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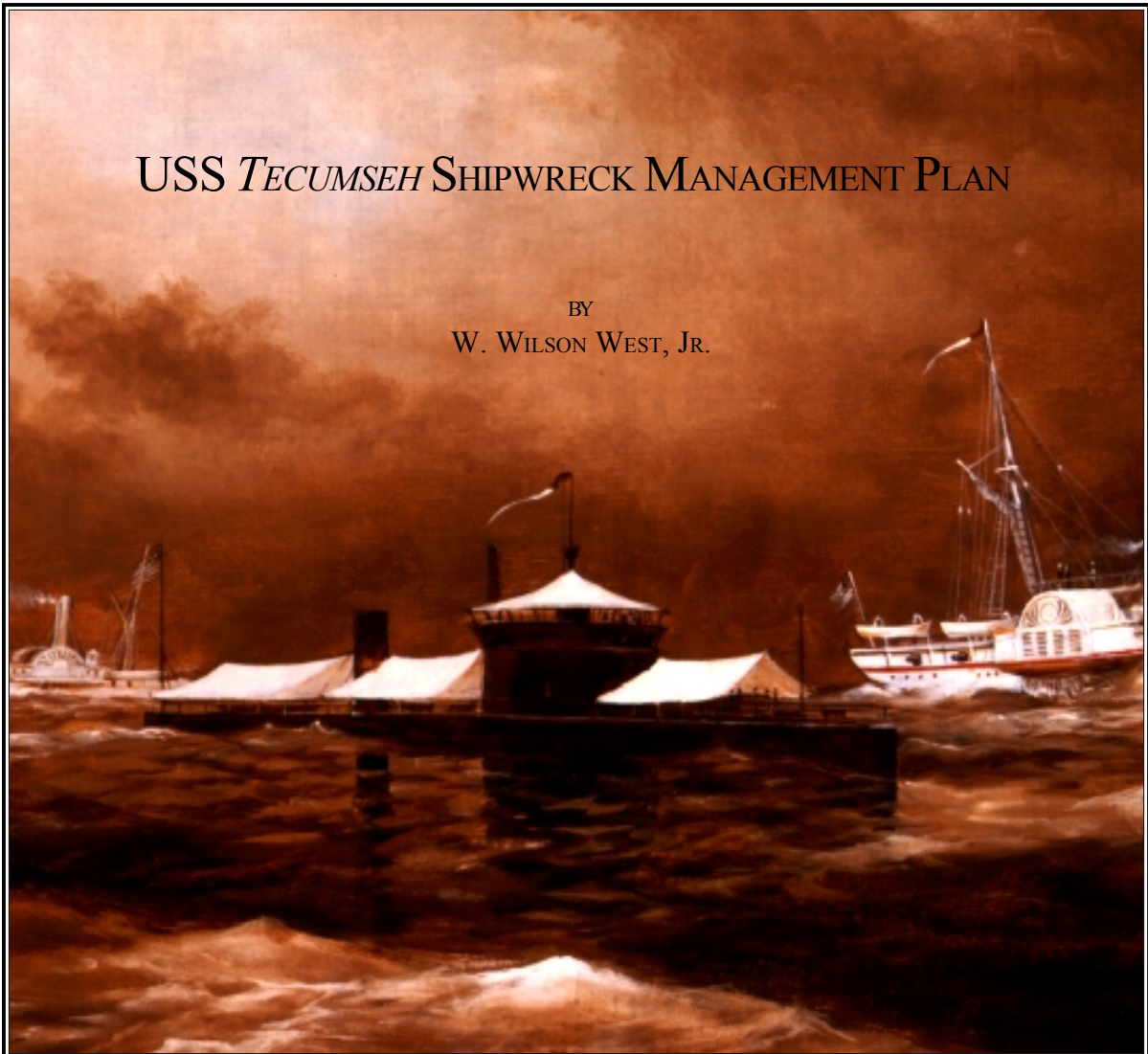
USS *Tecumseh* Shipwreck: Management Plan

W. Wilson West, Jr.

1996

USS *TECUMSEH* SHIPWRECK MANAGEMENT PLAN

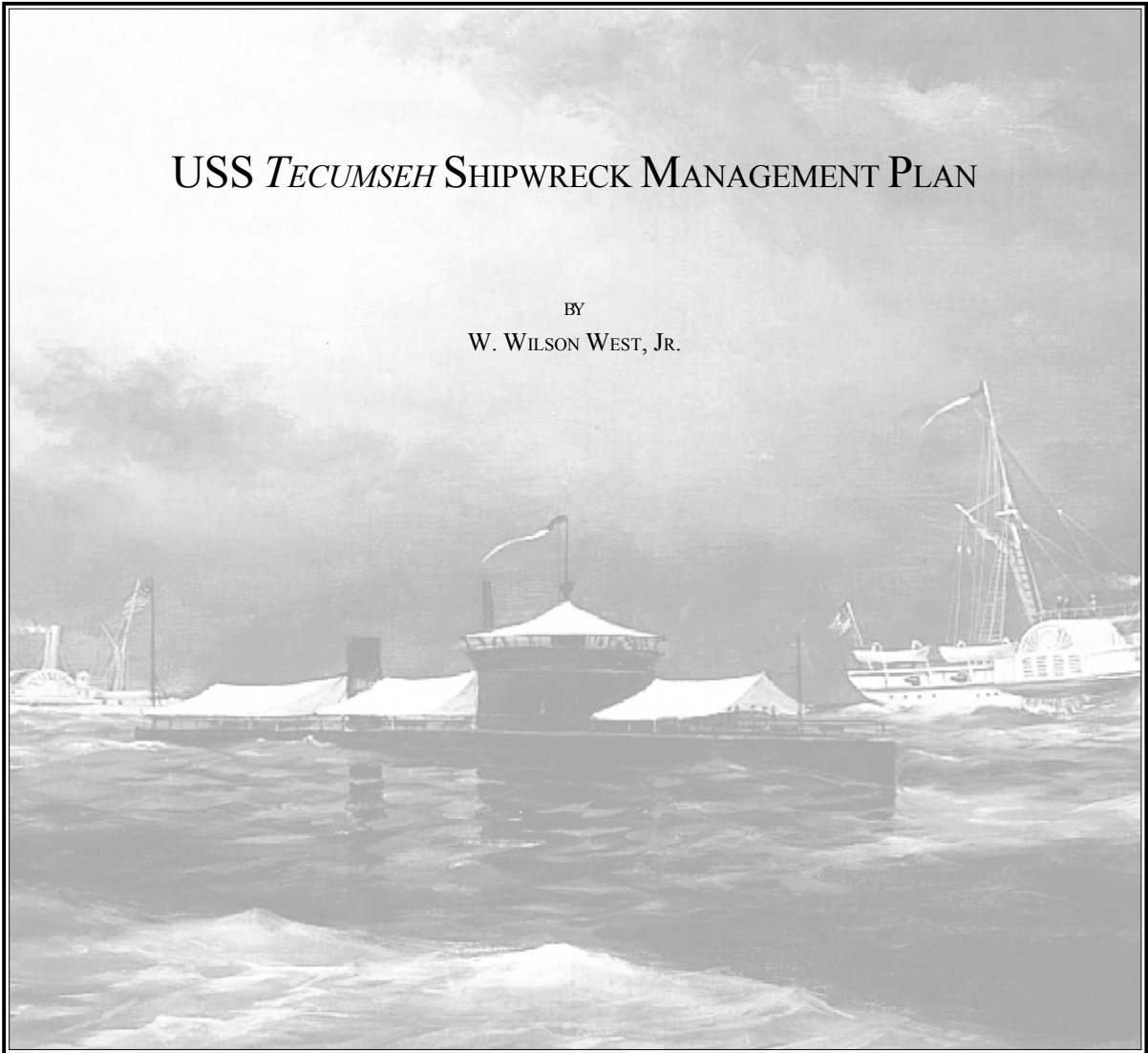
BY
W. WILSON WEST, JR.



Cover: Rare painting of *Tecumseh* at sea en route to Mobile Bay, accompanied by USS *Augusta* (right) and USS *Eutaw*. Oil on canvas (1912) by Xanthus Smith, Captain's Clerk aboard USS *Augusta*. (Dr. Charles V. Peery)

USS *TECUMSEH* SHIPWRECK MANAGEMENT PLAN

BY
W. WILSON WEST, JR.



PRODUCED AND FUNDED THROUGH
A COOPERATIVE PARTNERSHIP

BETWEEN

DEPARTMENT OF DEFENSE LEGACY RESOURCE MANAGEMENT PROGRAM
NAVAL HISTORICAL CENTER
NATIONAL MARITIME INITIATIVE, NATIONAL PARK SERVICE
NATIONAL CONFERENCE OF STATE HISTORIC PRESERVATION OFFICERS

1996

USS *TECUMSEH* SHIPWRECK MANAGEMENT PLAN

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The history of USS *Tecumseh* now extends over 132 years. The research materials and data related to her construction, operational history, and past site investigations, are spread across the country among federal and state archives, local historical repositories, and private collections and personal papers. The collection and compilation of this information was made possible by the generous assistance offered by many individuals whom I would like to recognize.

A large amount of the documentation related to the history of *Tecumseh* is housed in the Military History Collection of the National Museum of American History at the Smithsonian Institution. Dr. Harold Langely, Curator of the naval collection, provided access to the vast amount of material associated with the Smithsonian's recovery project (1967-1974).

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At the beginning of this project, I was confident and sustained high hopes of learning a great deal more about the construction and internal workings of John Ericsson's monitors. I gained the interest and the ear of Captain Ernest W. Peterkin, USNR, considered the final authority on the design and construction of the monitor-type ironclad. Sadly, we lost Pete early this year. However, because of her generosity and desire to have Pete's years of hard work reach as many people as possible, his widow, Betty Peterkin, provided me with complete access to his papers and plans relating to *Monitor* and *Tecumseh*. This material is now on loan to the Mariner's Museum, and I am grateful to be able to include Pete's original drawings in the USS *Tecumseh* Management Plan. This report is dedicated to his memory.

W. Wilson West, Jr.

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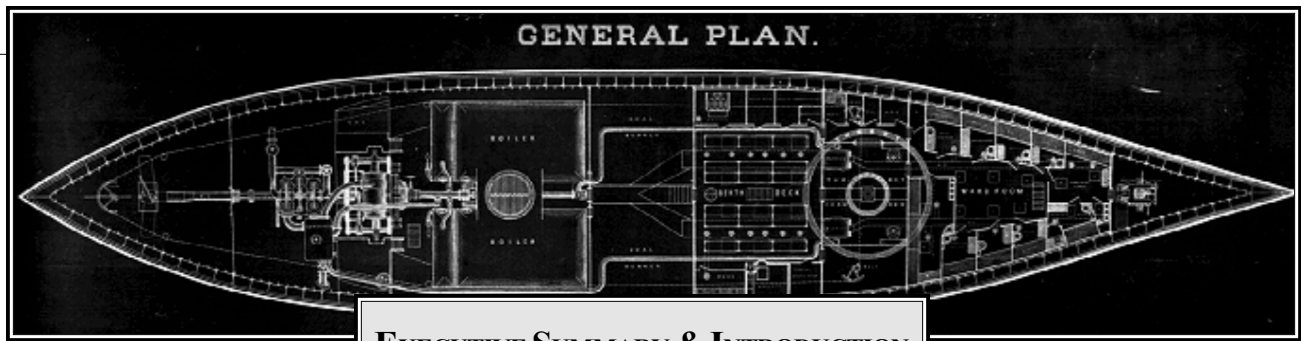
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EXECUTIVE SUMMARY & INTRODUCTION

Early on the morning of August 5, 1864, fourteen-wooden steam warships, lashed in pairs, followed four turreted ironclads toward the entrance to Mobile Bay, Alabama. As the lead ship USS *Tecumseh* approached the buoy marking the edge of the Confederate minefield, her captain, T. Augustus Macdonough Craven, ordered the helm to port. *Tecumseh's* bow slowly answered the helm as she passed the buoy on the starboard side. Seconds later a violent underwater explosion rocked the ironclad throwing her over on the port beam ends. *Tecumseh* began to settle quickly and, rolling over to port, sank in less than two minutes. Despite the rapid plunge, twenty-one of the 114 crewmen survived. Captain Craven, however, was not among them.

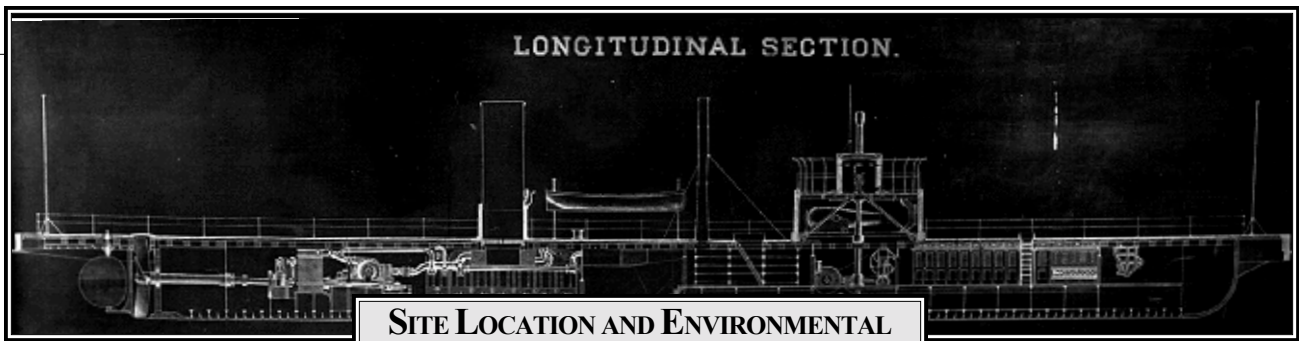
On February 16, 1967, the Smithsonian Institution announced it had located *Tecumseh* off Ft. Morgan in thirty feet of water. She was found buried in the muddy bottom, intact and in a remarkable state of preservation. Smithsonian officials were aware of *Tecumseh's* historical significance and her potential for display. At this time the museum revealed plans to make the ironclad the centerpiece of a new outdoor museum park near Washington, D.C.. However, after conducting a two-year survey of the wreck, they abandoned the project in 1974. In 1975, to provide increased protection for the wreck, *Tecumseh* was added as a discontinuous property of the Fort Morgan National Historic Landmark site. Since 1975, despite several cursory examinations, there has been no organized effort to scientifically study or recover the ironclad.

In September of 1993, the USS *Tecumseh* Conference convened aboard the battleship USS *Alabama* in Mobile. The conference was sponsored by the National Park Service's American Battlefield Protection Program, working with the National Maritime Initiative, and organized by the Naval Historical Center (NHC), Washington, D.C..

Hosted by the USS *Alabama* Battleship Commission aboard *Alabama*, attendees included representatives of the U.S. Navy, State of Alabama, National Park Service, the Smithsonian Institution, National Oceanic and Atmospheric Administration, U.S. Army Corps of Engineers Mobile District, Fort Morgan State Historic Site, City of Mobile, Mobile Maritime Museum, Baldwin County Archaeological Committee, University of Alabama, East Carolina University Program in Maritime History and Nautical Archeology, local historians, divers, and other experts on Civil War naval history.

The conference was held to discuss the future management and protection of *Tecumseh*. Because of her location in the shallow littoral of lower Mobile Bay, the site is threatened by both human and natural forces, including vandalism, looting, commercial vessel anchoring, erosion, and corrosion. The *Tecumseh* conference recognized an urgent need to coordinate the efforts of government and the private sector in the interests of preserving and managing this important historic site, and to consider options by which the site can be better protected and further studied. As a tomb for 93 sailors, and containing important artifacts, supplies, and equipment, *Tecumseh* is both a war grave and an important source of data on the Union navy and life at sea in the nineteenth century.

Representatives agreed that a management plan detailing all of the conference's issues and options was necessary. Acting on behalf of the U.S. Navy, which has custody of the wreck, the Naval Historical Center, assisted by the National Maritime Initiative, has developed this draft plan, which was produced in cooperation with other federal agencies, state and local governments, and private groups and individuals. It addresses the ship not as an isolated site, but within her historical, geographical, and technological context, and outlines options and recommendations for protection and preservation.



SITE LOCATION AND ENVIRONMENTAL SETTING

The *Tecumseh* site is 300 yards northwest of Fort Morgan, off the western end of Morgan Peninsula. Bathymetric data indicates that she lies on a south to north orientation between the 25- and 30-foot bottom contours. *Tecumseh* capsized as she sank and, because of the short distance to the bottom, the turret did not fall away from the deck. She came to rest on the starboard rail, supported by the turret and pilothouse at an angle of approximately 20 to 25° off the bottom. Previous investigations of the site indicate that the vessel rests on a hard, coarse-grain sand bottom and is covered with alternating layers of sand and silt. The distance from the starboard turn of the bilge, the highest part of the wreck, to this hard bottom, is approximately thirty feet.

PHYSIOGRAPHY

Coastal Alabama is located in the northeastern part of the Gulf of Mexico extending from Perdido Pass, in the southeast corner of the state, westward for fifty-six miles to the Mississippi state border. Alabama has forty-six miles of shoreline along the Gulf. This area lies within the Southern Pine Hills and the Coastal Lowlands, subdivisions of the East Gulf Coastal Plain. The Southern Pine Hills are a moderately sloping plain ranging in elevation from about 100 feet near the coast, to 300 feet in northern Baldwin and Mobile counties. The Coastal Lowlands is a flat to gently undulating plain extending along the coast adjacent to Mobile Bay and lies behind the coastal beaches in southern Baldwin County.¹ (Figure 1)

The Mobile Bay estuarine system is separated from the Gulf by Morgan Peninsula and Dauphin and Petit Bois islands. Its main components are Mississippi Sound, Mobile Bay, Mobile Delta, Little Lagoon, and Bon Secour Bay. These estuaries have a total surface area of 397,353 acres of open water, a volume of 3,833,489 acre-feet mean high water (MHW), and an average depth of 9.74 feet. The formation of this valley dates to the middle to late Pleistocene Period. Present-day Mississippi and

Alabama barrier islands are thought to be Holocene in age, dating from 3,000 to 6,000 years old.² (Figure 2)

The source of this large, dynamic estuary lies forty miles north of Mobile Point in the Mobile Delta. The confluence of six rivers combine as the Mobile-Tensaw river valley which forms the Mobile Delta. These rivers drain an area that extends northward into the Piedmont sections of Mississippi, Alabama, and Georgia, forming a watershed area of nearly 43,200 square miles. With an average discharge of 61,945 cubic feet per second, this volume carries approximately 4.7 million tons of suspended material, mainly of sand, clay, gravel, and heavy minerals into Mobile Bay each year. This is the fourth largest river system in the United States in terms of discharge.³ (Figure 3)

Fort Morgan sits on the western end of Morgan Peninsula at the entrance to Mobile Bay. Morgan Peninsula is a large “bay-mouth bar” or “spit” that has formed westward from the eastern shore of the bay, extending eighteen miles to Mobile Point. From Mobile Point, the main pass of the bay extends three miles to the eastern end of Dauphin Island. Main Pass is a natural inlet maintained by tidal currents and is classified as tide-dominated because of its well-developed ebb-tidal delta system, which acts as a transition zone between the main estuary and the Gulf of Mexico. A submerged tidal delta has formed on both the seaward and landward sides of the inlet. This ebb-tidal delta forms a fan-shaped apron extending six miles into the Gulf of Mexico. Depths average ten feet along the delta outside the channel, however, high sediment deposition rates have created emergent channel margin bars. Pelican Island, Sand Island, and other intermittent bars combine to form Pelican Bay, immediately south of Dauphin Island. To the northwest of Dauphin Island is the bay’s auxiliary outlet through Pass aux Herons. About 28% of the bay water flows through this pass and into Mississippi Sound.⁴

The average annual bay water temperature is fairly constant, with bottom water usually slightly cooler than water at the surface. The Main Pass area

is warmer in the winter and cooler in the summer than the upper bay. The average yearly water temperature at the entrance to the bay is 74°F at the surface, and 73.5°F on the bottom. The average annual temperature for Fort Morgan is 68.9°F. The annual amount of precipitation is high in the bay area, with an average of sixty-four inches, and tends to be highest during July and lowest in October and November. The average monthly relative humidity for Mobile is 73%.⁵

The direction and velocity of the prevailing winds in coastal Alabama varies with the seasons. The average annual wind velocity is 8.3 miles per hour. Winds are predominately from the northerly directions during the fall and winter months, and southerly during the spring and summer. The strongest winds (25+ miles per hour), other than tropical cyclones or hurricanes, occur less than five days during the year and originate from the northwest and southeast.⁶

THE WATER COLUMN

The astronomical tide along coastal Alabama varies from 1 to 1.6 feet being lowest in the tidal streams at the north end of the bay. The mean tidal range at Mobile Point is 1.2 feet, which is classified as microtidal. Main Pass is the primary avenue through which Gulf of Mexico waters meet freshwater from the Mobile-Tensaw River system. Tidal movement and freshwater discharge are the two most important factors that affect currents in Mobile Bay. The ebb- and flood-tides flow through Main Pass every six hours and the change from flood to ebb to flood produces short periods of zero current velocity. The current at Morgan Point can reach four knots at peak flood and ebb tide.⁷

At early flood tide Gulf water enters Mobile Bay through Main Pass and is deflected toward the northeast. During ebb tide there is a fairly uniform movement of water to the south. Freshwater discharge and wind have an affect on tidal range by piling up water in the northern part of the bay during high freshwater discharge or strong southerly winds, and removing bay water during low freshwater discharges or strong northerly winds.⁸

Salinity distribution in Mobile Bay is a result of the interaction of freshwater discharge, currents, evaporation, tides, winds, and bathymetry. Salinity levels can range from 0 to 36 parts per thousand (ppt)

in the lower bay. The lowest salinities are present during high river discharge and flooding between January and May and average 15 ppt in lower Mobile Bay. Conversely, the highest salinities occur during low river discharges between June and November, and average 30 ppt in the lower bay. During periods of very low rainfall, salt water tends to dominate the surface in the lower part of the bay and Main Pass, and can be found as far as twenty-one miles up the Mobile-Tensaw River.⁹

In general, average annual bottom salinities are higher than those at the surface. The best evidence of this is the Mobile Ship Channel. The channel is flanked by an almost unbroken line of dredge spoil material on both sides for its entire length. This barrier, between the deep channel and shallow bay, produces a salt water wedge from Main Pass to the Mobile-Tensaw River for most of the year. Other effects of the Mobile Ship Channel are segmentation of the bay, shoaling, alteration of water exchange, increased turbidity, and changes in sedimentation.¹⁰

BATHYMETRY & SEDIMENTATION

The 1849 bathymetric data for Mobile Bay shows the natural configuration of the ebb-tidal delta before the first dredging and spoil operations. At that time, the floor of the bay was relatively flat with a depth of ten to fourteen feet with a gentle slope toward its center and southward to the Gulf. At the bay's mouth, the eastern side of the tidal inlet between Dauphin Island and Mobile Point was scoured to a depth of fifty-four to fifty-eight feet. North and south of the delta the depths decrease rapidly, shallowing to less than eighteen feet in Pelican Bay.¹¹ (Figure 5)

