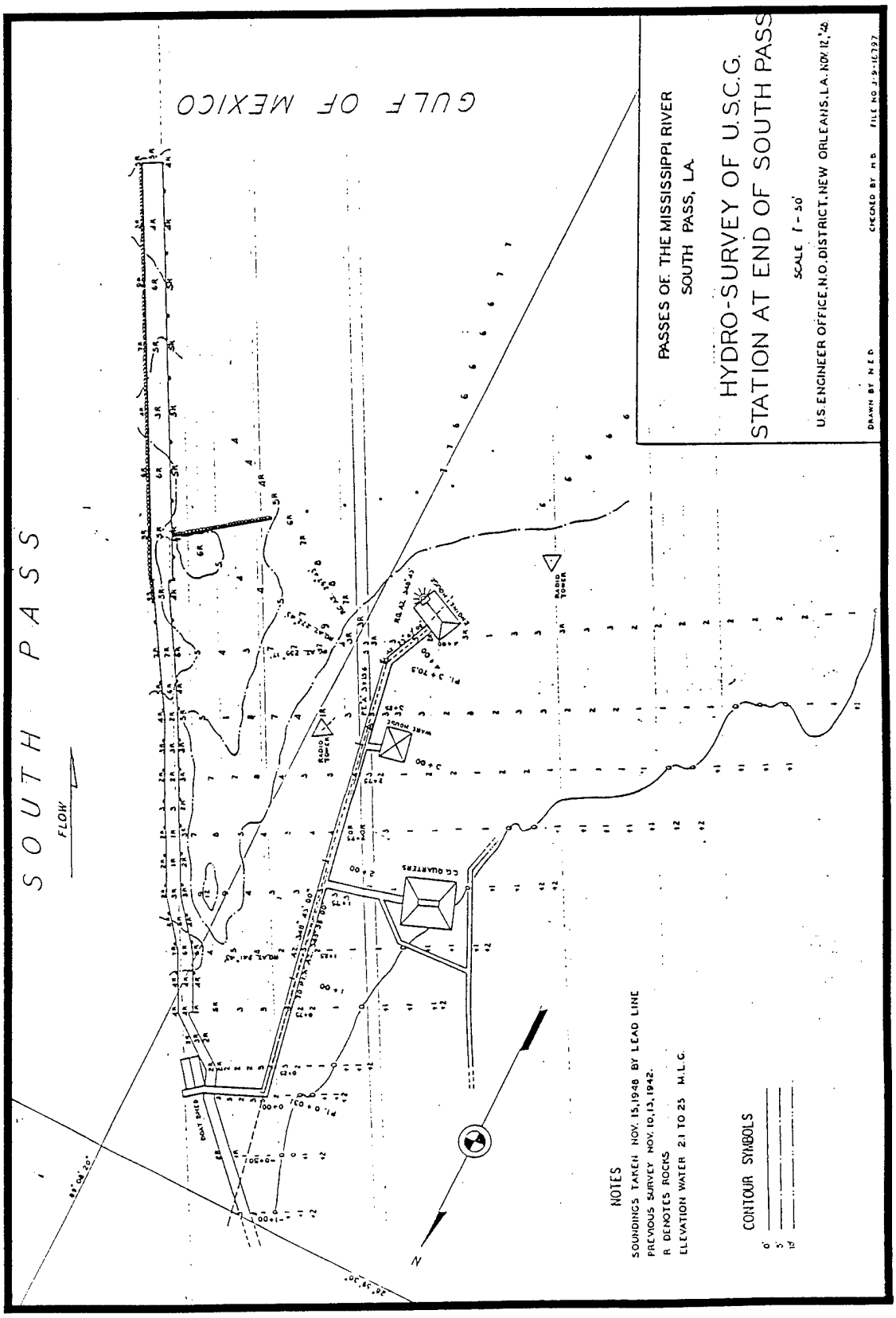


Figure 149. 1948 Corps Hydro Survey map.

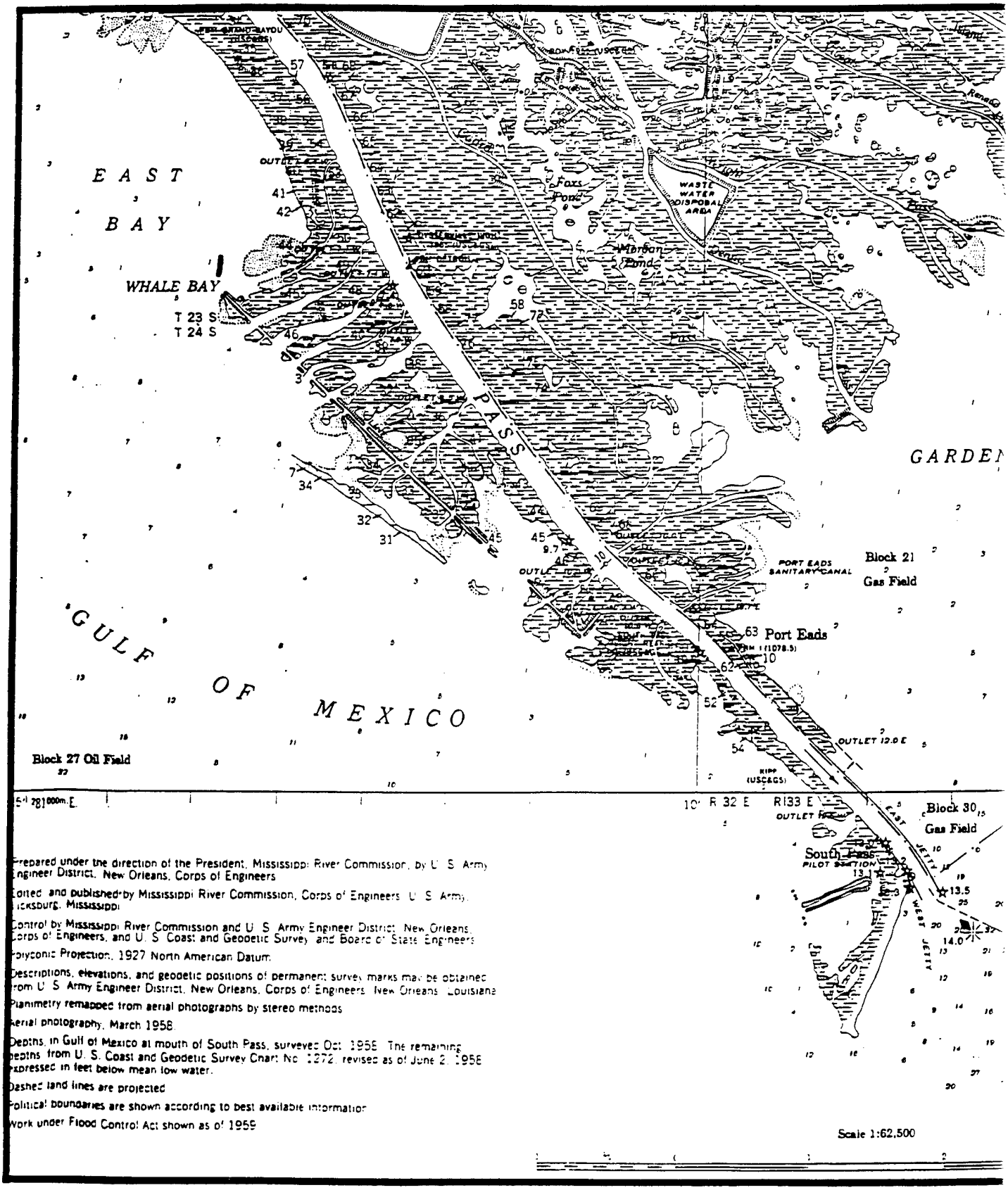
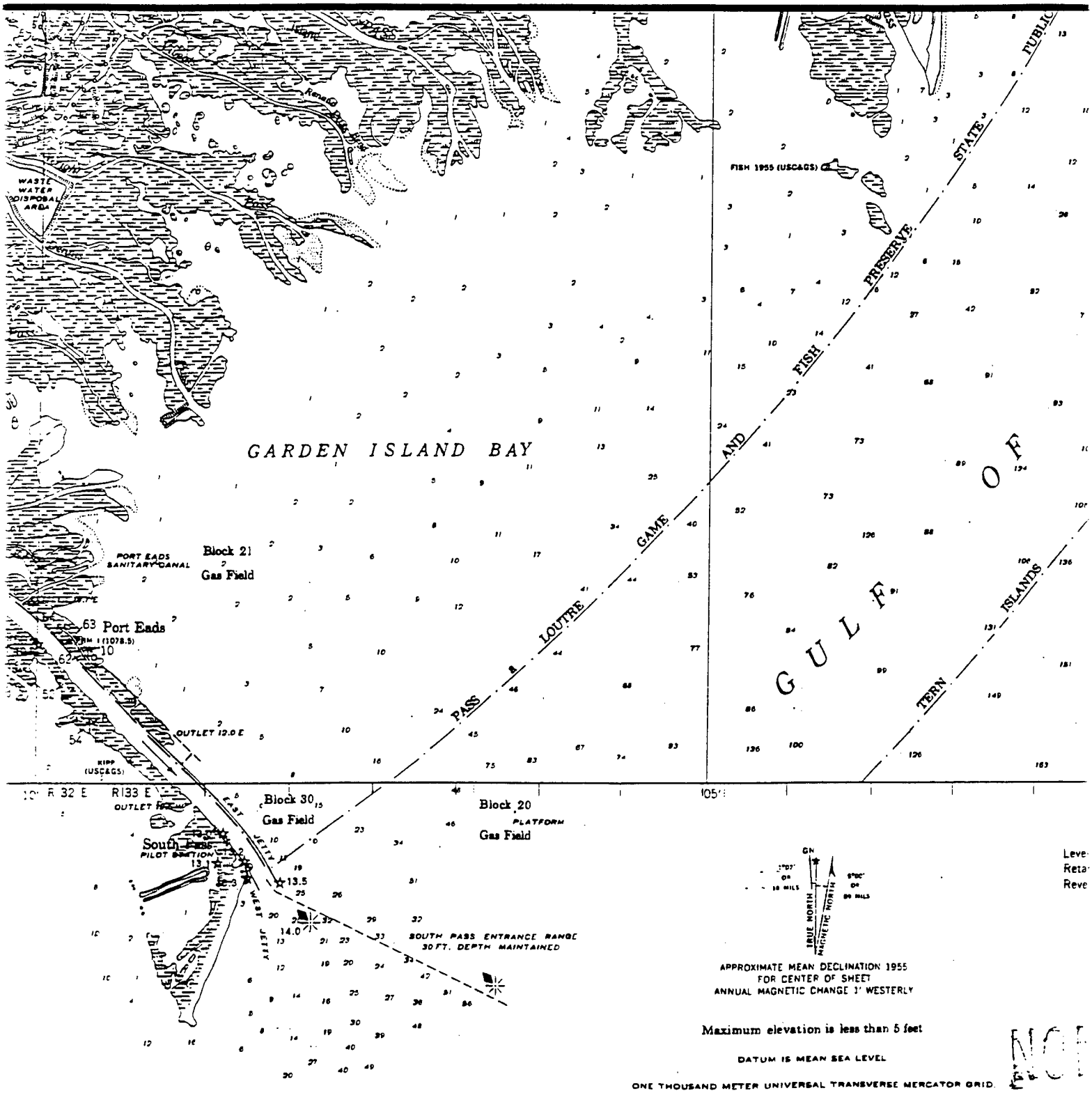
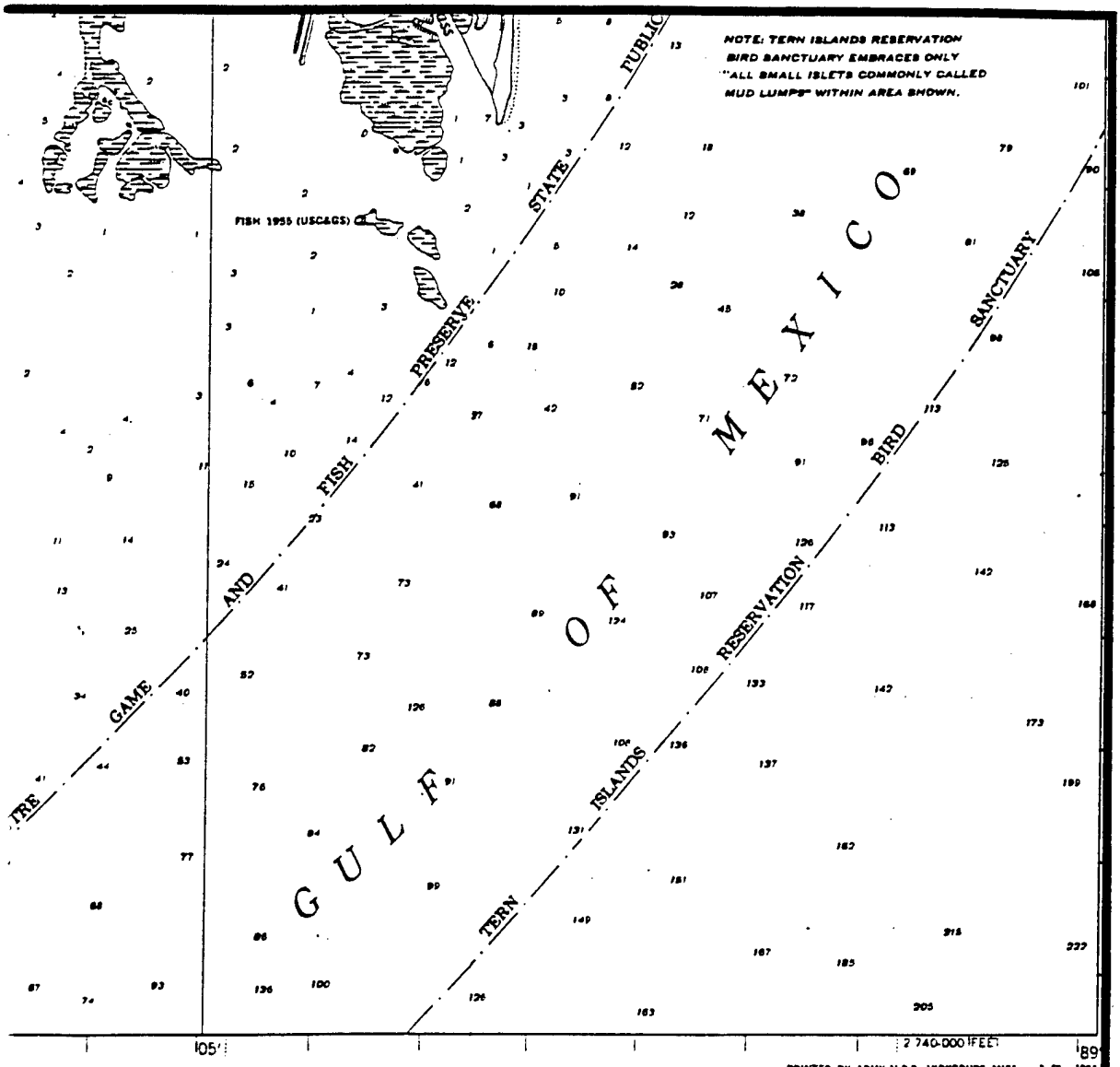


Figure 150. 1959 East Delta quadrangle.


GARDEN ISLAND BAY
GULF OF
WASTE WATER DISPOSAL AREA
PORT EADS SANITARY CANAL
Block 21
Gas Field
63 Port Eads
62
54
OUTLET 12.0 E
KIPP (USC&GS)
PASS A LOUTRE GAME AND FISH PRESERVE STATE PUBLIC
TERN ISLANDS
FISH 1955 (USC&GS)
R 32 E
R 33 E
OUTLET
EAST JETTY
WEST JETTY
Block 30
Gas Field
Block 20
PLATFORM
Gas Field
South Pass
PILOT STATION
13.1
13.5
14.0
SOUTH PASS ENTRANCE RANGE
30 FT. DEPTH MAINTAINED
105°
GN
TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION 1955
FOR CENTER OF SHEET
ANNUAL MAGNETIC CHANGE 1' WESTERLY
Maximum elevation is less than 5 feet
DATUM IS MEAN SEA LEVEL
ONE THOUSAND METER UNIVERSAL TRANSVERSE MERCATOR GRID
ZONE 16 IS INDICATED BY TICKS OUTSIDE THE NEATLINE
LOUISIANA STATE GRID ZONE SOUTH IS INDICATED BY DOTTED TICKS
OUTSIDE THE NEATLINE AT 10,000 FOOT INTERVALS
Scale 1:62,500
1
2
3
4 Miles

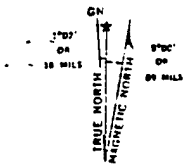
(2)



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LEGEND

Levee		Levee station	LS
Retards and dikes		Townhead	T.H
Revetment		River Gage	



APPROXIMATE MEAN DECLINATION 1955
FOR CENTER OF SHEET
ANNUAL MAGNETIC CHANGE 1' WESTERLY

Maximum elevation is less than 5 feet

DATUM IS MEAN SEA LEVEL

ONE THOUSAND METER UNIVERSAL TRANSVERSE MERCATOR GRID.
ZONE 16 IS INDICATED BY TICKS OUTSIDE THE NEATLINE

LOUISIANA STATE GRID ZONE SOUTH IS INDICATED BY DOTTED TICKS
OUTSIDE THE NEATLINE AT 10,000 FOOT INTERVALS

Distances on South Pass below the Head of Passes are shown at 5 mile intervals

NON-CIRCULATING

EAST DELTA, LOUISIANA

EDITION OF 1959

N2900-W8900/15

(3)

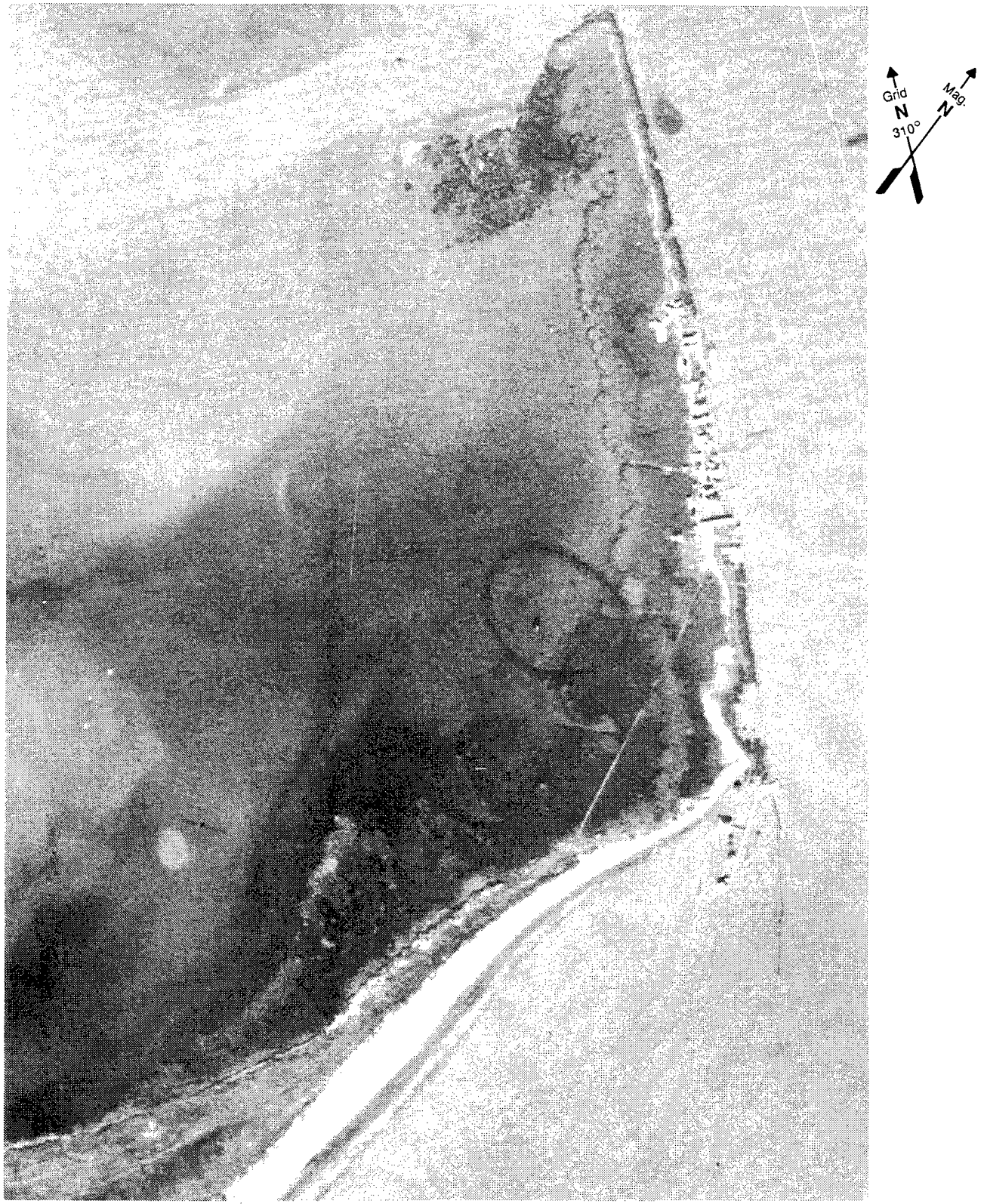


Figure 151. 1951 Aerial photograph.

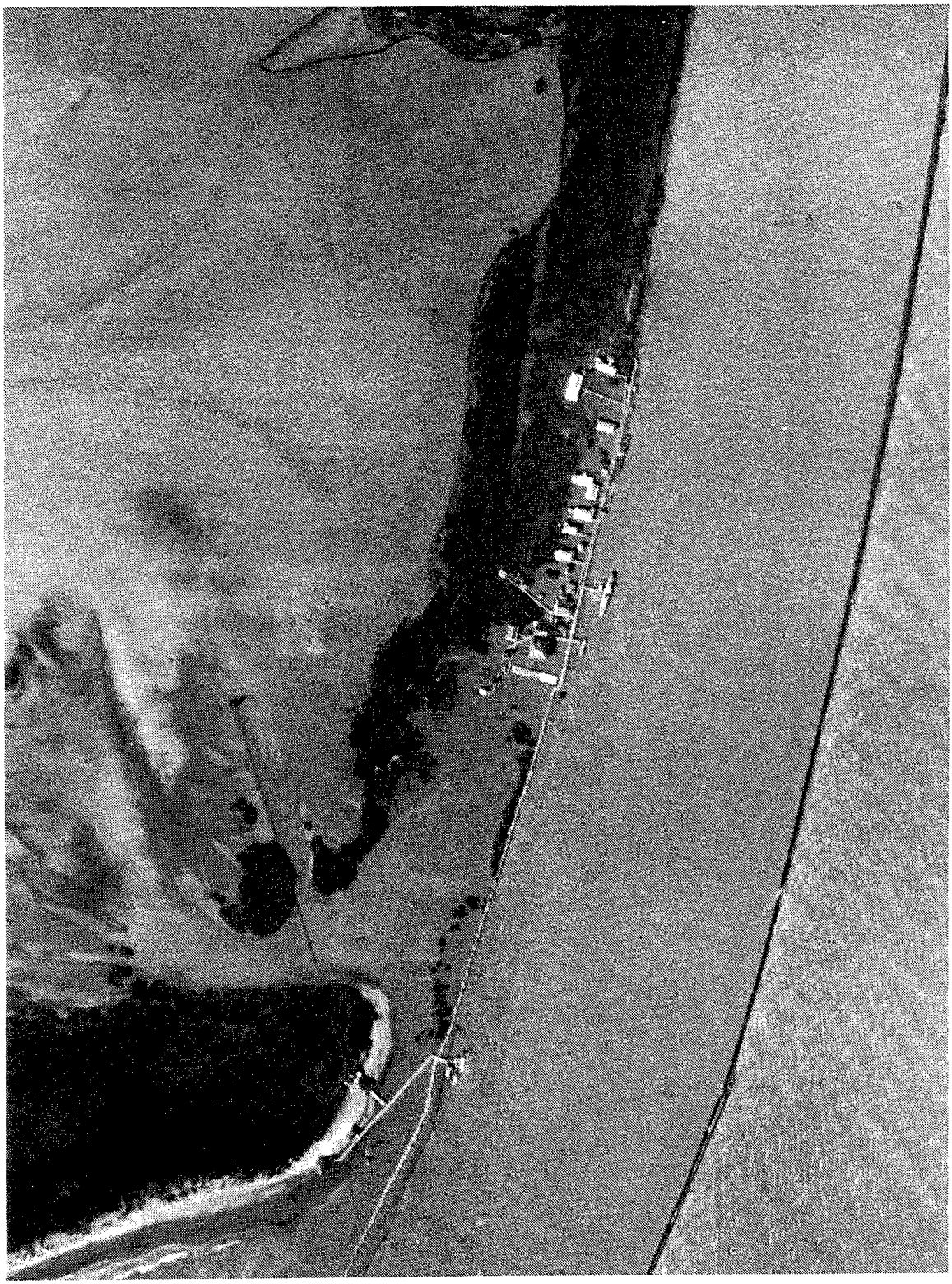


Figure 152. 1961 Aerial photograph.

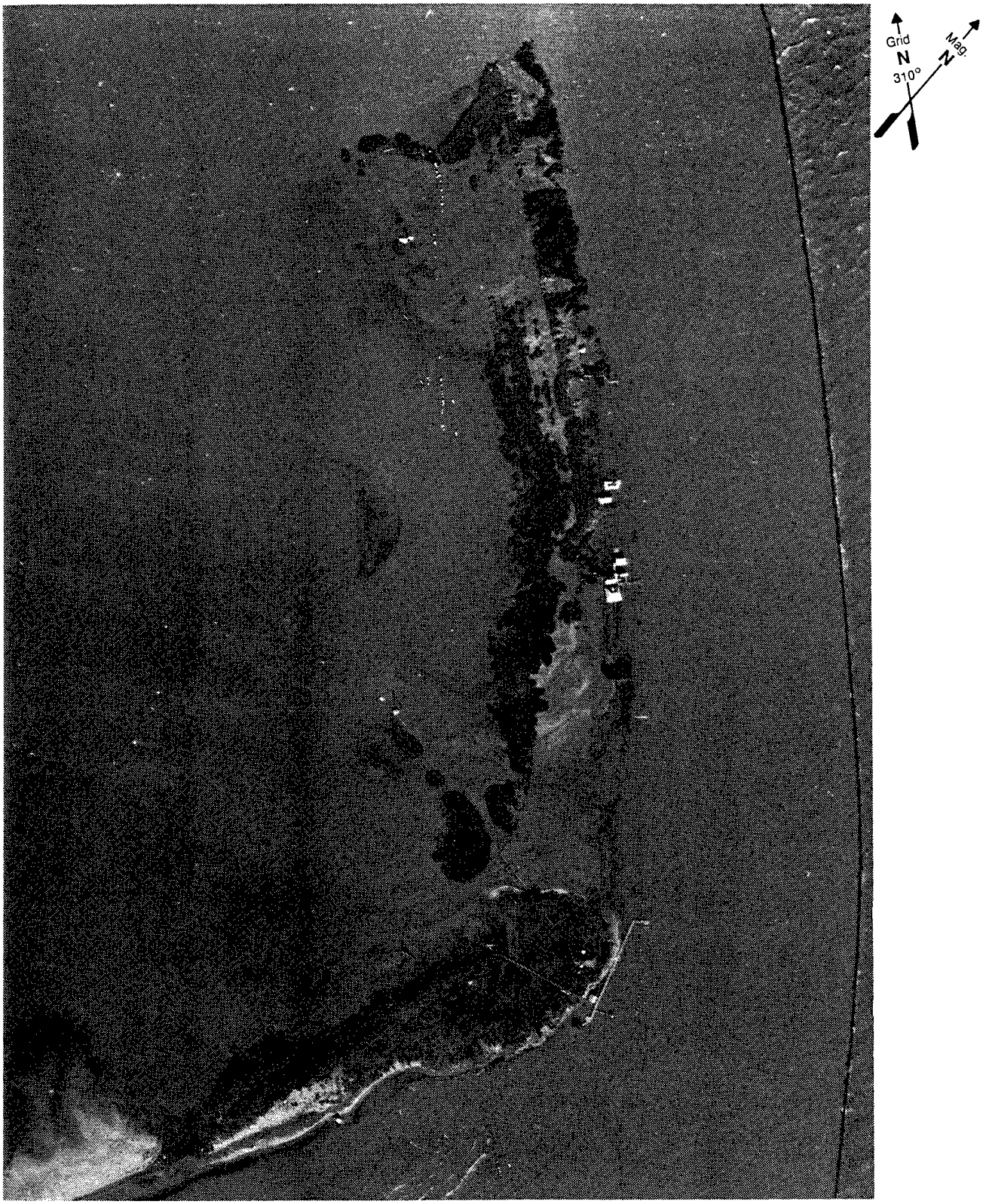


Figure 153. 1973 Aerial photograph.