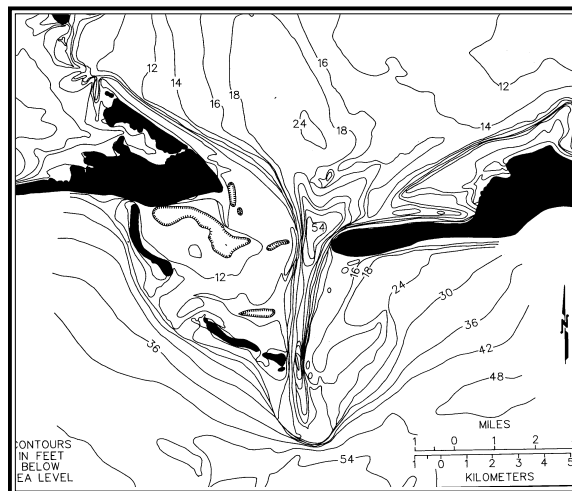


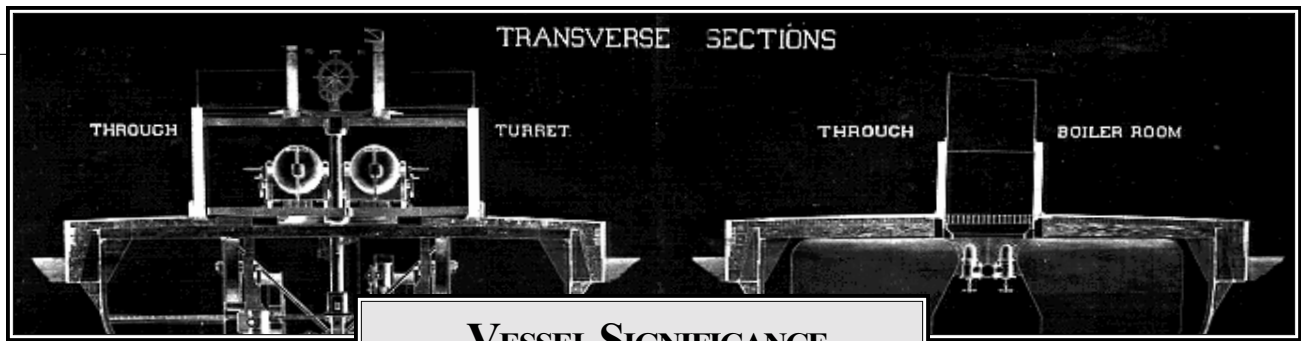
Figure 5. 1849 Bathymetric map of lower Mobile Bay. (Geologic Survey of Alabama)

Significant changes have occurred in the bathymetry of Mobile Bay since 1849. General shoaling of the broad flat bay bottom decreased the depth of most areas from one to three feet. The bathymetry was greatly modified by the dredging of the ship channel and disposal of dredge material. The main ship channel from Mobile to the mouth of the bay is presently 400 feet wide with a depth of thirty-seven feet. Spoil banks, with a relief of six feet or more, extend along both sides of the channel south to Great Point Clear. South of there, the spoil material is on the west side of the channel with a relief of two to three feet. Over the last 130 years, the silting up of Pelican Bay and southern Mobile Bay seems to have been a gradual and continuous process. The most likely causes are freshwater discharge, sedimentation rate, wave energy, relative sea level change, and the history of deforestation and dredging.¹²

The suspended sediment load of the Mobile-Tensaw River system reaching Mobile Bay is estimated as averaging 4.7 million tons per year. Of this amount, 30% (1.4 million tons) of the total load passes through the estuarine system into the gulf each year. Long term sediment accumulation for the bay had been estimated at 1.7 feet per century. Present rates are considerably higher than in the past and are probably still accelerating. This accumulation, due in part to the growth of the delta toward the mouth of the bay, has shifted deposition “down-bay” and increased sedimentation rates in that area.¹³

An east-west belt of sand encompasses Dauphin and Little Dauphin islands, Main Pass, and Morgan Peninsula between the bay-bottom clays and silts, and the ebb-tidal delta clays and silts. In the southern periphery of the bay, sediments are estuarine silts and clays with mixed clay-silt-sand and sand. A curving ribbon of sand follows the tidal and main ship channels from Mobile Point to the southern end of the ebb-tidal delta. This belt of sand widens considerably in Pelican Bay, and this area and the ebb-tidal delta are slowly aggrading; the ebb-tidal delta sedimentation rate has been calculated at 2.5 feet per century.¹⁴

Stratigraphic cross-sections have been made based on borings taken by the Exxon Company in support of a pipeline route survey. The cross-section through the ebb-tidal delta consists of a lenticular body of quartz sand measuring up to thirty feet thick, along the east-west axis of Dauphin Island and Morgan Peninsula. Toward shore, it is less shelly and grades to silty sand with numerous clay lenses.¹⁵ (Figure 4)



VESSEL SIGNIFICANCE

SIGNIFICANCE OF USS *TECUMSEH*

Today, USS *Tecumseh*'s significance can be judged on several levels. One places her in the "Cult of the *Monitor*": The success of "the ship that saved the Union" at the Battle of Hampton Roads, and the monitor mania that ensued, provided the catalyst for the technological changes which would transform the world's navies. Although historians continue to debate the contributions of *Monitor* to the development of the ocean-going capital warship, one salient feature remains today: the revolving gun turret. Early monitors exhibited poor sea-keeping qualities which consigned their class to coastal operations. After the war, however, they continued in this service as training and coastal defense platforms until the first decade of the twentieth century. Of the fifty-one monitors laid down during the war, the nineteen ships of the *Passaic* and *Canonicus*-classes embody the features of mature monitor design as developed by Navy engineers.

Tecumseh is also significant for her role in Admiral David Farragut's attack on Mobile Bay in August of 1864, one of the largest naval battles of the Civil War. That role represents a single moment defined by a dramatic sinking at the outset of an hours-long battle. Her loss set into motion a series of events, resulting in one of the most recognized naval slogans ever uttered; "Damn the Torpedoes, Full Speed Ahead!" Ironically, *Tecumseh*'s sinking is the primary reason why she survives today, and her paramount significance derives mainly from the remarkable state of her preservation. She may be the most important and valuable Civil War relic in the United States.

Including *Tecumseh*, there are only four known surviving examples of the Ericsson U.S. Navy ironclad in the world. The original, USS *Monitor*, is in 235 feet of water off Cape Hatteras, North Carolina. She lies capsized and exposed on the bottom. Although the ironclad and its contents have remained intact, she is in a severely deteriorated

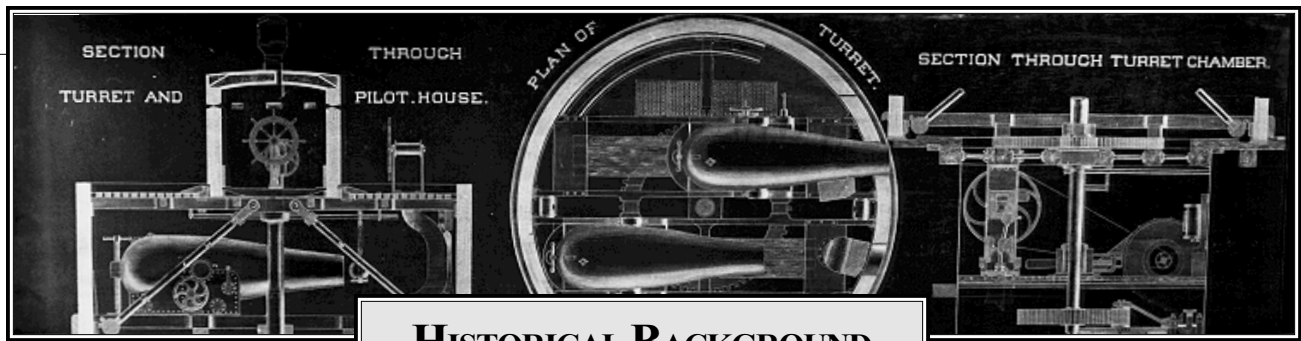
condition. USS *Weehawken*, of the *Passaic* class, is just offshore of Morris Island, South Carolina, at the entrance to Charleston Harbor. *Weehawken* was lost in a freak accident in December 1863. In 1871, after extensive channel clearance demolition, the Corps of Engineers reported that the pilothouse, turret and deck were blasted to a depth of eleven and a half feet. Pieces of these structures were left in the hold with the boilers and her engines were removed. Today, the remains of *Weehawken*'s hull lies under eight to ten feet of sand. USS *Patapsco*, also of the *Passaic* class, struck a torpedo (underwater mine) in the shallow waters of Charleston Harbor, off Ft. Sumter, in January 1865 with the loss of sixty-four officers and men. Efforts to clear *Patapsco* from the channel were also made in 1871. The pilothouse was removed and her turret was reported as inclined at an angle of 35°. The decks were blown off over the engine room but the engines were not removed. At the time there was five and one half feet of water over the upper edge of the turret and fifteen feet over balance of the wreck. Today the wreck is in much the same condition, with a large amount of structural remains exposed on the bottom.¹⁶

Of these four monitors *Tecumseh* is, without question, the best preserved. Suspended in sediment, the vessel is a time capsule containing pristine examples of mid-nineteenth century technological and cultural material. Some scholars will argue that these types of examples abound today and that little additional knowledge can be gained from the study of a site for which there is already a body of documentary material. The monitors, however, are an anomaly in the development of warship design and contain numerous mechanical and architectural features which, due to the exigencies of wartime construction, were not thoroughly documented. These innovations presented new and unique living and working conditions unknown to crews prior to the war. The preservation and study of this material provides us with a tool for understanding these changes and their effect on the way we conducted our wars.

WAR GRAVE STATUS

Technology is giving us the opportunity to locate and explore previously inaccessible U.S. Navy wrecks throughout the world. Many of these vessels contain the remains of crew who perished during the loss. At the time of this writing, the Navy has no formal policy concerning the protection of the remains of servicemen lost at sea. In the past, the treatment of ships as “watery graves” has been taken on a case-by-case basis. Of the numerous U.S. losses in the Pacific during World War II, *Arizona* stands out as one of the most dramatic and costly in terms of lives lost. It is, perhaps, our most visible example of a naval war grave and memorial.

Tecumseh shares this distinction with *Arizona* by the instantaneous loss of more than 80% of the crew. Consequently, consideration must be given to the men still entombed aboard her. Concern over the disposition of the remains was expressed by the families of the crew only three months after the sinking. *Tecumseh*'s status as a war grave was confirmed with the passage of the joint resolution of August 1876 revoking James Slaughter's salvage rights. However, this law did not prohibit the recovery of *Tecumseh*; anyone attempting to salvage the vessel would have to include a detailed plan for the removal and reburial of the crew. Although the Smithsonian planned for the recovery and reburial of the remains, bones were removed from the wreck in a piecemeal fashion during the course of their project. Today, the Naval Historical Center considers *Tecumseh* a war grave site and as such she cannot be disturbed without the permission of the Secretary of the Navy.¹⁷



HISTORICAL BACKGROUND

CONSTRUCTION AND OPERATIONAL HISTORY

For more than 300 years, from the introduction of artillery on warships through the War of 1812, engagements at sea were fought in familiar line-of-battle formations by heavily constructed wooden ships carrying large batteries of smoothbore guns. In the half century before the American Civil War, however, rapid advances in ship design, propulsion, and ordnance accelerated by the Industrial Revolution, brought radical changes to naval architecture and war at sea. The introduction of steam-driven paddlewheels and screw propellers for naval purposes forever altered the course of strategy and tactics. It was the shellgun, however, successfully tested during the Crimean War, which doomed the largest wooden warships, steam or sail, to extinction. Naturally, naval shipwrights took the next logical step and the only defense against exploding shells: armor plating.

Proposals and plans for armoring ships and floating batteries appeared in the United States from the time of the War of 1812, increasing with each development in ordnance. Despite this, Congress appropriated funds for only one armored vessel before the Civil War. In 1842, Robert L. Stevens of Hoboken, New Jersey, submitted a plan for a “large iron steamer to be protected by plates of four-and-one-half-inch iron armor plate.” Unfortunately, work on the “Stevens Battery” suffered many setbacks and the vessel remained unfinished at the outbreak of the war. By 1846, Congressional attention had focused on the war in Mexico. The success of steam warships along the Mexican coast led to postwar appropriations for wooden steam frigates and sloops. After initiating construction on the first armored, seagoing warship, the United States fell steadily behind the European powers, particularly France and Great Britain.¹⁸

The introduction of the shellgun in 1824 and its use by a Russian fleet to destroy a Turkish fleet at Sinope during the Crimean War, had convinced the French to adopt armor plating. The successful demonstration of the offensive and defensive

capabilities of armored floating batteries at Kinburn in 1855 ended wooden warship construction in France. Not to be replaced as self-appointed master of the seas, Great Britain immediately initiated its own ironclad construction program. Large steam frigates, plated with armor but retaining the full-rigged ship design of the period, characterized construction in both countries. The French were producing the *La Gloire* class, three-masted steam frigates plated with four and one-half inches of iron from stem to stern. The British countered with *Warrior*, a large iron-hulled steamer armored only amidships for protection of the gundeck and engineering spaces. By 1861, thirty-seven armored warships were in various stages of construction in Europe.¹⁹

Before 1860, the United States had adopted every major innovation in warship design and construction except armor plating. To an apathetic Congress, the growing European ironclad fleets appeared formidable but untested. In any case, civil war had brought an immediate need for conventional warships to enforce a newly imposed blockade of the southern United States.

At the time of the Confederate attack on Fort Sumter, April 12, 1861, Union Secretary of the Navy, Gideon Welles, counted forty-two vessels on active duty. Of this number, only twelve were immediately available for service along the southern coast. Fortunately for Welles, nineteen first-class steam warships had been built just prior to the war. In early 1861, Congress authorized construction of seven screw sloops-of-war to which Welles added one more. Without awaiting Congressional approval, he contracted for twenty-three light-draft screw gunboats to be rapidly constructed to meet the Navy’s immediate needs in shallow southern coastal waters.

At the special session of Congress called by President Lincoln on July 4, Welles reported on the condition of the Navy and his recent action to improve the service. Sanctioning his early construction contracts, Congress appropriated funds for twelve additional light-draft paddlewheel

steamers. Having secured the initial appropriations necessary for implementing the blockade, Welles focused attention on the construction of armored warships. He emphasized recent improvements in the French and British navies, and the “ingenuity and inventive facilities of our own countrymen.” Despite his belief that this was not the best time for heavy expenditures on experimental vessels, Welles did not hesitate to call for ironclad construction.²⁰

Congress responded quickly to Welles’s request. Two weeks after the special session, a bill was introduced in the Senate directing the Secretary to appoint a board to investigate ironclad construction. The measure, enacted August 3, called on the board to “investigate the plans and specifications that may be submitted for the construction or completing of iron or steel-clad steamships or steam batteries.” The sum of \$1,500,000 was appropriated for the construction. The three designs approved for construction by the board became the ironclads USS *New Ironsides*, USS *Galena*, and USS *Monitor*.²¹

The synthesis of the technological and scientific advances during this period is nowhere better illustrated than in the construction of USS *Monitor*. Designed and built by the Swedish engineer and inventor John Ericsson, the *Monitor*-type became the ironclad of choice of the United States Navy during the Civil War, giving its name as the generic term for all low-freeboard turreted vessels. Ericsson came to the United States in 1839 to build the highly successful USS *Princeton* for Captain Robert F. Stockton. The first screw steam warship, *Princeton*, incorporated a number of recent developments in naval technology, many of which were Ericsson’s own inventions. In addition to his patented six-

blade propeller, Ericsson introduced a direct-acting marine engine which connected directly to the screw shaft. The combination of these features enabled the builder to place all of the vessel’s motive machinery below the water line. Eliminating the paddle wheels greatly reduced the risk of disabling gunfire and allowed room for additional broadside armament. *Princeton*’s boilers burned smokeless anthracite coal and were force-fed by fan blowers.²²

Ericsson successfully combined these technological innovations in the creation of his steam-powered armored gun battery. *Monitor* was 172 feet long, 41 feet in beam, and had a 10-foot 4-inch depth of hold for a total displacement of 1,255 tons. All of the engineering and berthing spaces were located in the hull, which was protected by a 6-inch-thick armor belt that encircled the vessel at the waterline. The flat deck was featureless except for the pilothouse at the bow, the smokestacks, and *Monitor*’s most unique and controversial feature, the revolving turret. The idea of mounting guns in a revolving platform dates back to the introduction of artillery. Although an ancient concept, the turret was never widely accepted for land defense and not for naval purposes until the Civil War. Ericsson’s turret was twenty feet in diameter and nine feet tall and carried two XI-inch Dahlgren smoothbore cannon. The structure was made of nine layers of one-inch-thick iron plate bolted through, and rotated by auxiliary steam power.²³ (Figure 6)

The contract for *Monitor* was signed on October 4, 1861 with Ericsson’s guarantee that the vessel would be completed and ready for sea in one hundred days. This time stipulation was particularly important to the government in light of the events taking place in Norfolk, Virginia. After their capture of the Gosport Navy Yard, the Confederates began construction of a casemated ironclad ram. CSS *Virginia* was built on the salvaged remains of the steam frigate USS *Merrimack*, which had been burned and scuttled during the Union withdrawal. Federal officials feared that *Virginia* could destroy the fleet in Hampton Roads, thus breaking the blockade and potentially threatening the Union capital.²⁴ (Figure 7)

Monitor was commissioned February 25, 1862, and received her crew of fifty-seven men, all volunteers. Lieutenant John L. Worden was her first commanding officer. Worden was ordered to take the ironclad to Hampton Roads as soon as possible and wait for CSS *Virginia*. Repairs and bad weather delayed his departure until March 6. At the last minute the Navy Department, bowing to political

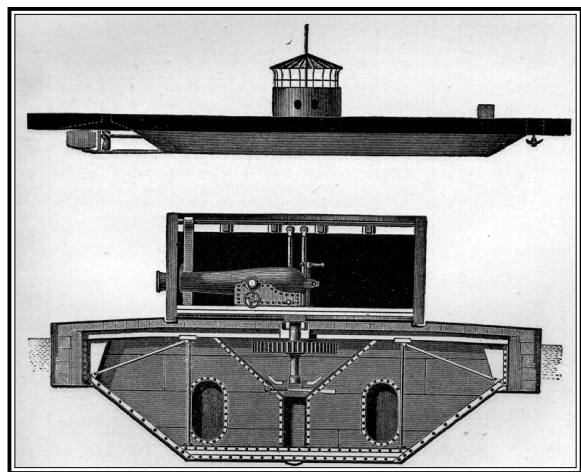


Figure 6. Outboard profile and cross-section of USS *Monitor*

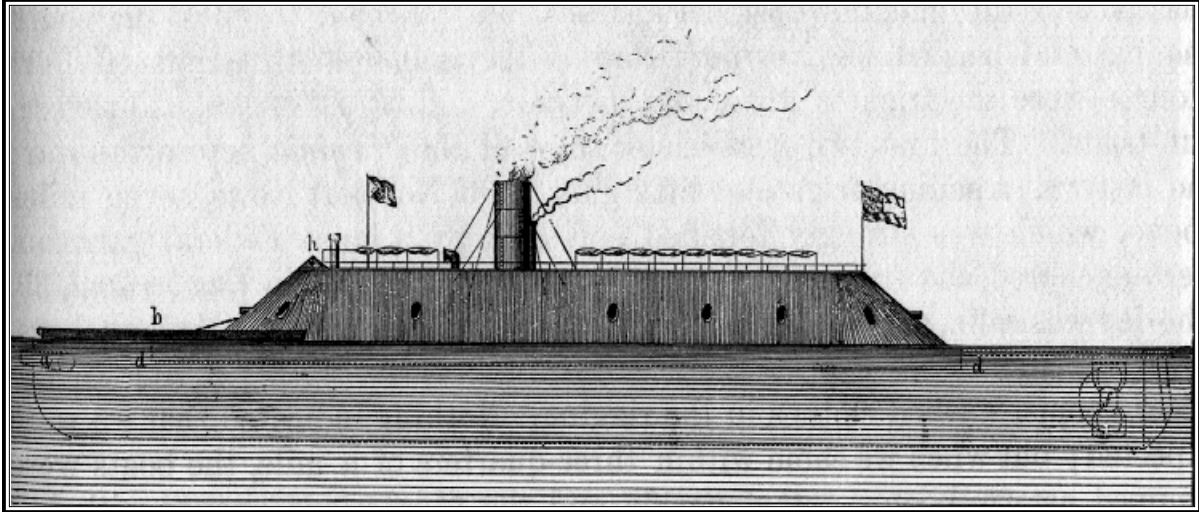


Figure 7. Outboard profile of CSS *Virginia*.

pressure, sent orders for Worden to steam directly to Washington, D.C., rather than join the fleet at Hampton Roads. *Monitor*, however, was well out to sea before the new orders arrived.²⁵

Sailing under tow for Virginia, *Monitor* ran into trouble. Caught in a gale off New Jersey, she immediately demonstrated her poor sea-keeping qualities as there appeared to be a leak in every seam. As the engine room filled with water, the blower fans were disabled thus cutting off draft for the furnaces and ventilation. Suffocating smoke and fumes filled the engine room and prostrating the crew. Fortunately, the storm abated, enabling the crew to lower the water level and restart the blowers. Spared by the elements, *Monitor* limped into Hampton Roads on the night of March 8 to be

greeted by the explosion of USS *Congress*. On her first day, *Virginia*, under the command of Flag Officer Franklin Buchanan, had rammed and sunk USS *Cumberland* and driven *Congress* ashore in flames, before withdrawing at dusk. The steam frigate USS *Minnesota* was hard aground with her crew anticipating *Virginia*'s return the following morning.²⁶

The *Monitor-Virginia* fight that followed on March 9 was tactically a draw, with both sides claiming victory. The Federals could claim a victory in strategic terms because they remained in control of the blockade of Hampton Roads. However, although the two ironclads never fought each other again, the mere presence of *Virginia* kept the Union fleet in check until the Confederate evacuation of

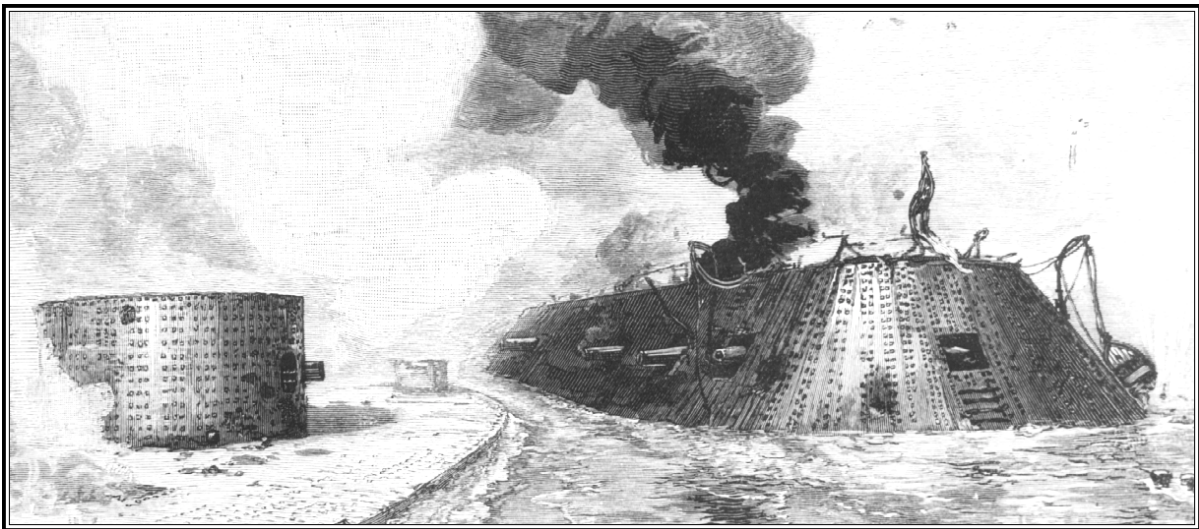


Figure 8. Battle of Hampton Roads. *Monitor* and *Virginia* at close range.

Norfolk two months later. (Figure 8)

Secretary Welles had decided before the battle at Hampton Roads that the monitor-type ironclad offered the only rapid and effective counter to the Confederate ironclad construction program. In his annual report to Congress on December 2, 1861, the Secretary recommended the construction of twenty armored vessels. After a month and a half delay, the Senate passed the Act of February 13, 1862, appropriating \$10,000,000 for the construction of twenty ironclads. The Navy Department advertised the following week for the construction of three types of armored vessels: one for western rivers, one for harbor defense, and one for coastal defense. Of the two latter classes, it was required that the guns could “train to all points of the compass without change in the vessels position.” Despite the merits of the monitor system, and to avoid any embarrassing failures, they stated that no contracts for armored warships would be awarded until *Monitor* was thoroughly tested.²⁷

Confident that his vessel would perform as promised, John Ericsson submitted a proposal to Welles in late 1861 for the construction of six ironclads of an improved *Monitor*-type. Shortly after the *Monitor-Virginia* engagement, Ericsson and his partners were awarded contracts for the six vessels. Four additional contracts for ironclads of the same design were awarded to builders in Boston and New York. Generally known as the *Passaic* class, these vessels were larger versions of the original *Monitor*, incorporating several improvements.²⁸

Monitor had been plagued with defects caused

by compromises in design necessitated by her rapid construction. Ericsson himself admitted that many of the “improvements” in the *Passaic* class had been carefully considered during *Monitor*’s construction. The Union’s immediate needs, however, had required simple, rapid construction. The *Passaics* measured 200 feet in length overall with an extreme beam of forty-six feet. While maintaining the same draft as *Monitor*, the depth of hold was increased by one foot to eleven feet four inches and their displacement was doubled. The most significant improvements in this class were the relocation of the pilothouse to the top of the turret and a more conventional hull design. The pilothouse became a cylindrical structure secured atop the turret’s central support shaft. Six feet in diameter, it was built of eight layers of one-inch iron plate and pierced with viewing slits.²⁹

The *Passaic*-class turret’s inside diameter was enlarged to twenty-one feet to mount two XV-inch Dahlgren smoothbore cannon. However, ordnance manufacturers were only able to supply half the large guns by the commissioning dates. Consequently, one XI-inch cannon was substituted in each turret. After installation of the XV-inch guns, it was discovered that they would not project through the gunport. To enable the operation of the gun, Ericsson designed an iron smokebox over the inside of the port to direct the smoke and muzzle blast out of the turret. In addition, *Monitor*’s cumbersome pendulum port stoppers were replaced with crank-shaped stoppers, allowing the simultaneous firing of both guns. A permanent smokestack was installed with eight inches of armor on six of its eighteen feet. Permanent standing ventilators and additional

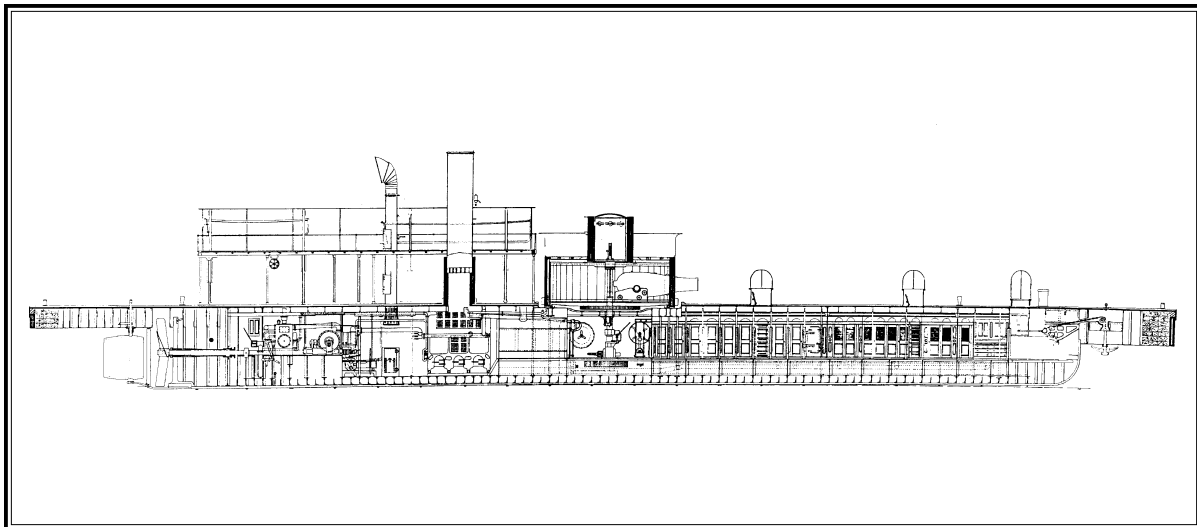


Figure 9. Inboard profile of USS *Montauk* (*Passaic*-class). (Canney, *The Old Steam Navy*)

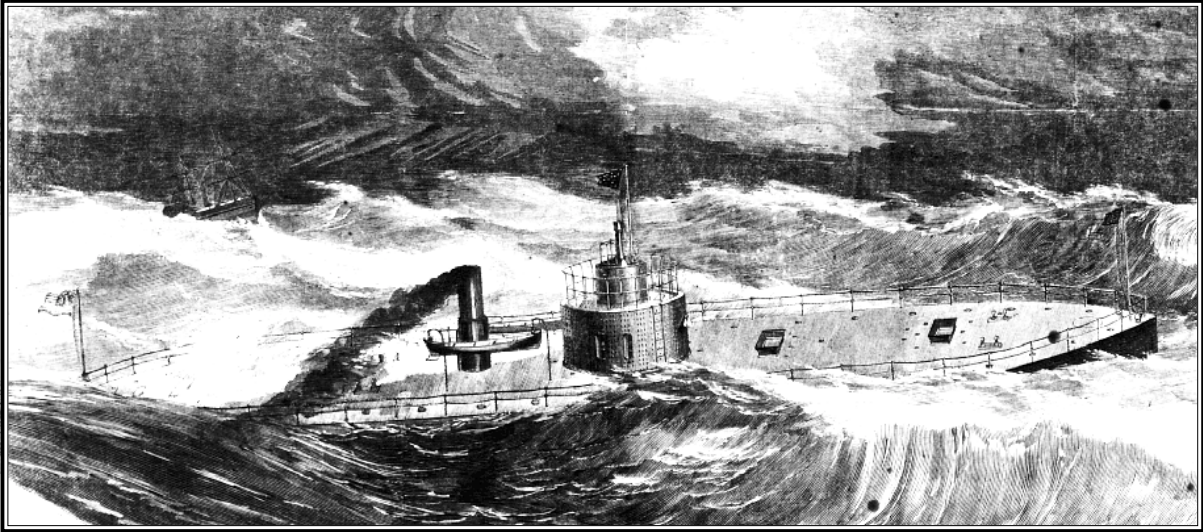


Figure 10. USS *Passaic* at sea. (Naval Historical Center)

blowers were added to increase ventilation below. (Figure 9) To improve their sea-going capabilities, Ericsson gave the *Passaics* more ship-like lines, substantially reducing the overhang of the armor belt at the bow and stern. This single design change was a major factor in the survivability of these vessels. During the war, no monitors, with the exception of the original, were lost at sea due to structural failure or weakness.³⁰ (Figure 10)

The majority of the *Passaic* vessels were being built in east coast shipyards. To facilitate communication between the Department and the contractors, Welles appointed Rear Admiral Francis H. Gregory as Superintendent of Ironclads and instructed him to open an additional office in New York City. Chief Engineer Alban C. Stimers was appointed Chief Inspector of Ironclads with oversight over all the vessels under construction.

While the *Passaics* were under construction, the Navy Department solicited bids for the construction of the third generation of turreted ironclads based on Ericsson's original design. These would be the largest and most advanced single turret monitors to see combat during the war. Nine contracts for the *Canonicus*-class monitors were awarded in September of 1862.³¹

The shipbuilding firm of Charles Secor & Co. of New York City received the contract to build *Tecumseh*, as well as USS *Manhattan* and USS *Mahopac* in six months, for the sum of \$460,000 each. Additionally, the Department would pay a bonus of \$500 per day if the vessels were completed ahead of schedule; however, the same amount would be applied as a penalty for every day the

vessels were delivered beyond the due date. Secor & Co. was formed in 1847 by Frances Secor and his sons, Charles, Zeno, and James, and since that time they had completed numerous civilian and government contracts including the fitting out steamers for the Army and the Navy at the outbreak of the war. The Secors were currently completing USS *Weehawken*, and as the *Canonicus*-class was simply an enlarged version of the *Passaics*, they felt they would have no difficulty in rapidly completing one or more of the new vessels.³²

The specifications and list of modifications for the proposed monitors outlined only minor changes to the overall length of the vessels and the size of their power plants. The length on deck was increased from 200 feet to 235 feet. However, the beam, depth of hold, and dimensions of the lower hull remained the same. The two Ericsson vibrating lever engines were enlarged, the number of boilers was increased from 2 to 4 and the propeller was enlarged to 14 feet in diameter.³³ (Figures 11-14)

With the prospect of substantial profits for early completion, the Secors began work on the ironclads immediately. The Department informed them that the plans and specifications were being prepared by Chief Engineer Stimers and would be forwarded as completed. In the interim, the builders should consult John Ericsson concerning any construction questions; however, when approached by the contractors for assistance, Ericsson declined to help because of his involvement with the construction of the *Passaic* class. Rather than delay the start of construction, the Secors relied on their *Weehawken* plans and the list of modifications originally provided.

As with all previous monitor construction, the majority of the work was subcontracted. The hull, turret, pilothouse, and deck armor were fabricated at the shipyard of Joseph Colwell in Jersey City, New Jersey. The main and auxiliary boilers were built by John Dolan & Co. and the Atlantic Steam Engine Co., both of New York City. Turret engines and gearing were provided by Clute Brothers of Schenectady, New York. The joinery work was subcontracted to the firm of Hawthorn and Friend. Forging for the main engines were provided by Lazell Perkins Co. of Bridgewater, Connecticut. Numerous small contracts were let for nuts, bolts, gaskets, hoses, belts, and other miscellaneous materials.³⁴

By October, the ironclads were well underway. The keel, garboard strake, and stem and sternpost were nearly completed on *Tecumseh* and a number of frames, beams, and plates had been fabricated. Because of their extensive shipbuilding facilities and convenient location near the Ironclad Office, the Secors moved well ahead of the other contractors.

The specifications for the ironclads were finally sent to the contractors on October 9, 1862, and plans would continue to arrive in a sporadic and haphazard manner. Upon examination of the specifications, the Secors discovered several instances where they differed materially from the original plans and specifications used as the basis for their bids. Not only would the changes substantially alter the work already completed, there was concern that the vessels would not float when launched. Because construction was advancing so rapidly, the Department had no choice but to temporarily stop the work on all the *Canonicus*-class monitors until the type and extent of the changes required could be determined.³⁵

Work languished on the ironclads for more than a month. Finally the list of alterations were sent on December 22. Basically, the vessels were deepened by eighteen inches, thus lengthening the stem and stern posts and the vertical shaft under the turret. This increased the length to beam ratio to 5:1, thus moving the turret twenty feet forward on the deck. The tops of the boiler shells were raised, and the dome over the propeller well was eliminated. These alterations ended all possibility of finishing the vessels before March 15, thus eliminating premiums for early completion. The size and form of the ironclads were materially changed rendering much of the materials on hand useless. By the middle of December, *Tecumseh* was almost completely in frame and the changes would require a large amount of the completed work to be torn out and replaced.³⁶

The contractors had no choice but to make the best of a bad situation by completing the alterations as quickly as possible. Unfortunately, the Navy was again long on promises and short on results. The new plans and specifications were slow in coming, appearing sporadically throughout the first quarter of 1863. Substantial alterations on the monitors were not begun until the beginning of February.³⁷

The original contract due date passed with the vessels no nearer completion than they were in mid-December. The Secors were understandably upset by the Navy's mismanagement of the project. They suggested to Welles that the government was entirely to blame for the delays which had placed their firm in financial difficulty. Since the alterations had drastically changed the contracted design, they felt the contracts were void and should be cancelled. Rather than defend the Navy's obvious blunders, the Secretary reminded the contractors of their patriotic duty and the Union's desperate need for the warships and "encouraged" them to press for completion. Unfortunately, this was just the beginning of a long list of delays and setbacks for the contractors which would postpone the completion of the ironclads for another year.³⁸

The last set of modifications for the vessels came after the aborted Union ironclad attack on Charleston, South Carolina, in April of 1863. On April 7, Rear Admiral Francis DuPont attacked the Confederate defenses of Charleston with a fleet of nine ironclads, including seven *Passaic*-class monitors. After the attack, Stimers and Ericsson reviewed the reports and assessed the damage to the individual monitors. Although none of the monitors were critically damaged during the attack, several received injuries that partially or completely disabled their offensive capacity. The concentrated Confederate fire had pounded turrets and pilohouses, jamming port stoppers and disabling guns. Shots striking at or near the bases jammed three turrets and severely retarded the movement of several others. The most critical defect was discovered in the tower's construction. When a shot hit the structures, broken nuts and bolts would ricochet across the interior wounding and sometimes killing the crewmen. USS *Nahant*'s pilot was killed in this manner and so many bolts were lost in her pilothouse that it nearly collapsed.³⁹

On June 18, Stimers sent a list of alterations to the contractors designed to correct these weakness. To alleviate the problem of broken bolts and nuts, rivets would be used for securing the plates of the

turret, pilothouse, and smokestack. They would be put through from the inside and riveted smooth on the outside. In an effort to prevent turret jamming, a band of wrought iron five inches thick and fifteen inches wide would be attached around the base of the turret. As an additional anti-jamming measure, the gutter in which the turret rested was widened and filled with hemp gaskets. The gun carriage slides were also shortened to give a one-inch clearance between their ends and the wall of the turret.⁴⁰

The damage to *Nahant's* pilothouse prompted several important changes. The armor was increased to ten inches and the viewing slits were enlarged. To compensate for structural weakness, two additional iron bands were applied around the inside top. The cover was increased in thickness, recessed into the top, and riveted into place. The base of the pilothouse was to have an iron band or glacis similar to that of the turrets to protect the "composition ring" on which it rested. The smokestack armor was increased to eight inches and an iron grate was placed inside the stack below the deck line to keep debris from entering the engineering spaces. To improve the habitability of the vessels, and particularly the ventilation when secured at battle stations, Stimers installed a permanent ventilator stack twenty-five feet tall, tapering from twenty-four to eighteen inches in diameter. This ventilator entered at the berthdeck with connecting pipes to ventilate the galley and water closets. All of these changes were ordered for the vessels under construction and as a retrofit on the *Passaics*.⁴¹

On June 22, Commander Tunis Augustus Macdonough Craven was appointed commander of *Tecumseh*. Craven was an energetic veteran naval officer who had received his commission as a passed midshipman in 1835. At the time the contracts for the Harbor and River monitors were let, Craven was in command of the steam sloop-of-war USS *Tuscarora* searching for Confederate commerce raiders in European waters. On June 9, 1863, Welles ordered him to command *Passaic*; however, two weeks later he was given command of *Tecumseh* with orders to push her construction forward as rapidly as possible. Craven reported for duty at the Secor's yard in early July. In his first report to the Department he stated that the work was progressing well and he expected the ironclad's launch in four weeks. The changes ordered on June 18 had ended any hope of completing the ironclads by the fall of 1863, and delays in receiving her boilers postponed *Tecumseh's* launch until Septem-

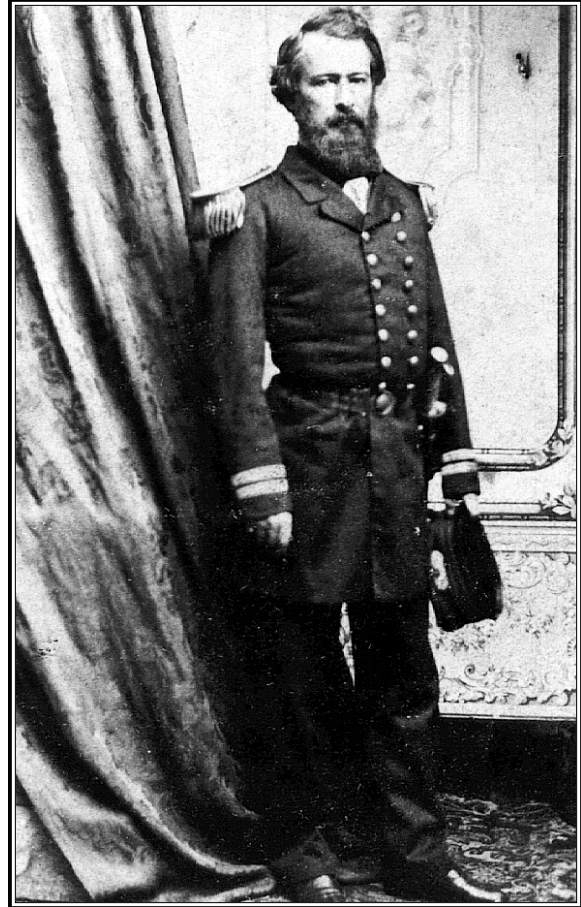


Figure 15. Commander T.A.M. Craven. Taken while commanding USS *Tuscarora*, 1862. "Carte de Visite" courtesy of Dr. Charles V. Peery.

ber 12. Moored to the wharf, the work recommenced immediately to complete the vessel's turret and pilothouse and install her motive machinery. Craven optimistically estimated that *Tecumseh* would be ready for service in six weeks.⁴² (Figure 15)

However, minor problems and alterations continued to delay the completion into 1864. An important feature in the design of *Monitor* and the *Passaic* class was the ability to operate the ship's anchor under fire without endangering the crew. The four-fluked Ericsson anchor designed for these vessels was secured in a circular anchor well under the overhang of the bow. It could be deployed and retrieved in battle or at sea without going on deck. The redesigned hull of the *Canonicus*-class precluded the use of this system. Their fine lines and reduced bow overhang left no room for an anchor well. The plans which the contractors bid on, did not show the anchor well nor did they indicate how the anchors would be serviced. After weeks of deliberation it was decided that the most efficient

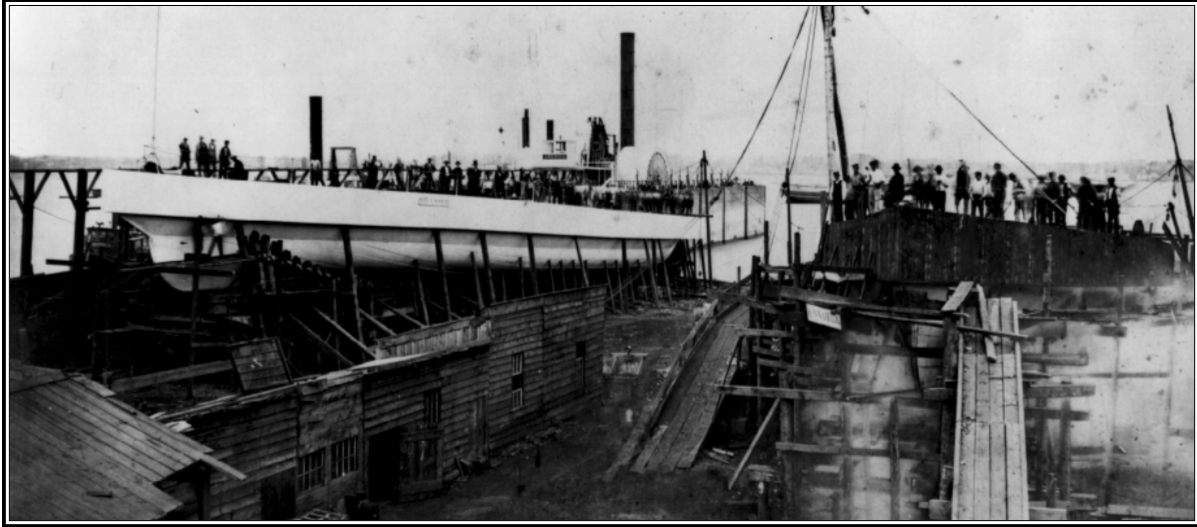


Figure 16. Rare Brady photograph of USS *Tecumseh* (left) and USS *Manhattan* under construction at Jersey City, New Jersey. Note the fine ship-like bow of *Tecumseh* which necessitated the redesign of the anchor and hoisting mechanism. (City Museums of Mobile)

method would be to lead the chain over the bow through iron chocks, across the deck in a covered chainway, and into the chain locker. A collapsible derrick would be provided for “catting and fishing the anchors.”⁴³ (Figure 16)

Tecumseh’s battery of two XV-inch Dahlgren smoothbores cannon was delivered the first of November but because of a machinists strike in New York City it was not mounted until January 6, 1864. To alleviate the problems encountered with the *Passaic*’s gunports, the muzzles of the XV-inch guns were lengthened sixteen inches to allow them to project out of the turret. After installation of the guns, Craven reported that the port stoppers did not sufficiently close the ports, leaving an opening of nine inches at the top and seven inches at the bottom. He considered this unsatisfactory, explaining that “an 8” shot can easily enter the port; if at the top, it will glance upwards through the pilothouse; if below, it will glance downward and through the bottom of the ship.” Craven recommended that new port stoppers be made immediately. Responding to the report, Stimers explained that the stoppers had been moved back two inches from the ports to prevent jamming similar to that in the *Passaic* turrets and that only small fragments could enter.⁴⁴

The Department referred the problem to Ericsson who, after reviewing the reports, agreed with Stimers that the only danger was from flying fragments of shots striking the stoppers. He proposed that the contractors install small stop blocks of wrought iron above and below the port to

deflect fragments projected toward the inside of the structure. This design was approved and adapted to all the *Canonicus*-class vessels.