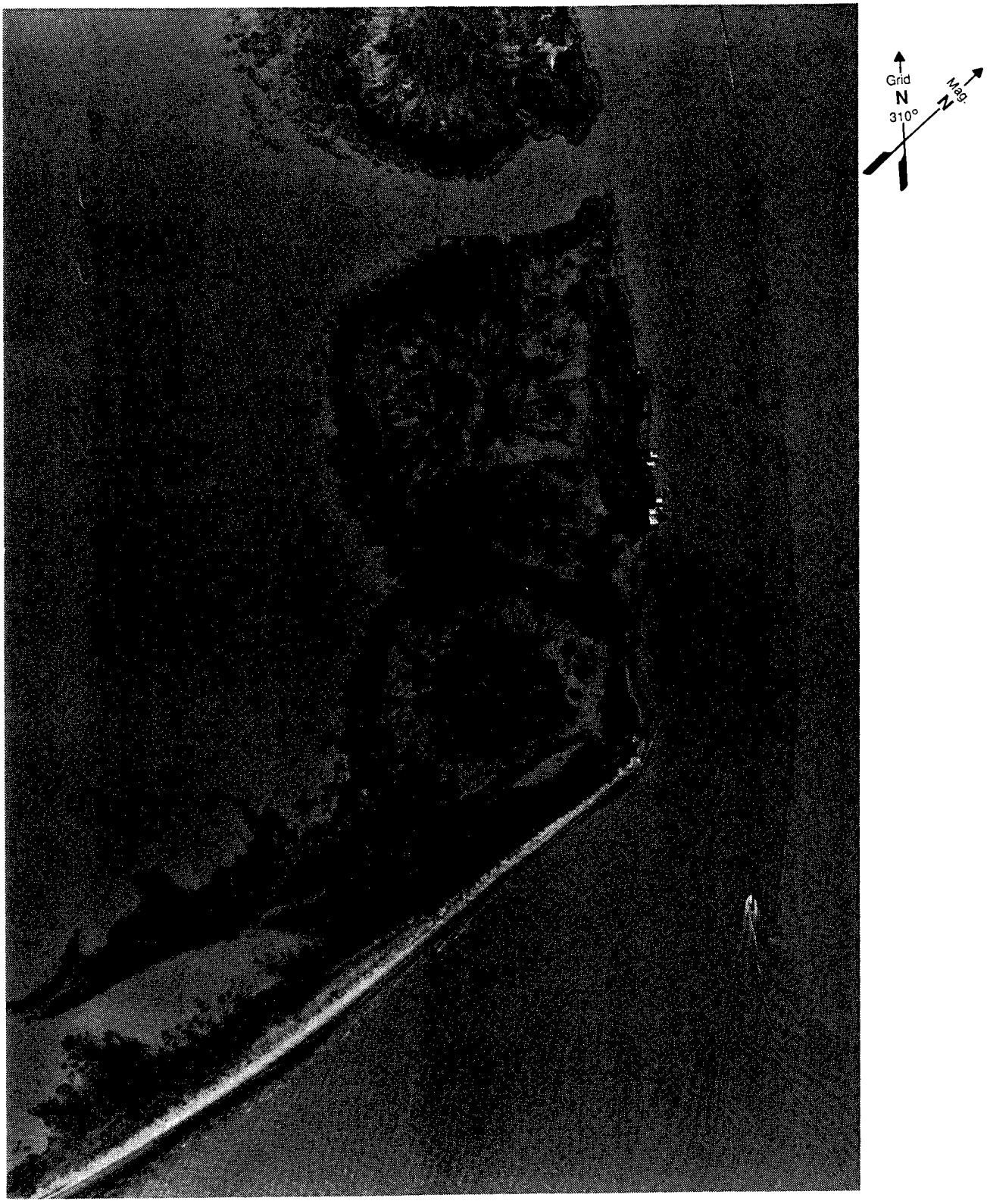


Figure 154. 1983 Aerial photograph.

On the 1992 aerial (Figure 155), the primary structure visible is a radio tower and pier that was constructed between 1983 and 1986. There is no trace of either the Bar Pilots' Station or the Coast Guard Station, except for one small object that may be a structure or a metal storage tank.

Environment

This site is located on the west bank at the mouth of the pass. The regional environment is that of a deltaic riverine marsh. The highest elevation is five feet. Due to its tenuous location, the area is subject to rapid changes in the topographic and vegetative environments caused by the deposition and erosion from storms and floods. In fact, the land of the site area appears to have been created as a result of the construction of the jetties in 1875, as it is not present on earlier maps.

The present topography consists of a narrow strip of dry land a maximum of a meter above low tide and no wider than 20m (refer back to Figure 131). This dry land is along the river's edge and appears to be a natural levee. To the west of the levee is a marsh that extends for 500m extending to East Bay. There is another narrow strip of dry land along the bay shoreline.

The biotic environment is a brackish to salt water marsh community. The southern portion of the site is covered with knee-high marsh grass with a few clumps of bushes and patches of open water, both of which average 20 to 30m in diameter.

The marsh grass extends 200m north along the shoreline of the river, where roseau cane takes over. The roseau cane is more persistent closer to the shoreline, giving way to marsh grass depth of the water increases to the west. Much of the interior is wet; the few clumps of bushes denote higher ground.

The water level of the marsh averages one foot at high tide and may drain at very low tides. The open water areas may be up to three and one-half feet deep. On the higher ground there are a few bare salt flats.

Landform Change: By 1951, the Coast Guard Station is almost completely in the water. By the 1973 aerial, the island which houses structures associated with the pilots' station and the Coast Guard Station has broken up. Most of the land north of the Coast Guard Station is shown as submerged. Since the east jetties, normally submerged at high tide and during floods, are above the water in the aerial, it appears that the land was not submerged, but was washed away. This fact has very significant implications with regard to archaeological remains, many of which were likely washed away as well.

Just 10 years later, on the 1983 aerial, the island is not only whole, but the land area has doubled; the majority of the Coast Guard Station is now on land. The most notable features are two large circular areas of dry ground in the north and central portions of the island; this could be dredge fill deposition.

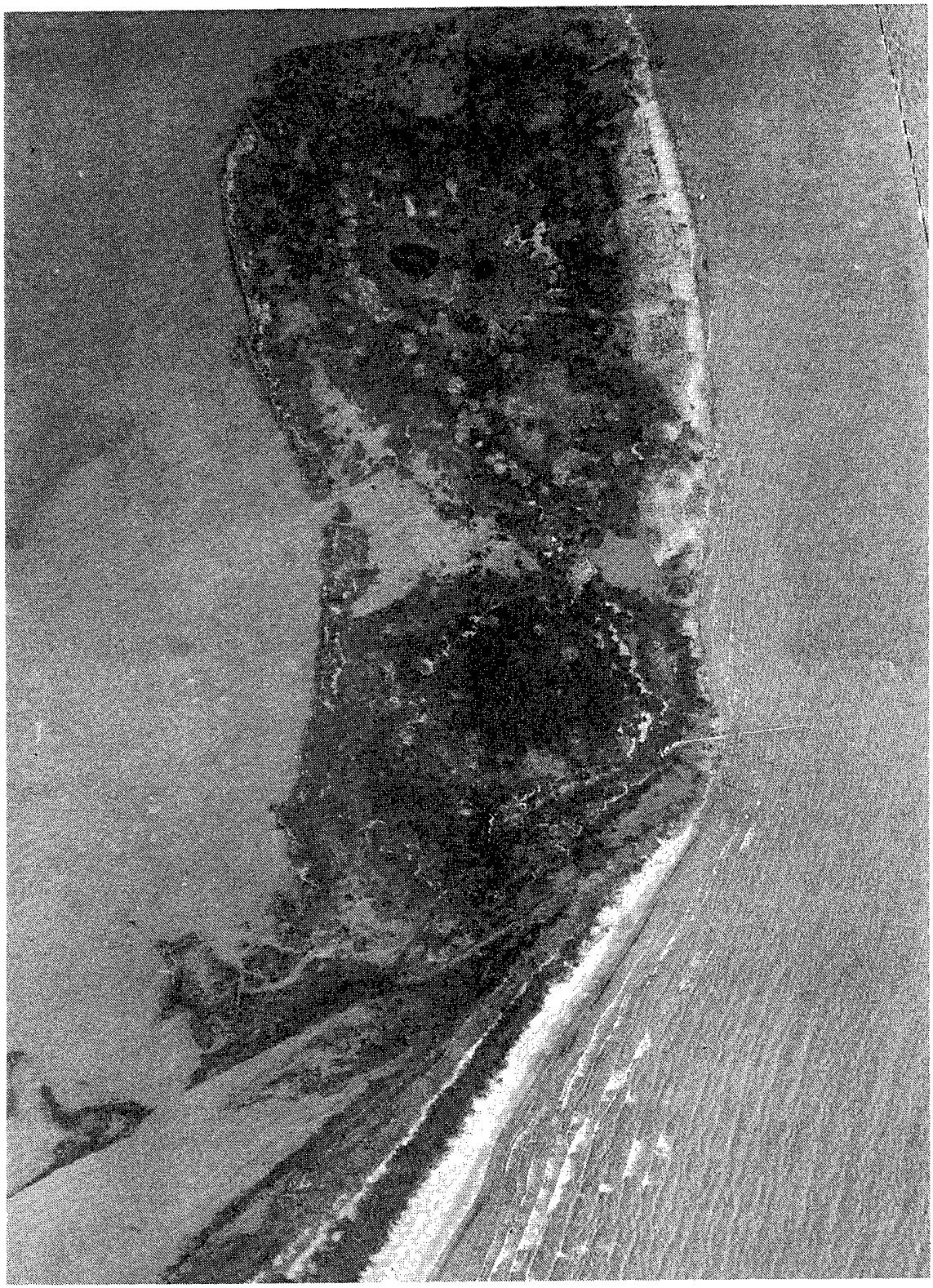


Figure 155. 1992 Aerial photograph.

Research Objectives

This site is scheduled for intensive dredging and filling activities so, along with 16PL63, it is likely to receive the most impact. In addition to identifying less sensitive areas where dredging equipment could travel, there was a special concern for the Bar Pilots' Station, which Weinstein had evaluated as potentially eligible for the NRHP, and any other standing structures at the site. The condition of the Bar Pilots' Station was to be reevaluated and any other structures recorded and evaluated.

Field Investigations

Because the once inhabited area was claimed by the river, the field investigations were restricted to mapping the site, surface collection, and subsurface testing of the strip of dry land inland of the inundated habitation area. Since this strip of land was covered in dense roseau cane, the grid transects again had to be cleared using an air boat. A north-south, oriented at 310° was cut through the roseau cane with the airboat. This transect paralleled the narrow sand beach that lines the shore of South Pass at its southern end. The transect was set about 15 to 20m inland from the beach and extended a distance of 500m. Transects, spaced at 50m intervals, were then cut from the beach on the east to the marsh that borders the area to the west. The length of these transects varied, depending on the distance to the marsh.

Easily observable today are pilings in the water, representing former locations of structures (Figure 156). Reconnaissance of the area also produced possible evidence of structures in the cane. Between Transects 6 and 7, a pile of decayed lumber was observed. About 10m inland and further north was a large metal storage tank that had been blown inland. A wooden foundation that may have served as the tank's support was located in the water about 30m east. At the north end of the site, the roof of a small structure was also noted (Figure 157), but there were no structural remains beneath it. A careful surface survey of the beach was also accomplished.

The site was mapped using a transit to plot the major features, while a tape and compass were utilized to map the transects and vegetation. Mapping of the pilings proved difficult and somewhat dangerous as they were not apparent until low tide, many were even still submerged, and some could only be reached by boat.

The subsurface investigations consisted of placing a line of 50cm by 50cm test units along the north-south transect at 50m intervals, usually at the juncture of each east-west transect and the long north-south transect. All units were excavated on high ground between the beach to the east and the wetland to the west. In addition, a single test was placed on a small area inland of the Coast Guard Station and in the vicinity of possible structures. A total of 11 test units were completed.



Figure 156. Mapping operations at 16PL123.



Figure 157. Roof found at 16PL123.

Results

Very little evidence of the once sizable occupation at the site was found during the investigations. The only standing structures found at the site were the abandoned radio tower complex and the associated pier (Figure 158). No artifacts relating to the occupation were found during the surface collection nor were any recovered from the subsurface tests. Considering the extensive erosion depicted in the 1973 aerial, it is probable that most of the artifacts associated with the occupation were washed away during that period.

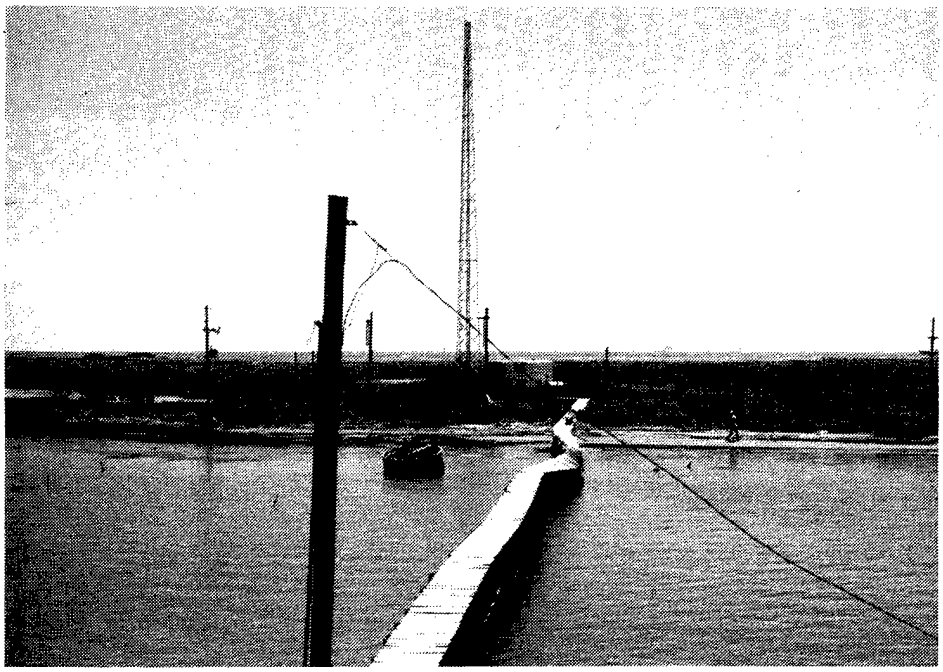


Figure 158. Photograph of 16PL123, taken from the pier facing west toward the radio tower.

Soils in the site area appear to be a mixture of recent sediments and possibly dredge fill. The water table is high, averaging 40 to 60cm. A typical profile is five centimeters of a brown (10YR 5/3) silty loam A horizon with a layer of gray (10YR 5/1) sand underlain by a very dark brown (10YR 3/3) strata of sandy loam (Figure 159).

Structural Remains

Figure 160 depicts features and pilings mapped at 16PL123. The pilings depicted are those visible during normal low tide. Additional pilings were sometimes apparent at lowest tide in the vicinity of the Coast Guard Station.

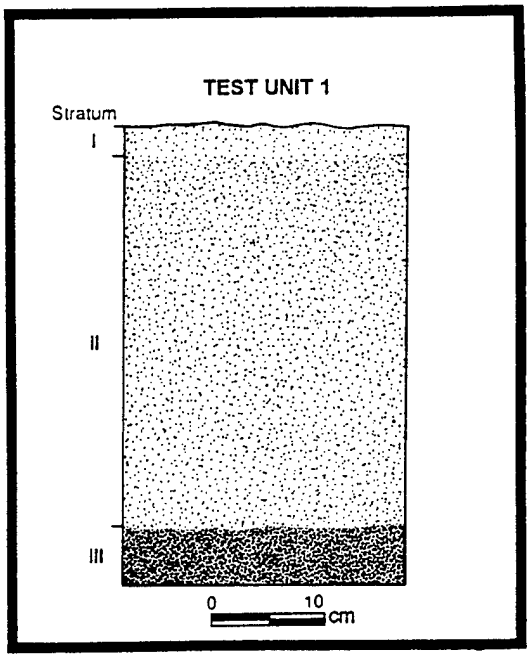


Figure 159. Profile of test unit 1 at 16PL123.

Feature 1 - Radio Tower: This is a 100-foot, metal-girdered radio tower located at the west end of the pier. The tower is first visible on the 1961 aerial with the pier and the ancillary shacks (Features 2 and 3) appearing between 1973 and 1983. It is 10.8 feet by 10.8 feet at the base and mounted on 6.5 feet high concrete pillars. The tower is not functional; all wiring is disconnected.

Feature 2 - Operations Shack: This structure is an eight feet by 10 feet portable fiberglass building mounted at the west end of the pier next to radio tower. The radio transmitter, air conditioner, and other operations equipment has been removed.

Feature 3 - Generator Shack: This structure is the same type of shack as Feature 2. It differs in that the generator and other power equipment remain inside and a 200-gallon diesel tank is stored on east side.

Feature 4 - Tide Gauge Pier: This is a pier over 100m long, extending 70m into the river and 30m on land. The pier connects the radio tower and tide gauge. Construction is of weathered creosoted lumber and galvanized bolts and nails. The pier is three feet wide and a portion is falling over, presumably from storm damage. This is a second generation pier from the Coast Guard Station to the radio tower. The original pier, shown on the 1973 and 1983 aerials, ran northwest from the Coast Guard warehouse. It was replaced by the present pier, which is first depicted on the 1986 aerial.

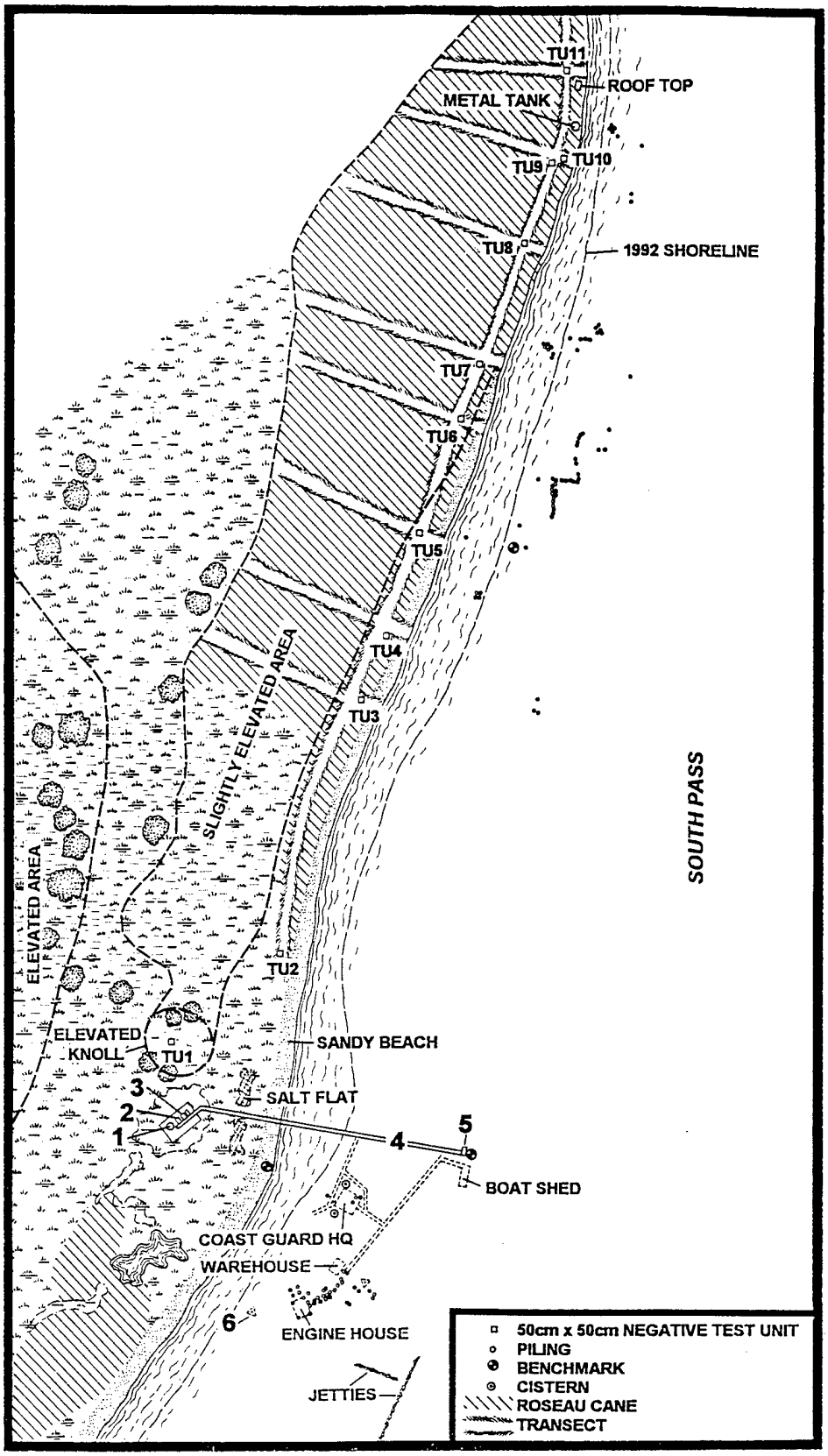


Figure 160. Detailed sketch map of 16PL123, identifying structures by number.

Feature 5 - Tide Gauge Shack: This structure is a six feet by eight feet metal-skinned shed mounted on pilings at the east end of the pier and 20 feet above the water. It first appears on the 1986 aerial. The structure was locked, precluding entry and interior examination. However, a sign identified it as a tidal recording device.

Feature 6 - South Navigational Beacon: This is a 15 feet metal tower with a green beacon on top and three four feet by eight feet identification panels mounted on the south side. The metal tower is mounted on eight feet by 10 feet platform on pilings 15 feet above water. The beacon has an attached power line and appears to be functional. It is in the location of a radio tower on an earlier map, but definitely appears to be a beacon on the 1961 air photo. The beacon was connected to the Coast Guard Station by a pier, but only a few pilings remain of this extension. The beacon's official name on the 1992 map is "South Pass West Jetty Range Front Light."

Bar Pilots' Station Remains

The primary remnants of the pilot station are clusters of pilings in the pass that extend for almost 400m along the shoreline. Other remains include the roof top and a metal tank. These pilings are all in the water and extend up to 70m out in the pass. Most of the pilings are only visible at low tide, and large numbers are still submerged even at lowest tide. Those present on the site map were above water. Mapping of these pilings proved difficult due to the deep water and currents.

Judging from the maps and aerials, the largest cluster appears to be the remains of the pilot station. A National Ocean Survey bench mark (BM 0550A), dated 1982, was identified in the vicinity. To the north, the smaller clusters of pilings could be remains of structures that appear on the 1983 aerial. The pilings to the south are the remains of older structures that were destroyed between 1951 and 1973 according to our examination of the aerial photographs.

Coast Guard Station Remains

The basic plan of the Coast Guard Station was largely unchanged from its initial construction to its ultimate demolition. As with the Bar Pilots' Station, the present remains primarily consist of pilings in the water (Figure 161); many of which are submerged or have been washed away, and two half-buried cisterns that were attached to the headquarters building.

The remains extend between 30-110m out into the river from the present shoreline. Remnants of the engine house were most evident, but very few of the pilings north of this were above water during the investigations. The cisterns, both of which measure 10 feet in diameter and have open tops, are now 20m into the pass. Both cisterns are only three feet above water and are in ruins. The northern cistern is visible on the 1951 aerial and the other can be seen on the south side of the headquarters building on the 1957 air photo. The remains of the two earlier piers were not found on land or in the water. The most recently constructed pier remains.



Figure 161. Photograph of pilings, facing south toward remains of the Coast Guard Station, 16PL123.

Discussion

The only material evidence at the Bar Pilots' Station and the Coast Guard Station site were two piers, a radio tower, several shacks, a beacon, clusters of pilings in the river, the two cisterns from the headquarters building of the Coast Guard Station, a pile of lumber, possibly a metal storage tank, and a stranded roof top. It appears that even the artifacts were washed away by the strong natural forces that hold sway over the area.

SUMMARY

Archeological investigations were conducted at four sites (16PL49, 16PL62, 16PL63, and 16PL123). Remains associated with the nineteenth and twentieth century occupations of historic Port Eads are present at 16PL49 and 16PL62. Eighteenth century ceramics found at these sites are interpreted as ballast rather than evidence of any habitation of the area during the 1700s.

The Bar Pilots' House and Coast Guard Station (16PL123) are no longer extant. There are some standing features in the area, but these are not associated with the site. Site 16PL63 was reported to consist of pilings associated with a 1945 gun emplacement. Piling Group 1 may be remnants of an observation tower, whereas Piling Groups 2 through 4 are probably the remains of the batteries. Piling Group 5 is located some distance from the other four groups and is probably associated with a former structure that appears on the 1951 aerial.

CHAPTER SIX
JETTY INVESTIGATIONS

By
Jack Bergstrasser

With Contributions By
Joy Jackson

CHAPTER SIX - JETTY INVESTIGATIONS

OVERVIEW

When mandated by congress in Section 4 of the River and Transportation Act of March 3, 1875, the novel improvement project intended "to open a wide and permanent deep channel between the Mississippi River and the Gulf of Mexico through South Pass" was one of the most innovative and economically important engineering projects ever attempted on the River (*U.S. Government Printing Office 1875a:3*). If successful, the jetties to be built by prominent engineer James Buchanan Eads of St. Louis would open up the Mississippi and the port of New Orleans to a magnitude of commerce that had always been defied by the shallow bars that blocked the passes linking the River to the Gulf of Mexico.

The project was as controversial as it was innovative in concept. It was opposed by many New Orleans businessmen who favored a lateral canal from St. Philip to the Gulf of Mexico and were suspect of Eads' motives because of the entrepreneur's ties to rival financial factions in St. Louis. It was also opposed by top officers of the Army Corps of Engineers who, on the one hand, resented the intrusion of a civilian engineer into a problem they had been working for decades to improve and, on the other hand, doubted the validity of the hydraulic principals upon which Eads' plan was based.

A project that would have been difficult to accomplish even with complete and whole-hearted support from all factions was made even more difficult because there was no precedent in the western hemisphere for building jetties in an environment so formidable as the mouth of the Mississippi River. While their detractors scrutinized every decision for any hint of error, Eads and his associates were forced to devise innovative solutions to problems that arose regularly during construction. These solutions ranged from modifying designs for particular construction components of the jetties themselves (e.g., the controversial reed mats used as their base) to modifying the dredge boat *Bayley* to resist the buffeting waves encountered at the mouth of the pass. The jetty builders were also forced to develop specialized equipment and procedures, including a pile driver raised by friction gearing and a system for mixing and distributing concrete across the top of the jetties.

Undoubtedly the most innovative aspects of the project were the theoretical hydraulic principals that Eads claimed would be put into play if the jetties were constructed to his specifications. He asserted that a set of parallel jetties built to a width determined by the volume of water entering South Pass would allow the water to scour a channel just deep enough to achieve an optimum velocity. At this velocity the amount of sediments suspended in the water would reach a state of equilibrium where additional material could neither be picked up nor dropped. Since it could not gain or loose sediments, the flowing water would neither wear away existing material nor deposit any new material in the channel. At the same time, sediments already suspended in the water would be carried well beyond the bar outside the mouth of the pass. In fact, Eads claimed, if the jetties could maintain a channel that discharged just beyond the apex of the bar, the saltwater of the Gulf would act as a channel of its own, similar in proportions to the one formed by the jetties, that would carry the river water well out into the Gulf where it would be dispersed by littoral currents. In this way, Eads would fulfill the most ambitious mandate of the congressional committee which

instructed him to build the works so substantial that "said channel may be maintained for all time" (*U.S. Government Printing Office 1875a:36*).

Once completed, the South Pass jetties became a milestone in the commercial and economic history of the Mississippi River. Not only did they secure the position of New Orleans as a world harbor, increasing its export trade 26-fold and raising it from eleventh to the second largest port in the United States, their success was so impressive that the jetties became a precedent for the initiation of a comprehensive, publicly funded program of river management and improvement that continues to the present day (*Yager 1968:101-109; Lippincott 1914:658*).

EADS AND CONSTRUCTION OF THE SOUTH PASS JETTIES

James Buchannan Eads: the Self-Taught Engineer

One reason for the significance of the South Pass Jetties is their association with an engineering figure of the magnitude of James B. Eads (Figure 162). Although self-taught, having learned primarily from the borrowed books of an early employer, then later from extended conversations and correspondence with professional engineers and business associates, Eads showed a remarkable gift not only for invention and organization, but also for an ability to work easily with formally trained engineers.

Prior to constructing the South Pass jetties, Eads had established a national reputation for his ability to improvise radical, yet infinitely workable solutions to individual design problems, while simultaneously and efficiently coordinating the hundreds of tasks required to complete a major construction project. His first step toward building such a formidable reputation came during the Civil War when the former snag boat captain launched a total of 14 ironclad boats that formed the nucleus of the fleet that took part in battles beyond the Mississippi. Following the Civil War, Eads took on his second major project, another one for which he had no previous training or experience —building, at St. Louis, the first bridge ever to cross the Mississippi River. And, as with the Ironclads, Eads employed a series of resourceful ideas that resulted in significant new patents.

The Ironclads

The construction by Eads of 14 Union ironclads during the Civil War brought the first nationwide recognition of his abilities. As a result of the war's outbreak, the nation was in disarray in July 1861 when the Quartermaster General advertised for bids for the construction, as quickly as possible, of seven gunboats. In a fashion that would later become a personal trademark, Eads set forth a very ambitious proposal backed by the commitment of his own personal funds should he not deliver on his claims.

The contract called for the delivery of the ironclads by October 10, 64 days later, a date that Eads missed by only a few days. Coming as close as he did to the promised completion date was an accomplishment in itself, requiring that Eads draw together a diverse and geographically far-flung

group of technicians and manufacturers. Machine shops and foundries in St. Louis were put to work on a 24-hour basis. Iron plate was rolled in St. Louis, Cincinnati, and a series of small towns in Kentucky and Ohio. Timber was assembled from four states. By successfully marshaling all these resources, Eads was able to deliver all of the ordered ironclads within the remarkably short period of 100 days (*How 1970:29-30*). This timely delivery provided the backbone of a river fleet that was largely responsible for securing the Mississippi River and its major tributaries for the Union (*How 1970:37*).

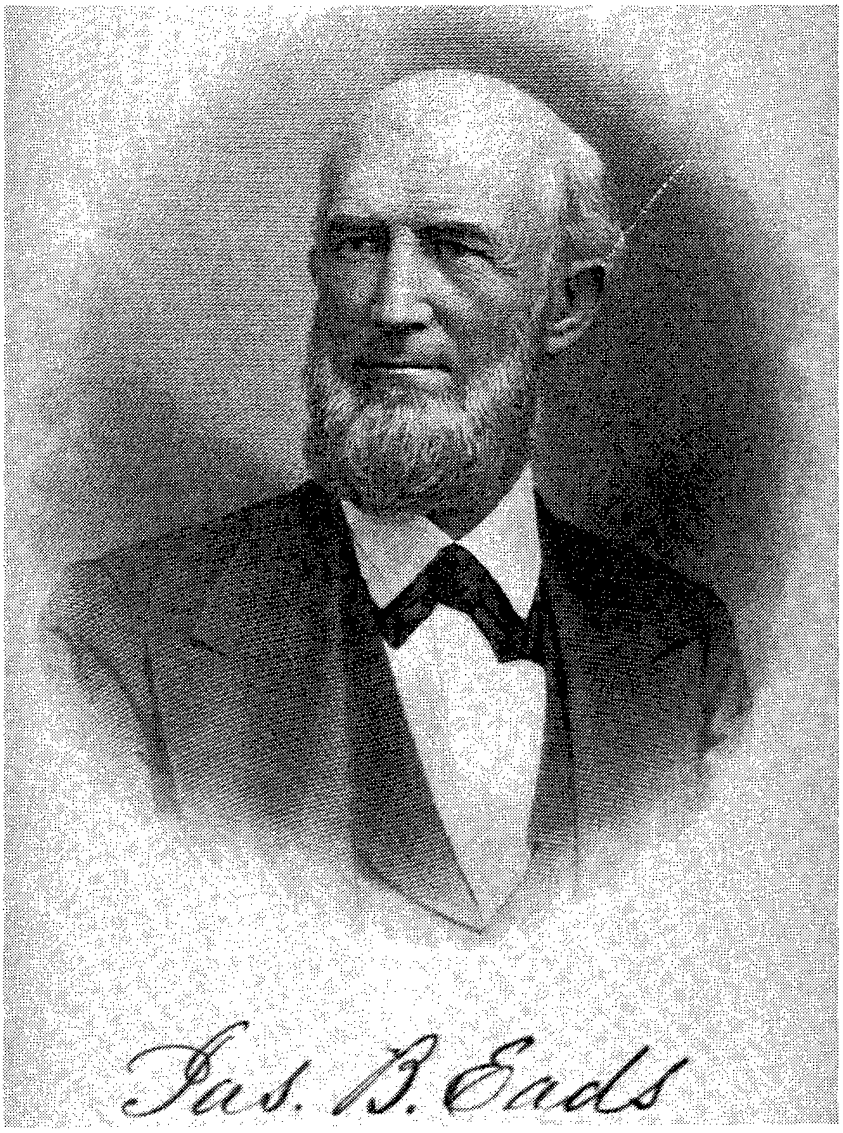


Figure 162. Portrait of James B. Eads.
(from *Corthell 1881*)

Another government contract for ironclads secured by Eads called for the construction of double-turreted versions of John Ericsson's design for the original *Monitor*. In this case Eads decided that he could improve greatly on the turret design and firing capability of the Ericsson boat. When his plans to install the new turrets on the ironclads were turned down by the War Department, he made the unusual request to place one of his turrets on two boats along with one each of Ericsson's design. If the Eads model proved to be inferior he would replace it at his own cost.

Once the request was granted, trials proved that the Eads system, featuring a steam-powered mechanism for raising and lowering the gun for loading, a steam recoil, and ball bearing mounts for the turrets, was capable of firing every 45 seconds, seven times faster than the Ericsson turret. Later in the war, two of the double-turreted ironclads, the *Chickasaw* and *Winnebago*, were instrumental in Admiral Farragut's victory at the Battle of Mobile Bay (*Dorsey 1947:68-69; How 1970:39-40*).

The Eads Bridge

The construction of the Eads Bridge over the Mississippi River at St. Louis was, according to Fredrick Dobney, "revolutionary in both design and construction" (*Dobney 1978:41*). The list of new concepts, materials, and construction methods is impressive. It was to consist of two 502-feet spans and one 520-feet span, the longest constructed to that date, and was to be built of alloy steel in the first major application of this building material in bridge construction *(Yager 1968:74*).

The use of steel in the construction of the bridge spans required that Eads orchestrate another complex marshaling of technical expertise and manufacturing facilities. One of his most important associates was Andrew Carnegie, who supplied material for the project through the Keystone Bridge Company and the firm of Carnegie and Kloman of Pittsburgh. But, as Rosemary Yager has pointed out, Eads also relied on such leading producers as the Butcher Steel Company of Philadelphia and the Chrome Steel Works of New York. And since there were no precedents from which to work, Eads and his suppliers were forced to develop their own alloys of steel as well as design the individual construction members and the machinery on which they were to be manufactured (*Yager 1968:73-75; Dobney 1978:41*).

The foundations upon which the steel spans rested were equally innovative. Eads drew heavily upon knowledge that he had gained during many visits with European engineers to implement the first use of underwater pneumatic caissons in the United States. These were taken deeper than ever before, in order to reach bedrock which lay beneath 100 feet of sand in the river bottom. Eads knew that such substantial foundations were necessary because of his knowledge of the immense scouring capacity of the river, learned during his years as a wreck salvager, while walking the bottom of the river in a diving bell of his own design.

An important aspect of Eads's work, as pointed out by his many biographers, was the easy way in which he wove the elements of self-taught empiricism, such as his personal observations of hydraulic scouring, with the formulas and principles of higher mathematics supplied by his formally trained engineering colleagues (*How 1970:63; Yager 1968:62*). So impressed were his English

associates, they nominated him to the Royal Society, Britain's oldest scientific association (*Yager 1968:66*).

The South Pass Jetties

The South Pass jetties were built in order to open up the mouth of the Mississippi River to ocean-going traffic. The 276 million cubic yards of sediments that reached the mouth of the river each year reduced its openings into the Gulf of Mexico into a series of shoals and mudlumps that posed a serious obstruction to most vessels and a complete barrier to those with deep drafts (*Dorsey 1947:170; Weinstein 1984:21*). Efforts to overcome this blockage, which had always been bad but had worsened during the nineteenth century, could be traced back as early as 1726 when workers had attempted to "deepen the channel over the Gulf bar by raking its crest with harrows so the Gulf littoral current, running parallel to the shore, might carry the loosened mud away" (*Dorsey 1947:167*).

In the first half of the nineteenth century, efforts finally began to achieve some momentum, beginning with the first government appropriation in 1837 for a survey and for dredging with buckets (*How 1970:78-79*). Beginning in 1852, the War Department appointed the first of a series of boards and commissions that would study the problem and make recommendations. The first action taken was to harrow the Southwest Pass in 1852, an effort which deepened the natural 13-feet channel an additional five feet. As Dorsey indicates, however, within three years this new channel had filled back in, resulting in the decision to construct a mile-long jetty on the east bank of the pass. This effort, in turn, met with little success (*Dorsey 1947:167-168*).

As efforts to deepen a natural outlet to the Gulf were moving with fits and starts, an alternative plan to bypass the lower delta region altogether by digging a canal eastward from Fort St. Philip to the Gulf was emerging and gaining advocates. In 1832 the Louisiana legislature approved such an effort, but no immediate action was taken. Following the Civil War, support for the canal idea grew, leading to the formation of two distinct factions, one favoring the improvement of a channel through one of the delta passes and the other favoring a canal from Fort St. Philip eastward to Breton Sound *(How 1970:80-81; Dorsey 1947:168-169; Yager 1968:92-93*). The debate climaxed within the course of roughly one year between 1874 and 1875 during which the Congress of the United States first appeared ready to approve the St. Philip Canal project, then, at the urging of Eads, reconsidered and finally decided to fund the improvement of one of the natural passes through the delta to the Gulf. Ironically, however, after reopening the debate at Eads's urging, the Congress chose to ignore his plans to improve South West Pass in favor of deepening the South Pass (Figure 163).

The decision to reconsider came from the Senate after the House had already passed the canal bill and resulted in the formation of a board of engineers made up "of three from the Army, one from the Coast Survey, and three from civil life" *(How 1970:83; U.S. Government Printing Office 1875b:948*). The sudden reversal created formidable enemies for Eads, since only a few months earlier the canal project, designed by Army Engineer C. W. Howell and personally supported by

Army Chief of Engineers, Brigadier General A. A. Humphreys, had been approved, by a vote of six to one "by the most distinguished army engineers" (*How 1970:82*), who had simultaneously condemned the idea of jetties at the mouth of the Mississippi. The canal advocates within the Army were joined by the City of New Orleans and other factions while Eads's support derived mainly from St. Louis, government insiders, and a number of prominent civilian engineers. With so many interested and powerful people following the project, it became a national issue receiving wide coverage in the press.

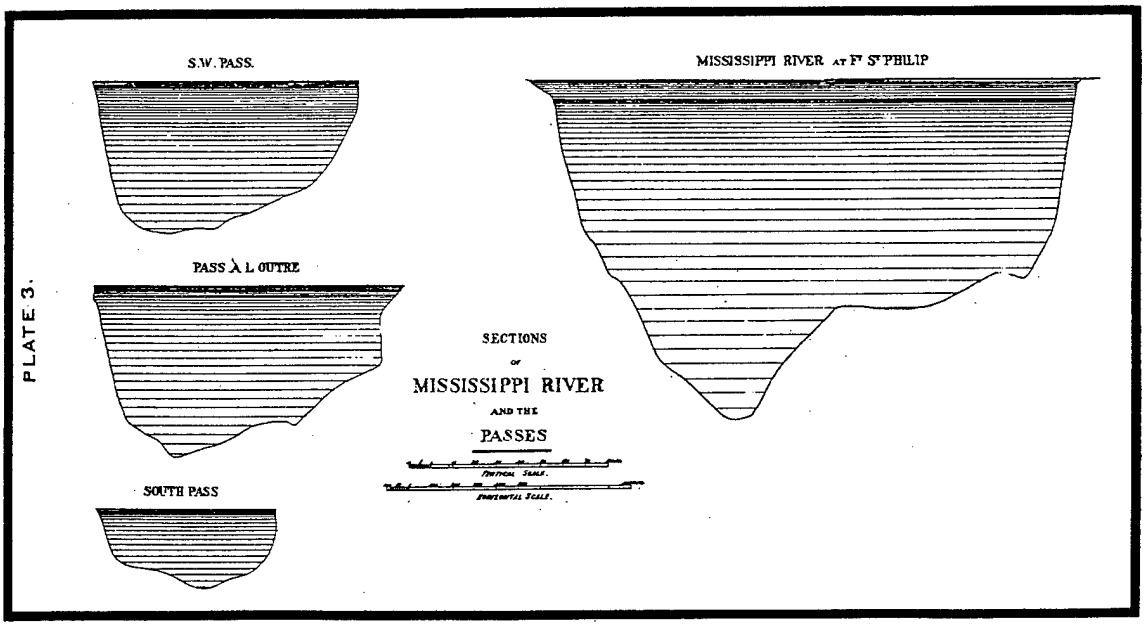


Figure 163. Pass comparison prior to jetty construction.
(from *Corthell 1881*)

The activities of the new board were reported in the *Annual Report of the Chief of Engineers of the Secretary of War for the Year 1875*. Funded through an appropriation of $25,000 by the first session of the Forty-third Congress, the board met first in New York City on July 20, 1874. Since there was no example in the United States of an effort to improve a large river in order to create an "outlet to the sea with much deeper water than naturally exists on its bar" (*U.S. Government Printing Office 1875b:949*), the group traveled to Europe, where they observed the public works projects on the Vistula, Danube, Rhone, and other major rivers. Traveling as a private citizen at his own expense, Eads followed the board on this trip. Returning to the United States the board reconvened in New Orleans, where they proceeded to visit the delta passes and the sites of various proposed canals, including the Army's favored Fort St. Phillip project *(U.S. Government Printing Office 1875b:948-950)*.

Corthell provides an excellent summary discussion of the contemporary European examples that were observed by the committee. He first cites the case of the Russian Dvina River flowing into

the Gulf of Riga, a tideless arm of the Baltic. While smaller than the Mississippi, Corthell indicates that it was similar to the Mississippi in several characteristics. The depth of the bar at its mouth had been increased from six to 18 feet by jetties which had been in service for over 100 years at the time of the committee's visit. Corthell goes on to describe the jetties at the mouth of the Maas in Holland. He indicates that this was a particularly relevant example, not just for the fact that the jetties had been successful, but also because a dam closing the Scheur River was similar to one that Eads would employ at the head of the passes at South Pass and because the willow mats employed in the Dutch project would serve as an example for the Mississippi jetties. As an additional European success story, Corthell describes the jetties deployed at the mouth of the Sulina branch of the Danube River. Here a recent project begun in 1858 and finished in 1861 increased the depth on the bar between seven and 11 feet to 20 feet by 1872 (*Corthell 1881:50-55*).

In his discussion Corthell also refers to a Rhone River project that had failed to achieve a deep and permanent channel. While he indicates that opponents of Eads might used this French case as evidence against the South Pass jetties, Corthell argues that it was not the jetties concept that had failed but the fact that they had not been extended beyond the crest of the bar outside the mouth of the river (*Corthell 1881:51-52*).

Other than these European examples, the committee had no contemporary models in this country upon which to base their decision. Jetties had been used extensively in the Great Lakes, but there were no cases in the United States where they had been employed to open and maintain a deep channel into a body of salt water. Similar projects in this country would have to wait until the South Pass experiment had been proven successful. Two such efforts that would follow quickly upon the completion of the jetties at the mouth of the Mississippi were initiated a few years later at Charleston, South Carolina and in the tidal basin at the mouth of the St. Johns river in Florida, referred to herein as the Jacksonville jetties.

The Jacksonville jetties were particularly important because their success confirmed that the general principals that Eads had first applied to the alluvial delta of the Mississippi would also apply to rivers emptying into tidal basins. While the construction of the Jacksonville jetties was performed by Lara, Ross and Company in the early 1880s, Eads had written an essay on their theoretical feasibility in 1878 during the midst of the South Pass project. Reporting in 1971 upon a reevaluation of the ideas set forth in the Jacksonville jetties paper, O'Brien concluded that "Eads stated a number of general principles regarding tidal inlets which subsequent experience has shown to be valid" (*O'Brien 1971:1*).

O'Brien's findings hint at the true significance of the South Pass jetties. Although in a few instances such improvements had been made to work in the past, the construction at the mouth of the Mississippi was the first case where the builders had clearly set forth beforehand the principles of hydrology which the jetties were designed to accommodate. And Eads had gained his knowledge of these principles through practical experience—gained particularly during his early career as a salvage boat captain when he had frequently walked the bottom of the river in a diving bell of his own design. The South Pass jetties, therefore, were a milestone marking the climax of an era in

American science and engineering when an artisan employing empirical knowledge could still discover and implement general physical principles in a major public works project.

While associates of Eads, such as Corthell, were firmly convinced that the European experiences confirmed the viability of jetties, the congressionally appointed board saw the evidence as being less conclusive (*Hair et al. 1982:4-5*). Nonetheless, after careful deliberation, the Board of Engineers submitted its report on January 13, 1875. Rejecting the canal proposal because of its greater cost, requirement for a lock at the Gulf, and because it provided a sea-entrance of only 300 feet in width compared to 900 feet for South Pass, the Board narrowed its choices to one of the passes. Although Eads favored the South West Pass, which was generally acknowledged to be the best choice for the long term because of its greater size, they finally selected South Pass as the cheaper of the two alternatives. Estimating the cost for the Project to be $7,942,110, and requiring three years for completion, they awarded the contract to Eads and his associates along with generous allowances for procuring trees and other building materials from specified public lands *(U.S. Government Printing Office 1875b:955-956, 977*).

If the purpose of the jetties at South Pass was to maintain a permanent, deep channel through which ocean-going ships could pass, the method for achieving this goal was to be "by confining a mouth of the river by jetties on the bar, so that, aided if necessary, by dredging or stirring up, the water shall be able to scour a channel through the bar, and to maintain it when once formed" (*U.S. Government Printing Office 1875b:951*). This task of confinement would require not the initial estimate of three years but instead four years, beginning on June 14, 1875 and ending on July 10, 1879, when measurements indicated that the flow of the Mississippi River during average flood tide had scoured a channel 30 feet deep as it passed through the jetties (*Dorsey 1947:167; How 1970:98*).

One indication of the magnitude of the effort involved is indicated by the number of trees used in its construction. After three months of work, Major C. B. Comstock, Army Engineer monitoring the project, reported that the crew already at work had driven 1,100 piles (Figures 164 and 165). Before the project was concluded, Eads would request and receive from the government permission to harvest an additional 10,000 trees from Hancock, Pearl, and Marrion Counties in Mississippi and Saint Tammany and Washington Parishes in Louisiana (*U.S. Government Printing Office 1875b:980-981*). While possibly not the total count, the construction of the jetties and support facilities required at least 11,100 trees.

While Eads and his associates, including his contractor James Andrews and Company, his long time business partner William Nelson, and assistant engineer Elmer Corthell who later wrote an exhaustive treatise on the project (*Corthell 1881*), are due much of the credit for the construction of the jetties, they were mandated to follow fairly rigorous guidelines that had already been established by the Board of Engineers. A passage from their report indicates how specific these requirements could be:

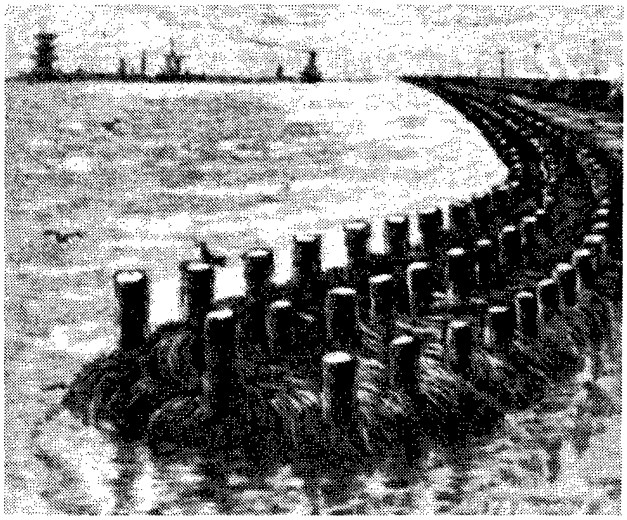


Figure 164. Sketch of the east end of the jetties as they looked during construction.
(from *Harper's Weekly 1883*)

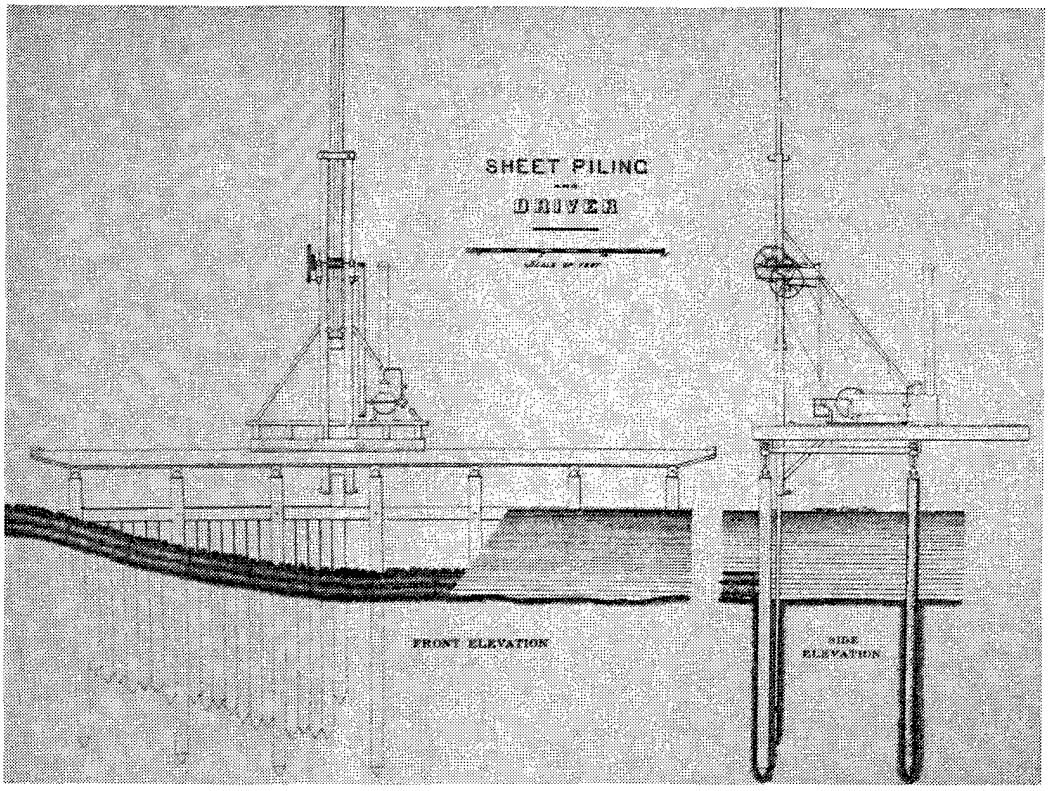


Figure 165. Sketch of the driver used to place pilings for the South Pass jetties.
(from *Corthell 1881*)

> These dikes should begin at the two banks of the pass, about 1,650 feet below the South Pass light-house, where the river has a width of nearly 900 feet and a maximum depth of 30 feet. They should run in straight lines, parallel to each other, in the direction of the pass, to where the water is thirty feet deep outside the bar.... The dikes for the first 7,100 feet should be 10 feet wide on the top; should then widen to 20 feet in a further distance of 2,050 feet; should then gradually widen to 50 feet.... The top of the dikes to be rounded and paved, the crown rising to high-water of spring tides (*Government Printing Office 1875b:953*).

The first phase in the construction of the dikes, which would forever-after be called jetties, began with the driving of two long lines of piles out into the Gulf on either side of the pass opening. The piles were primarily intended to serve as guides for the subsequent placement of willow mats topped with stone. The East Point reference station was established as a control point from which to survey in the locations for the pilings (Figure 166). East Point was designated as zero and distances along the pile rows on either side of the channel were marked off in 100 foot increments according to the convention followed for railroad construction. Each 100 foot increment was assigned a station number and points between stations were identified by the preceding station number plus the number of feet from that station. For instance, the 548 foot point along the east jetty would be designated as station 5+48. The principle measuring instrument used was a transit positioned at the East Point Reference station augmented by a variety of other measuring techniques (*Corthell 1881:84*).

Construction of the east jetty began on June 17, 1875, while work on the west jetty was initiated at station 40+58 on September 21 (*Corthell 1881:86*). Although the overall configurations of the two jetties were quite similar, the initial sections of each were constructed differently in order to accommodate variable conditions on either side of the channel. The first mile of the east jetty consisted of two rows of round piles placed twelve feet apart, with the individual piles in each row placed at eight foot intervals. The remainder of the jetty was made up of a single row of piles spaced from 10 to 20 feet apart. The first mile of the east jetty also included sheet piling made up of yellow pine planks 15 to 20 feet long that were 12 to 14 inches wide at the top and three inches at the bottom. These planks were driven side-to-side to a depth of 12 feet. While the entire length of the east jetty was parallel to the channel, the west jetty began with a 550 foot length of piles, known as the Kipp dam, that extended from the shore line near the Kipp signal station into the channel on a 90 degree angle (*Corthell 1981:75-76, 87*).