In late January Craven suggested that a shield of boiler iron be placed around the upper edge of the turret for “keeping out spray and to serve also as a guard, behind which to use musketry or hand grenades, in case the enemy gets in possession of the decks.” Because of a monitor’s low freeboard the turret roof was the only open deck space for the crew when operating at sea. Experience aboard the *Passaics* had also exposed the crew’s vulnerability to snipers when operating on inland waters. Approving Craven’s plan, Stimers directed the Secors to construct a rifle screen three feet high of one-half-inch plate on *Tecumseh*’s turret. Around the screen twelve inches from the upper edge, twelve loop holes were cut for muskets. Rifle screens were ordered for all the *Canonicus*-class and eventually added to the *Passaics*.⁴⁵

Tecumseh’s machinery was successfully tested on January 28, 1864, and on March 29, Craven reported to Welles that *Tecumseh* had finally completed all of her trials and had been delivered to the navy yard in New York. At the navy yard she was given priority to receive all available crewmen, equipment, and stores. *Tecumseh* was commissioned as an ironclad steamer, third rate on April 19. On the evening of April 26, Craven left Sandy Hook with orders to join Acting Rear Admiral Samuel P. Lee’s squadron at Hampton Roads. *Tecumseh* arrived on April 28, after an uneventful maiden voyage, and joined the squadron at anchor off Newport News.⁴⁶

OPERATIONS ON THE JAMES RIVER

On March 9, 1864, President Lincoln appointed Ulysses S. Grant as general-in-chief of all Union armies at the newly revived rank of lieutenant general. Prior to this time, and throughout the war, the various Union armies in the east and west had acted independently of each other with mixed results. To remedy this situation Grant selected an overall commander for each of the principal armies in the eastern and western theaters. His plan was to move all the Federal armies in concert using their superior numbers and resources to apply simultaneous pressure against the remaining Confederate forces.⁴⁷

In the west, Major General William Tecumseh Sherman was selected to command the combined armies of the Cumberland, Ohio, and Tennessee. His objective was the army of General Joseph E. Johnston near Atlanta, Georgia. In the east, Major General George G. Meade remained in command of the Army of the Potomac; however, Grant established his headquarters with Meade's army in the field. This army faced one of the two major Confederate armies under General Robert E. Lee lying south of the Rapidan River and just west of Fredericksburg, Virginia.⁴⁸

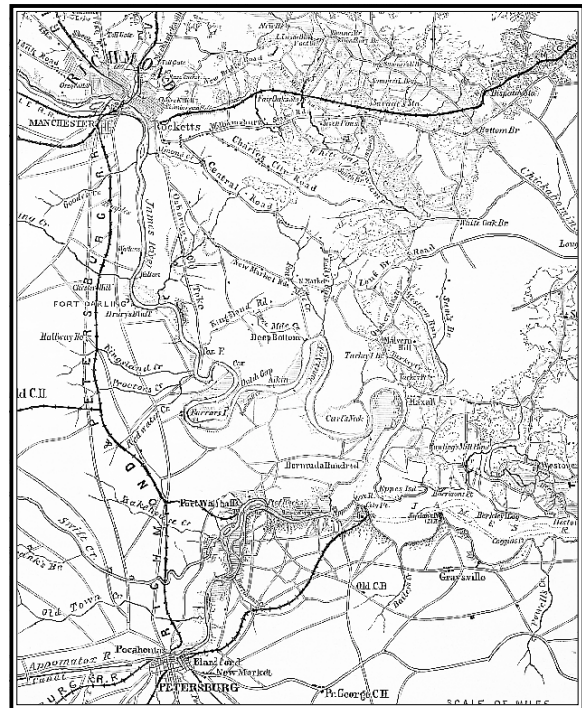
In addition to the movements of the main armies, Grant ordered Major General Franz Sigel to advance in force up the Shenandoah Valley thus threatening the Confederacy's "breadbasket." In southeastern Virginia, Major General Benjamin F. Butler would ascend the James River, with the objective of severing the Richmond-Petersburg railroad, and if possible, capture Petersburg or Richmond. The desired effect was to cause Lee to spread his badly outnumbered forces to protect all the threatened areas.⁴⁹

Grant set his armies in motion in early May. Meade crossed the Rapidan River on May 4, and Butler was to start that night and advance as far up the James as possible by daylight on the 5th. Butler embarked his 40,000 troops on vessels of Admiral Lee's North Atlantic Blockading Squadron, which would support the army's right flank on the James during the advance. An odd assortment of 200 transport and support vessels would be escorted up river by five ironclads and seven gunboats. These vessels included the monitors USS *Tecumseh*, *Canonicus*, *Saugus* and *Onondaga*, and the captured Confederate ram *Atlanta*. The shallow-draft gunboats USS *Osceola*, *Commodore Morris*,

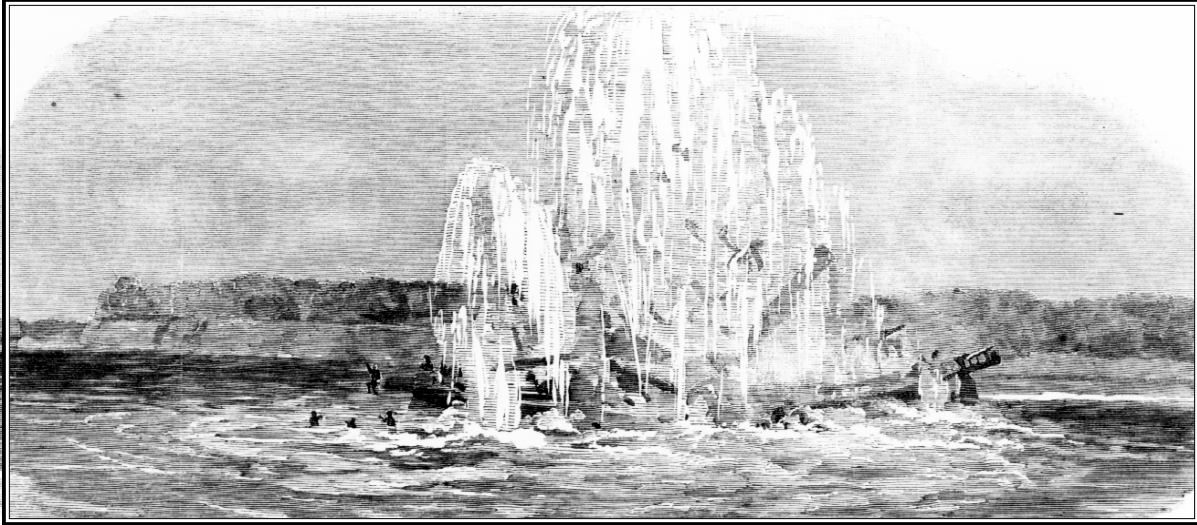
Shokokon, *Stepping Stones*, *Delaware*, *General Putnam*, and *Shawsheen* would be employed in the upper James to provide support for the ironclads and maintain communications with Hampton Roads.⁵⁰

On the night of May 4, Butler began his advance with Lee's gunboats searching for torpedoes and obstructions. Following the gunboats were the transports carrying troops and supplies. Craven, as senior ironclad captain, led the monitor column, which was bringing up the rear, under tow. The fleet reached City Point at the confluence of the James and Appomattox rivers by sunrise on the 5th, encountering little or no resistance along the way. After securing City Point, the bulk of Butler's army was landed at Bermuda Hundred, a neck of land lying between the James and Appomattox rivers. By midmorning on the 6th the Army of the James was entrenched along a line from Port Walthall's Landing on the Appomattox, to Trent's Reach on the James, about fifteen miles below Richmond.⁵¹ (Figure 17)

After landing the army, Lee ordered the gunboats to begin searching the meandering river north of Bermuda Hundred for torpedoes and other obstructions. Although the task was painstakingly slow, the squadron steadily advanced until the afternoon of May 6 when USS *Commodore Jones* (Figure 18) was destroyed by an electrically detonated torpedo in an area known as Deep



Figures 17. Map of the upper James River.



Figures 18. USS *Commodore Jones* was destroyed by a 2000 lb. electrically-detonated torpedo opposite Jones Point on the upper James River. (Naval Historical Center)

Bottom.

Fearing the loss of a monitor, the admiral recalled his squadron and ordered the torpedo clearance operations to recommence at a slower, more vigilant pace, no matter what the delays. The ironclads finally reached their assigned station at Trent's Reach, opposite Butler's right flank, at the end of May.⁵²

Throughout the first half of May, Butler's army made several half-hearted attempts to advance on Richmond and Petersburg. However, by May 17, Butler was back at his original entrenchment line at Bermuda Hundred, effectively "bottled up" by the army of Confederate General P.G.T. Beauregard. Although Beauregard would never be able to take

this strongly defended position, Butler's forces were neutralized and unable to cooperate with Grant's operation north of the river.⁵³

The Overland Campaign ended at Cold Harbor on June 3. Throughout five weeks of fighting Grant had been unable to defeat General Lee north of the James River. Therefore he decided to secretly move his entire army south of the James and operate against Petersburg. Successfully completing this maneuver by June 14, Grant crossed the river below City Point and began the assault on Petersburg the following day.

In response to reports that the Confederate ironclad squadron was below the obstructions at Drewry's Bluff six miles south of Richmond, Grant

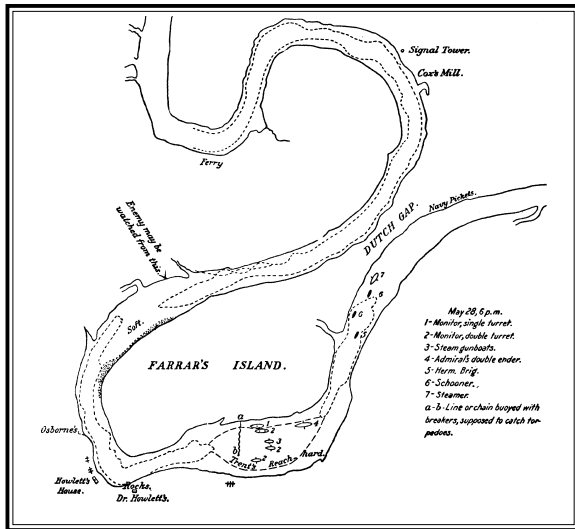


Figure 19. Map of Trent's Reach. The position below the obstructions (lower center) was the anchor for the right flank of General Bulter's army.

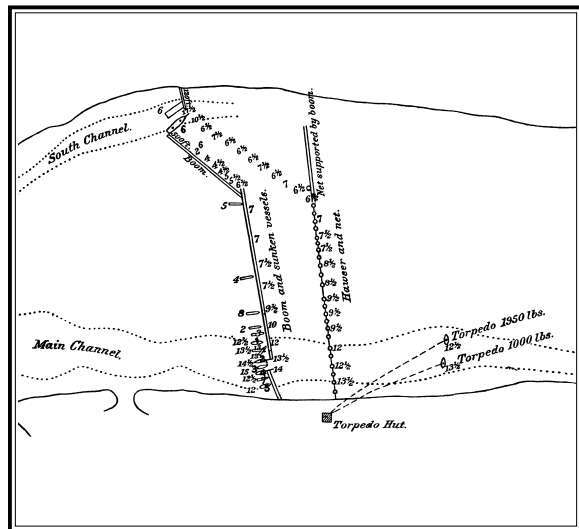


Figure 20. Detail of Union Obstructions at Trent's Reach.

ordered the river obstructed at Trent's Reach in preparation for his crossing. Lee and his officers strongly protested this move because it would force his squadron to lie in a defensive position below these obstructions. Grant remained firm in his request, to which Welles acquiesced and the obstructions were begun. On June 15, Craven, as senior officer present, was put in charge of the project.⁵⁴

The area known as Trent's Reach was the southern arm of a long meandering bend in the upper James River. The right flank of Butler's army was anchored on the south bank of this bend. The river was unusually wide at this point and had two navigable channels. The main channel ran along the south bank and a smaller channel ran close to the north shore. Craven and the engineers sank four wooden hulks and extended a heavy boom across the main channel. Another boom was extended across the river's shallow center and secured with anchors. A schooner was sunk in the northern channel with a boom extending to the river bank. Craven was later advised to sink two more hulks in this channel. A secure line of obstructions was finally completed on June 18, four days after Grant had begun crossing the river. Admiral Lee stationed his monitors in a position below this line to guard against its removal, or any advance by the Confederate squadron. Above these obstructions the Confederates had begun construction on a battery of heavy guns on Beauregard's left flank at Howlett's farm. Situated on a high bluff, Battery Dantzler had a commanding view downriver of the Union ironclads in Trent's Reach.⁵⁵ (Figures 19 & 20)

On June 20, the monotony of blockade duty was interrupted by the approach of the Confederate James River Squadron. The squadron, composed of the ironclads CSS *Virginia II*, *Fredericksburg*, and *Richmond*, and five gunboats, moved down from Drewry's Bluff to cooperate with Battery Dantzler in an attack on the Union ironclads.

At noon on the 21st, Battery Dantzler began firing on *Tecumseh*, *Saugus*, *Canonicus*, and *Onondaga* in Trent's Reach. Craven immediately ordered all ships to return fire. Shortly after the battery opened fire, the Confederate fleet joined in from their position near Dutch Gap in an attempt to catch the monitors in a crossfire. Unfortunately both *Virginia II* and *Richmond* broke down during the engagement and were forced to retire. Due to the extreme range and the Confederate fleet's inability to see the monitors, their action was of little consequence, with most of the fire being exchanged by the monitors and Battery Dantzler. The engagement was little more than an exercise for the gun crews. Craven reported that the engagement lasted about four hours and *Tecumseh* destroyed one gun emplacement. *Canonicus* and *Saugus* received minor hits. Ultimately the guns at Howlett's remained and the Confederate fleet retired upstream.⁵⁶

Two days after the attack, *Tecumseh* left Trent's Reach for Norfolk. Craven had received orders to proceed to Pensacola, Florida, where he was to report to Rear Admiral David G. Farragut, commanding the West Gulf Blockading Squadron. En route to Norfolk, *Tecumseh's* wheel ropes parted causing the ironclad to run hard aground where she

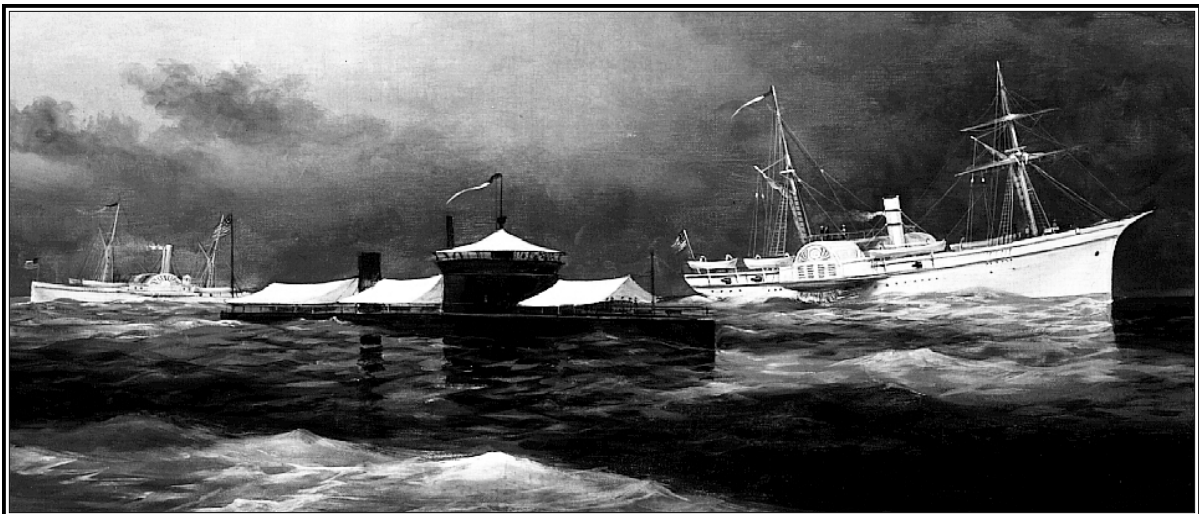


Figure 21. Rare painting of *Tecumseh* at sea en route to Mobile Bay, accompanied by USS *Augusta* (right) and USS *Eutaw*. Oil on canvas (1912) by Xanthus Smith, Captain's Clerk aboard USS *Augusta*. (Dr. Charles V. Peery)

remained for four hours. Upon investigation, it was discovered that the wire tiller ropes had been burned in half by the heat of the boilers. Craven spent a week repairing and supplying his vessel while waiting for a tow from USS *Augusta* or *Eutaw*. All three vessels were ready for sea and sailed for Pensacola on July 5.⁵⁷ (Figure 21)

MOBILE BAY

In January 1864, Admiral David G. Farragut returned to his headquarters at Pensacola, Florida, after a five-month leave to find his West Gulf Blockading Squadron infected with “Ram Fever.” Rumors were running along the Gulf that his counterpart, Admiral Franklin Buchanan, of CSS *Virginia* fame, was going to bring his squadron out of Mobile Bay and break the blockade. Farragut was hoping to conduct a joint operation with the army to close the bay to Confederate commerce before Buchanan’s fleet appeared in the lower bay.⁵⁸

Farragut and his staff believed that when the Confederate squadron appeared it would be formidable. According to deserters and contrabands, the vessels completed or under construction at Mobile were the lightly-armored, wooden gunboats CSS *Morgan*, *Gaines*, and *Selma*; the ironclads CSS *Tennessee*, *Tuscaloosa*, *Huntsville*, and *Nashville*; and the CSS *Baltic*, a converted towboat whose hull was so rotten she was eventually laid up as unseaworthy.

CSS *Tennessee*, however, was considered the most powerful ram in the Confederate navy in 1864. She measured 209 feet long and forty-eight feet in beam. The casemate was seventy-eight feet, eight

inches long and armored with five inches of iron plate. An extra inch of plate was added to the forward of the pilothouse. *Tennessee* was armed with four 6.4-inch Brooke rifles in broadside and 7-inch Brooke rifles fore and aft. The ironclad’s machinery proved to be one of her main weaknesses. The engines were not designed and built for the vessel, but were taken from a stranded riverboat. They were inadequate for the vessel’s use, developing only six nautical miles an hour. *Tuscaloosa* and *Huntsville* were similar in design to *Tennessee* but smaller. CSS *Nashville* was a large side-wheel ironclad. Because of the slow production of iron plate, these three vessels were not completed before the Union attack. The gunboats *Morgan*, *Gaines*, and *Selma* carried a total of sixteen guns and were armored only with light plating around their boilers.⁵⁹ (Figure 22)

In late January, Farragut made a reconnaissance of the fortifications at the entrance to Mobile Bay. The principal entrance into the bay was approximately three miles wide running between Mobile Point on the east and Dauphin Island on the west, Fort Morgan on the western end of Mobile Point, and Fort Gaines on the eastern end of Dauphin Island guarded the channel. (Figure 23)

Fort Morgan was a bastioned work of brick and earth with exterior water batteries on the beach facing the channel. It mounted forty-five guns ranging in size from 10-inch Columbiads to 24-pounders, the majority being of the smaller caliber. The fort was garrisoned by 640 officers and men under the command of Brigadier-General Richard L. Page.

Fort Gaines was a smaller brick and earth work mounting about twenty-seven guns and garrisoned by 400 officers and men. To the northwest of

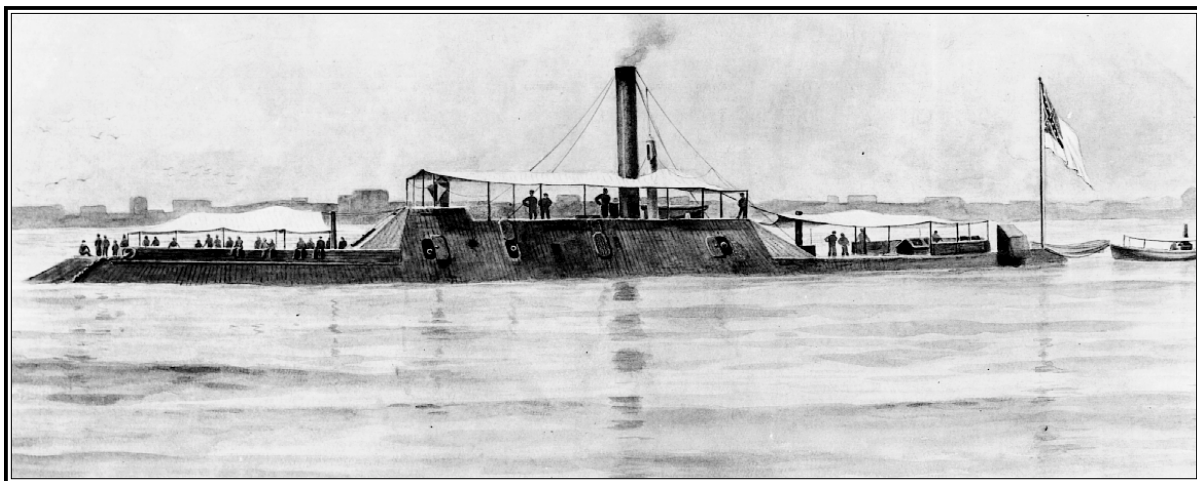


Figure 22. CSS *Tennessee*. (Naval Historical Center)

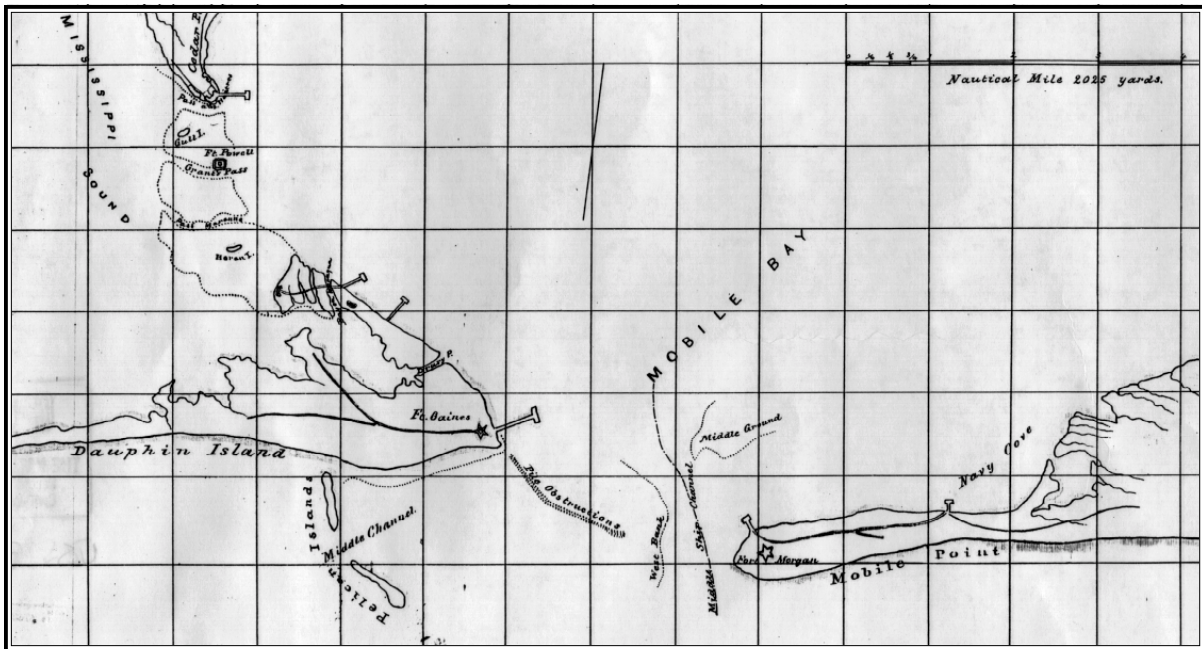


Figure 23. Map of the Confederate Defenses of lower Mobile Bay drawn by Captain Jules V. Gallimard, Engineer, C.S.A. (National Archives)

Dauphin Island was Grant's Pass, a smaller, shallower channel used only by light-draft vessels. It was guarded by a small earthwork fortification known as Fort Powell. Fort Powell mounted only six guns and was garrisoned by two companies of infantry.

In addition to these fortifications, the Confederates had driven wooden piles into the shoal waters at Grant's Pass and east of Fort Gaines. As Farragut noted the presence of these piles, he was aware that mines, known as torpedoes, had been laid in the main channel to further constrict its size. The torpedoes extended approximately 400 yards into the channel from the end of the piles, their easternmost end being marked by a red buoy. It was generally believed that there were anywhere from 100 to 200 torpedoes planted in three staggered rows. The majority of these devices were the cone-shaped, Fretwell-singer type fired by a direct contact cap and trigger device. Additional torpedoes placed shortly before the battle were the Raines keg-type with ultra-sensitive primers. This type was usually anchored to the bottom with a section of railroad iron. Approximately 300 yards of the main channel directly under the guns of Fort Morgan were left open for blockade runners.⁶⁰ (Figure 24)

Farragut's plans for an early attack on the bay were postponed again in April as a result of Major General Nathaniel P. Banks's ill-fated Red River campaign in Louisiana. Banks's move on Shreveport was supported by Rear Admiral David

Porter's river gunboats. In mid-April Banks's army suffered defeat, forcing him to retreat leaving Porter's fleet trapped above the falls on the Red River until May 13. Farragut wrote to Welles commenting on Banks's disaster and the excitement it created along the gulf. He feared that the Confederate victory in the west would move Buchanan into action.