As the line of pilings progressed, large mattresses of a design used by "Mr. Caland at the mouth of the Maas" (*Government Printing Office 1875b:953*) were floated along side. Typically 100 feet long, 35 feet wide and two feet thick, they were then weighted down with stones until they sank. Rip rap was added to hold the mattresses in place, while sand and mud gradually filled the crevices between the willow reeds and logs used in their construction. Eventually the artificially constructed framework with its filling of natural river sediments would coalesce into a semi-permanent dike (*Weinstein 1984: 25; Corthell: 1881:75-80; Yager 1968 96-98*).

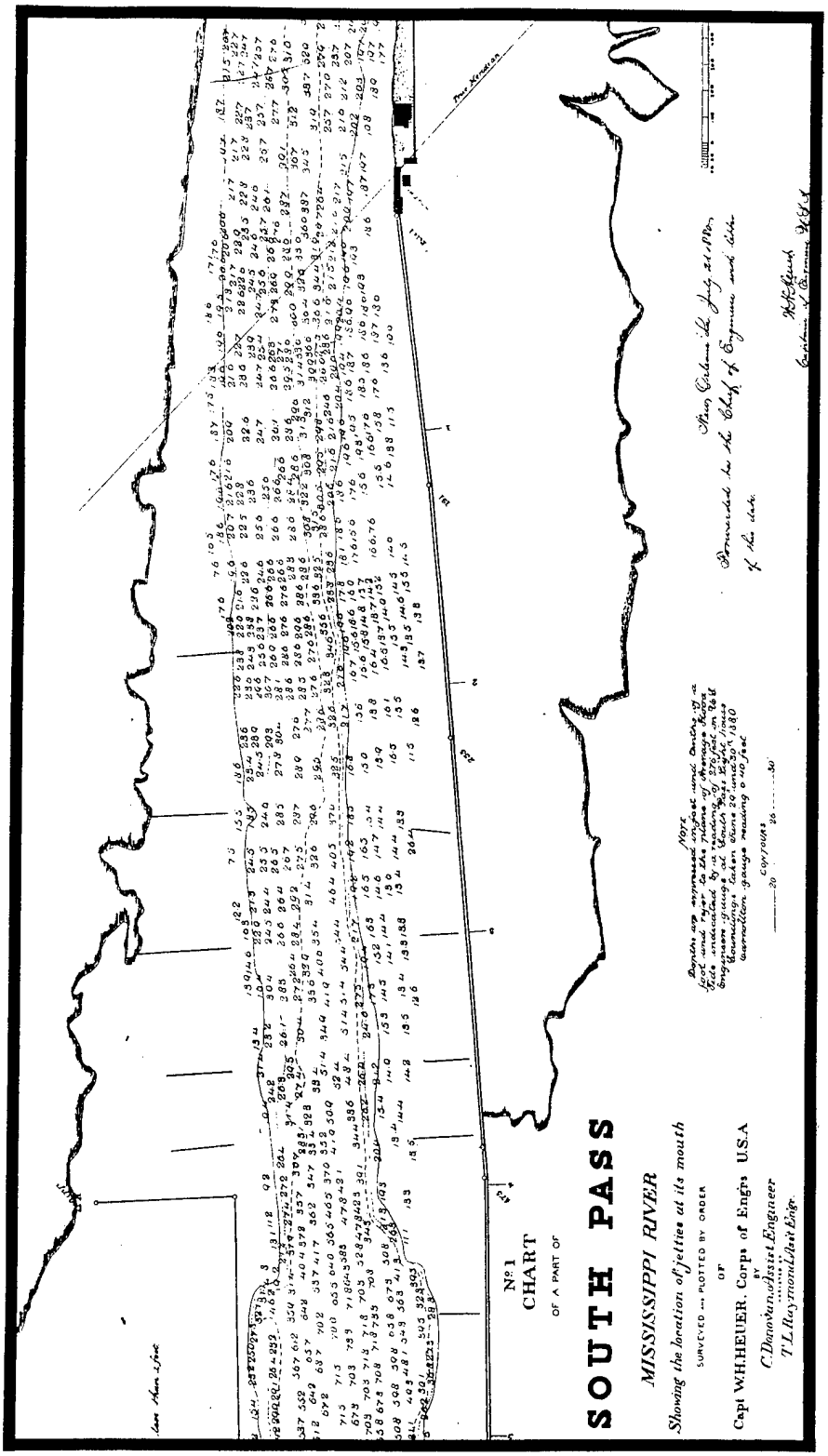


Figure 166. Portion of Corps 1880 chart of South Pass showing East Point and Kipp stations.

The mattresses were woven from willow branches which were cut upriver around The Jump, an opening in the river below Buras. The mattress construction was hard work (Figure 167). The men lived and ate on houseboats and worked sometimes thigh high in mud and water cutting the willows. They packed the cut willow branches into bundles which they carried over their shoulders back to a waiting barge. When the barge was filled with bundles, it was towed down to South Pass (*Corthell 1881:76*).

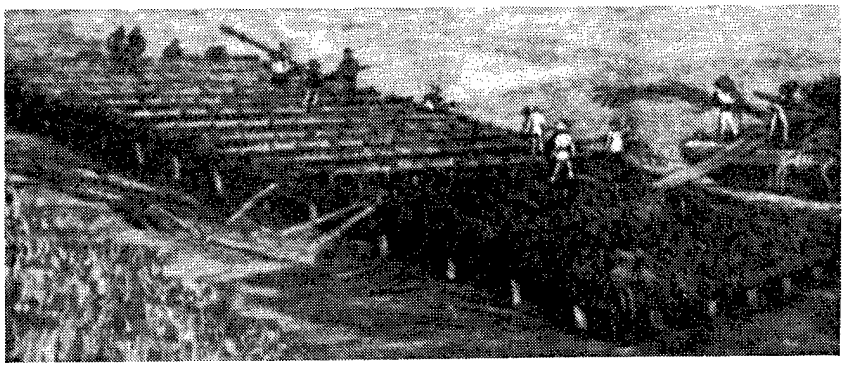


Figure 167. Sketch of workers completing a willow mattress atop the jetties.
(from *Harper's Weekly* 1883)

A mattress frame was made out of yellow pine strips approximately 35 feet long (Figure 168). This would be the width of the lower layers in the jetties. As more layers were piled on top of these, the later strips were made shorter in order to create a sloping bank when it was complete. The strips were laid in parallel rows five feet apart. The end strips were then secured together to create a frame one hundred feet long. Stakes were driven through the strips with two feet standing exposed, and willow branches were then placed over the sections of this frame with branches hanging out of both sides of the frame. Layers of branches were alternated: up and down on one layer, then crosswise on the next layer. When the willow cover reached eighteen inches in thickness, a second mattress was laid over it and pressed down. Binding strips with holes were placed over the stakes and wedged tightly in place.

Now the double mattress was ready to be floated and towed to the jetty site where it would be maneuvered into place against the piles and covered with stone rip-rap dropped from a barge. One section of the mattress at a time would be covered with riprap, until the last section was released from the cables attached to its towboat and allowed to sink to the bottom. Eads depended on the river to complete the task of bringing down sediment and filling in the crevices of the mattresses to create a solid earthen wall. This method of creating jetties had been used in Europe and was called the fascine method. But Eads's particular method of making the mattresses so quickly was his own plan (*Corthell 1881:76-80*).

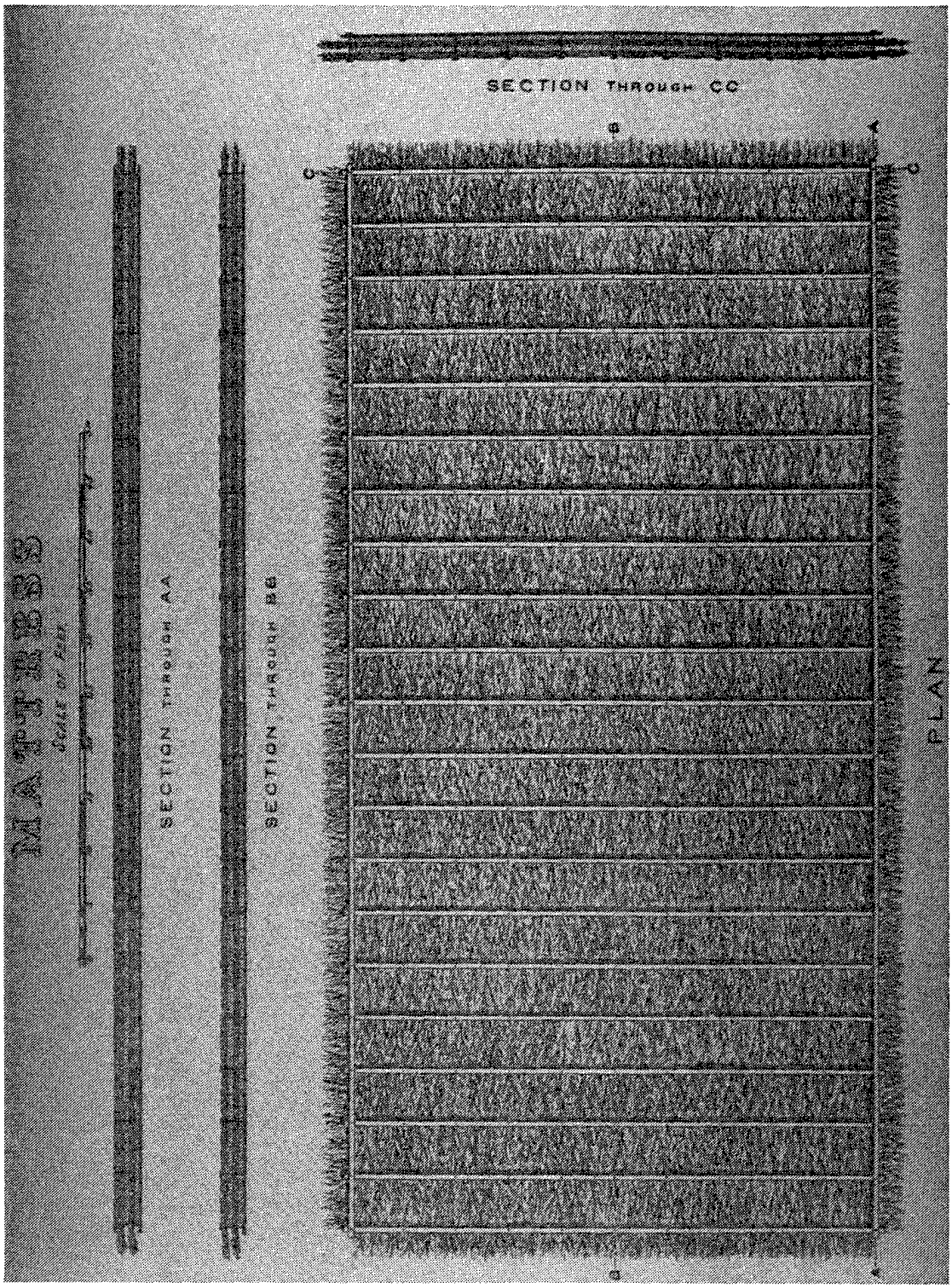


Figure 168. Drawing depicting willow mattress design.
(from *Corthell 1881*)

In order to increase the scouring effect of the channel created by the advancing jetties the construction crew added a series of eight temporary wing dams constructed in pairs opposite one another beginning at station 90 and ending at station 118 on the east jetty. The guide piles for these dams extended about 150 feet into the channel from both the east and west jetties. The total length of mattresses laid down in the process amounted to 1,200 lineal feet. The wing dams were intended to overcome the leakage of channel water through and over the newly constructed jetties (*Corthell 1881:90-91*).

By the fall of 1878, it had become clear that the massive stones placed atop the mattress walls of the jetties would not be adequate to withstand the wave-action created by storms. During particularly severe storms rubble stones weighing as much as 3,000 pounds were dislodged from the east jetty by easterly storms allowing sand to wash over its walls and create shoals in the channel.

To remedy the problem Eads and his engineers decided to cap the tops of the most exposed seaward ends of the jetties with a series of concrete blocks, or *betons*. These blocks would be poured in place into forms built directly atop the jetties. On the west jetty they would extend from station 90 to the seaward end and on the east jetty they would extend from station 65 to station 118. As an added measure of protection for the outer east jetty, which was exposed to the easterly winds of the severest storms, Eads added square-shaped concrete and rubble masonry parapets to the tops of the blocks. The concrete caps would have to be massive to have any chance of surviving hurricane-force wind and waves. The blocks at station 65 on the east jetty were three and a half feet wide, three feet thick and 16 feet long while those at station 117 were 13 feet wide, five feet thick and 55 feet long. The heaviest weighed 260 tons (*Corthell 1881:202*).

The system devised for mixing and pouring the concrete crowns for the storm-battered jetties was of such interest that it was described by Max E. Schmidt, a Civil Engineer working on the jetty project, at the annual conference of the American Society of Civil Engineers in June 1879. Wharfs requiring about 400 piles spaced eight feet apart were constructed alongside each jetty to serve as storage areas for the sand, gravel, macadam and cement that would be required. These materials were moved by wheel barrow and carts to a large steam elevator and hoisted to a holding bin mounted atop a steam-rotated mixer. The mixer was a five foot nine inch cube constructed of iron boiler plate (Figure 169). The concrete was transported via railroad tracks across the jetties and poured into large boxes built directly atop the reed mats. While Corthell indicates that the concrete mixer on the east jetty was located at station 102, he does not mention the location of its counterpart on the opposite jetty (Figure 170) (*Corthell 1881:188; Dorsey 1947:211; Weinstein 1984:27*).

The materials that went into the construction of the blocks were carefully selected and maintained to exacting standards (*Corthell 1881:204-205*). The gravel was a clean wash material selected from the bed of the Mississippi River 130 miles to the north and was comprised of pebbles that ranged in size from 1/30 to 1 1/2 inches in diameter. The macadam was produced from compact limestone crushed to pass through a three inch ring. The sand, moderately coarse and sharp grained with an average width of 1/40 inch across, was carefully selected.

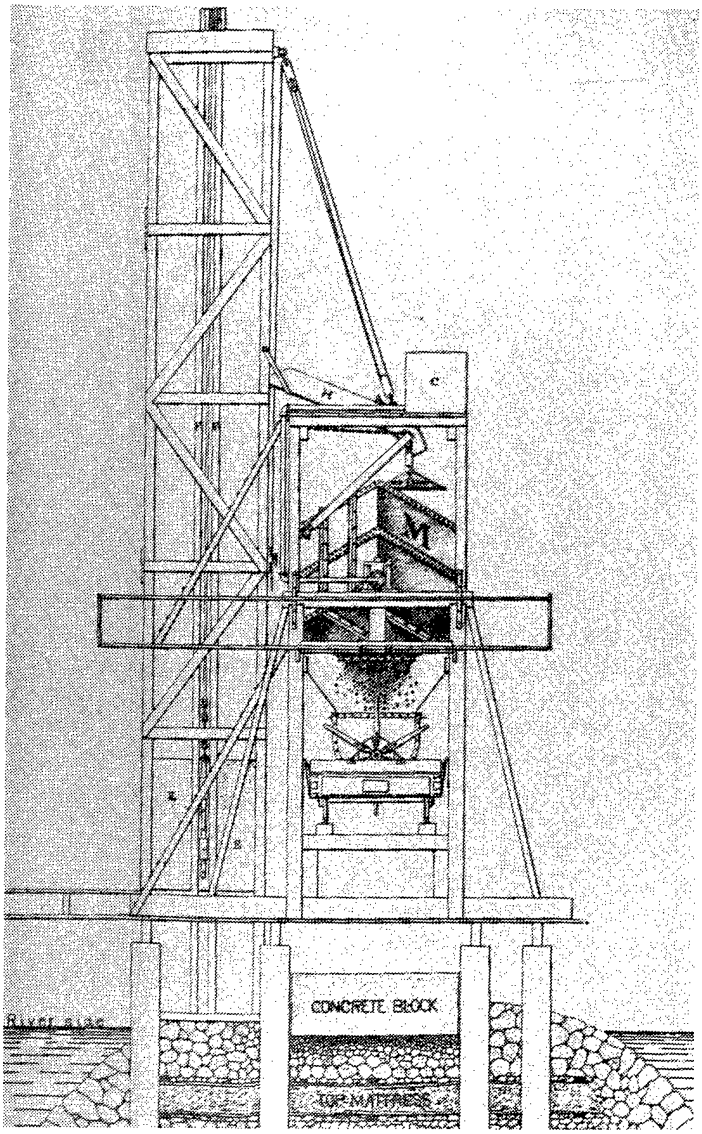


Figure 169. Sketch of the cement mixer shown on platform above a portion of the jetty. (from *Corthell 1881*)

The concrete blocks eliminated the problem of washouts in the jetty walls but created another related problem. While the wave action could no longer carry away boulders from the top of the walls the newly added blocks created conditions that allowed the waves to sweep along parallel to the outer walls of the jetties. These parallel waves, called runners, would undermine the walls and carry the rocks and boulders along until they met an obstruction. At this point the rocks would build into a mound and sometimes spill over into the channel (*Corthell 1881:206*).

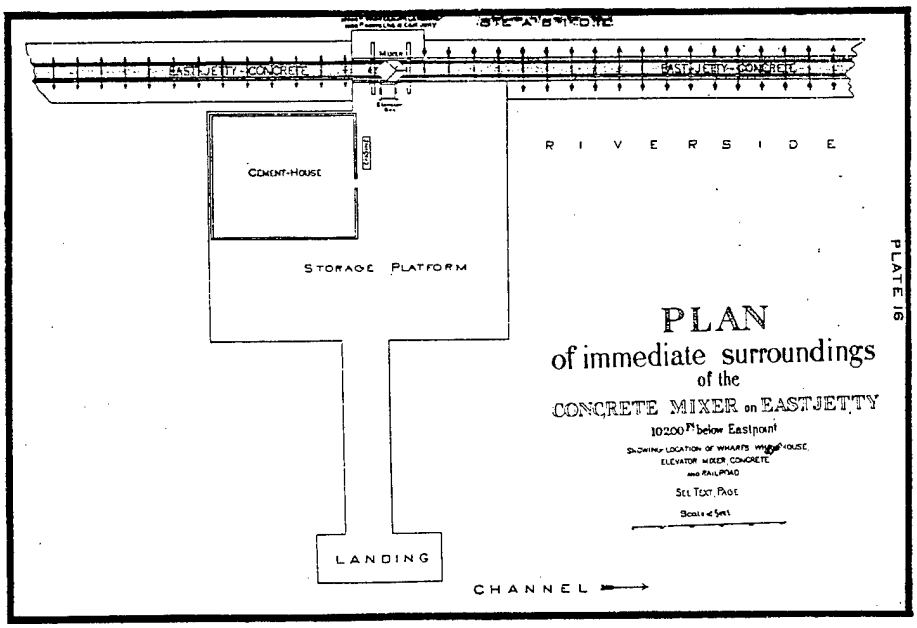


Figure 170. Plan view of the cement mixer and surrounding facilities on the east jetty. (from *Corthell 1881*)

To remedy this problem the construction crew added spur cribs, rectangular-shaped boxes made of palmetto palm logs and filled with boulders, at 100-foot intervals along the both sides of the jetties (Figure 171). The west jetty was completely enclosed in such cribs for 300 feet above its seaward end. The cribs toward the seaward end of the west jetty were constructed with "very flat slopes" in order to present as little resistance as possible to the wave action (*Corthell 1881:206-208*).

Everyone involved in the jetty construction project acknowledged that it was without precedent involving many lessons, such as the need for the wing dams and spur cribs, that "must be learned by trial" (*Government Printing Office 1875b: 955*). Still, Eads detractors led by General Humphreys and Major C. B. Comstock would regularly demand exact compliance to the guidelines conceived prior to the inception of construction. Occasionally their insistence on rigid protocol caused great difficulties for the project including delayed arrival of crucial sounding reports and, on one occasion, payment for completed work was delayed so long that the construction crew had to work for weeks without pay (*Dorsey 1947:193-195, 203*).

One of the most vexing incidences deriving from the practice of allowing no tolerance for unexpected contingencies came when Eads was forced to divert a major portion of his resources toward work at the head of the South Pass in order to create a stream flow sufficient to produce the required scouring at its mouth. While unanticipated in the original contract, this task became a major undertaking, requiring Eads to close Grand Bayou (Figure 172), constrict the mouth of Pass a'Loutre by 600 feet, and create a dam at the head of the Pass in order to channel the newly increased river flow into South Pass. The response of government inspectors, under pressure from Humphreys, was

to criticize Eads for neglecting his work at the jetties while he was performing this essential work elsewhere (*Dorsey 1947:197*).

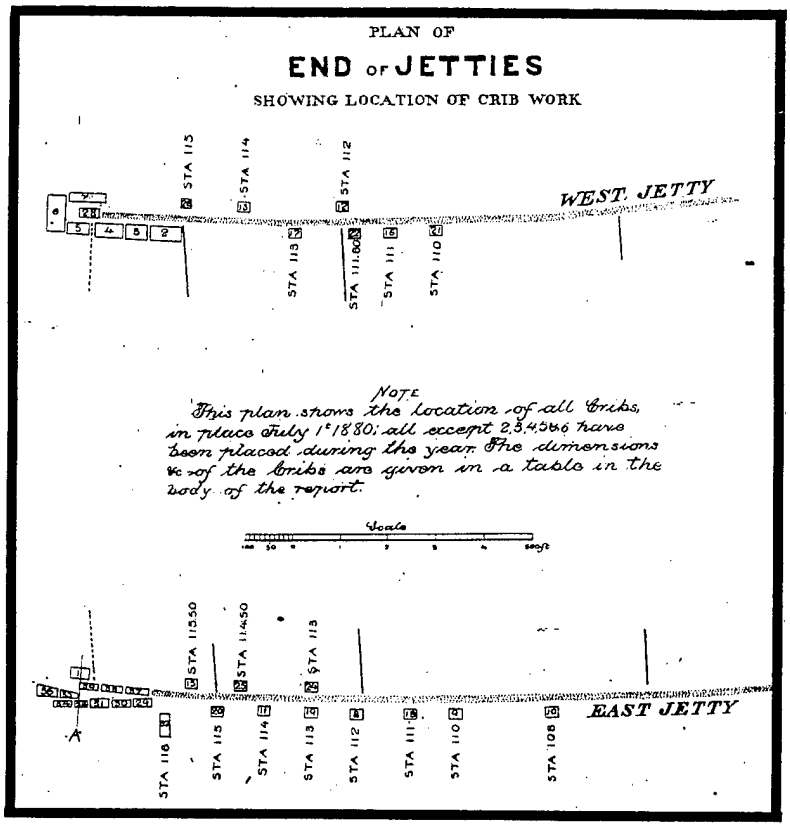


Figure 171. Map of the crib locations.
(from *U.S. Army Corps of Engineers 1900*)

Although the work was difficult in its own right, it was further hampered by frequent storms and a yellow fever epidemic that broke out in August of 1878. The fever was brought to the work camp at Port Eads by a supply boat and resulted in the deaths of 11 crew members among the 64 who contracted the disease. Among the dead was Eads' long-time partner William Nelson. An unspecified number of the men who died during the epidemic are buried near the Kipp signal station (*Corthell 1881:188*). In the meantime storms on September 17 and December 2 of the first year destroyed portions of existing work and caused delays in progress.

To attack these delays, Eads employed his usual skills of innovation to devise a series of labor- and time-saving methods and machines. Improving upon the "Dutch system" used in Europe for constructing the reed mats, he reduced the construction time for an individual mat from two days to two hours (*Dorsey 1947:184*). At another point Eads designed a modified dredge that proved greatly more efficient than conventional boats (*Yager 1968:98-99*). Perhaps the most impressive improvisation, however, was the system for mixing and pouring the concrete required to build the concrete blocks required as crowns for the storm-battered jetties.

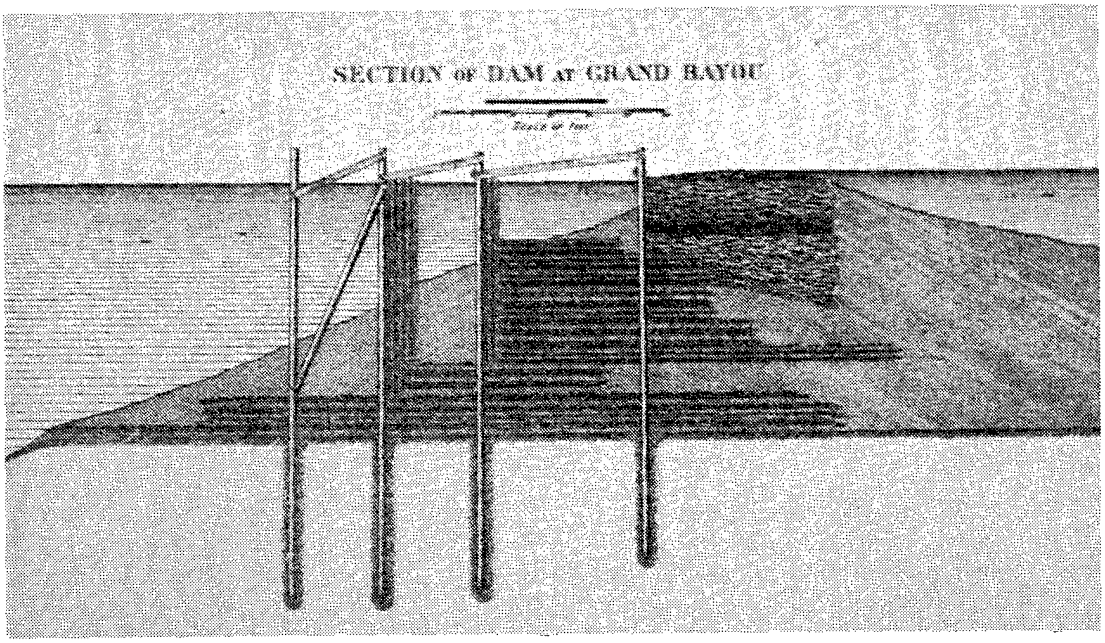


Figure 172. Sketch of the dam at the Grand Bayou outlet on South Pass.
(from *Corthell 1881*)

Despite a large and vocal corps of opponents, tardy payments from the government, and a string of natural adversities, the jetties project continued in a successful fashion (Table 9). As criticism seemed to be reaching one of many peaks in May 1876, the project received two major endorsements that signaled the beginning of a shift toward universal acceptance. The first was the successful movement, on May 12, of the *Hudson*, "a large coastwise vessel of the Cromwell Line," at full speed through the Pass. Followed in a few days by a visit from Brazilian Emperor Dom Pedro II, the passage of the *Hudson* encouraged a steady stream of other vessels. While criticism continued, the growing depth of the channel and its increasing use by large shipping began to render objections to the project a moot point (Figure 173).

Table 9. South Pass Jetties project time line.

June 14, 1875	Construction Begins
June 26, 1875	East Jetties extend 1,000 feet from land. Rate of progress is 200 feet per day. Telegraph lines from New Orleans to Head of Passes completed.
Sept. 17, 1875	Violent gale tears up five piles near sea-end, destroys 1,000 to 1,200 linear feet of mattresses.
Dec. 2, 1875	A second severe storm delays work.
May 12, 1876	The *Hudson*, a large vessel, moves easily through the Pass succeeded in the following months by an increasing flow of traffic.
May 1876	Brazilian Emperor Dom Pedro visits the construction site.

Table 9. South Pass Jetties project time line.
(Continued)

August 1876	After eight months of work, the once eight-feet channel over the South Pass Bar has deepened to 13 feet.
Oct. 5, 1876	Channel depth reaches 20 feet.
August 1877	Deprived of scheduled payments from the government, Eads tells crews they can not be paid. All but two of crew agree to work without pay.
August 1878	Yellow Fever epidemic kills eleven, including long-time Eads partner, William Nelson.
July 10, 1879	Project completion. Jetties develop a middle depth of 30 feet at average flood tide.
Jan. 29, 1901	20-year maintenance agreement expires.

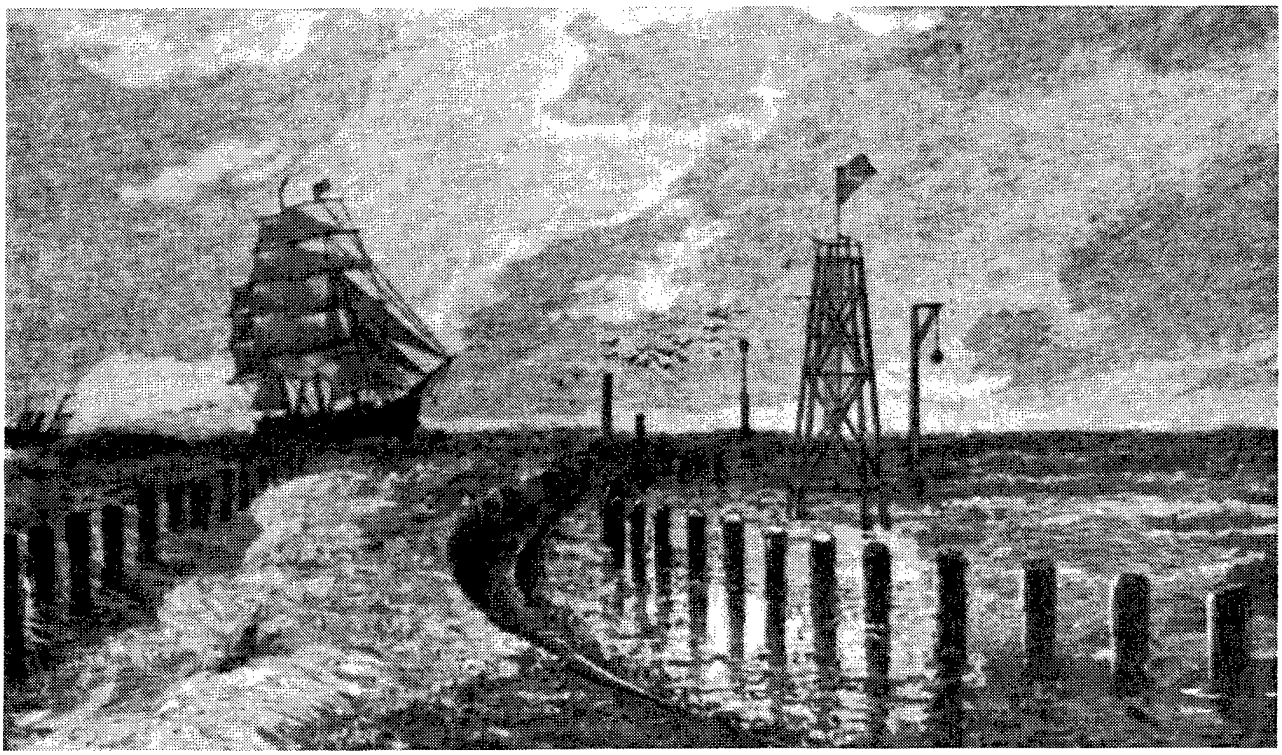


Figure 173. 1883 Sketch of a sailing ship approaching the South Pass entrance.
(from *Harper's Weekly* 1883)

Before long, the success of the project could be measured in financial and statistical terms. Over a 20-year period, New Orleans enjoyed a 100 percent increase in commerce and a rise from eleventh to second largest port in the United States. The annual saving in marine insurance rates

alone, as a result of the safer and more timely passage through the jetties, was calculated to be $5,000,000. In 1879, following on the success of the jetties as a coordinated federal project, the Mississippi River Commission was formed to provide a comprehensive, federally-funded program of river improvements *(Yager 1968:101-102; How 1970:103-104; Lippincott 1914:658)*.

When the channel reached the required depth of 30 feet on July 10, 1879, the event marked the formal conclusion of the original construction project, but it soon became obvious that additional structures would have to be added to insure the permanence of the opening to the Gulf. Eads, who had been granted a 20-year maintenance contract, soon launched an additional phase of construction. In 1880, 36 wing dams were added. Inner jetty construction was begun in 1881 on both sides of the channel. The inner east jetty was 11,170 feet long while the inner west jetty was 4,710 feet long. Another 797 feet were added to the inner east jetty by the government after the expiration of the Eads contract (*United States Army, Corps of Engineers 1916:855*).

Storms of even the mildest magnitude could cause extensive damage necessitating a perpetual series of minor repairs punctuated by occasional major reconstruction projects. While Table 10 chronicles the impact of some of the more severe storms that have struck South Pass, the damages inflicted by a brief episode of wind and rain in 1881, and reported by Assistant Engineer C. Donovan, provided a hint of the kinds of problems that would continue as long as the jetties were kept in service.

Table 10. Late nineteenth and early twentieth century storm damage to the South Pass Jetties.

Date	Location	Damage
September 8, 1882	East Jetty	1/2 mile of the concrete wall was "badly broken up." Solid concrete blocks, estimated to weigh 28 tons, were torn from the jetty, flipped over by tidal action, and scattered about.
September/ October 1889	East Jetty	Two storms one month apart. All but 690 feet of the outer east jetty were destroyed and had to be rebuilt. A new outer jetty was constructed inside the old one, below East Point.
October 7-8, 1894	South Pass	No. 3 wing dam was destroyed.
August 1900	South Pass	A pile driver, derrick boat, and barges were sunk by a severe storm.
August/ September 1915	South Pass	"Considerable damage" caused by an August hurricane. $11,441 in damage to the jetties caused by a September hurricane.

The storm lasted from February 4 through February 9 with winds that never exceeded 35 miles per hour but left 1,215 feet of the east jetty damaged. As Donovan indicated "there are sixteen

localities where the wall has been destroyed, ...the total length of wall destroyed being 97 feet..." (*United States Army, Corps of Engineers 1881: 1248*). Aside from the localities where the wall was destroyed, there were 15 other places where it was simply cracked. As typically would be the case in the future, the west jetty suffered considerably less damage consisting of 1.75 feet of subsistence in one block at station 113. Rotted piles, worm damage, undermining caused by stream flow through the channel, shipwrecks, and other factors would create additional requirements for regular repairs.

A listing of every documentable repair to the jetties would be voluminous, but selected excerpts from the *Annual Reports* of Chief of Engineers of the United States Army can provide some impression of the major repairs and modifications that had been made up until the 1940s. In 1889, the seaward 5,865 feet of the original 12,070 east outer jetty was capped by a wall of concrete (*United States Army, Corps of Engineers 1900:2229*). In 1922, 2,382 feet of the inner end of the inner east jetty was provided with a light concrete capping (*United States Army, Corps of Engineers 1922:966*). In 1928, 4,000 feet of the seaward end of the inner east jetty "was raised to grade" by the addition of large rip rap stone, and 3,000 feet of the concrete cap along its mid-section was raised and repaired by the addition of concrete and rip rap stone (*United States Army, Corps of Engineers 1928:882*). In 1940 the inner west jetty was repaired by the addition of 8,313 linear feet of creosoted poles and 665 linear feet of pile to produce an enclosure which was then filled with brush and stone. The east outer jetty was also repaired for a distance of 4,300 linear feet backward from its outer end. A brush dike connecting the seaward ends of the outer and inner east jetties was also rebuilt (*United States Army, Corps of Engineers 1940:841*).

INTEGRITY OF THE ORIGINAL OUTER JETTIES

Despite the combined impact of extensive human alterations and the natural forces of wind and water over the last 120 years it is possible that a major portion of the outer jetties, erected during the controversial and high profile original construction project, from 1875 to 1897, have survived. Virtually the entire length of the west outer jetty and the inland 1/4 to 1/3 of the outer east jetty have been covered by sand since some time before the turn of the century. A comparison of the maps in Figures 174 and 175 shows that, as early as 1886, the burial process had made significant progress. A map which accompanied the 1900 *Annual Report* shows that by the turn of the century, the west outer jetty was almost completely buried. It is difficult to guess how much the wood and reed elements of these buried structures have deteriorated but the concrete blocks and stone work are almost certainly in place, although subsided. The seaward end of the outer east jetty has not fared as well. As Table 10 shows, "all but 690 feet of the outer east jetty was destroyed" in 1889. It is possible however, that the concrete cap added to repair the damage has facilitated the preservation of this remnant, while hastening its subsidence below water level.

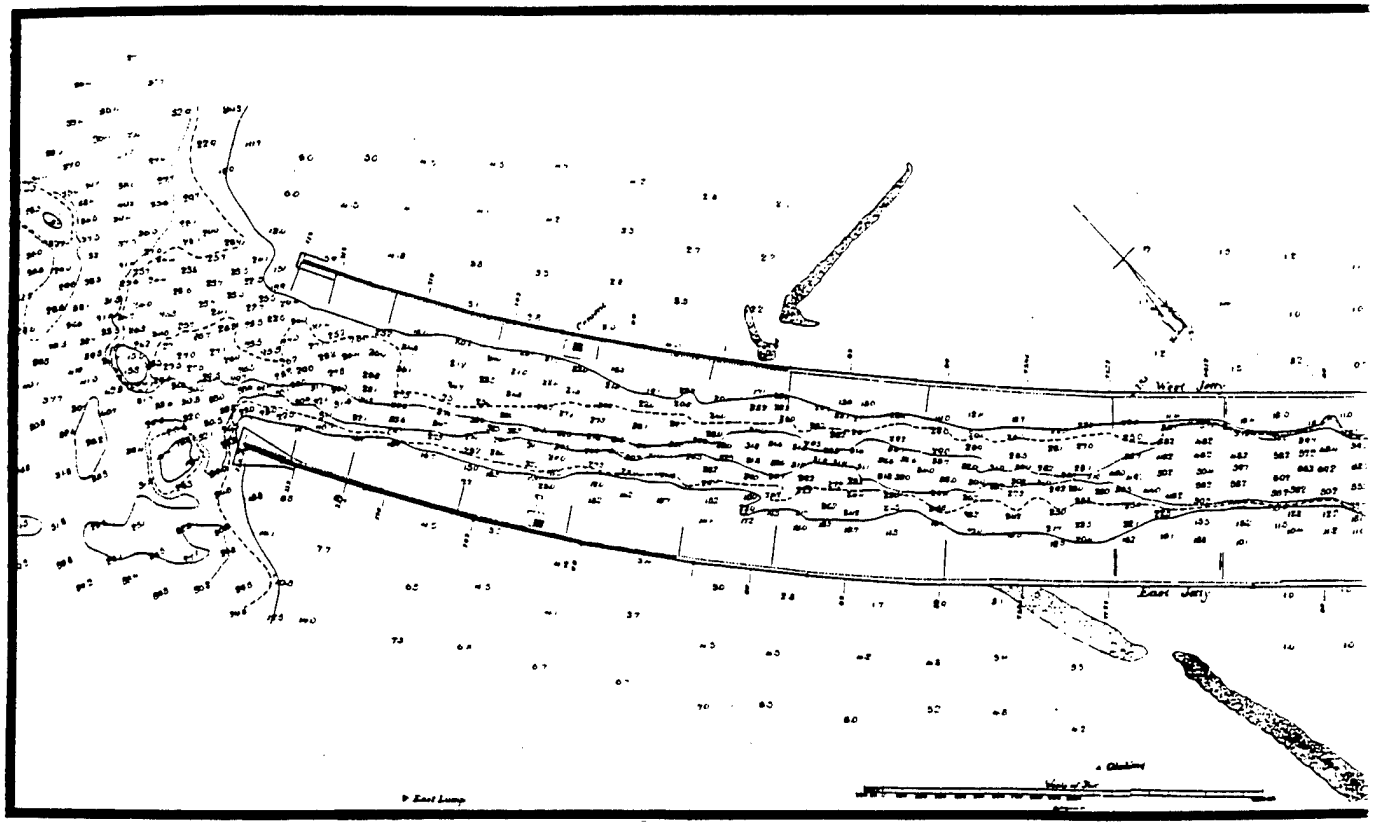


Figure 174. 1879 Chart of the mouth of South Pass.

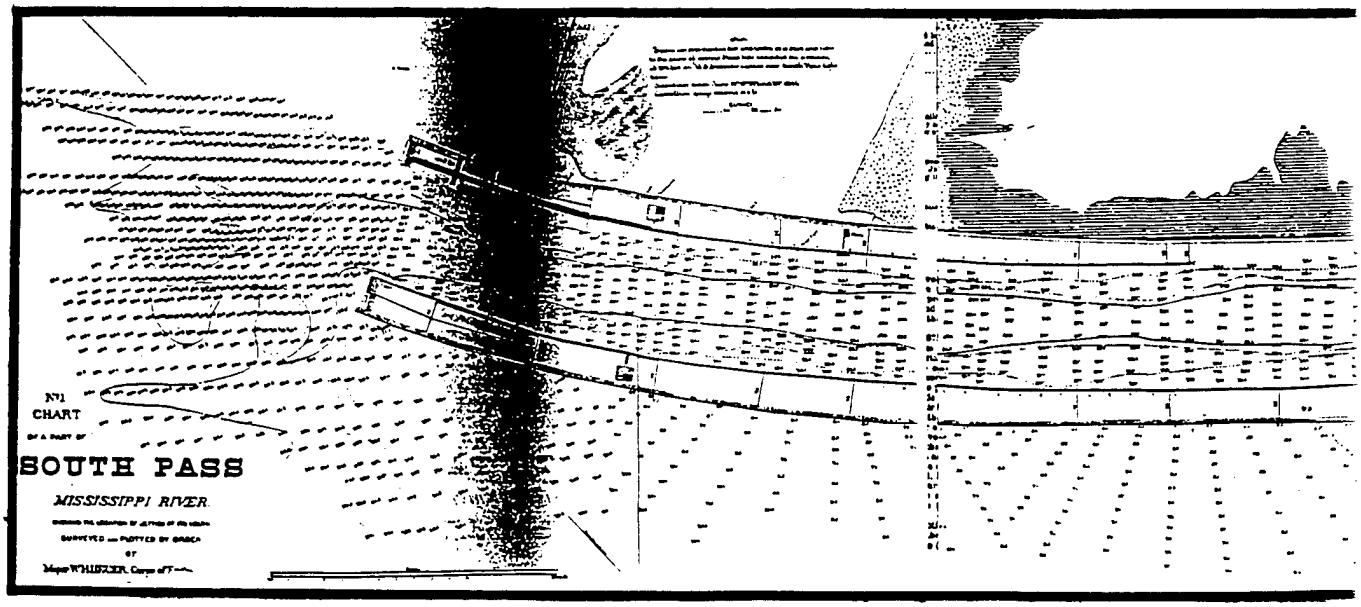
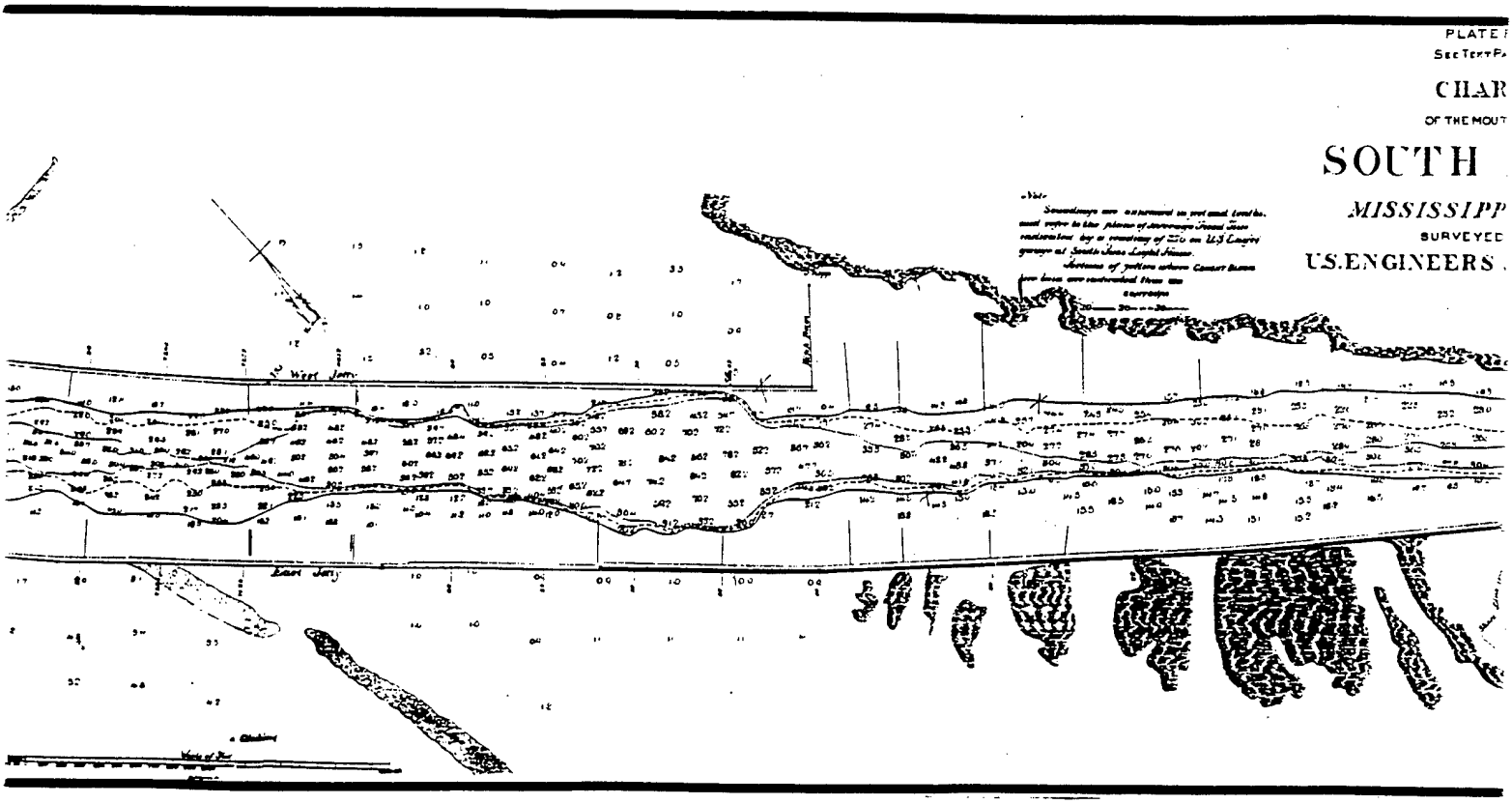
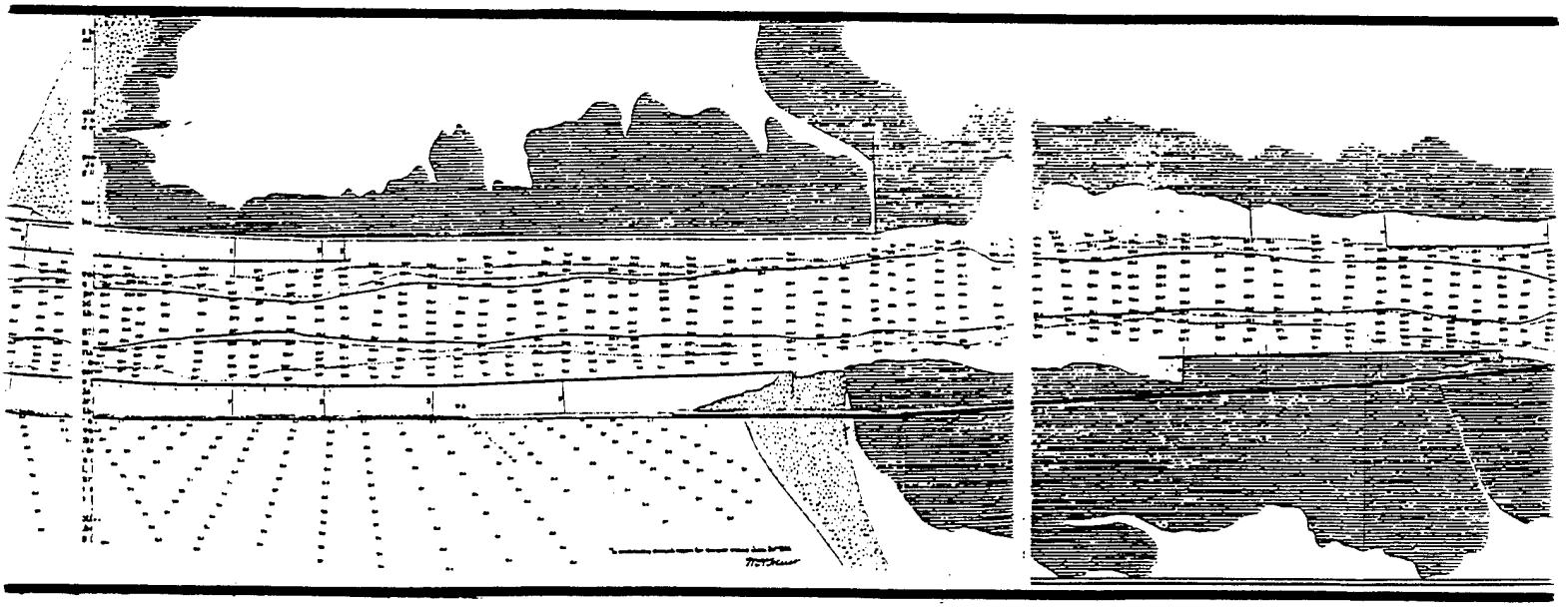


Figure 175. 1886 Chart of the mouth of South Pass.



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PLATE F.

SEE TEXT PAGE 211

CHART

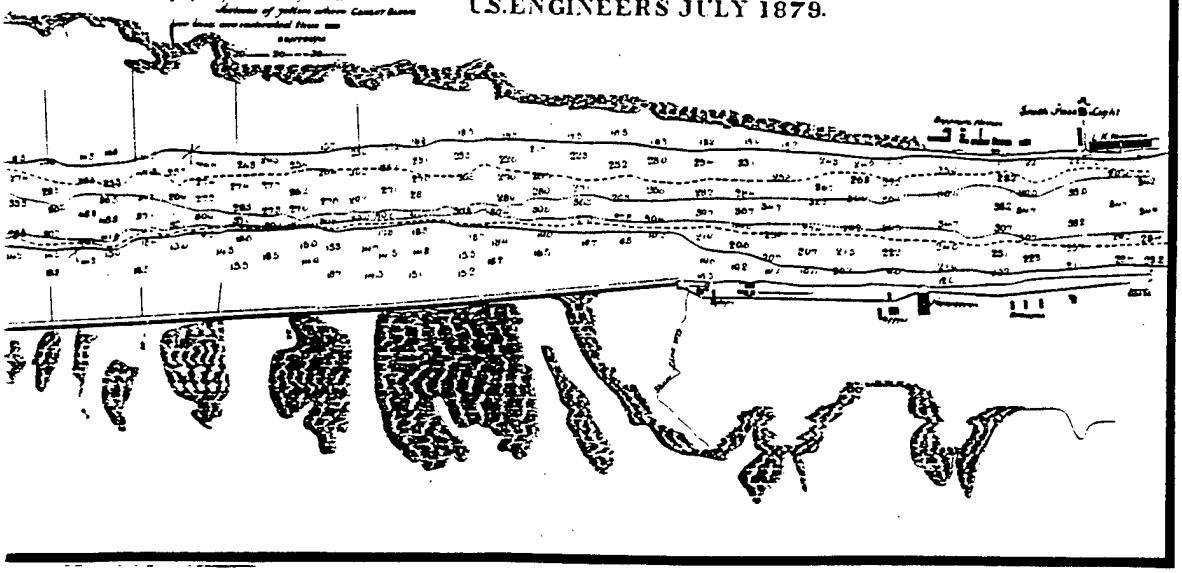
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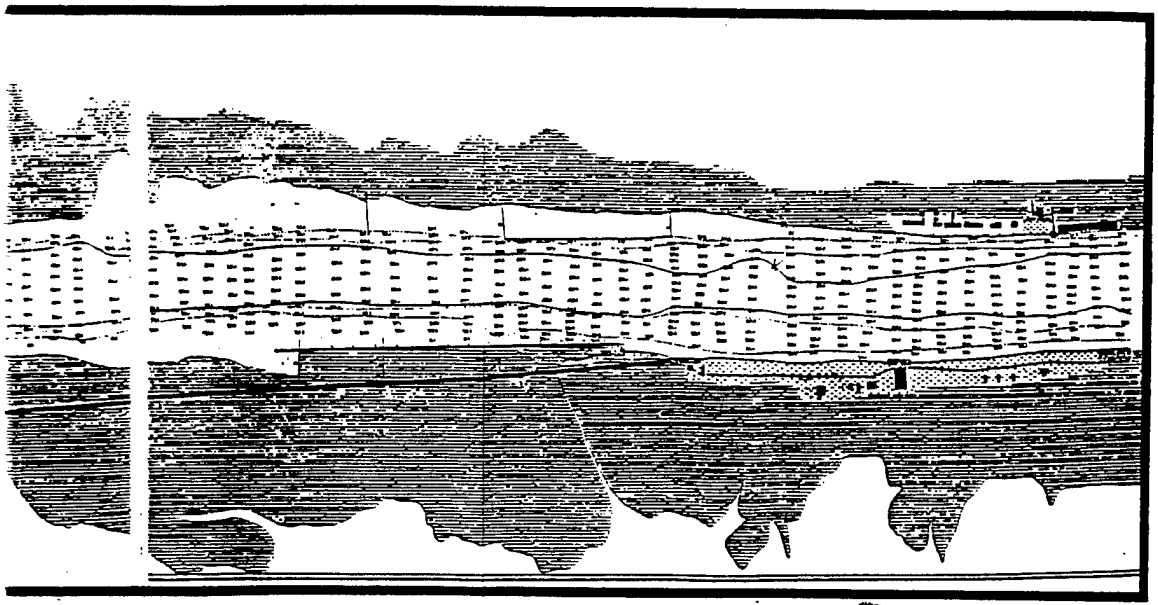
SOUTH PASS

MISSISSIPPI RIVER

SURVEYED BY

U.S. ENGINEERS JULY 1879.





CHAPTER SEVEN
MANAGEMENT RECOMMENDATIONS

By
Prentice M. Thomas, Jr.
Allen Saltus
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MARINE RESOURCES

Area 1

The survey of Area 1 produced evidence of 14 wells (two outside the study area), two linear magnetic features presumed to be pipelines, 11 magnetic anomalies that appear to be associated with rig moorings, one possible shipwreck, and possible remains of the outer east jetty constructed by James B. Eads between 1875 and 1879. The potential historic features are a linear bathymetric feature believed to be the remains of the outer jetty and a magnetic anomaly designated Anomaly 1, which is believed to be the remains of the *S.J. Dickson*, lost in 1901. As discussed below, it is also possible that additional wrecks are located within this area.

None of the magnetics presumed to represent wells, pipelines, or moorings are thought to be significant and, as such, these are not eligible for the NRHP. No further work is warranted at these locations. The potential historic features are discussed below.