On the night of May 17, Buchanan brought *Tennessee* into the bay. Buchanan knew his only hope for success was a surprise attack on the Union blockaders, and he planned this attack for that night. Unfortunately, it was midnight by the time coal and ammunition were loaded and when the anchor was hauled up, they discovered that the ironclad was aground by the outgoing tide. With sunrise the next morning, the vessel's position was revealed just as

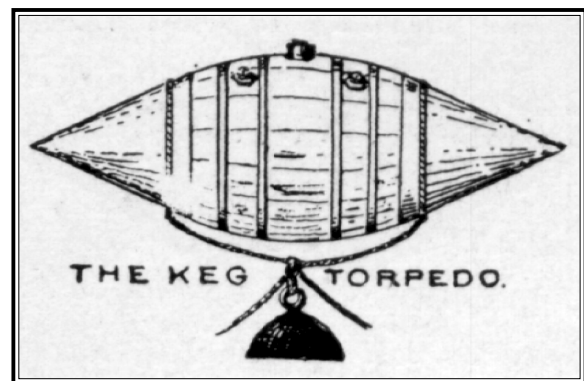


Figure 24. The Raines Keg Torpedo.

the incoming tide refloated her. After this, Buchanan assumed a defensive attitude and began preparing his squadron for the Union attack.⁶¹

CSS *Tennessee* was a constant worry to Farragut. He told his commanders in New Orleans and Pensacola to prepare themselves for an attack which might come at anytime. Meanwhile, he bombarded the Navy Department with requests for monitors. The presence of *Tennessee* in the lower bay seemed to bring the Navy Department to life. On June 7, Welles ordered the newly commissioned *Manhattan* to proceed to Pensacola and report to Farragut. He also wrote to Admiral Porter at Mound City, Illinois, asking, and then ordering him to send some of the new Mississippi River ironclads to Farragut. Welles notified Farragut on June 25 that *Manhattan* was en route from New York, the twin-turreted river ironclads USS *Winnebago* and *Chickasaw* were headed for New Orleans, and *Tecumseh* was at Norfolk and would be sent in a week to ten days. It appeared the admiral would finally be able to make his move. *Manhattan* arrived at Pensacola on July 8.⁶²

Assured that the monitors were on their way, Farragut issued his orders for the assault. They began, "Strip your vessels and prepare for conflict. Send down all your superfluous spars and rigging." The line of attack was to be the same as at New Orleans and Port Hudson. The ships would pass Fort Morgan in pairs lashed side by side. The flagship would lead, running northeast until abreast of the fort, then north by west. He went on to state that "If one or more of the vessels be disabled, their partner must carry them through."⁶³

By the time *Manhattan* joined the fleet off Mobile, Farragut decided he would use fourteen of his largest wooden steamers and the four ironclads. The wooden vessels would be paired as follows: USS *Hartford* and *Metacomet*; USS *Brooklyn* and *Octorara*; USS *Richmond* and *Port Royal*; USS *Lackawana* and *Seminole*; USS *Monongahela* and *Kennebec*; USS *Ossipee* and *Itasca*; and USS *Oneida* and *Galena*. The fleet would run in on the morning flood tide at low steam, preferably with a light southwest wind, which would blow the smoke

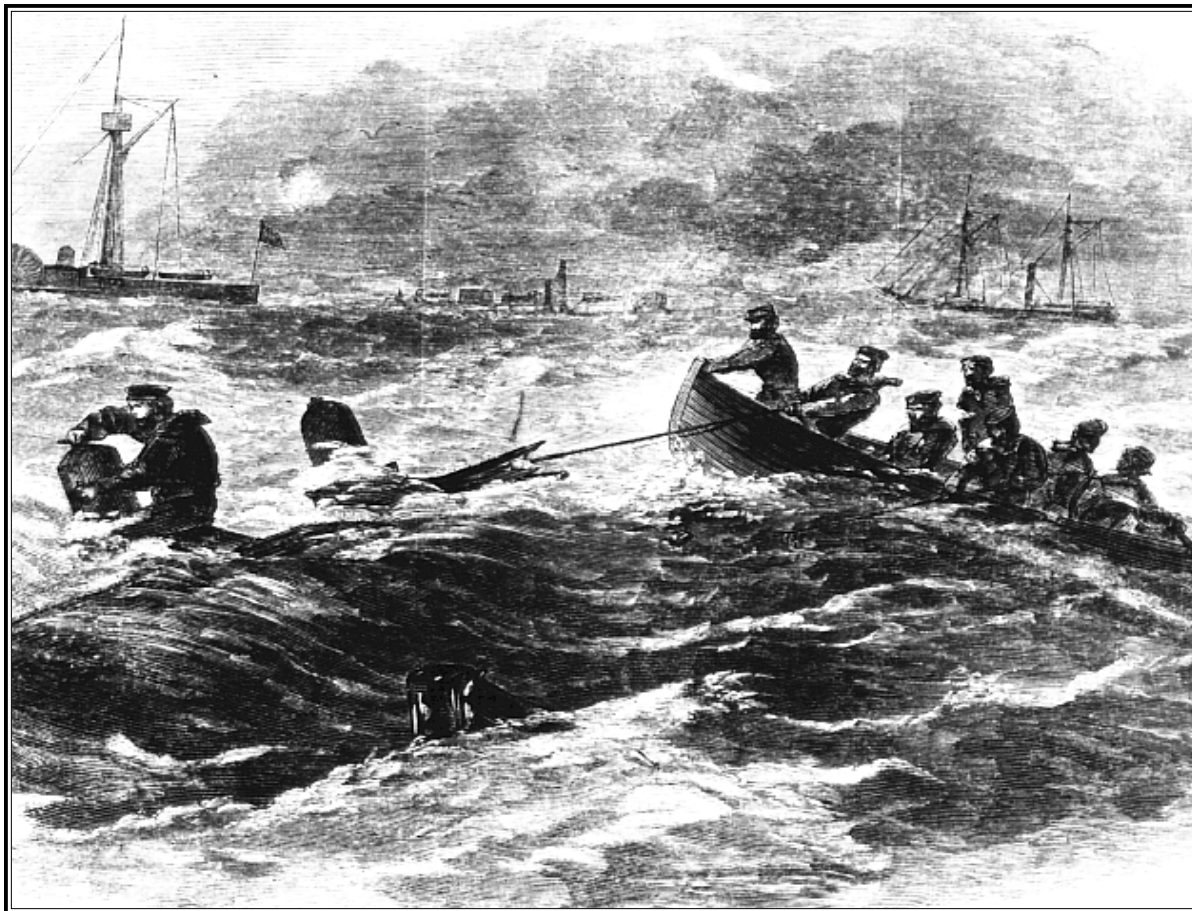


Figure 25. Mine sweeping operations at the entrance to Mobile Bay. Admiral Farragut ordered the recovery and examination of many of the torpedoes planted by the Confederates in the Main Pass channel.

from the battle into the faces of the fort's gunners.⁶⁴

Tecumseh finally arrived off Pensacola on July 28. The following day, Farragut issued additional orders to clear up any questions his commanders might have. They read, in part, "Should any vessel be disabled to such a degree that her consort is unable to keep her station, she will drop out of line to westward and not embarrass the vessels next astern by attempting to regain her stations." As to torpedoes he stated:

There are certain black buoys placed by the enemy from the piles on the west side of the channel across it towards Fort Morgan. It being understood that there are torpedoes and other obstructions between the buoys, the vessels will take care to pass to the eastward of the easternmost buoy, which is clear of all obstructions.⁶⁵

He also suggested that propellers be stopped to allow the ships to drift over drag lines laid by the enemy. As it turned out, these ropes and many torpedoes had been carried off by storms and swift currents. (Figure 25)

Winnebago arrived from New Orleans on August 1, and *Chickasaw* a day later. The weather had been extremely rough, causing delays in getting the monitors to Mobile. Farragut was anxious to start and grew impatient when *Tecumseh* was delayed at Pensacola. He knew from the Mobile papers that the Confederates were making last minute preparations for his attack. He wrote to Captain Thorton Jenkins commanding USS *Richmond* at Pensacola informing him of the arrival of the river monitors and advising him to leave with *Tecumseh* as soon as she was ready.⁶⁶

By the end of July the necessary troops were available for an assault on Forts Morgan and Gaines in connection with Farragut's attack. Major General Gordon Granger was chosen to lead the first assault against Fort Gaines. Granger visited Farragut off Mobile on August 1 and informed him that he planned to land his troops on Dauphin Island on the 3rd and attack the fort on the 4th. Farragut told Granger that the Confederates were concentrating on the defense of Fort Morgan and were unprepared for him at Fort Gaines. Granger's force was made up of 1,500 infantry, two light and two heavy batteries, and a battalion of engineer troops - in all 2,400 men.⁶⁷

Farragut tentatively agreed to run his fleet in at

the same time the army attacked the fort; however, *Tecumseh* was two days behind schedule because of repairs and the admiral feared that he would be delayed. Both Farragut and Captain Percival Drayton sent urgent letters to Jenkins telling him to hurry *Tecumseh* along. On the 4th, Granger's troops engaged Fort Gaines as Farragut waited for *Tecumseh*. Now he sent out last minute instructions concerning the use of the ironclads. Because the monitors were slower than the wooden vessels they would get underway first. This allowed them to cover the fleet when the rebel ships attacked. Farragut stated:

The service I expect from the ironclads is, first, to neutralize a much as possible the fire of the guns which rake our approach; next to look out for the [enemy] ironclads when we are abreast of the fort, and, lastly, to occupy the attention of those batteries which would rake us while running up the bay.⁶⁸

He planned for *Chickasaw* and *Winnebago* to hold a position off the fort and follow after the wooden ships had passed. *Tecumseh* and *Manhattan* were to concentrate on *Tennessee*. *Tecumseh*, in tow of USS *Bienville*, finally arrived with *Richmond* and *Port Royal* on the evening of the 4th. After these vessels were safe at anchor, Farragut made his decision to go in the next morning.

At 3:00 a.m. on the 5th, the admiral rose and found the wind light from the southwest and the flood tide running. All hands were called and by 5:30 a.m. the fleet stood ready to get underway. Farragut had been persuaded after much debate to allow *Brooklyn*, under Captain James Alden, to lead the wooden column.

As senior monitor captain, Craven was again given the leading position and at 6:00 a.m. he led the monitors into the channel toward Fort Morgan. *Tecumseh* and *Manhattan* were the first to come into range at approximately 6:45 a.m. and fire on the forts to determine range and elevation. Fort Morgan commenced return fire and the engagement became general as each vessel came into range.⁶⁹ (Figure 26)

By 7:30 a.m. the fleet was nearing the narrow channel between the torpedo field and Fort Morgan. The wooden vessels, however, were overtaking the slower monitors. This in turn was forcing the main column into a collision course with the torpedo field. At this point, *Brooklyn* suddenly slowed and stopped, causing a near collision with each vessel in

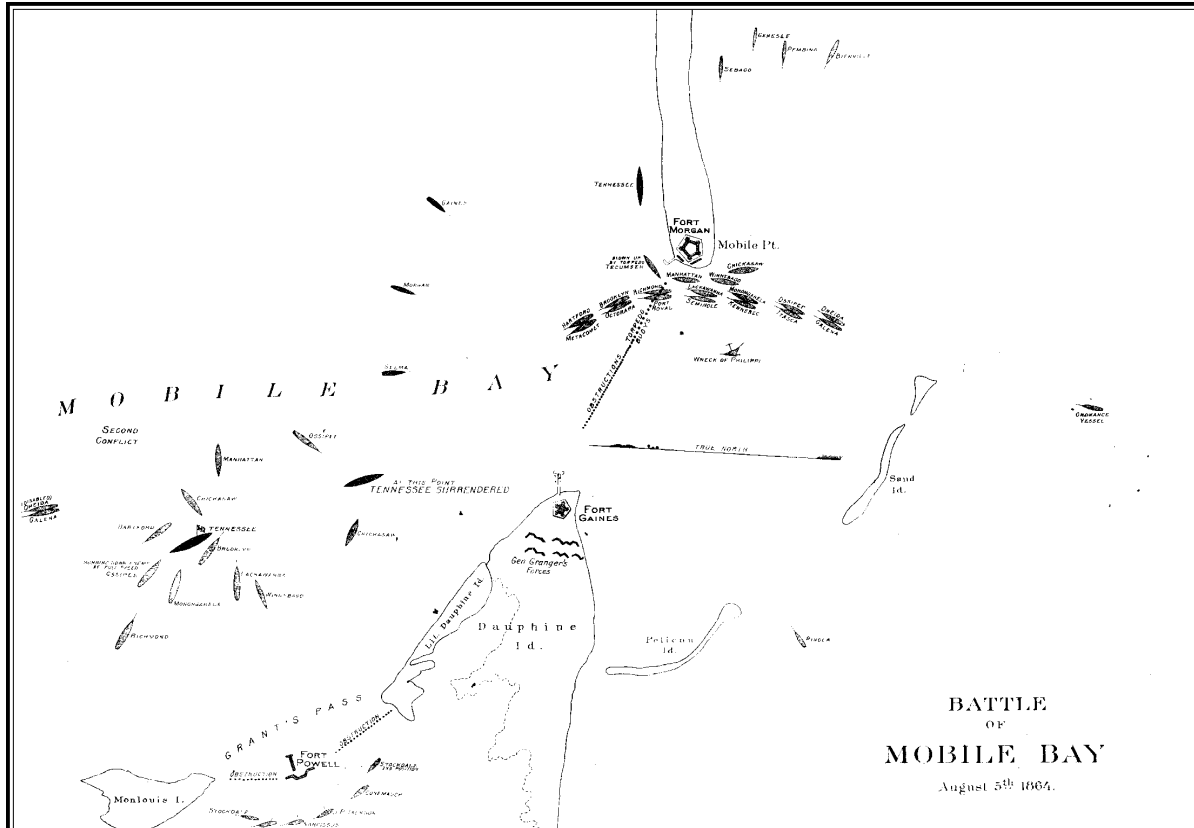


Figure 26. Battle of Mobile Bay - August 5, 1864.

line. Farragut, observing from the port main shrouds of *Hartford*, saw this sudden move and signaled for an explanation, to which Alden replied, "The monitors are right ahead. We cannot go on without passing them." Farragut's immediate reply was, "Order the monitors ahead and go on." However, to Farragut's disbelief, *Brooklyn* did not move. It was

during this time that the fleet, stalled under the fort's guns, suffered its greatest damage. At the approach of the Union fleet Buchanan had moved his squadron from the lee of Fort Morgan to a position athwart the main channel. At the same time *Brooklyn* stopped, Craven observed from *Tecumseh*'s pilothouse that Buchanan was moving *Tennessee*

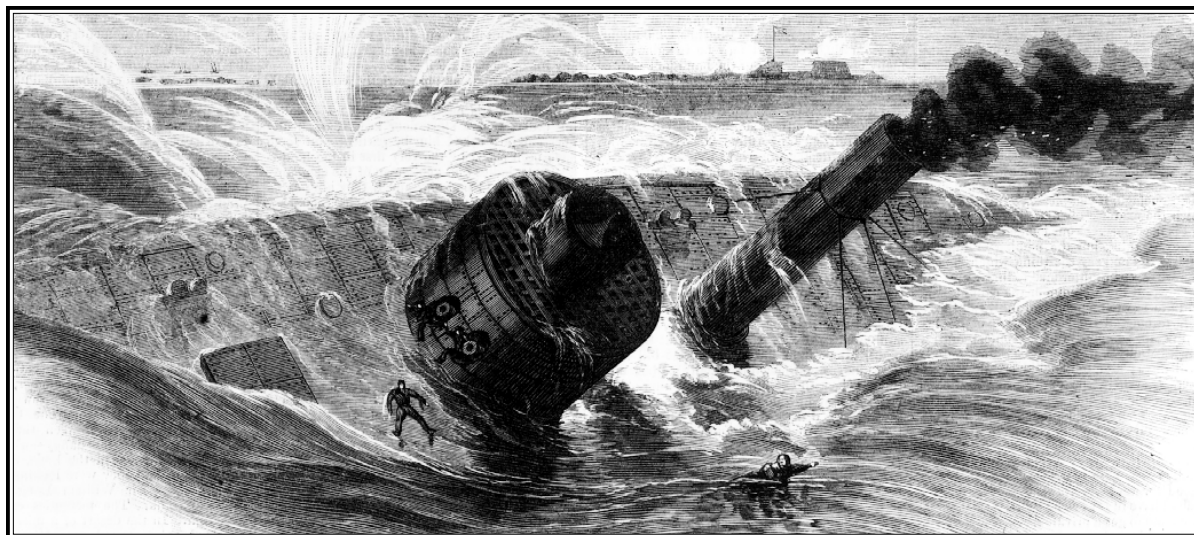


Figure 27. Loss of *Tecumseh*. (Harpers Weekly)

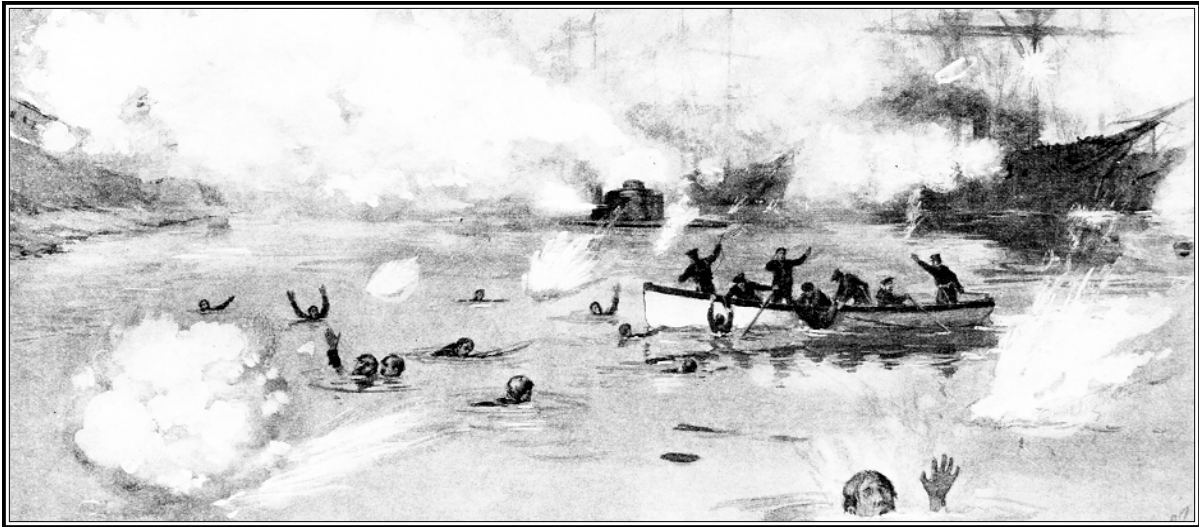


Figure 28. Boat from USS *Metacomet* rescuing survivors. (Naval Historical Center)

above the torpedo field to attack the main column. As *Tecumseh* reached the buoy marking the easternmost edge of the field, Craven turned to his pilot John Collins and said, "The Admiral ordered me to go inside that buoy, but it must be a mistake."⁷⁰

After Collins assured him that there was sufficient depth to pass to the outside, Craven ordered the helm to port. *Tecumseh's* bow slowly swept to the outside as she passed the marker buoy on the starboard side. Seconds later the ironclad was violently rocked by an underwater explosion and everyone on board knew that the vessel was mortally wounded. As *Tecumseh* quickly began to settle by the bow rolling to port the order was passed to abandon ship. (Figure 27)

Tecumseh sank in less than two minutes and unfortunately, as she was secured for battle, the only way out was through the turret. Despite the rapid plunge, twenty-one of the 114 crewmen survived. Most of these men were stationed in or near the turret. Seven managed to escape in one of the ship's boats, four swam ashore and were captured, and the remaining ten were rescued by a boat from *Metacomet*. Acting Master Henry Niels of that ship took a boat under the fire of the fleet and Fort Morgan to rescue the survivors. General Page ordered his gunners not to fire on a boat saving drowning men.⁷¹ (Figure 28)

Escape for Craven and Collins meant exiting the pilothouse through the hatch leading down into the turret. Once in the turret, they would have to climb up and out its top. According to Collins, both men made it into the turret and Craven was about to go up the ladder when he suddenly stepped aside and said, "After you, pilot, I leave my ship last." Quick to

obey, Collins probably jumped to the top of the ladder. Afterwards he recalled, "There was nothing after us, when I reached the upmost rung of the ladder, the vessel seemed to drop from under me."⁷² (Figure 29)

Another report by two survivors, Acting Masters Charles Langley and Gardner Cottrell, related the possible fate of Craven. They stated that, "Captain Craven was seen on the turret, just before the vessel sunk, and as he had a life-preserving vest on we have hopes that he reached shore." Craven did not survive the sinking and his body was never recovered. If he did make it onto the turret it is probable he was pulled under by the vortex of the sinking ship.⁷³

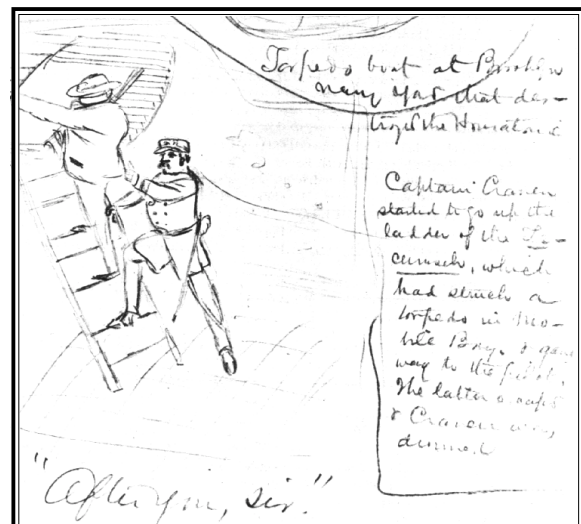


Figure 29. "After you, sir." Contemporary sketch by Alfred Waud illustrating Captain Craven and Pilot Collins's encounter at the turret hatch. (Library of Congress)

Shortly after the disaster, Alden signalled *Hartford*, "Our best monitor has been sunk." As the entire fleet was aware of this Farragut signalled back, "Tell the monitors to go ahead and then take your place." When *Brooklyn* did not move, Farragut decided to take the lead and ordered *Hartford* and *Metacomet* to pass to the left of *Brooklyn*. As they steamed by, a warning of torpedoes was shouted. The Admiral is reported to have replied, "Damn the torpedo." Then to Drayton, "Four bells, Captain Drayton. Go ahead." *Hartford's* course took the two vessels directly over the torpedo field. Sailors later reported hearing torpedoes bumping along the hull as the firing pins snapped. The rest of the main column followed the admiral's lead successfully crossing into the bay over the torpedoes.⁷⁴

By 9:00 a.m. the balance of the fleet had passed into the bay. After two separate and fiercely fought engagements, *Selma* was captured, *Gaines* was run aground and burned, and *Morgan* escaped to Mobile. With Buchanan wounded, *Tennessee* surrendered after five of her six guns were disabled and the steering chains shot away.

Fort Powell was evacuated on the same day and Fort Gaines surrendered to Granger's forces on the 8th. Fort Morgan held out until August 23 when General Page surrendered after three weeks of bombardment. With the surrender of Fort Morgan, Mobile was officially closed to blockade running and Admiral Farragut finally had the use of the lower bay as a base of operations.⁷⁵



SITE HISTORY

The surrender of *Tennessee* gave Union sailors time to reflect on the tragic loss of *Tecumseh*. Certainly the crewmen in the turret of the *Manhattan* would not soon forget the sight of the ironclad's giant propeller swinging high into the air as if driving it to the bottom of the bay.