Possible Shipwreck(s)

Anomaly 1 is within and adjacent to the well site magnetics, but exhibits an area 300 feet by 150 feet. Its magnetic nature, configuration, and size are consistent with shipwrecks and may represent the remains of the *S.J. Dickson.* That ship was lost in 1901 in a hurricane, but latitude and longitude coordinates for the wreck place it south of our study area. However, the wreck report states that it sank on the concrete of the east jetty. If the written report is correct and the coordinates are in error, the remains of the *S.J. Dickson* may be within study Area 1. Conversely, Anomaly 1 may represent an unnamed 1875 shipwreck or another shipwreck for which we do not have a record. Diver investigation of the site is required to determine if this anomaly is, indeed, the remains of a shipwreck.

No evidence in either the side scan sonar or magnetometer data appears to represent the other two reported wreck locations within Area 1 including the *Doris*, lost in 1985, or the unnamed shipwreck depicted on the 1875 hydrological chart. However, the massive amount of ferrous material in Area 1 associated with the well heads and pipelines could very well mask the magnetics of historic period shipwrecks.

Possible Outer East Jetty Remnant (16PL130)

Investigations in Area 1 produced a linear bathymetric anomaly that could possibly be the remains of the outer east jetty constructed by James B. Eads between 1875 and 1879. There do not appear to be any magnetics which can be attributed directly to this bathymetric trend. The magnetics in the area of this possible outer jetty feature appear to develop from and are associated with the inner east jetty.

The linear bathymetric anomaly trends parallel to the east jetty in the same general area and orientation as the jetty location of the 1991-92 Corps Hydrographic Chart and the historic 1879 Chart of the Mouth of South Pass Mississippi River. In-site, in-water diver investigation is required to determine 1) the nature and boundaries of these remains and 2) whether they may be significant according to NRHP criteria.

Area 2

Area 2 produced 21 magnetic anomaly areas referred to as CMAAs and five single anomalies. Each category of findings is discussed below.

CMAA

Port Eads East (16PL49): CMAAs 1 through 5 are likely to be associated with historic portions of Port Eads. Among these anomalies may be remains of the coal landing, landing dock, bulkhead and structures associated with the industrial community as depicted on the 1879 chart of the mouth of South Pass. CMAA 5 may also be where east jetty construction began. CMAA 8 and 9 appear to be outlet closures and require no further consideration. CMAAs 6, 7, 10, 11, 12, and 13 appear to be associated with the present inner east jetty and represent ongoing maintenance and repair efforts. The inner east jetty is not associated with the original outer jetty construction. As such, five of these six anomalies are not significant and require no further consideration. One, CMAA 7, is associated with both the inner east jetty and the location of a sunken barge (1876). As such, CMAA 7 as well as CMAAs 1 through 5 require diver investigation for identification and evaluation of potential significance.

Port Eads West (16PL62): Five CMAAs are found on the west bank in the area of Port Eads West. CMAA 14 is associated with the historic South Pass Light and government compound, while CMAA 15 is associated with boarding houses used by Eads' workers. These anomalies warrant further investigation in-water to assess their origin and significance. CMAAs 16, 17, and 18, however, do not correlate with historic features and do not appear to exhibit any significant remains; these three CMAAs deserve no further consideration.

Pilot Station (16PL123): CMAA 19 corresponds to the former location of the Coast Guard station and earlier Pilot's Station. Magnetics are associated with pilings and are likely to be associated with docks, wharfs, boat houses, and the Pilot House as well. These remains warrant further investigation. CMAA 20 and 21 are not associated with potentially significant remains and are, therefore, not recommended for additional consideration.

Possible Shipwrecks

Three single anomalies have wreck-like signatures: Anomalies 3, 4, and 6. The first is at a location near the *Julia*, which was lost in 1915, and also is the location of the model barge. Although not associated with the original jetty construction between 1875 and 1879, Anomaly 3 may

be significant in terms of shipbuilding, navigation, and/or maritime commerce. Anomaly 4 is associated with the *Wild Wagoneer* (1876). The third, Anomaly 6, poses exciting possibilities; it is within and outside the project area, lying near a reported 1852 wreck. However, this area was the scene of many wrecks, including the *Louisiana, Catania*, and a barge. All three anomalies must be ground-truthed by diver investigation to identify the remains and make an evaluation of potential significance.

Unknown Anomalies

Anomalies 2 and 5 also had wreck-like magnetics. However, Anomaly 2 is at the mouth of freshly dredged outfall and was land by 1879, mitigating its potential significance. Anomaly 5 was also land by 1879; moreover, Anomaly 5 is located within the currently maintained channel, further mitigating its potential significance. No further work is recommended for Anomalies 2 and 5.

Recommendation

The integrity of the marine resources cannot be determined at this time. Diver investigation is required not only to assess the nature of each, but also to determine its condition and future research potential.

TERRESTRIAL RESOURCES

The terrestrial survey and documentary research demonstrate that sites 16PL49, 16PL62, and16PL130 have research potential, and, as such, these sites are evaluated as potentially eligible for nomination to the NRHP according to NRHP criteria A, B, and D. Table 11 lists the features associated with these sites and lists them either as contributing or non-contributing features. Some features have been listed as contributing due to the probability that they are associated with early Port Eads. Future research may provide for refinement of the chronological data.

Sites 16PL49, 16PL62, and 16PL130 are associated with events that made a significant contribution to the broad patterns of history along the Mississippi River, to American commerce in general, and to the economic ascent of New Orleans as a major port city. The sites are identified with the life of James B. Eads, a person of considerable significance in terms of Civil War and post-bellum engineering feats, whose achievement with jetty construction rivals that of the St. Louis bridge and Ironclads. Finally, archaeological work conducted there has yielded data that are meaningful to our understanding of the history of the commerce and transportation industries, government-contracted construction and associated community establishment, as well as composition and abandonment of the late nineteenth and early twentieth centuries.

As a result of Eads' engineering efforts in jetty construction at South Pass, New Orleans was no longer by-passed and its status rose from the eleventh to the second largest U.S. port city. The community that developed as a result of jetty construction is every bit as important as the jetty itself, providing housing and sustenance for the workers, engineering staff, and commercial pilots.

Table 11. Port Eads Historic District Contributing and Non-Contributing Features.

SITE	FEATURE	CONT.	NON-CONT.	TYPE	COMMENTS
16PL49	1-walkway pilings	X		structure	probably post-1900, possibly associated with early Port Eads
	2-remains of a seawall	X		structure	probably part of central dock-1942 map
	3-cluster of pilings	X		structure	in vicinity of structure on 1942 map
	4-inland berm and pond		X	site	dredge material discharge
	5-inland berm and pond		X	site	dredge material discharge
	6-cluster of pilings	X		structure	may be shops from late 1800s Port Eads or part of 1950s dock complex
	7-valve station		X	building	post 1960s oil production
	8-cluster of pilings		X	structure	1950s dock complex
	9-concrete foundation		X	structure	1950s dock complex
	10-cluster of inland pilings	X		structure	possibly associated with late 1800s Port Eads; look like structure pilings
	11-inland berm and pond	X		site	may be associated with structure on 1942 map
	12-concrete bulkhead	X		structure	age and function unknown, but in vicinity of nineteenth century central dock.
16PL62	1-metal water tank		X	structure	in area of large warehouse complex on 1942 map, second generation-1960-1973
	2-storage shed		X	building	post 1950 construction
	3-storage shed		X	building	probably post 1950 construction
	4-metal cistern		X	structure	1950s construction
	5-metal cistern		X	structure	1950s construction
	6-mobile home		X	building	1960-1970 construction
	7-metal cistern		X	structure	1950s construction, second generation 1970s
	8-pumphouse		X	building	1960s to 1970s construction

SITE	FEATURE	CONT.	NON-CONT.	TYPE	COMMENTS
16PL62 (cont.)	9-generator shed		X	building	recent construction
	10-baithouse		X	building	recent construction
	11-Lightkeeper's residence	X		building	World War II construction, later improvements; condition good
	12-food storage building		X	building	recent construction
	13-guest house		X	building	1960s construction
	14-concrete slab with brick sill	X		structure	shown on 1942 map and in vicinity of 1848 lighthouse
	15-Lighthouse	X		structure	1881 construction on NRHP
	16-fishing camp	X		building	appears on 1942 map; in good condition
	17-guest house	X		building	may be structure on 1942 map
	18-cistern		X	structure	post-1950s construction
	19-water tank		X	structure	late 1940s or 1950s construction
	20-water tank		X	structure	post-1950 construction
	21-fishing camp remains		X	site	remains only, post 1940, probably 1960-1970 construction
	22-collapsed fish camp		X	site	remains only, post 1961 construction
	23-boat house		X	building	remains only, post-1950 construction, probably 1960-1970
	24-dock and walkways	X		structure	dock portions from late nineteenth century with later additions
	rip-rap seawall		X	structure	1951 and after construction
	raised earthen and shell roadways		X	site	probably 1970s containment dike
	survey towers		X	structure	probably 1960-1970 construction
	power line		X	object	1960-1970
	dolphins		X	structure	1960-1970
	shell beaches	X		site	early twentieth century
16PL130	Jetties	X		structure	present-1875 initial construction

In view of the association of these sites with each other, American engineering achievements, and the historic personage of James B. Eads, we recommend that 16PL49, 16PL62, and16PL130 be considered as part of a Port Eads historic District (Figure 176). Two of these sites contain 36 structures or structural remains and a variety of other features. The Lighthouse, Feature 15 at 16PL62, has been nominated to the NRHP, but not listed. 16PL130 is the South Pass jetties, which, as discussed above, appear to be present as a linear bathymetric feature.

Port Eads East (16PL49) and West (16PL62)

The documentation available from Corps of Engineers records and other relevant sources have provided for a recapitulation of what appears to have been the construction and abandonment sequence at Port Eads. There is no question that this sequence is directly related to the government contract, different stages of jetty construction, Eads' demands for project completion, and the rise and decline of South Pass as an entry to the port of New Orleans.

Archaeological investigations have barely scratched the surface of Port Eads' (16PL49 and 16PL62) potential. Areas of potential structural remains have been identified and areas of artifactual remains are present. Data recovery operations at these sites should be able to associate particular structures with artifactual remains. Through chronological interpretation of the archaeologically recovered data, the structures' construction and abandonment sequences can be pinpointed with confidence. These data will provide a detailed reconstruction of the establishment, early operation, growth and decline of Port Eads, which can be related to different stages of jetty construction. Census figures can also be gathered to identify population growth, which can also be compared and interpreted in relation to the jetty construction and the developmental stage of the town.

Excavation of this site, coupled with more background research (see jetty discussion below), can provide data on the configuration of commerce/transportation industrial communities, structural modification and its relationship to surrounding events, status differentiation and overall economic composition. The location of features associated with structures may also provide sealed contexts, time capsules if you will, for gathering the artifacts and other cultural remains that will further interpretation.

Research Issues

The data to be gleaned from these sites will come from more extensive background research and further archaeological excavation. As data are derived, there is little doubt that additional research issues will be raised and the potential of the sites' contents expanded even further. At present, we have suggested the following topics to be addressed by investigation of Port Eads East and West:

- artifact assemblages associated with different commercial industries in the communities;

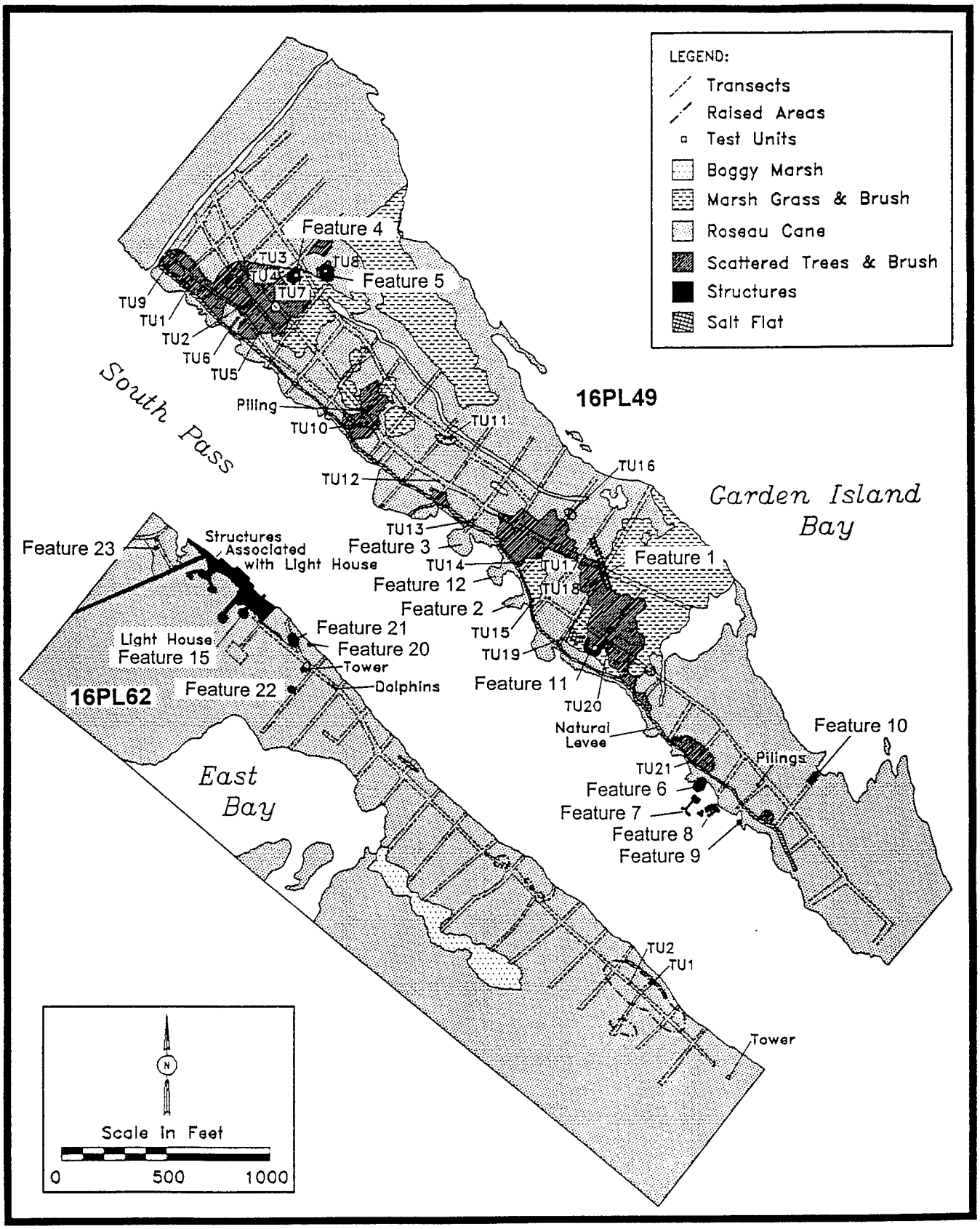


Figure 176. Map showing the terrestrial portion of the proposed Historic District.

- artifact assemblages associated with boarding houses;
- artifact assemblages associated with residences;
- status differentiation between residents of the community;
- status differentiation between industries of the community;
- data regarding structural modifications;
- structure information for construction/abandonment sequence comparisons; and
- the nature of community layout.

Integrity

It is true that most of the structures are gone. However, artifacts litter the surface and very likely, once cleared, will be revealed in many concentrations representing the former locations of structures. Moreover, subsurface deposits are buried in places beneath up to 70cm of alluvium. Because the area has been so isolated and cane has so completely covered much of the site areas for so long, we have to assume that archaeological remains retain integrity. Certainly, the buried materials have integrity as they have been preserved by modern deposition. The surface artifacts, likewise, probably retain integrity in terms of structural associations. Overall, therefore integrity of the remains appear good.

Jetties (16PL130)

The outer jetty appears to retain integrity. Virtually the entire length of the west outer jetty and the inland 1/4 to 1/3 of the outer east jetty have been covered by sand since some time before the turn of the century. A comparison of the maps in Figures 174 and 175 in Chapter Six showed that, as early as 1886, the burial process had made significant progress.

Research Issues

The primary research issue that investigation of the jetties could address is the contribution to national understanding of these engineering features. Of importance is making a firm determination as to how well the remaining segment stood up to the test of time and forces of nature. Such investigation can focus on specific aspects of jetty construction and their survival. This type of information is not only instructive in its historical value, but also in its application to modern technology.

Integrity

A map which accompanied the 1900 *Annual Report* shows that, by the turn of the century, the west outer jetty was almost completely buried. It is difficult to guess how much the wood and reed elements of these buried structures have deteriorated, but the concrete blocks and stone work are almost certainly in place, although subsided. The seaward end of the outer east jetty has not fared as well. As discussed in Chapter Six, much of this part was destroyed in 1889. It is possible, however, that the concrete cap added to repair the damage has facilitated the preservation of this remnant, while hastening its subsidence below water level.

Recommendation

With regard to the delineation of a historic district, several further actions are recommended. First, a thorough in-water inventory and evaluation of both east and west jetties and associated features should be conducted. If this evaluation reveals that extensive evidence has survived, the integrity of the buried and submerged remains of the outer jetties could be documented. A set of drawings and a detailed historical narrative of the jetties construction to the standards of a Level IV recording project of the HAER Division of the National Park Service should be conducted and the findings deposited in that agency's collection in the Library of Congress.

Terrestrial investigation could be coordinated with the marine effort. Deep coring is recommended in the vicinity of the 1840 lighthouse to determine if there are any associated subsurface remains. Finally, CMAAs 1 through 5, at 16PL49, and CMAAs 14 and 15, at 16PL62, may be associated with historic portions of Port Eads; these warrant additional in-water investigation to determine the nature and boundaries of these possible cultural features and establish their association with the historic district.

Suggestions for Public Awareness

There is a considerable amount of documentation on Port Eads, James B. Eads, and the South Pass jetties. This documentation includes maps, photographs, drawings, and written documentation. Construction of the South Pass jetties was a monumental achievement with far-reaching benefits for the port of New Orleans and the Mississippi River delta region.

We recommend that an exhibit be developed to document this engineering feat and the emergent development of Port Eads. A portable exhibit which could be moved from one Corps location to another up the Mississippi River would be worthwhile. Such an exhibit would also provide for public education regarding historic Corps achievements.

BATTERY EMPLACEMENT SITE—16PL63

The battery emplacement site, 16PL63, consists only of pilings in the water. These are not part of the proposed historic district and, individually, lack integrity and research potential. One of

the groups, Piling Group 5, is likely related to a former structure and not part of any World War II defensive action at all. Although the others are considered to be the remnants of World War II gun emplacements, they are not recommended as NRHP eligible nor worthy of further consideration.

BAR PILOTS' HOUSE AND COAST GUARD STATION—16PL123

Neither the Bar Pilots' House nor the Coast Guard Station remain extant. Pilings are the only physical indication that either of these structures was ever present. Besides the pilings, there are two cisterns and a recent pier in the vicinity of the Coast Guard Station. Other features found in the general area include a radio tower, operations shack, generator shack, tide gauge shack, and navigational beacon. None of these constitute significant cultural resources eligible for nomination to the NRHP. No further consideration of this site is recommended.

STUDY AREA CONSIDERATIONS FOR ADDITIONAL SIGNIFICANT SITES

Chapter Three reviewed the history of the project area, including the stretch to Head of Passes above the locus of field investigation. Certain locations should be considered culturally sensitive, although they have not been field checked. (Refer back to Figure 24, which is a drawing made by an unidentified local resident, dating ca. 1898-1901. Although lacking precision in terms of measurement, it does provide some idea of the relative location of areas that may be culturally sensitive.)

Beginning on the east bank at Head of Passes, there was a wharf; a navigational marker; the Mary Julia Burat-Brown-Purgley house; areas (possibly pens) for cattle and pigs; stands of cypress, spruce, cedar, and large cattails; a cemetery; the Loar home; shell piles; a canal, dock, and high bank; houses; and a coal and rock storage area. From Head of Passes on the west bank is a bell tower, animal pens, cane break, iron rail fence, two cemeteries, lighthouse, dock, area of swamp, the town of Oysterville, and a government storage house.

Cultural remains associated with any of these former structures, features, or locales could be present. Additionally, on the east bank of the Mississippi River at Head of Passes is an area where the willow for the jetties was collected. Finally, at Head of Passes, there was construction work associated with the channel training works at South Pass—specifically, dike work and sills construction across the Southwest Pass and Pass a l'Outre dams and closures at Grand and Picayune bayous. Eads and, later, the Corps of Engineers reportedly worked on improvements in this area; industrial features may remain today and could be eligible for the NRHP.

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APPENDIX I
SCOPE OF WORK

CELMN-PD-RN

17 May 95

REVISED* SCOPE OF SERVICES
CONTRACT DACW29-94-D-0021 **(PTA)**
DELIVERY ORDER # 02

CULTURAL RESOURCES INVESTIGATIONS
OF SOUTH PASS OF THE MISSISSIPPI RIVER,
PLAQUEMINES PARISH, LOUISIANA

***Revisions underlined in boldface**

1. Introduction. This delivery order calls for historical background and records research, remote sensing survey and site delineation within and near proposed dredge material disposal areas to be used during routine maintenance dredging on the South Pass of the Mississippi River, Plaquemines Parish, Louisiana. This effort will be conducted to identify and evaluate cultural resources within the project area and to provide recommendations for further studies.

Preparation of comprehensive draft and final reports of investigation are requirements of this study. The contract period for this delivery order will be 32 weeks.

2. Study Area. The study area consists of South Pass, from Mile **0** to 14.0 Below Head of Passes (BHP) and includes adjacent areas designated for beneficial use of dredged material for the upcoming dredging cycle. For the purpose of this study, the fieldwork will be restricted to areas between Miles 10.7 and 14.0 BHP. The material dredged from South Pass will be deposited in shallow open water areas and used to stabilize existing barrier island features and create wetlands, a total of 943 acres are delineated for disposal. The location of the work is shown on Attachments 1 and 2.

3. Background Information. The authorized dimensions of South Pass are a 30-foot deep by 450-foot wide channel within the pass and a 30-foot deep by 600-foot wide bar channel. Routine maintenance dredging of the authorized project dimension was last completed during 1977. Approximately 300,000 yards of material is expected to be removed from within a 20-foot deep by 300-foot wide channel between Miles 7.4 and 14.0 BHP during the upcoming dredging cycle. Dredging will be accomplished using a hydraulic cutterhead dredge. The material is to be placed unconfined to an initial elevation of +4.5 ft mean low gulf (M.L.G). It is estimated that the final height of material after compaction and dewatering will be +3.0 ft M.L.G. Additional disposal sites will become necessary for future dredging cycles.

Portions of the current project area were previously subject to cultural resources investigations. A general overview of recorded shipwrecks and a navigational history of the project area is provided in the report entitled A History of Waterborne Commerce and Transportation within the U.S. Army Corps of Engineers, New Orleans District and an Inventory of Known Underwater Cultural Resources (Attachment 3). The shipwreck inventory lists a total of twenty shipwrecks in the vicinity of South Pass (Attachment 4). Cultural resources investigations of the proposed South Pass Bulk Terminal were conducted by Coastal Environments, Incorporated during 1984. A total of five archeological sites (16PL49, PL62, PL63, PL123 and PL130) and three potential shipwreck locations were identified as a result of archival research and visual inspection of the project area and its vicinity (Attachment 5). Recommendations for additional surveys of the area, discussions on the National Register significance of the South Pass Light and recommendations on the lower portion of South Pass as a National Register Historical District were presented in the report of investigations (Weinstein 1984). A copy of the National Register nomination form for the South Pass Lighthouse is included as Attachment 6. Finally, a review of terrestrial cultural resources on South Pass is provided in the report entitled Evaluation of the National Register Eligibility of Burrwood, Plaquemines Parish, Louisiana (Attachment 7). The report provides the context for evaluating Burrwood, a residential and industrial complex on Southwest Pass, which is comparable in scope and function to sites existing on South Pass.

4. Study Requirements. The evaluation will be conducted utilizing current professional standards and guidelines for both historical and archeological research including, but not limited to:

·the National Park Service's National Register Bulletin 15 entitled, "How to Apply the National Register Criteria for Evaluation" and, Bulletin 36 entitled, "Guidelines for Evaluating and Registering Historical Archeological Sites and Districts;

·the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation as published in the Federal Register on September 29, 1983;

·Louisiana's Comprehensive Archaeological Plan, dated October 1, 1983;

·The Advisory Council on Historic Preservation's regulation 36 CFR Part 800 entitled, "Protection of Historic Properties";

The work to be performed by the Contractor will be divided into four phases. Phase 1 will consist of background research. Phase 2 will consist of remote sensing survey. Phase 3 includes site delineation and significance assessment of **five** sites including Port Eads-East Bank (16PL49), Port Eads-West Bank(16PL62), **World War II Gun Battery (16PL63),** South Pass Bar Pilot's House (16PL123), and South Pass East Jetty (16PL130). Phase 4 will consist of data analyses and report preparation.

a. Phase 1: Background Research. The Contractor shall commence, upon work item award, with a literature, map, and records review of the **study** area. Valuable sources of information available at NOD include Annual Reports of the Chief of Engineers, Engineering files, Real Estate files and reports listed in Section 7, below. The effort shall include literature review, research of historical records, maps, photographs and archives to assist in the identification and documentation of cultural resources within the project area. The result of this research will be a comprehensive fine-grained history of the Eads complex and an historic context for South Pass. This research will provide a context for assessing the significance of all sites encountered and investigated within the project area during phases two and three. **The research will provide information for making recommendations for further marine and/or terrestrial cultural resource investigations from Mile 0 to 14 BHP of South Pass. The recommendations will be included in reports prepared during the Phase 4 effort.**

b. Phase 2: Marine Survey.
Phase 2 will commence with the contractor establishing reference stations (if required) for a positioning system followed with a marine survey of two areas identified on Attachment 2. These consist of a 4,000-foot by 6,500-foot area east and adjacent to the east jetty, and the areas adjacent to the navigation channel and the existing bankline of South Pass, from Mile 10.7 to 13.5 BHP. The purpose of the survey east of the east jetty is to identify any potential shipwrecks. The purpose of the survey along the banks of South Pass is to identify and delineate any historic remains relating to the Port Eads complex. The survey methodology will be conducted in accordance with the Contractor's proposal. The minimum equipment array required for the remote sensing survey effort will include:

(1) a marine magnetometer
(2) a positioning system
(3) a side-scan sonar system
(4) a fathometer

The following requirements apply to the marine survey:

(1) transect lane spacing will be no more than 150 feet.

(2) positioning control points will be obtained at least every 100 feet along transects,
(3) background noise will not exceed +/- 3 gammas,
(4) magnetic data will be recorded on 100 gamma scale,
(5) the magnetometer sensor will be towed a minimum of 2.5 times the length of the boat or projected in front of the survey vessel to avoid noise from the survey vessel,
(6) the survey will utilize the Louisiana Coordinate System,
(7) additional, more tightly spaced, transects will be run over all potentially significant anomalies.

c. Phase 3: Terrestrial Site Delineation. The field investigations will proceed with terrestrial site delineation at sites 16PL49, 16PL62, **16PL63** and 16PL123. Information obtained during phase one and two will be sufficient for documenting conditions and developing recommendations for the treatment of site 16PL130.

Site delineation at each of the **four** sites will include systematic visual inspection and detailed mapping of the site area to identify and record the presence of any structural remains or cultural resources loci associated with each site area. All mapping data will be tied to the Corps baseline for South Pass. The Corps will provide all available data regarding P.I.'s along this baseline (x,y, elevations and descriptions). As a minimum, standard methodologies will be employed during mapping. Additional shovel and/or auger testing will be conducted to determine the presence and condition of intact artifact deposits at these sites. The fieldwork will concentrate on defining the maximum limits of the site and the distribution of features or loci within the site in an effort to provide recommendations for the placement of a pipeline for conveying dredged material across the site. The fieldwork will complement the phase one research by providing information regarding the integrity and archeological potential of any intact deposits at each site. The fieldwork will result in an appropriately scaled map of each site showing at a minimum, the limits and location of cultural features or loci within the site, the location of all test excavations, and any related natural or cultural features.

All areas investigated and all sites tested within project boundaries will be recorded (in ink) to scale on the appropriate USGS 7.5 minute quadrangle and project maps. The appropriate type and number of State site forms will be completed for any sites documented during these investigations. Coordinates (x, y's) for all sites or potentially significant anomalies will be provided in Louisiana State Plane coordinates.

d. Phase 4: Data Analyses and Report Preparation. All data collected in conjunction with this investigation will be analyzed using currently acceptable scientific methods and in accordance with the contractor's proposal. The post-survey data analyses and report presentation will include as a minimum:

(1) post-plots of survey transects, data points and bathymetry;
(2) same as above with magnetic data included;
(3) plan views of all potentially significant anomalies showing transects, data points and contours;
(4) correlation of magnetic, sonar and fathometer data, where appropriate.

The interpretation of identified magnetic anomalies will rely on expectations of the character (i.e. signature) of shipwreck magnetics derived from the available literature. Interpretation of anomalies will also consider probable post-depositional impacts and the potential for natural and modern, i.e. insignificant, sources of anomalies. The Contractor will file state site forms with the Louisiana State Archeologist and cite the resulting state-assigned site numbers in all draft and final reports for any anomaly classified as a site. The report shall contain an inventory of all magnetic anomalies recorded during the underwater survey, with recommendations for further identification and evaluation procedures when appropriate. These discussions must include justifications for the selection of specific targets for further evaluation. Equipment and methodology to be employed in evaluation studies must be discussed in detail. The potential for each target or submerged historic property to contribute to archeological or historical knowledge will be assessed. Thus, the Contractor will classify each anomaly as either potentially eligible for inclusion in the National Register, or not eligible. The Contractor shall fully support his recommendations regarding site significance. The report will include the assessment of potential significance and recommendations for further work.

A product to be provided under this delivery order and submitted with the draft reports will include CAD graphics and/or design files compatible with the NOD Intergraph system and the NOD provided base map. Maps and supporting files depicting the construction and abandonment sequence for structures within the project area will be generated from data obtained during phase one research. The maps and supporting files generated from marine survey data will show, at a minimum, the survey coverage area, the locations of all anomalies and other pertinent features such as: channel beacons and buoys, channel alignments, cables and pipeline crossings, etc. The maps and supporting files generated from terrestrial site delineation data will show, at a minimum, site

boundaries, the location of any associated structures or activity areas, locations of excavations or disturbances and the site datum with accurately referenced grid locations.

The Contractor shall catalog all artifacts, samples, specimens, photographs, drawings, etc. obtained during the course of the investigations, utilizing the format currently employed by the Louisiana State Archeologist. The catalog system will include site and provenience designations. The results of these analyses will be reported in full, in the written reports. If determined by the COR, the final report will not include detailed site location descriptions, state plane or UTM coordinates. The decision on whether to remove such data from the final report will be based upon the results of the survey. If removed from the final report, such data will be provided in a separate appendix. Additional requirements for the draft and final report are contained in Section 6 of this Scope of Services.

5. Unmarked Burials or Human Remains. In the event that evidence of an unmarked burial, human skeletal remains, or associated burial artifacts are encountered during the fieldwork, the provisions of the Louisiana Unmarked Human Burial Sites Preservation Act [Louisiana R.S. 8:671 through 681 and R.S. 36:209(I) and 802.13] shall apply. Activity that may disturb the remains shall cease immediately and the Contractor shall notify the COR as soon as possible to determine the appropriate plan of action regarding the discovery.

6. Reports.

a. Management Summary. Three copies of a management summary will be prepared and submitted to the COR at the completion of the Phase 2 work effort. The management summary will serve as an interim document to immediately assist project planning. The report will include a description and location for each site or anomaly located during the survey and recommendations for further identification and evaluation procedures when appropriate. A preliminary map, or maps of the surveyed areas and each of the terrestrial site areas will be included with the management summary. A summary table listing all anomalies will be included with the maps. The table will include the following information: Project Name; Survey Segment/Area; Magnetic Target Number; Gammas Intensity; Target Coordinates (Louisiana State Plane).

b. Draft and Final Reports. The draft and final reports shall include all data and documentation in accordance with the Secretary of Interior's Standards and Guidelines (Section 4 above). The report will provide a comprehensive historic context for South Pass integrating an analysis of all historic sites, features, jetties, buildings, lights, shipwrecks, etc. located within the

project area. Recommendations specific to the present dredging project and a plan for further inventory and evaluation will be included in the reports.

Five copies of a draft report, integrating all phases of this investigation will be submitted to the COR for review and comment 15 weeks after the date of the order. The final report shall follow the format set forth in MIL-STD-847A with the following exceptions: (1) separate, soft, durable, wrap-around covers will be used instead of self covers; (2) page size shall be 8-1/2 x 11 inches with 1-inch margins; (3) the reference format of American Antiquity will be used. Spelling shall be in accordance with the U.S. Government Printing Office Style Manual dated January 1973. The final report cover will conform to the New Orleans District Cultural Resource Report Series standards and specifications.

The COR will provide all review comments to the Contractor within 6 weeks after receipt of the draft reports. Upon receipt of the review comments on the draft report, the Contractor shall incorporate or resolve all comments and submit one preliminary copy of the final report to the COR within 3 weeks. Upon approval of the preliminary final report by the Contracting Officer's Representative, the Contractor will submit one reproducible master copy, one copy on floppy diskette, 40 copies of the final report, and all separate appendices to the COR within 32 weeks after date of order. A copy of the Scope of Services shall be bound as an appendix with the Final Report.

7. References.

Pearson, Charles E., George J. Castille, Donald Davis, Thomas E. Redard and Allen R. Saltus
1989 A History of Waterborne Commerce and Transportation within the U.S. Army Corps of Engineers, New Orleans District and an Inventory of Known Underwater Cultural Resources. Report submitted to the U.S. Army Corps of Engineers, New Orleans District.

Weinstein, Richard A.
1984 Cultural Resources Survey of the Proposed South Pass Bulk Terminal, Plaquemines Parish, Louisiana. Report submitted to Waldemar S. Nelson and Company, Inc. New Orleans, Louisiana.

Goodwin, R. Christopher, Kenneth R. Jones, Debra M. Stayner and Galloway W. Selby
1985 Evaluation of the National Register Eligibility of Burrwood, Plaquemines Parish, Louisiana. Report submitted to the U.S. Army Corps of Engineers, New Orleans District.

8. **Attachments.**

Attachment 1. General location of the project area.

Attachment 2. Excerpt of the Hydrographic survey maps showing the location of the project area.

Attachment 3. Report entitled A History of Waterborne Commerce and Transportation within the U.S. Army Corps of Engineers, New Orleans District and an Inventory of Known Underwater Cultural Resources prepared by Coastal Environments, Inc. (1989).

Attachment 4. Inventory records of shipwrecks for the lower portion of South Pass and the surrounding portions of the Gulf of Mexico.

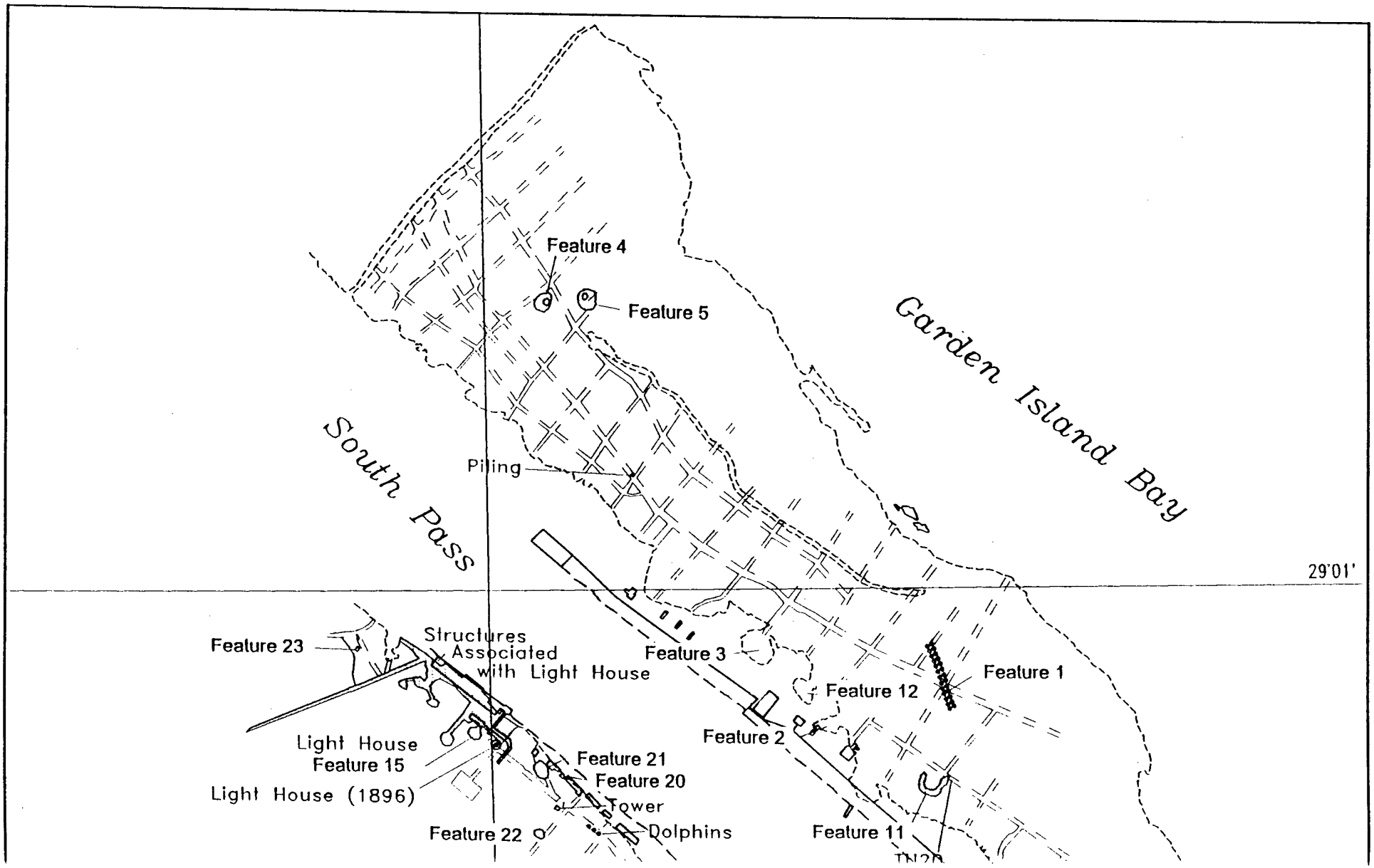
Attachment 5. Report entitled Cultural Resources Survey of the Proposed South Pass Bulk Terminal, Plaquemines Parish, Louisiana prepared by Weinstein (1984).

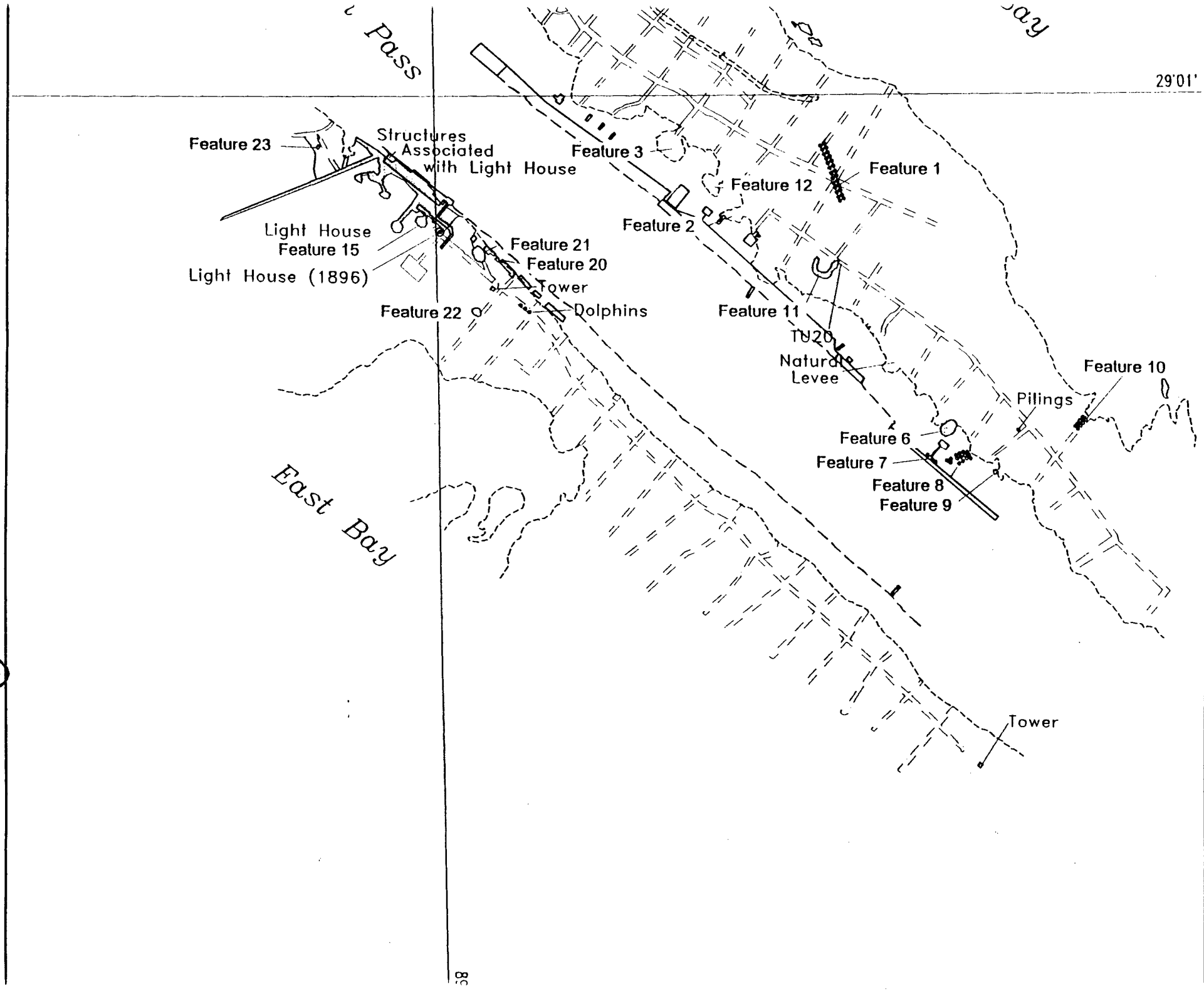
Attachment 6. National Register of Historic Places Inventory-Nomination Form, South Pass Light.

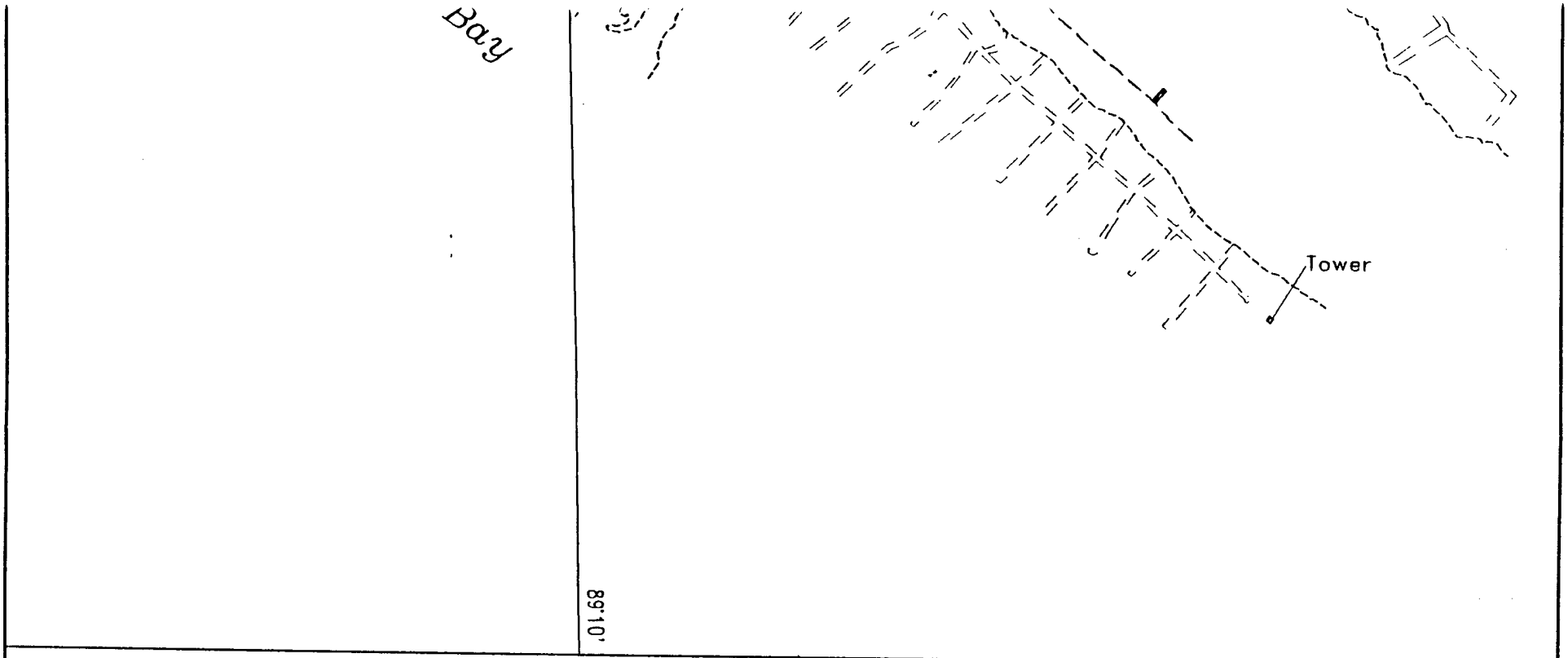
Attachment 7. Report entitled Evaluation of the National Register Eligibility of Burrwood, Plaquemines Parish, Louisiana prepared by R. Christopher Goodwin & Associates, Inc. (1985).

APPENDIX II
OVERLAY OF HISTORIC DATA WITH 1995 ARCHAEOLOGICAL DATA

PORT EADS EAST AND WEST


339
Feature 4
Feature 5
Garden Island Bay
South Pass
Piling
29'01"
Feature 23
Structures
Associated
with Light House
Feature 3
Feature 1
Feature 12
Feature 2
Light House
Feature 15
Light House (1896)
Feature 21
Feature 20
Tower
Feature 22
Dolphins
Feature 11


Pass
29°01'
Feature 23
Structures Associated with Light House
Feature 3
Feature 1
Feature 12
Feature 2
Light House Feature 15
Light House (1896)
Feature 21
Feature 20
Tower
Feature 22
Dolphins
Feature 11
TU20
Natural Levee
Feature 10
Pilings
Feature 6
Feature 7
Feature 8
Feature 9
East Bay
Tower



IA. OVERYLAY OF 1896 CORPS DATA WITH 1995 ARCHAEOLOGICAL DATA

Legend:

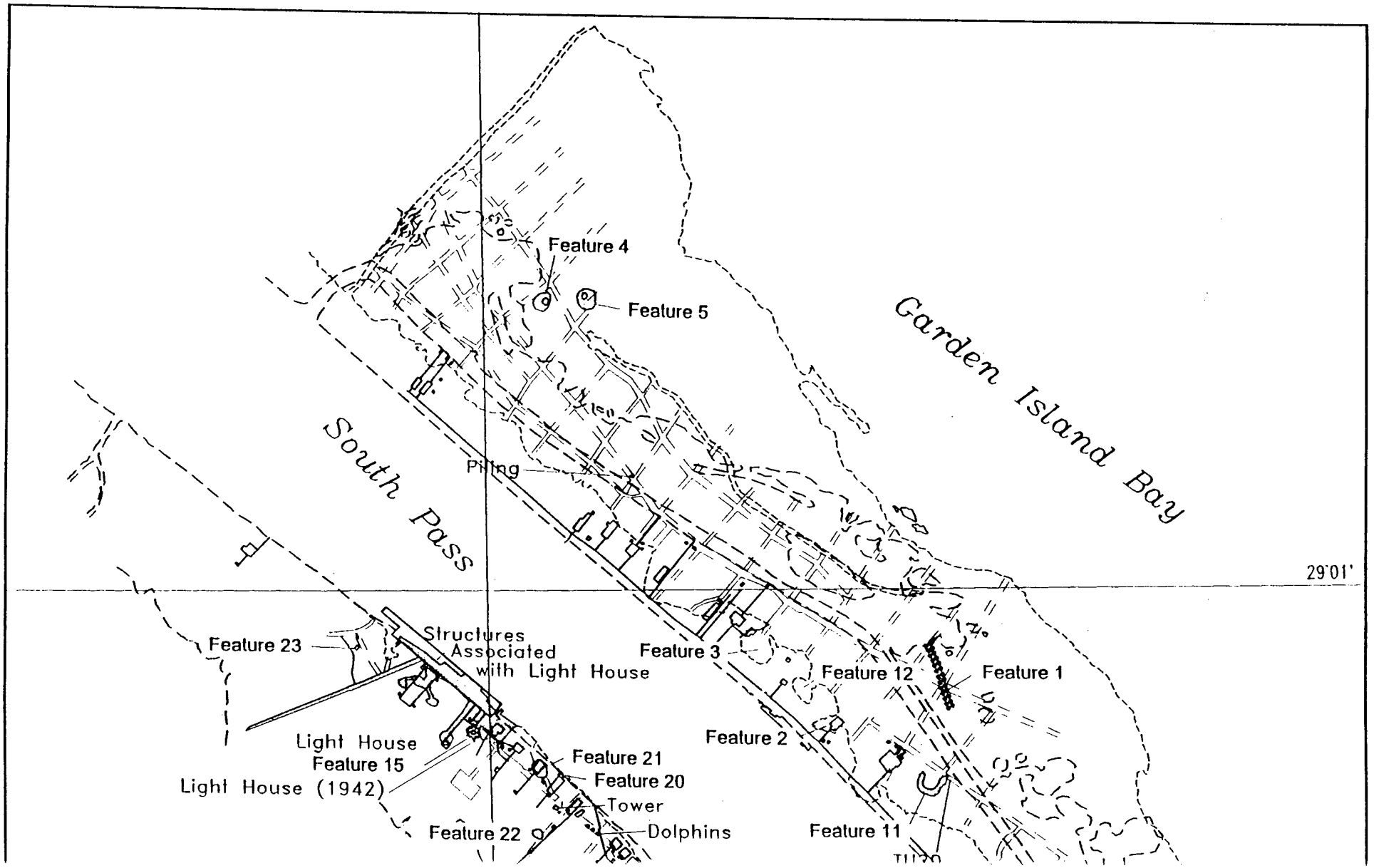
- 1896 Coastline
- 1896 Structure
- 1995 Coastline
- 1995 Structural Feature
- 1995 Transects

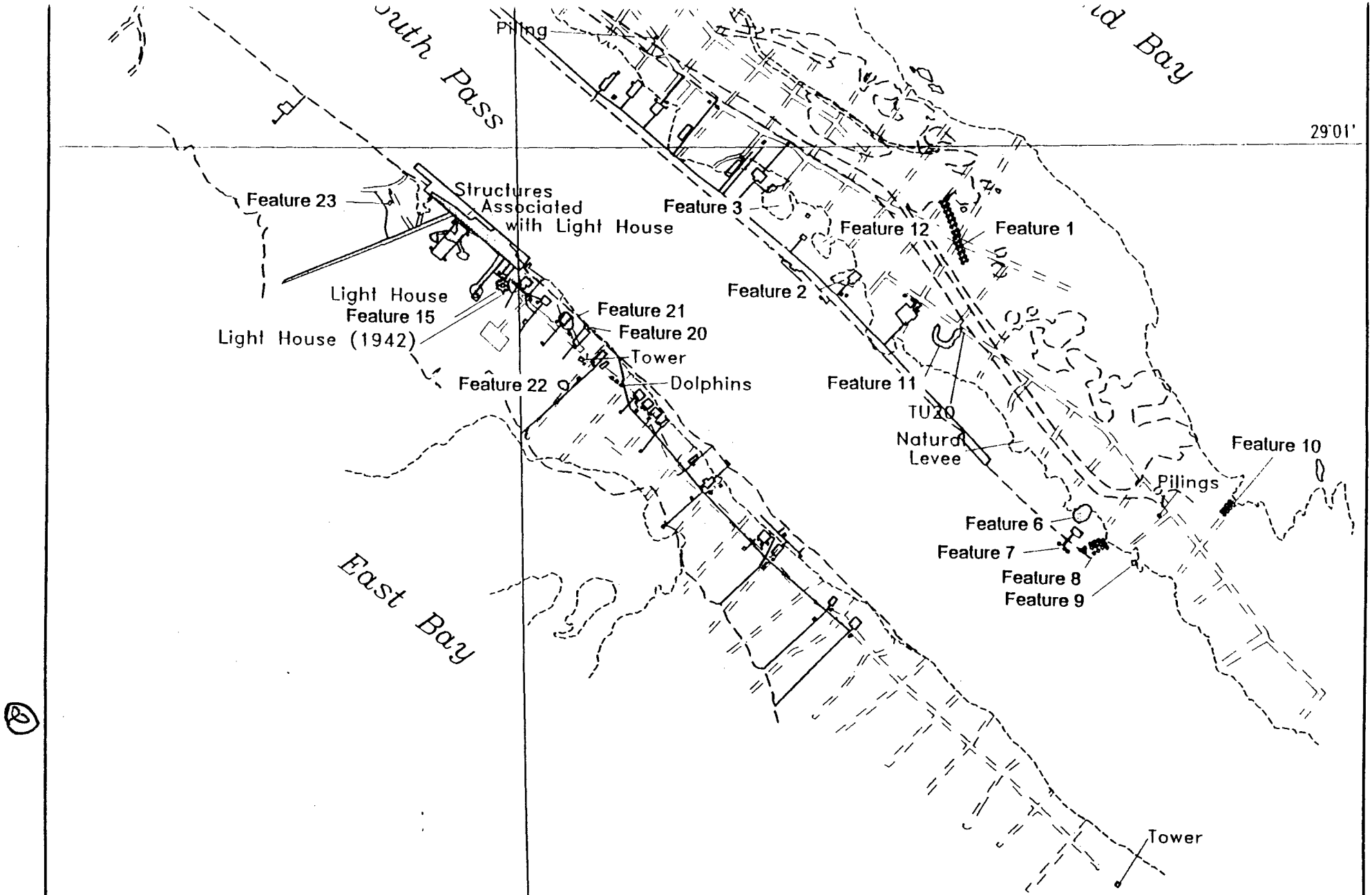
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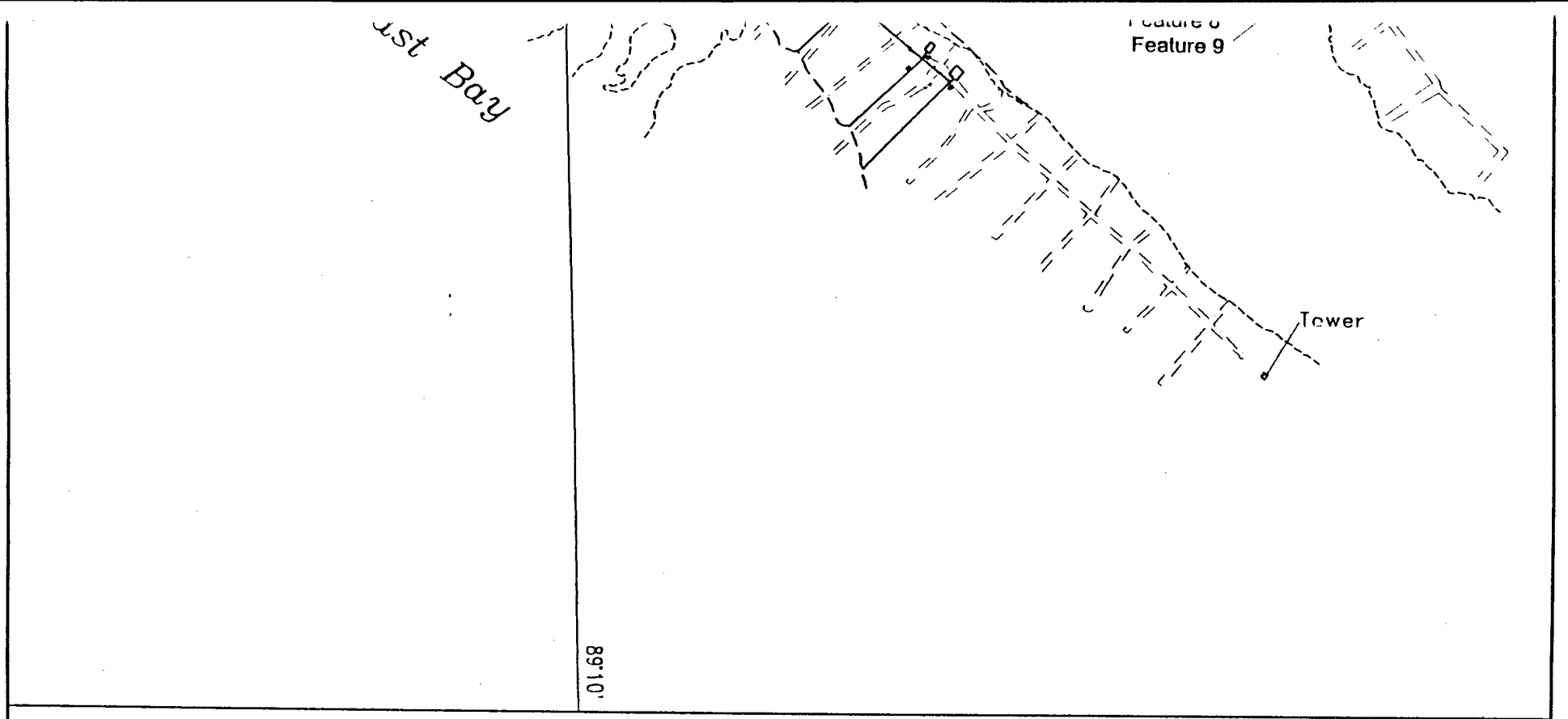
Scale In Feet