Three months after the battle, Farragut informed Gideon Welles that a Boston salvage firm, represented by T. H. Bacon was, "anxious to undertake to raise the *Tecumseh*." Farragut told the Secretary that:

The *Tecumseh* is buoyed and lies very near Fort Morgan, say two or three hundred yards from the wharf in seven fathoms of water, with three fathoms over her. We have not been able to ascertain her position, not being able to discover her turret.⁷⁶

He suggested that, "much valuable material and her guns may be recovered, provided good divers are employed on this duty." Although Welles later acknowledged that the families of the men lost on *Tecumseh* were writing regarding the recovery of bodies and personal effects, no immediate action was taken by the Department.⁷⁷ (Figure 30)

There was no serious interest in salvaging the ironclad for almost a decade. In June 1870, a joint resolution of Congress authorized the Secretary of the Treasury to "make such contracts and provisions as he may deem proper for the interest of the government, for the preservation, sale, or collection of any property, or the proceeds thereof, which may have been wrecked, abandoned, or become derelict..." Marine salvage and harbor clearance operations were begun in almost every southern state.⁷⁸

On August 3, 1873, James E. Slaughter of Mobile purchased salvage rights to *Tecumseh* from the Department of the Treasury for \$50. After the purchase, Slaughter let it be known that he intended to use explosives to blast the wreck into salvageable pieces to recover the iron and possibly the ship's

safe. The news of his plans provoked relatives of the men lost on *Tecumseh* to petition Congress in 1876 to stop the salvage. Reacting quickly to the requests, Congress passed a joint resolution on August 15, 1876, directing the Secretary of the Treasury to "return and tender to the party claiming to have purchased the United States monitor *Tecumseh* the sum of fifty dollars, with interest at six per centum..." The act further empowered the Secretary of the Navy to assume the control and protection of the monitor and authorized him to dispose of the wreck, "providing in such disposition for the removal from said monitor and the proper burial of the remains of the persons carried down when she sank." Although Slaughter refused the government's proposition, he was not allowed to salvage the ironclad, and the resolution's stipulation requiring the removal and interment of all bodies on board succeeded in curbing the requests from other would-be salvagers.⁷⁹

The publicity surrounding Slaughter's salvage attempt had temporarily renewed the Navy's interest in *Tecumseh*. A month before the resolution, USS *Huron* was dispatched with orders to relocate and mark the ironclad's position. After relocating the vessel, the crew established magnetic bearings from the wreck to the Fort Morgan lighthouse (SE 3/4 E), and from the wreck to the Fort Morgan wharf (NE 1/2 E), and marked the site with a buoy. The passage of the Joint Resolution of August 15, apparently ended both government and private interest in *Tecumseh* until the turn of the century.⁸⁰

In January of 1901, the Navy Department received a letter from C. W. Taylor, General Manager of the Mobile Steamship Company, requesting information concerning ownership of *Tecumseh*. The Department referred the request to the Office of the Navy Judge Advocate General (NJAG) who responded as follows:

The wreck...appears to be the property of the United States. As the vessel has long been abandoned by this Department, so far as its further use for naval purposes is

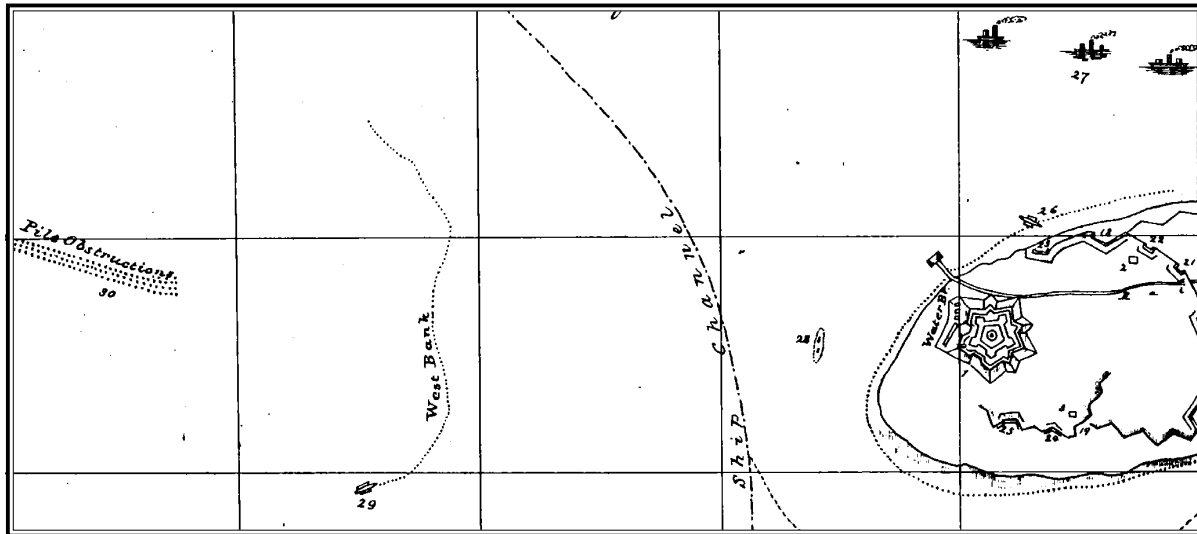


Figure 30. Portion of a contemporary map drawn by Captain Jules V. Gallimard, Engineer, C.S.A. who was in charge of the lower bay defense line. His drawing shows locations of the wrecks USS *Philippi*, CSS *Gaines* and *Tecumseh*. Note *Tecumseh* (28) appears to be shown with two turrets. This map was drawn after the naval battle and during the siege of Fort Morgan.

concerned, the question of its disposition would seem, under existing circumstances, to be cognizable by the Secretary of the Treasury...⁸¹

The NJAG office recommended “that the matter be referred to the Secretary of the Treasury for such action in the premises as he may deem proper,” and from this date on the Navy referred all inquiries concerning *Tecumseh* to the Treasury Department. Although many requests for general information were received during the first half of the twentieth century, there were no serious inquiries concerning the ironclad’s salvage until 1965. At that time a Mobile group, Alabama Historama, Inc. , expressed an interest in raising and exhibiting *Tecumseh* as a tourist attraction. Lawyers for the group approached the Navy Department for information concerning the ownership of the ironclad. They expressed their client’s concern that the Navy might make a claim for the vessel after they had gone to great expense to salvage it.⁸²

Once again the result of the request was a renewed interest by the government in the vessel’s disposition. The General Services Administration (GSA), which now retains custody of the vessel, began negotiations for its sale to Alabama Historama, Inc. The Federal Property and Administrative Services Act established GSA in 1949. Under this act, the authorization to provide for the disposition of wrecked, abandoned, or derelict property shifted from the Treasury Department to the Administrator of GSA. This

section also covers all former Confederate property including shipwrecks.

The debate over the ironclad’s salvage and the question of jurisdiction caused concern within the Navy Department. In a letter to the NJAG office in September 1965, Rear Admiral E. M. “Judge” Eller, Director of Naval History, expressed the Department’s opinion that, despite a lack of interest by the Navy Department in the past, three factors apply to the continued involvement of the Navy Department in the disposition of *Tecumseh*. First, as expressed in the Joint Resolution of 1876, the recovery and burial of the remains of officers and crew aboard were a continuing concern of the Department. Secondly, the Navy considered *Tecumseh* to be a “priceless historic relic” and that salvage attempts by unqualified parties would lead to the destruction and piecemeal disposition of valuable artifacts. Lastly, Eller cited the Navy Department’s interest in “naval relics for collections and display in museums.”⁸³

Despite the Navy’s opposition, GSA could legally sell the ironclad to anyone who could conduct a professional salvage operation and provide for recovery and burial of the crew. However, the Navy Department’s fear that the vessel would be salvaged by “unqualified parties” was short lived. In the fall of 1965 the Smithsonian Institution expressed an interest in conducting its own salvage and restoration project.

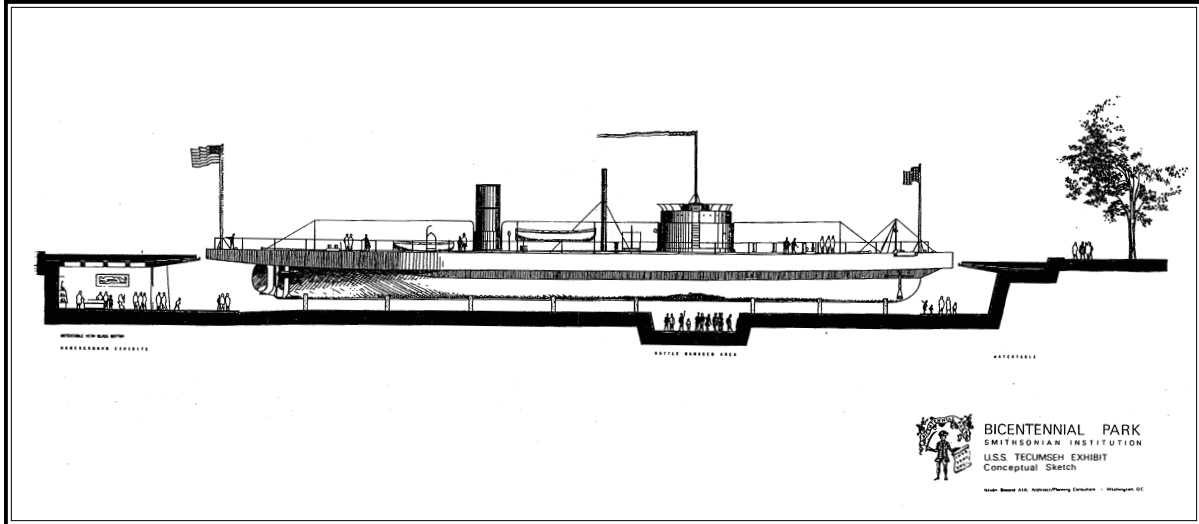


Figure 31. Drawing of conceptual display of *Tecumseh* for the National Armed Forces Museum Park. (Smithsonian Institution)

THE SMITHSONIAN PROJECT

By an act of Congress in August 1961, the National Armed Forces Museum Advisory Board (NAFMAB) was established within the Smithsonian Institution to portray the contributions which the Armed Forces of the United States have made to American society and culture. The Board of Regents of the Smithsonian and NAFMAB were directed to acquire lands and buildings in or near the District of Columbia for a new Smithsonian museum to be called the National Armed Forces Museum Park (Fort Washington). The interest of private individuals in recovering *Tecumseh* had caught the attention of NAFMAB in the summer of 1965. Realizing the potential of the ironclad for display at

the National Armed Forces Museum Park, the Smithsonian initiated a feasibility study for its recovery. As an initial step, title to the vessel was transferred from GSA to the Smithsonian on June 3, 1966.⁸⁴ (Figure 31)

The Smithsonian began their “*Tecumseh* Project” in the fall of 1966. A survey to locate the vessel was conducted in early 1967 using the 1877 *Huron* survey data and information provided by local watermen. After two attempts, divers located an exposed area of iron approximately twenty feet long, protruding eighteen inches out of the mud. Closer inspection revealed this area to be the starboard turn of *Tecumseh's* bilge.

On February 16, “*Tecumseh* Project” coordina-



Figure 32. Aerial view of *Tecumseh* site during Smithsonian Project. (Smithsonian Institution)

tor Colonel Robert M. Calland, USMC (Ret.) and NAFMAB Director Colonel John Magruder, USMC (Ret.) held a news conference in Washington, D.C. to announce the discovery of *Tecumseh* and the Smithsonian's plans to raise and restore the ironclad for display at the proposed National Armed Forces Museum Park. The announcement that the vessel was to be removed from Alabama sparked what has been called, "The Second Battle of Mobile Bay." Local protests quickly turned into legal action.⁸⁵

The first lawsuit came from local businessman, J. O."Sonny" Wintzell who claimed he had found *Tecumseh*, registered the discovery, and obtained salvage rights from the State of Alabama in February 1965. Alabama officials were surprised and embarrassed by Wintzell's lawsuit. The State Attorney General's office and the Department of

Archives and History expressed their concern that there might be a conflict with Alabama interests and statutes concerning *Tecumseh*'s removal. Alabama law did not allow such antiquities to be disposed of outside the state, and if the ironclad were raised it should be displayed locally. Therefore, the Alabama Legislature recognized itself as the responsible agency in the *Tecumseh* matter, and by joint resolution created the "Tecumseh Committee." At a meeting of state and federal officials, NAFMAB and the "Tecumseh Project" staff were able to allay the fears of the committee that the ironclad would be quickly removed from the state. They explained that the recovery and restoration phases of the project would take many years and the Smithsonian planned to conduct this work in Alabama.⁸⁶

The Wintzell lawsuit was the only obstacle

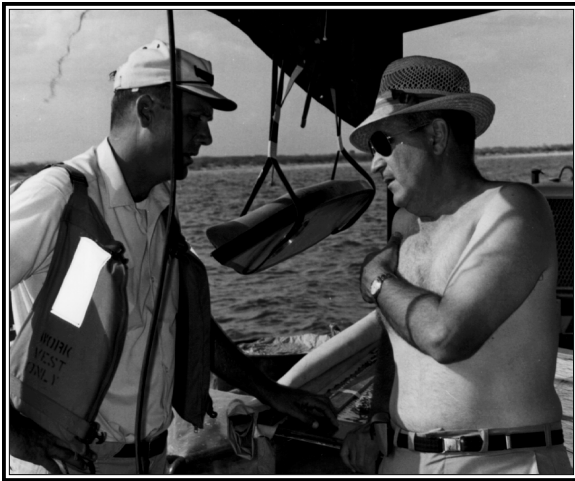


Figure 33. Colonel Robert M. Calland (right), project manager, discusses operations with dredge engineer. (Smithsonian Institution)



Figure 34. Long poles were used as reference guides for the dredge operator. (Smithsonian Institution)



Figure 35. Janke Services dredge, *Booster #3*. (Smithsonian Institution)



Figure 36. Dredge arm with twin water jets. (Smithsonian Institution)

delaying the start-up of the project. The case was tried in U.S. District Court in Mobile where Wintzell's lawyer argued that the Federal government had abandoned the vessel and that its title rested with the State of Alabama. The Federal prosecutor asked for dismissal on grounds that the Smithsonian, as a branch of the Federal government, could not be sued. He stated that the abandonment of government property requires an act of Congress and no such act had been passed, therefore the court agreed and dismissed the case.⁸⁷

After the dismissal of the Wintzell case, the Smithsonian conducted a two-week survey of the wreck in July 1967. (Figures 32-40) The Tecumseh Project team consisted of Magruder, Calland, James Stokesberry, project historian, and Earl Lawrence, a civilian diver with the Navy's Supervisor of Salvage

Office. A dive barge and support vessel with airlift, surface-supplied diving gear, cutting and welding equipment, and miscellaneous supplies, were provided under contract by S. L. Miller Professional Divers, Inc. Earl Lawrence and S. L. "Buster" Miller were the primary dive team with backup provided by Miller's assistants. With the assistance of a commercial dredge the entire hull was exposed from the starboard to the port armor belt. As a result of the dredging, several interesting discoveries were made. It was determined that the ironclad had rolled over as she sank and was now resting on her port gunwale, supported by the turret and pilothouse. The turret and pilothouse were in place and intact. When the rudder/propeller assembly was uncovered, the rudder was found in a one-fourth to one-half turn position, corroborating Craven's course change.⁸⁸



Figure 37. Calland and project diver Earl Lawrence (right) discuss progress of excavations. Notations on the model represent the only site record. The location of the model is unknown. (Smithsonian Institution)

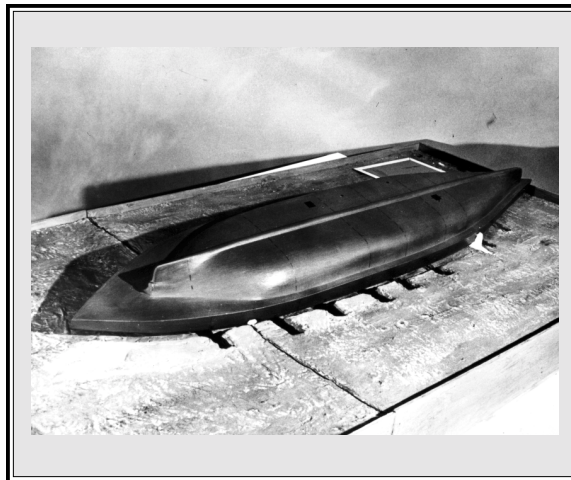


Figure 38. Conceptual model of *Tecumseh's* position on the bottom. The wreck was not completely exposed during the Smithsonian project. (Smithsonian Institution)



Figure 39. Lawrence on the dive barge with steel probe. (Smithsonian Project)



Figure 40. Press conference held in Washington, DC after the project. Note ship's anchor and dinnerware recovered during excavations. (l to r) Earl Lawrence, Captain Willard Searle, U. S. Navy Supervisor of Salvage, Colonel John Magruder, NAFMAB Director, and Colonel Robert Calland. (Smithsonian Institution)

The most important discovery was the location of the area damaged by the torpedo. The explosion had not ripped a hole in the hull. Instead, divers found a twelve foot long, twelve to fifteen inch deep “depression” in the starboard hull next to the keel. The torpedo blasted in the hull, separating two strakes of plating for approximately three feet. The space exposed by this opening was a blower compartment directly beneath the turret. This compartment was found filled with mud and the supporting wooden deck beams had been destroyed by shipworms. The survey revealed the ironclad to be in a remarkable state of preservation under a protective cover of mud. Preliminary analysis of iron and wood samples indicated that the hull was structurally sound. At the end of the project, closure plates were placed over all the openings found and

made in the hull, including the battle-damaged area.⁸⁹

The purpose of this initial investigation was to determine the vessel’s overall condition after 104 years underwater. The condition of the iron hull and supporting deck timbers was vital to determining the method of salvage. Throughout the project the divers commented on the remarkable state of preservation of the vessel. In addition to the samples taken, the divers also recovered a portion of blower housing (Figure 41), two pieces of cast iron engine room deck plate (Figures 42-45), and a section of hull plating with a portion of a transverse frame. (Figures 46-48) All of these items were sent to the Naval Research Laboratory (NRL) in Washington, D.C. The results of the analysis were as follows:



Figure 41. Section of blower housing damaged by torpedo explosion that was removed during Smithsonian project. (Naval Research Laboratory)

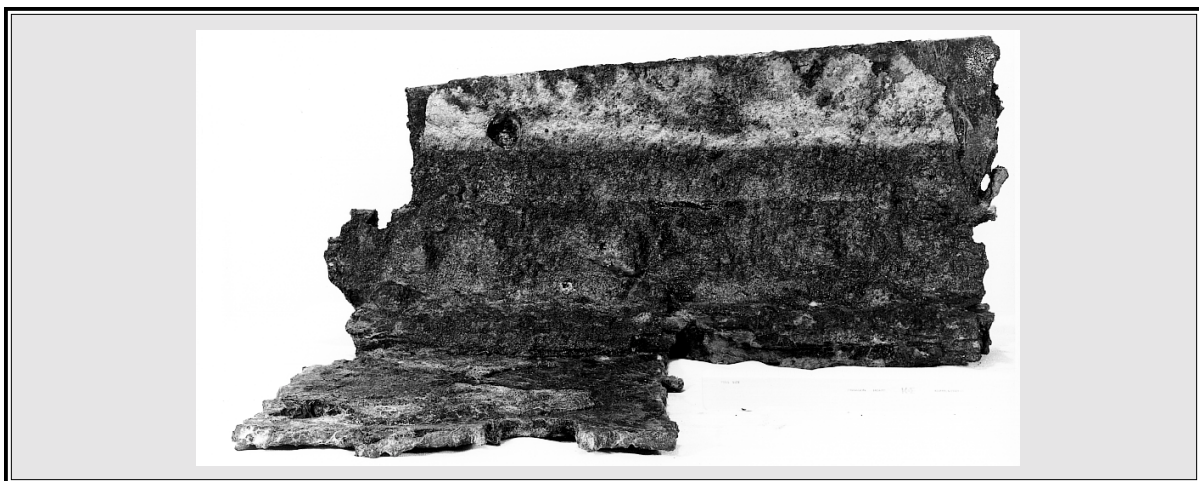


Figure 42. Section of frame and deck plating removed for analysis during Smithsonian project. (Naval Research Laboratory)

1. In the parts examined, the exterior peened down ends of the rivets connecting the hull plate to the angle iron (and thus to the frame) were seriously penetrated by corrosion. It seems possible that some of these ends may collapse and pull through the rivet holes under stress if they are not strengthened.
2. The spaces or crevices between members of riveted joints were usually filled with micro-porous corrosion products, which in turn were saturated with seawater.
3. Neither fresh water flushing nor ultrasonic washing will effectively remove chloride from deep pockets of corrosion products. Ultrasonic cleaning may reduce the chloride content of thin layers or shallow pockets of corrosion scale
4. The best techniques for cleaning and preserving the hull appears to be:
 - Removal of mud and loose scale by high-pressured water or steam.
 - Chipping and sandblasting thoroughly to remove the scale completely.
 - Prolonged washing with fresh water or

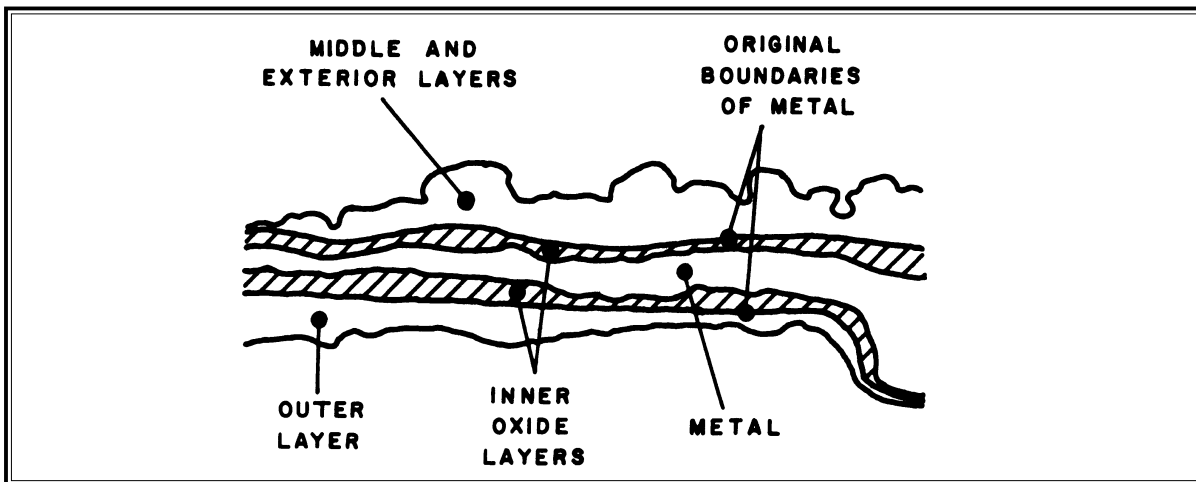


Figure 43. Analysis of cross section of deck plate (see below left). (Naval Research Laboratory)

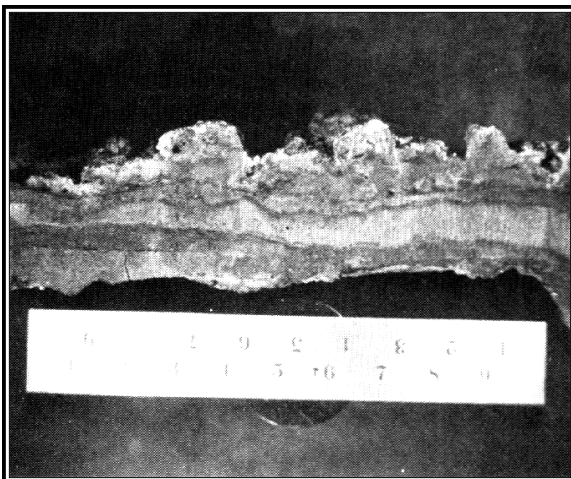


Figure 44. Cross section deck plate removed for analysis during Smithsonian project. (Naval Research Laboratory)

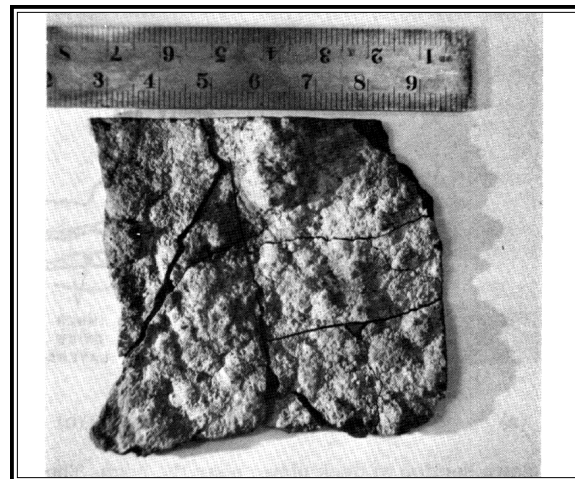


Figure 45. Sample of scale removed from plating. (Naval Research Laboratory)

steam to leach out the remaining salts.

- Painting with a corrosion-inhibiting primer.
5. The scale consisted typically of three layers: an oxide layer preserving the original outline of the metal; a porous oxide layer which grew out from the metal; and a hard calcareous accretion on the exterior. The formation of the scale layers can be explained by accepted electrochemical and oxidative corrosion mechanisms. The dense calcareous layer limited the corrosion of the metal over which it formed by reducing the diffusion of oxygen from the water into the outside layers.⁹⁰

The favorable reports from the July survey and

the Naval Research Laboratory convinced the Smithsonian that *Tecumseh* was salvageable. Therefore, the “Tecumseh Project” staff was directed to initiate plans for the first phase of the recovery. In late August, Earl Lawrence and his supervisor, Captain Willard Searle, U.S. Navy Supervisor of Salvage, made a field trip to inspect *Tecumseh* and the surrounding site. Representatives of Murphy-Pacific Marine Salvage Company of New York were also present as they were under consideration for the salvage contract. After inspecting the site, the group sat down to discuss a salvage plan for the upcoming year.