0 250 500 750 1000

(3)


340
①
Feature 4
Feature 5
Garden Island Bay
South Pass
Piling
29°01'
Feature 23
Structures
Associated
with Light House
Feature 3
Feature 12
Feature 1
Feature 2
Light House
Feature 15
Light House (1942)
Feature 21
Feature 20
Tower
Feature 22
Dolphins
Feature 11


Piling
29°01'
Feature 23
Structures Associated with Light House
Feature 3
Feature 12
Feature 1
Feature 2
Light House
Feature 15
Light House (1942)
Feature 21
Feature 20
Tower
Feature 22
Dolphins
Feature 11
TU20
Natural Levee
Feature 10
Pilings
Feature 6
Feature 7
Feature 8
Feature 9
East Bay
Tower



(3)

Legend:

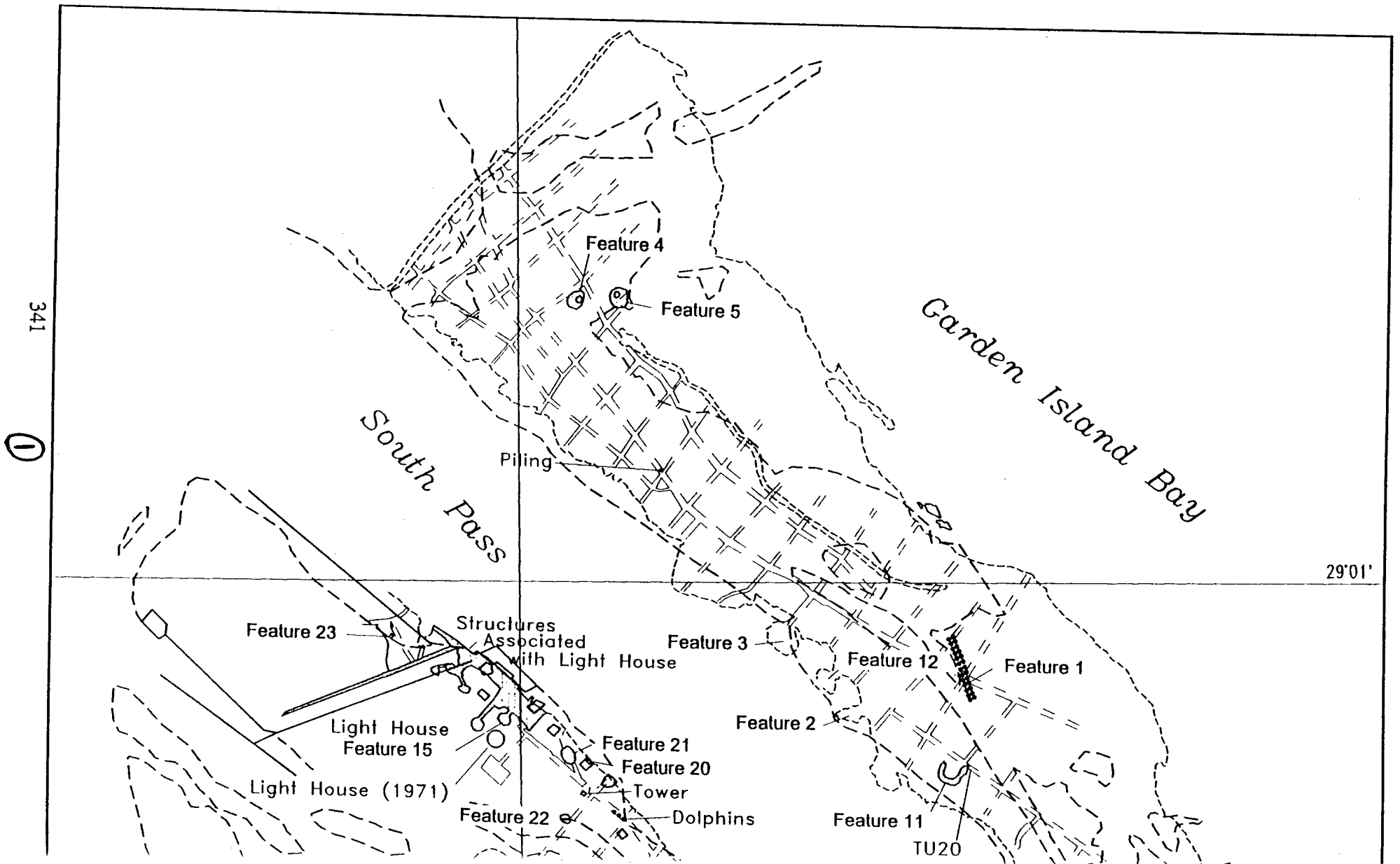
- 1942 Coastline
- 1942 Structure
- 1995 Coastline
- 1995 Structural Feature
- 1995 Transects

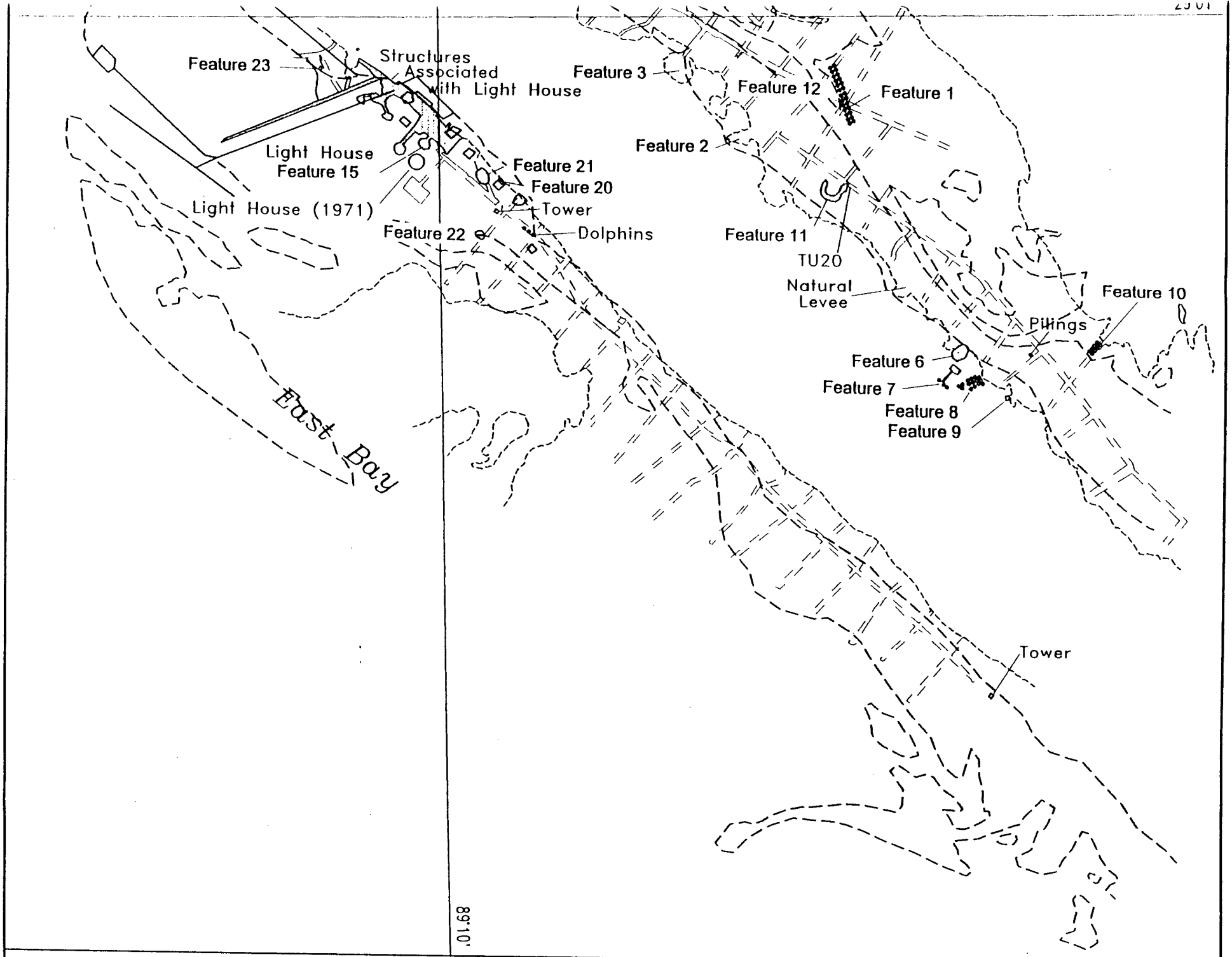
IB. OVERYLAY OF 1942 PROPOSED LEASE MAP DATA WITH 1995 ARCHAEOLOGICAL DATA

N

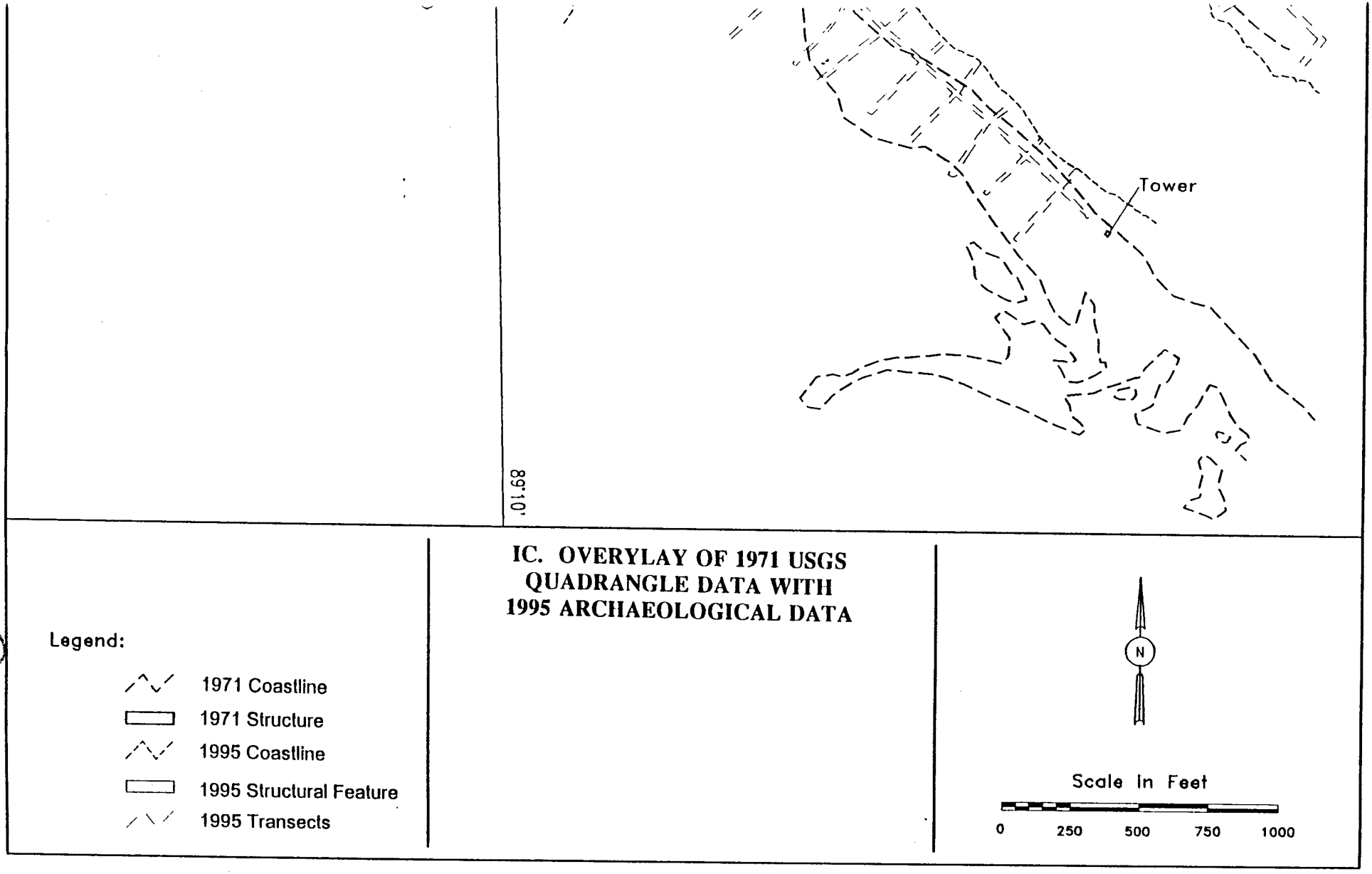
Scale In Feet

0 250 500 750 1000


341
Feature 4
Feature 5
Garden Island Bay
South Pass
Piling
29°01'
Feature 23
Structures
Associated
with Light House
Feature 3
Feature 12
Feature 1
Feature 2
Light House
Feature 15
Light House (1971)
Feature 21
Feature 20
Tower
Feature 22
Dolphins
Feature 11
TU20



IC. OVERLAY OF 1971 USGS



IC. OVERYLAY OF 1971 USGS QUADRANGLE DATA WITH 1995 ARCHAEOLOGICAL DATA

(3)

Legend:

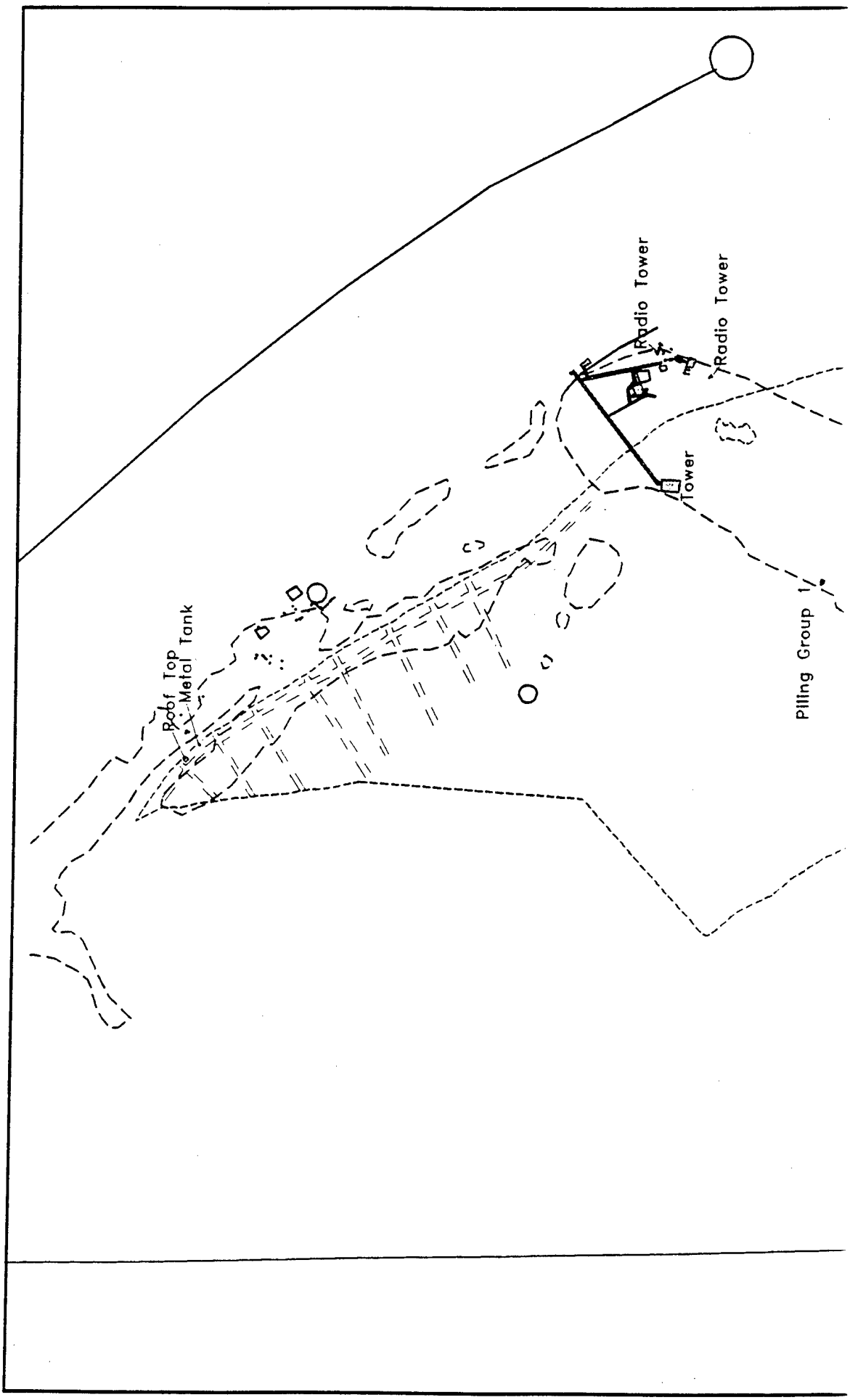
- 1971 Coastline
- 1971 Structure
- 1995 Coastline
- 1995 Structural Feature
- 1995 Transects

N

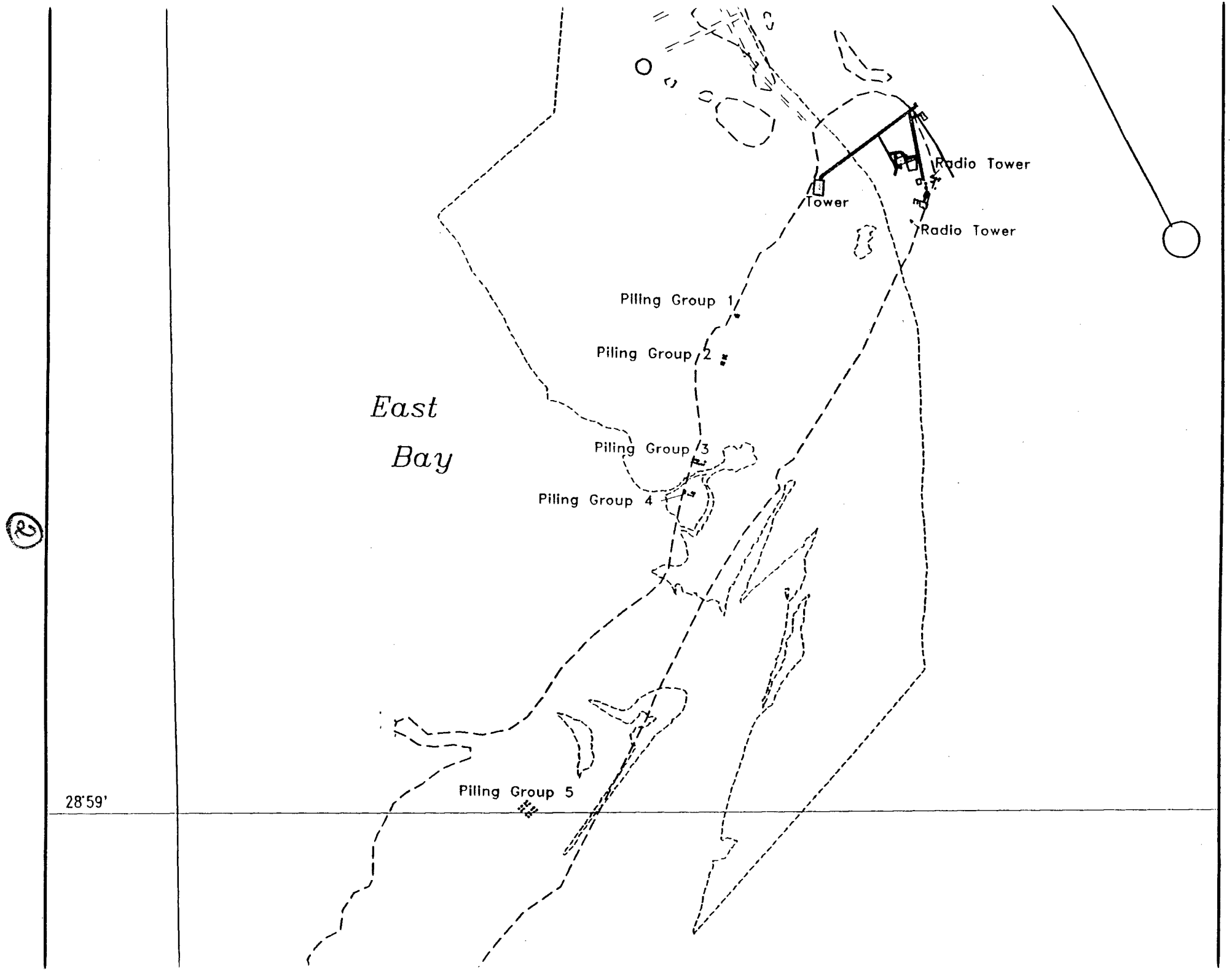
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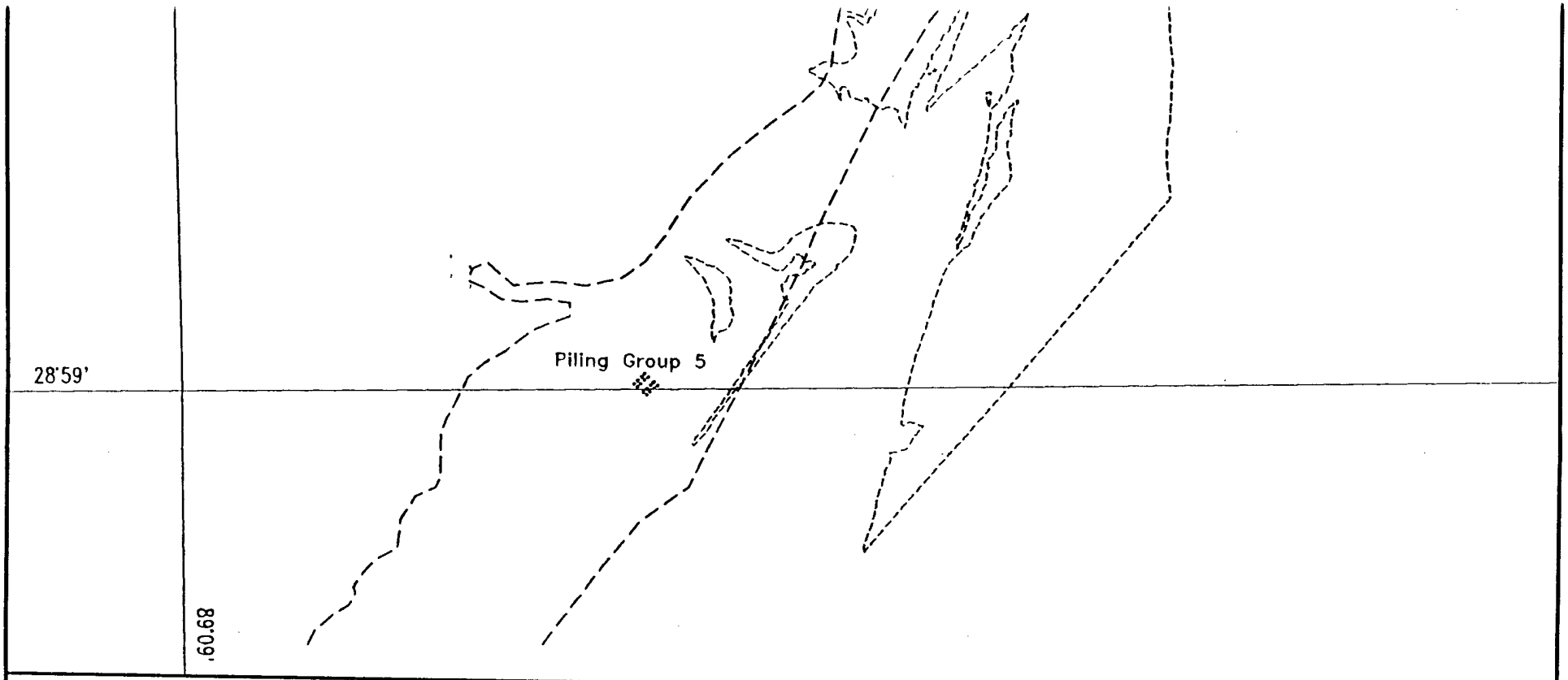
0 250 500 750 1000

PILOTS' STATION AREA AND REPORTED GUN BATTERIES AREA


Radio Tower
Radio Tower
Tower
Roof Top Metal Tank
Piling Group 1

(1)


Radio Tower
Tower
Radio Tower
Piling Group 1
Piling Group 2
East
Bay
Piling Group 3
Piling Group 4
Piling Group 5
28°59'



(3)

ID. OVERYLAY OF 1971 USGS QUADRANGLE DATA WITH 1995 ARCHAEOLOGICAL DATA

Legend:

- 1971 Coastline
- 1971 Structure
- 1995 Coastline
- 1995 Structure
- 1995 Transects

N

Scale In Feet

0 250 500 750 1000