Since the ironclad’s discovery, a number of salvage firms had approached the Smithsonian with recovery offers. In March 1968, Norman Scott, Vice

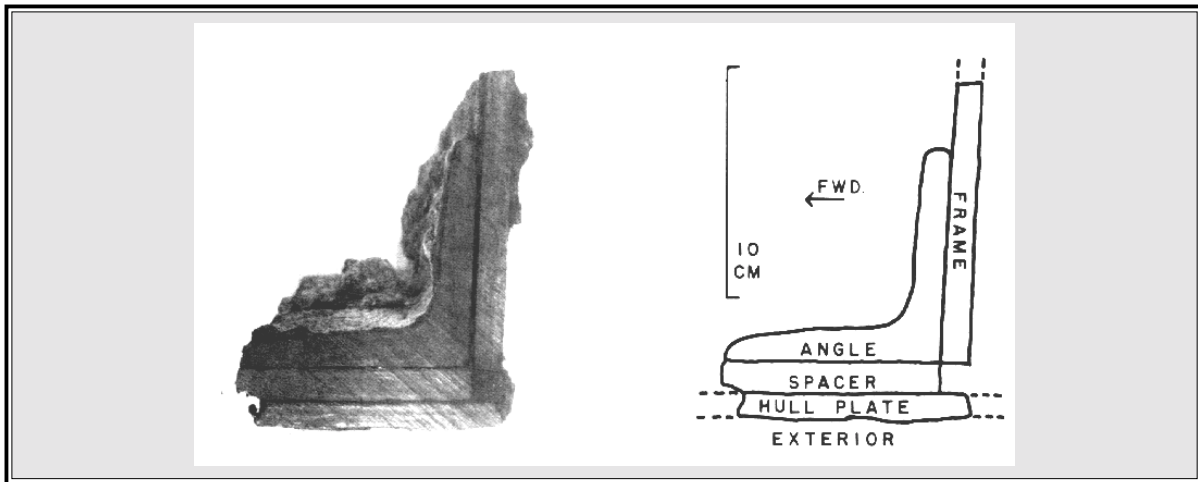


Figure 46. Cross-section of frame and hull plating removed for analysis during Smithsonian project. (Naval Research Laboratory)

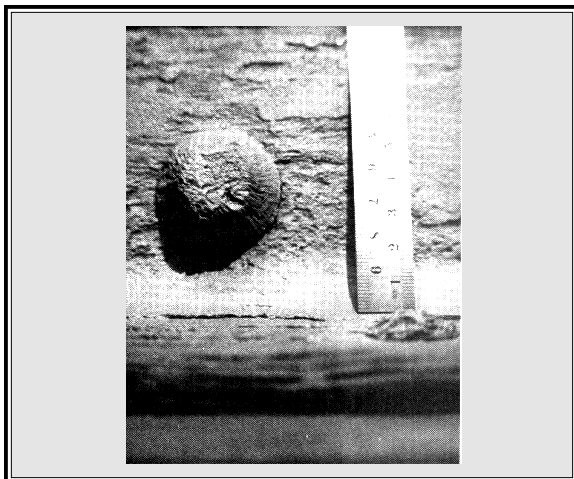


Figure 47. Rivet head through angle, spacer, and hull plating (sandblasted). (Naval Research Laboratory)



Figure 48. Peened end of rivet in Fig. 47 and exterior surface of hull plating (sandblasted). (Naval Research Laboratory)

President of Expeditions Unlimited, Inc. (EUI) of Pampano Beach, Florida, approached Colonel Magruder with an offer to salvage *Tecumseh*. He proposed to raise the ironclad “at a cost of \$1.00 to the Smithsonian Institution” with certain conditions. EUI would be the general contractor for the project and would have the exclusive rights to the salvage. Also, EUI would have “exclusive motion picture, TV, newspaper, literary, and commercial rights” for the vessel and the project. F. Kirk Johnson of Fort Worth, Texas, EUI’s financier, would provide \$1 million in advance capital for the project. Scott’s plan was to solicit donations in the form of funds, equipment, and services from large corporations. Revenue generated by the sale of photographic coverage and documentation would be used to reimburse Mr. Johnson and hopefully provide a profit for EUI.⁹¹

Scott submitted a preliminary salvage plan and budget to Colonel Magruder on June 18. In it he proposed to build a cofferdam in which the water level would be lowered and then filtered for visual inspections. Twenty-four eight-inch airlifts would be used to uncover the hull and break the suction. The exterior of the hull would be examined and samples taken for analysis. The interior would be completely cleared of mud and silt, and all artifacts, ships stores, and fuel removed. After a thorough examination of its structural integrity and strength, the method of raising the vessel would be devised. Scott mentioned “expandable beads and/or air” as possible lifting devices. Once raised, the vessel would be towed into drydock and “subjected to a twenty-four-hour sprinkler system until other methods of preservation and restoration [could] be affected.” The turret would be raised by conventional salvage methods as a second lifting project. Finally, Scott requested that his group be allowed to inspect the wreck site after which a detailed salvage plan could be presented. The opportunity to defer some of the cost of an expensive project appealed to the members of NAFMAB. Colonel Magruder informed Scott that Captain Searle would review EUI’s proposal and give his opinion as to its feasibility. Magruder agreed that an exploratory dive should be made as soon as possible.⁹²

In his review and comment Captain Searle noted that it appeared EUI could handle the job financially. “They apparently, he stated, “have a superior feel for the archaeological aspects of [the] salvage.” However, he cautioned that their lack of experience in “harbor clearance type salvage work is dangerous and you could very easily find yourself

in a Cairo-type situation, or in a situation where you had to abort, perhaps leaving a monument of sheet pilings in the entrance of Mobile Bay.” Enclosing an item by item critique of Scott’s proposal, Searle recommended that a fully qualified salvage firm participate in the project. He believed that a more detailed plan would most likely eliminate many of his questions and agreed that EUI should make a reconnaissance dive in the near future.⁹³

EUI conducted a reconnaissance survey the week of July 14, 1968. Present were Calland, Lawrence, and Miller, and representing EUI, Norman Scott, Russell Bartmes, and Mike Freeman. During the initial survey of the wreck, the plate was removed from the battle-damaged area. On the 31st, this area was airlifted providing access to the turret blower compartment. The divers noted that the deck and turret chamber beams had been completely destroyed by shipworms. Miller examined the turret and reported that the steel support beam for the main turret shaft was broken. Several artifacts removed included two bottles, several brass bunk supports, and stanchion rails. The survey was completed on August 1 and the plate was resecured over the battle-damaged area.⁹⁴

After the survey, EUI reached a tentative salvage agreement with the Smithsonian and Scott began his fund raising campaign. In October, he met with representatives of Murphy-Pacific to work out an agreement whereby the latter would raise and turn *Tecumseh* to an upright position. The cofferdam surrounding the vessel would be designed by Palmer and Baker, Inc. of Mobile and installed by Murphy-Pacific.

EUI made a second inspection dive on *Tecumseh* the week of November 6. During this survey the turret blower compartment was again inspected and an attempt was made to enter the wardroom forward of the turret. To further determine the vessel’s interior condition, they decided to enter an undisturbed area. A section of hull plate was removed between frames 41 and 43 allowing access to the engine compartment. After airlifting, the divers reported this area to be in excellent shape. The deck beams were solid and the engines and gauges were remarkably well preserved. The engine room signal gong and several burlap bags were recovered before the survey ended in November.⁹⁵

At the same time, NAFMAB distributed its “TECUMSEH PROJECT TASK MILESTONES” to project participants. Outlining the work completed

to date, it called for recovery operations to be completed in four phases:

Phase I.

Desilting and clearing out of the hull (including removal and conservation of all artifacts and heavy equipment such as coal, ordnance, and miscellaneous stores), and the recovery and interment of human remains.

Phase II.

The raising and righting of the hull and its delivery to a temporary berth in the Mobile Bay area.

Phase III.

The cleaning, preservation, and restoration of the hull and its components.

Phase IV.

Movement of the vessel to the Potomac River for permanent display at Bicentennial Park.⁹⁶

The report stated that before Phase I could begin “the project must be prepared to deal effectively with every conceivable object brought to the surface...” To accomplish this, the Phase I plan incorporated the establishment of a “field restoration laboratory” located at Fort Morgan. The report continued:

The full resources of Smithsonian personnel and technical facilities can be brought to bear on the project. Budget limitations, however, do not permit any extensive outlay of Federal funds. It is anticipated that, in addition to drawing on Smithsonian capabilities, Navy assistance and govern-

ment surplus resources \$267,923.00 will be required to support Phase I operations, including activation of the field restoration laboratory.⁹⁷

Twenty-seven “tasks” were established to carry the project from the selection of a salvage contractor to the ironclad’s installation in the display berth. (see Appendix 2)

EUI, Murphy-Pacific, and Palmer and Baker presented their salvage plan to the Smithsonian project team December 13. Because of the poor diving conditions, zero visibility, and strong currents, they decided that Murphy-Pacific would build and drive a cellular cofferdam designed by Palmer and Baker. The differential waterhead on the cofferdam was not to exceed thirty feet and cast-in-place foam would be used to lighten the wreck. It would then be lifted and turned with positive control cranes. Captain Searle recommended the cofferdam be redesigned for “100% dewatering,” thus allowing for a “Marine-type alternate salvage plan.” Other than this objection, he approved EUI’s proposal and recommended that they proceed with the recovery.⁹⁸ (Figure 49)

Scott contacted Colonel Magruder in late December with two requests. Mentioning large budget increases over the last two months, he suggested selling the completed cofferdam to the State of Alabama. He also requested that, pending completion of a contract, EUI should be given a firm “letter of intent” to facilitate fund raising. The Smithsonian agreed, sending the letter on January 10.

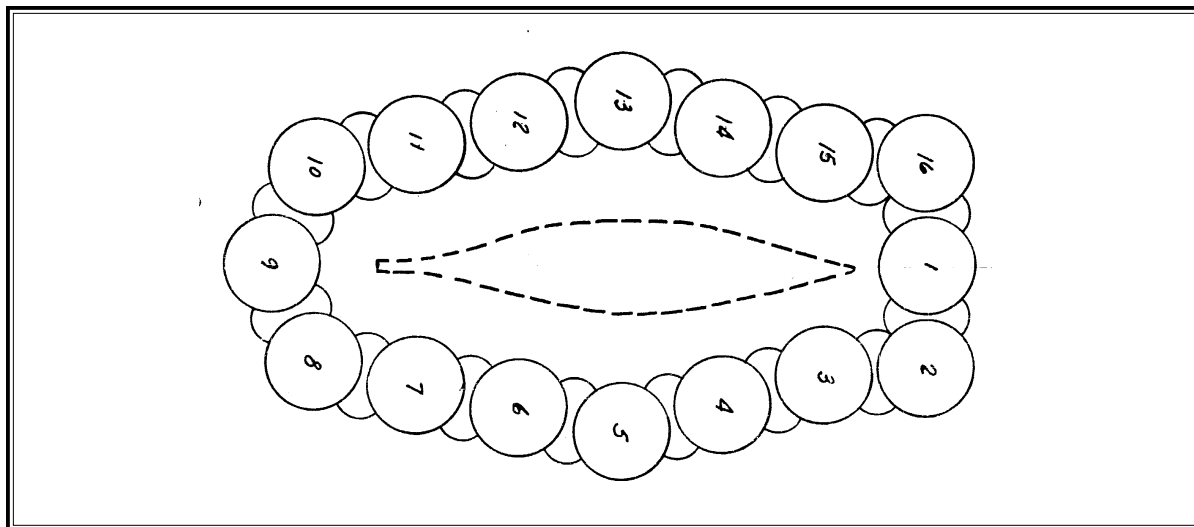


Figure 49. Conceptual drawing of cellular-wall cofferdam originally planned for the Smithsonian/EUI recovery project. (Palmer-Baker Engineering)

Throughout the early part of 1969, EUI and the Smithsonian held many meetings to discuss the budget and progress of the fund raising. During this period, the relationship between EUI and the Smithsonian began to deteriorate. Shortly after receiving the "letter of intent," Scott informed the Smithsonian that EUI's financier F. Kirk Johnson had died the previous August. Scott assured Smithsonian officials that additional backing had been secured from businessman Robert Tyo of Towson, Maryland, and that the project would continue on schedule. He explained, however, that Tyo's support differed significantly from Johnson's. The risk capital provided by Johnson would not be available. Tyo would only advance funds in amounts for which EUI had firm written commitments. This radically changed EUI's fund-raising process from selling films, articles, etc. during and after the project, to pre-selling events which were yet to happen. Funds had to be firmly committed before Mr. Tyo would advance the money to begin the project. Suddenly EUI's \$1 million in advance capital had disappeared. Smithsonian officials explained to Scott that the project could not begin without assurances that funds would be available to complete Phase I. They also emphasized that the timetable called for Phase I to begin July 1, 1969, with the vessel in its temporary berth by September.⁹⁹

In early May, EUI made another field trip to Mobile. The engineering firm of Capazoli & Sons of New Orleans was contracted to take core samples around the site prior to installation of the cofferdam. At the Smithsonian's request, Buster Miller participated in the dive and placed buoys at the bow, stern, and battle-damaged area. Surveying the vessel, Miller reported that the "closure plates" over the battle-damaged area and engine room had not been replaced by EUI on their previous expedition, and both compartments were completely filled with mud. He attempted to secure the plate over the battle-damaged area but was not successful due to deteriorating weather conditions. He stated that a Mr. Kemler of EUI replaced the engine room plate "at a later date."¹⁰⁰

On May 15, EUI submitted a funding status report to Smithsonian. In it, Scott explained that the project budget had increased from the original \$1 million to more than \$4 million and reiterated that this amount would not be provided by Mr. Tyo until a matching sum in contributions was obtained. He reported that to date EUI had approximately \$863,050 in cash and equipment committed in writing, \$239,975 in cash committed orally, and a

\$253,050 "cash prospective." To cut costs, the cofferdam was redesigned from a cellular to a sheet-wall type. Murphy-Pacific advised against this change stating that a sheet-wall cofferdam would, in the long run, balloon salvage costs, negating the initial savings. As an additional cost-cutting measure, Scott requested that the Smithsonian fund the construction and operation of the Fort Morgan restoration lab.¹⁰¹

Responding to this report, Calland stated that the present oral and written commitments were insufficient to start the project. "The report," he stated, "does not provide enough information to relate the committed equipment to the specific project requirements." Scott requested that the project schedule be modified to allow more time for fund raising. Calland, however, informed him that the "latest reasonable starting date" would be July 1, 1969.¹⁰²

On June 4, Scott and Tyo met with NAFMAB Members in Washington, D.C., to discuss EUI's future with the project. Tyo stated that they would not have sufficient funds to begin Phase I by July 1. If the Smithsonian could not agree to a postponement, EUI would have to pull out of the project. Colonel Magruder explained that they had decided to keep the July starting date rather than lose momentum and allow public interest to cool off. The Navy still supported the project and was anxious to begin work. He pointed out that the vessel was exposed and subject to rapid deterioration and damage by marine borers. He also mentioned the fact that EUI had neglected to secure the vessel the previous fall, exposing previously undisturbed areas of the ship. For these, and similar reasons, Magruder concluded that the project had to go forward as scheduled.¹⁰³

With adequate funding unavailable and the chances of postponement unlikely, EUI had no alternative but to withdraw. However, the opportunity to work on later phases of the project was offered by the Smithsonian. On June 26, James Bradley, Acting Secretary of the Smithsonian, withdrew the letter of intent issued in January.¹⁰⁴

The withdrawal of EUI shifted the burden of financial responsibility for the project to the Smithsonian causing July 1 to be an unrealistic startup date. In early July, Magruder and Calland announced that the Smithsonian was still committed to raising and restoring *Tecumseh* and that salvage operations would begin August 1. They stated, however, that due to rising costs, the proposed

cofferdam had been abandoned.

August 1 passed with the ironclad still on the bottom of Mobile Bay. The money to begin Phase 1, guaranteeing conservation of all artifacts, was not available and the project was rescheduled for the following fall. Early in 1970, Colonel Magruder announced that due to a lack of funds, NAFMAB had postponed the "Tecumseh Project" indefinitely.¹⁰⁵

In August of 1970, lawyers representing EUI informed the Smithsonian that their client was making administrative demand for the out-of-pocket expenses incurred between January 10 and June 26, 1969, plus reasonable compensation and profit. EUI considered the withdrawal of the letter of intent an "unjustified and unilateral termination of the contract," and demanded \$126,343.46 for expenses, and a \$100,000 "profit factor."¹⁰⁶

The following January, after the Smithsonian failed to respond to EUI's claim, Scott sued for breach of contract. He contended that verbal agreements and the letter of intent, signed January 10, 1969, constituted a contract which was breached when the letter was withdrawn. He asked for \$126,000 for expenses incurred, plus damages based on commitments of funds and equipment, which had been secured.

The case was tried before a jury in U.S. District Court in Washington, D.C., December 18-20, 1972. The focus of the trial was the actual existence of a contract as implied by the letter of intent. The jury decided in favor of EUI and awarded the expense claim of \$126,000 plus ten percent for the "alleged written commitments," or \$86,000, for a grand total of \$212,000. A settlement was reached in April 1973 in which EUI accepted \$150,000 and "dismissed the action with prejudice, and agreed to a vacating of the jury verdict."¹⁰⁷

The EUI lawsuit and its subsequent outcome were the final blows for the Smithsonian's "Tecumseh Project." NAFMAB was unable to raise additional funds for the project and there was speculation that, due to government spending cuts and the prevailing anti-war sentiment of the day, the entire National Armed Forces Museum Park might be cancelled.

Because Smithsonian was no longer actively pursuing the salvage, there was renewed interest in a local recovery effort. Early in 1973, U.S. Congressman Jack Edwards, representing the 1st District of Alabama, approached Smithsonian

officials concerning their future plans for *Tecumseh*. He believed that local groups in the Mobile area should be given an opportunity to raise, restore, and display the ironclad. GSA informed Edwards that while the Smithsonian still retained title to the vessel, no action could be taken by private groups.¹⁰⁸

NAFMAB held its annual meeting in November 1973. Among the topics discussed were current activities relating to *Tecumseh*. Assistant Staff Director Jim Hutchins reviewed the recent history of the project noting that no action had been taken on *Tecumseh* since 1969. He added that the ironclad's recovery was undertaken with the expectation of displaying it in the proposed Museum Park, which was to date, still in the planning stages. Hutchins pointed out that the Smithsonian title to the vessel was provisional. The agreement, signed in 1966, stated that, "in the event the Smithsonian Institution does not complete the salvage of the USS *Tecumseh*, the vessel shall be transferred back to the Administration of General Services without further action on his part; at which time this agreement shall terminate." He also revealed that the Smithsonian's Conservation-Analytical Laboratory had determined that the procedures for restoration would take many years and that there was no practical way to stop considerable shrinkage and warping of the vessel fabric. Finally, Hutchins informed the Board of the growing number of Alabama groups interested in raising and displaying the ironclad in Mobile. He recommended that custody of *Tecumseh* be returned to GSA. On December 14, 1973, the Smithsonian *Tecumseh* Project officially ended.¹⁰⁹

During the course of the Smithsonian's project, numerous wood and metal samples were taken for analysis and approximately thirty artifacts were removed. A site map or drawing of this work was not made. Copies of the ship's plans with clear overlays, a scale model of *Tecumseh*, and tape recorders, were used during the surveys. These items contain the only documentation of the divers' investigations and the location of samples taken from the hull. The location or existence of the ship plans, scale model, and tapes are unknown.

THE WHEELER TECUMSEH MEMORIAL CORPORATION

The announcement that the Smithsonian had relinquished its title to *Tecumseh* prompted quick reaction by state and local groups in Alabama. Three separate groups immediately expressed an

interest in the vessel as a potential tourist attraction. The various proposals included raising and displaying the ironclad alongside the battleship *Alabama* in Mobile, raising and displaying her at Fort Morgan, or leaving her *in situ* and building an underwater observation platform from which tourists could watch divers working on the wreck.

The proposal by the USS *Alabama* Battleship Commission to place *Tecumseh* alongside their vessel in Mobile received the most support. Henri Aldredge, Chairman of the Commission, stated his organization was extremely interested in raising and restoring the ironclad; however, the estimated cost, "which might run three to five million dollars," would put the project out of reach of most state and local agencies.¹¹⁰

The increased local interest in the ironclad's salvage prompted Robert Edington, now an Alabama State Senator, to reactivate the "Tecumseh Committee." Meeting on January 16, 1974, the Committee discussed site protection and recommended that the state investigate the feasibility of recovering and restoring the ship. John H. Friend, Inc., an economic and market research firm in Mobile, was contracted to prepare the report. Senator Edington also set up a meeting with Smithsonian officials to discuss the recent proposals.¹¹¹

In early March, the "Tecumseh Committee" released a statement requesting proposals for the salvage, preservation, and permanent exhibition of *Tecumseh* and her artifacts. Interested parties were to present a brief resume of their proposal by March 20. A basic proposal for financing should be included as the State was not prepared to undertake the project at its own expense. Edington also stated that GSA was willing to transfer title to the state of Alabama after the state presented an appropriate plan of salvage and preservation.¹¹²

The Committee received six salvage proposals submitted by private individuals, a private corporation, and a state agency. The Committee considered five of the proposals "advisory" because they did not offer a comprehensive plan for financing the salvage and restoration. The only proposal which met all the requirements set forth by the Committee was submitted by the Wheeler Tecumseh Memorial Corporation (WTMC).

In June 1973, E. Joseph Wheeler, Jr., President of Wheeler Industries, Inc., of Washington, D.C., was briefed by Norman Scott concerning EUI's

efforts to salvage *Tecumseh*. Throughout the summer and fall of 1973, Wheeler met with members of the Alabama Congressional delegation to discuss the possibility of a recovery project.

In early January 1974, incorporation papers were filed forming a non-profit, tax-free organization within the State of Alabama, to be known as the Wheeler Tecumseh Memorial Corporation. Officers for the corporation included William H. Hamilton as President and John M. Milling and Lyle Hurds as Vice Presidents. E. Joseph Wheeler, Jr. and James W. Wine were listed as Directors. The principal office was located in Montgomery, Alabama, with branch offices in Mobile and Washington, D.C.¹¹³

Prior to Edington's solicitation for proposals, Hamilton and Wine met with members of the "Tecumseh Committee" where they presented a preliminary proposal for the salvage, restoration, preservation, and display of the ironclad. Much of what they offered, however, were plans for the Phase I work. No detailed plan for the excavation, removal of artifacts, or conservation were given. However, WTMC's preliminary estimate of the cost for the entire project was approximately \$10 million. These funds were to be raised privately at no cost to the State of Alabama. The State would, however, be responsible for the protection and preservation costs of the site, which could be met by revenue generated by tourist visitation and by the sale of memorabilia.¹¹⁴

After the title to the shipwreck was secured by the State, a contract would be signed with WTMC for the duration of the project. The contract completion date was set for July 4, 1976, at which time the contract would expire. Since the display date for the ironclad was targeted for July 4, WTMC recommended certain steps be accomplished before the formal contract was signed.

WTMC suggested that the Governor's office make a request for transfer of title from GSA as soon as possible with the title to be vested with a designated state agency, such as the Alabama Historical Commission or the USS *Alabama* Battleship Commission. That state agency would then be responsible for negotiating the project contract with WTMC. Fund raising was scheduled to begin April 1, 1974. Through initial contributions, a comprehensive feasibility study would be conducted to identify all aspects of engineering, restoration, preservation, and display. Upon a favorable feasibility report, a formal

proposal for recovery would then be submitted. They anticipated this plan would be submitted by July 1.¹¹⁵

In late March, Edington wrote to Alabama Governor George C. Wallace relating the recent activities concerning the ironclad. Edington informed him of WTMC's selection as the primary salvage contractor and briefly outlined their proposal. Considering WTMC's plan, the only one which could be implemented prior to America's Bicentennial Commemoration, Edington recommended that the Governor's office take immediate action to designate the Alabama Historical Commission as the responsible state agency to receive title to *Tecumseh*. The Commission could then, with the Tecumseh Committee's approval, contract with WTMC to conduct the necessary feasibility studies. If WTMC demonstrated the financial capacity to carry the project through to a successful conclusion, the Commission would be authorized to contract for the recovery of the vessel. Edington concluded that WTMC appeared to be properly motivated and qualified to undertake the project.¹¹⁶

The USS *Alabama* Battleship Park was suggested as the appropriate site to display the monitor since the initial Smithsonian interest in 1967. The Park offered high visibility with nearly 290,000 tourists yearly, as well as a unique opportunity to create an exhibit on the development of the modern capital warship. The Battleship Commission responded favorably to the initial suggestions that the vessel be displayed in their park. However, by the spring of 1974, the Commission was reluctant to commit itself to a project of such grand proportions. Before accepting responsibility as the designated state agency, they demanded guarantees that the burden of financing the project would not eventually fall to the Commission. If they could not get this guarantee they would not agree to become involved in the project.¹¹⁷

Because of the adamant, uncompromising attitude of the Battleship Commission, Edington suggested that the title initially be transferred to the Alabama Historical Commission and then to the Battleship Commission at some future date. In an April 29th letter, the Governor informed Edington that he had received a proposal suggesting the Historical Commission as the responsible agency and he agreed that the state should take title to the monitor as she was a "tremendous asset."¹¹⁸

In early July, the Tecumseh Committee released

the Friend Report on the feasibility of "the salvage, preservation and display of the U.S. S. *Tecumseh* as a publicly-owned tourist attraction." Briefly, the report concluded that the state would substantially benefit from a successful project. However, it emphasized that "there would be no middle ground between total success and total failure."¹¹⁹

The report reviewed *Tecumseh's* history and other modern salvage projects, including *Vasa*, USS *Cairo* and CSS *Jackson*. *Vasa*, a seventeenth-century Swedish warship which capsized and sank in Stockholm Harbor in 1628, was found nearly intact and raised in 1961. *Vasa*, thus, represented a successful salvage project but also illustrated the high cost of conservation and maintenance. The disastrous salvage of the Civil War gunboats USS *Cairo* and CSS *Jackson* were used as examples to be avoided. Upon discovery, *Cairo* and *Jackson* were in a remarkable state of preservation. However, the subsequent salvage attempts resulted in the loss of both structure and artifacts. Approximately 30% of *Cairo's* structure and 25% of her contents were lost. *Jackson* lost 90% of her original fabric.

Also discussed were the problems unique to *Tecumseh's* salvage. The ironclad's size, its position on the bottom, the number of artifacts, and the environment of lower Mobile Bay were all factors to be considered. The vessel was considered salvageable, provided the hull was structurally sound. The major concern was the conservation and preservation of the vessel and its contents. The report stressed that funds must be available for the conservation of all artifacts and their continued preservation and maintenance. The conservation of the vessel itself presented the problem of treating wood and iron simultaneously. Unless the vessel was completely dismantled, a method for conserving iron and wood simultaneously would have to be developed.¹²⁰

The report identified seven distinct phases necessary for the successful salvage, preservation, and display of *Tecumseh*. These included the following:

- 1) A detailed feasibility study.
- 2) Removal and preservation of the vessel's artifacts.
- 3) Raising the vessel.
- 4) Moving the vessel to its ultimate site or to an intermediate site.

- 5) Preserving the vessel after salvage.
- 6) Restoring the vessel to its original appearance or to some acceptable facsimile.
- 7) Operating the vessel as a tourist attraction.¹²¹

It indicated that no study had been completed to date that showed the feasibility of phases two through seven. Such a feasibility study must be completed before any salvage effort could begin. "The salvage, preservation, and display of the U.S.S. *Tecumseh* should be viewed as a self-sustaining, income-producing investment." It was estimated that it would cost approximately \$10 million to raise and display *Tecumseh*, including from \$500,000 to \$1 million for the feasibility study, and several hundred thousand dollars annually to maintain the site. However, income, development costs, and operational expenses could not be determined at the time because of the many unknowns. The unknowns would be answered by an extensive technical and economic feasibility study. The report recommended that if the study revealed a questionable probability of success, the ironclad "should remain undisturbed until salvage and preservation techniques are more advanced."

The Friend Report concluded that a more thorough study was needed, and it convinced those involved of the necessity of adequate funding and planning for the recovery and restoration. Despite the pessimistic forecast of the Friend Report, WTMC believed that with the impetus of the Bicentennial, adequate funds could be raised nationwide to successfully complete the project. WTMC was in complete agreement with the report's recommendation for a comprehensive feasibility study and had earmarked nearly \$500,000 for the purpose. The only obstacle delaying the initial fund raising, and thus the feasibility study, was the transfer of the vessel's title to a designated state agency. Although they had already spent a considerable amount of money and resources, WTMC was unwilling to begin a full-scale fundraising campaign until contracts were made with an Alabama agency holding title to the vessel.¹²²

On February 6, 1975, Governor Wallace, in a letter to GSA, formally requested the transfer of *Tecumseh* to the Alabama Department of Conservation and Natural Resources. He advised that the Division of State Parks, Monuments and Historical Sites would make a report as to the practicality of recovering the ironclad. The formal request for the transfer of title brought new life to the

stagnant project. WTMC officially submitted its recovery proposal to the Department of Conservation and Natural Resources and requested that they be given exclusive authority to raise funds as soon as the title was received. Time was becoming critical with less than a year and a half to the initial recovery date. At this same time, WTMC asked Palmer and Baker Engineers, Inc. to submit a comprehensive recovery proposal.¹²³

The early months of 1975 were encouraging for those involved with the project. *Tecumseh* was placed on the National Register of Historic Places May 15. The seemingly simple task of transferring a piece of paper from a federal to a state agency was all that was needed to begin the recovery process. Unfortunately, the second attempt to recover the ironclad ended in a dispute over liability. In drawing up the transfer agreement, GSA made several provisions which WTMC and the State of Alabama considered unrealistic. Foremost among these was an indemnification agreement in which the state would be liable if the project failed. Considering the estimated costs of the project provided by WTMC and the Friend Report, GSA set a maximum liability of \$10 million for the project. State officials and WTMC considered this amount excessive and unacceptable. Wheeler worked through the summer to bring the two agencies together without success. In a letter to Wheeler dated August 12, 1975, GSA stated that they did not believe that "the best interest of the United States in preserving *Tecumseh* would be served by awarding a contract to a state that was unwilling to accept any responsibility with respect to the project." This impasse could not be resolved and the Bicentennial passed with *Tecumseh* still mired in mud and controversy.¹²⁴

SITE INVESTIGATIONS SINCE 1977

There have been nine officially sanctioned surveys of *Tecumseh* since 1967. The Smithsonian project had the greatest impact on the site and yielded the single largest body of data that we have on the wreck today. Wood and metal samples were taken from the hull for analysis and approximately thirty artifacts were removed. Four holes were cut in the vessel by the Smithsonian divers. Two small samples were taken for diagnostic purposes to determine the condition of the iron hull, and two were cut to provide access to the interior of the ship. Using a twelve-by-twelve-inch template the divers cut out one section high on the starboard hull in the

area of the engine room. Another cut was made on the B strake approximately thirty-five feet aft of the battle-damaged area. These were sealed with sixteen-inch-square, 3/8-inch plates backed with one-quarter-inch gum rubber gaskets. A larger hole was cut between frames 41 and 43 to allow access to the engine room, and the torpedo-damaged area was enlarged to allow entry into the blower compartment beneath the turret. A twelve-by-eight-foot, 3/16-inch, rubber-backed plate was bolted over the latter hole. In addition to these, four other holes were found during the project. Their origins are unknown at this time, however, it is possible that they are through-hull apertures (water intake and discharge or steam blows) or cannonball damage. In all, eight closure plates were placed on the hull.¹²⁵

In the fall of 1977, the Gulf Coast Archaeological Society (GCAS) of Mobile, conducted a survey of *Tecumseh*. Their purpose was to “accurately plot the position of the vessel, determine the condition of the hull,” and conduct a “training exercise for the divers who are involved in the underwater archaeological programs of the society.” During this brief project, GCAS found a large area of the starboard turn of the bilge exposed above the bottom. This area was 100 feet in length and 30 feet wide, extending as far down as, and including, the starboard armor belt. They observed little or no marine fouling, however, the hull was reported as “badly wasted, [with] numerous holes (some one foot or larger in diameter).” The holes were filled

with sediment. This report was filed with the Alabama State Historic Preservation Office in Montgomery.¹²⁶ (Figure 50)

In 1985, archaeologists with the contract firm of Espy, Huston & Associates of Austin, Texas, (EHA) conducted a cursory examination of *Tecumseh* at the request of the U.S. Army Corps of Engineers, Mobile District, prior to widening the Mobile ship channel. The divers found the same area of the turn of the bilge exposed and, although no measurements were taken during the survey, the size was considerably smaller than that reported during the GCAS survey. During this examination, they discovered three holes in the hull. Two were small openings of less than six inches in size. The third hole, not previously reported, was much larger, approximately fourteen inches wide by twenty inches high, and appeared to have been cut with a torch. A metal stake or reinforcing bar (commonly called rebar), with a line attached, was wedged in the hole. This line ran out of the hole and along the hull. The divers followed this line for several yards before it disappeared into the bottom. They estimated about three feet of sediment over the hull in this area. Fanning the sediment to uncover the line, they found a blue plastic bag, and less than six inches below the surface, the corner of what was described as a “rubber mat.” The rest of the mat lay beneath the sediment, presumably with the end of the line. Their video tape indicated that the holes lie in a line along the hull covering twenty to thirty feet. If the compartments exposed by this entry were clear or lightly silted, they have since filled with sand and debris. The lack of concretion along the edge of the hole, and the excellent condition of the lines, indicates that the intrusion was recent.¹²⁷

In the summer of 1991, Rod Farb, a commercial underwater photographer, and founder of the Farb Monitor Expedition, applied for and received a permit from the NHC to conduct a nondisturbance survey of the *Tecumseh* site. Once again, the hull, along the turn of the bilge, was exposed. This time the exposed area measured seventy feet by ten feet. Farb described the wreck as covered with a thin layer of sand over a deeper layer of river mud. He reported three holes cut into the hull, probably in the stern. These holes were described as “irregular squares...cut with welding rods,” approximately one foot in diameter. Farb also found a rebar and lines in one hole identical to that reported during the 1985 survey, although the sizes of the holes do not correspond. One of the other holes contained the remains of a “double layered plastic garbage bag” which Farb theorized was an attempt to prevent the

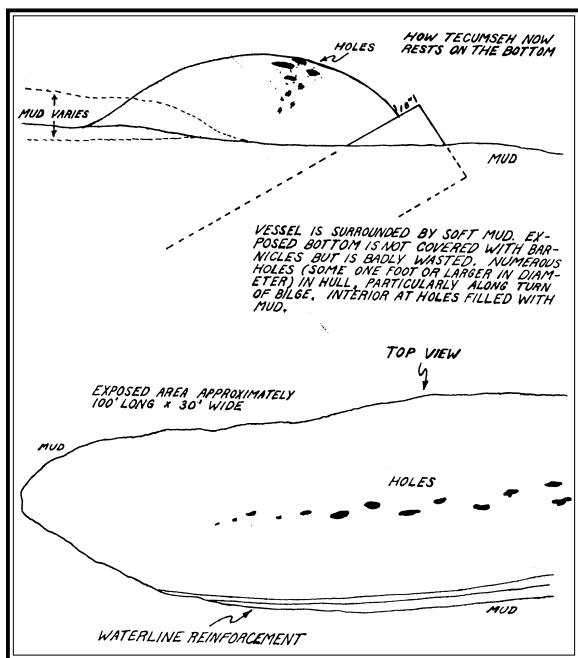


Figure 50. Gulf Coast Archaeological Society survey of *Tecumseh* - October, 1977. (Sidney H. Schell)



Figure 51. Sonogram signature of exposed remains of *Tecumseh*. (East Carolina University)

area from filling with mud. All the openings were filled with sediment. The survey was videotaped, however, no measurements were taken and a drawing was not produced. A brief report on the expedition was filed with the Naval Historical Center.¹²⁸

The most recent investigation of the site was conducted in October of 1993 by archaeologists from East Carolina University's Program in Maritime History and Underwater Archaeology. (Figures 51-53) Funded by the National Park Service's American Battlefield Protection Program, the ECU group conducted a Phase I survey of the remains of three participants of the battle of Mobile Bay: *Tecumseh*, USS *Philippi*, and CSS *Gaines*. This survey found *Tecumseh* in the same condition as reported by

earlier surveys, including low visibility, strong currents, and several holes along the exposed turn of the bilge. The large torch-cut hole with rebar and lines was located and drawn. Early in the survey the exposed area measured approximately eight to ten feet long. After two days of strong northeasterly winds, the divers reported this area had enlarged to approximately sixty feet. Two additional small holes were found sixty feet northwest of the large hole in this newly exposed area. The archaeologists believed these were also torch cut, and all the openings were filled with sediment. As with the previous expeditions, the iron hull was reported to be in very good condition. The exposed area was covered by a calcareous crust and only nominal surface deterioration was present. They reported only superficial marine fouling that suggests that this

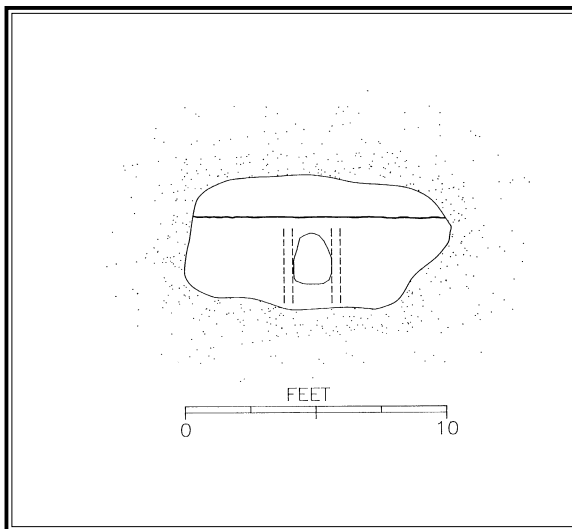


Figure 52. Plan of exposed area of *Tecumseh*'s hull showing torch-cut hole below fore and aft hull strake seam. (East Carolina University)

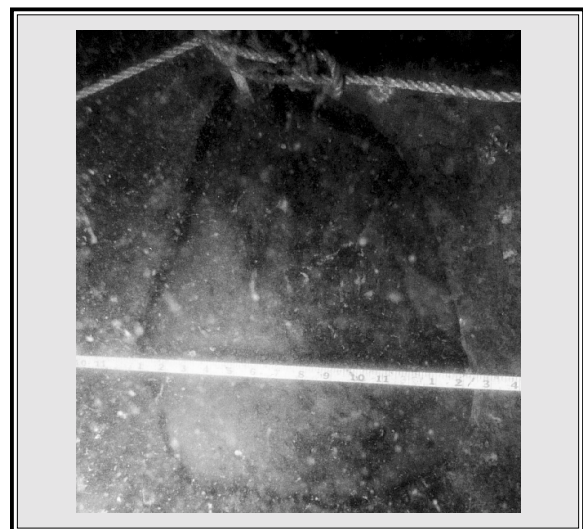


Figure 53. Photograph of torch-cut hole in the hull of *Tecumseh*. The hole is filled with sediment and its exact location is unknown. (East Carolina University)

area is not always exposed to the water column.¹²⁹

Collectively, the data recovered during these surveys have raised as many questions as they have answered. With the exception of the battle-damaged area and the plate cut at frame 42, the locations of the numerous holes examined over the last twenty-six years are unknown. Generally we know that they are on the starboard side of the hull and aft of the turret. Bathymetric data indicates, and each survey has concluded, that the ship lies lower at the bow and therefore the exposed area is along the turn of the bilge before the aft perpendicular. (Figure 54)

The varying size of the exposed area indicates that the site is greatly affected by environmental conditions. The 1977 GCAS survey provides some insight into the dynamics of the siltation process of the wreck site. Their project was just three weeks after Hurricane Babe came ashore at New Orleans and moved northeast over Mississippi and Alabama, producing strong northwesterly winds in Mobile Bay. After two days of high northeasterly winds during the ECU survey, the exposed area enlarged from approximately eight to nearly sixty feet in length. These reports raise questions about depositional patterns at the site and the frequency of desilting and size of the area exposed.

The EHA survey in 1985 yielded the most conclusive evidence of unauthorized site disturbance to date. Although there is no way of determining exactly when the large cut was made in *Tecumseh's* hull, the condition of the hole, rebar, and lines, and their absence from the 1977 GCAS site report, indicate that it occurred after this survey. Additionally, the rubber mat is an interesting, although disturbing discovery. As noted earlier, the Smithsonian divers bolted closure plates over the numerous holes in the hull, including those cut for samples. As a protective buffer, 1/4-inch rubber pads, or gaskets, were placed between the hull and the plates. If this is a gasket lying loose under the sediment it can only mean that at least one closure plate has been removed.

The discovery of the torch-cut hole in the hull of *Tecumseh* has finally succeeded in raising the awareness of federal, state, and local officials to the many threats to the site, both man-made and natural. In terms of preservation, we are perhaps fortunate that she capsized while sinking, as this low profile aided the subsequent burying process. Had *Tecumseh* lain exposed on the bottom since the war, would she have survived the forces of nature and the

salvager's art? Probably not. The sand/silt mixture of the bottom provides an anaerobic environment excellent for preservation and there is no doubt that the sediment surrounding and filling the vessel provides the optimum conditions for *in situ* preservation. The site, however, has reached an uncertain equilibrium and the current course of management, at best, falls under the option of "benign neglect."

PREVIOUS SHIP RECOVERY PROJECTS

Today's cultural resource managers have the advantage of "lessons learned" from the growth of preservation planning for submerged sites. The successes and failures of the innumerable shipwreck recovery projects over the last forty years provide a blueprint for preservation planners and managers contemplating the options for their sites.

There are only a small number of historic shipwreck recovery projects that could be called a success today. All of them are in Europe and *Vasa* is probably the best example. Nine extant Viking ships have been recovered and preserved in museums in Scandinavia. The first of these was discovered in 1867 and the last in 1970. The five ships of the Roskilde, Denmark collection were excavated within a dry cofferdam by student archeologists in 1962.¹³⁰

There are a number of examples of the successful excavation and preservation of artifact collections from shipwrecks. In many cases there was an extraordinarily large amount of material recovered. The seventeenth-century Swedish warship *Kronan* capsized and exploded during an engagement in 1676 littering the sea floor with wreckage. Her remains were found in the cold depths of the Baltic Sea in 1980, and archaeologists have since recovered an amazing collection of well-preserved material. (Figure 55) The steamboats *Bertrand* and *Arabia* were both wrecked on the Missouri River in the mid-nineteenth century. Eventually left under dry land by the meandering river, their excavations yielded more than one million artifacts. (Figure 56) A contemporary, although smaller collection of material has recently been excavated from the wreck of the side-wheel steamer *Maple Leaf* in Florida's St. Johns River. Under charter to the U.S. Army, *Maple Leaf* struck a torpedo and sank with a large cargo of military camp equipment and baggage in April 1864. The most notable examples, however, of the successful



Figure 55. The cold, brackish waters of the Baltic Sea have aided in the remarkable preservation of wooden carvings from the 17th-century Swedish flagship *Kronan*. (Courtesy of Kalmar County Museum)

recovery of both artifact assemblages and hull structure are *Vasa* and *Mary Rose*.¹³¹

On April 24, 1961, the seventeenth-century Swedish warship *Vasa* was raised from the cold

depths of Stockholm harbor. She emerged completely intact from the upper gundeck down to the keel. The hull was cleared of mud and the artifacts were slowly recovered and sent into conservation. Approximately 20,000 items were



Figure 56. Aerial view of the steamboat *Bertrand* excavation, Missouri River, Nebraska, 1969. (National Park Service)



Figure 57. 17th-century Swedish flagship *Vasa* floating on her own keel after recovery, Stockholm, 1961. (Vasamuseet)

removed from *Vasa* for conservation. This did not include a nearly equal number of wooden components of various sizes. The hull was subjected to 24-hour spraying of a polyethylene glycol (PEG) and water solution for seventeen years. In her museum setting today, *Vasa* is in a fragile condition requiring constant controls over humidity, temperature, and lighting in a specially constructed facility.¹³² (Figure 57)

The only other project equal in magnitude to *Vasa* was the recovery of *Mary Rose* in 1982. *Mary Rose* was built at Portsmouth, England, in 1509 for King Henry VIII. While maneuvering to engage a French invasion fleet, she capsized and sank in the Solent, off Portsmouth in July 1545. After her

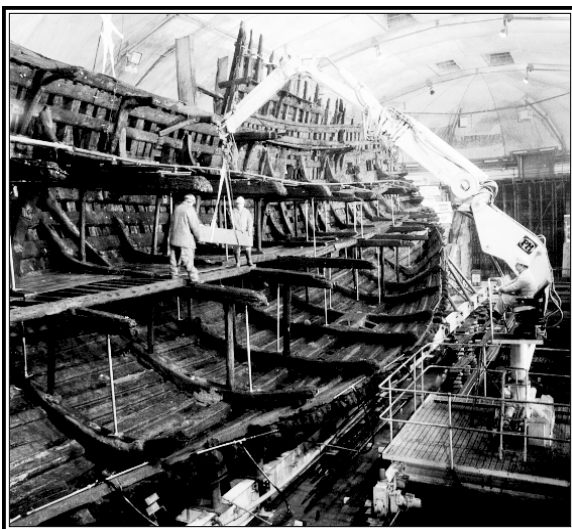


Figure 58. Two 1000-meter cranes are used to handle the placement of timbers and other large structural components of *Mary Rose*. Personnel baskets enable two staff members to work from each crane in safety. (*Mary Rose* Trust)

rediscovery in 1971, an eleven-year project ensued to excavate, document, and recover her remains. Unlike *Vasa*, less than half of *Mary Rose* remained intact. The partial remains of four decks on her starboard side are all that have survived. Numerous ideas were discussed on the proper method to raise the hull. Since she could not be floated like *Vasa*, it was decided that all the contents would be removed and the hull lifted into a custom designed steel support cradle. As with *Vasa*, 24-hour a day spraying was necessary to preserve the hull fabric until conservation procedures could begin. Since the recovery, conservation of the artifacts and starboard hull section has been continuous. More than 16,000 artifacts were recorded and brought ashore for conservation. These remains are exhibited in a climate-controlled building entered through double-airlock doors.¹³³ (Figure 58)

What can we learn from the dramatic losses resulting from ill-conceived and underfunded recovery efforts? Examples are on daily display at museums and parks around the country. USS *Cairo* is the most well-known case from the Civil War ironclad salvage attempts of the 1960s. *Cairo* was lifted with a cable method similar to *Vasa*. However, the weight of the vessel and its contents (iron plate, propulsion machinery, armament, artifacts, and river mud), caused the cables to cut deeply into the hull amidships, and severed a portion of the stern. Hundreds of artifacts and structural components spilled into the river and were lost. Exhibited outside, with inadequate conservation, *Cairo* has deteriorated to a disturbing extent. Less than 10% of the structural components recovered remain undamaged. (Figure 59) Other Confederate gunboats such as CSS *Neuse*, *Jackson*, and *Chattahoochee* suffered similar fates.

In March of 1865, CSS *Neuse* was burned and scuttled by its crew in the Neuse River during the evacuation of Kinston, North Carolina. *Neuse* was one of the smaller casemated rams built by the Confederates for operations in the shallow rivers of eastern North Carolina. Although her location was known to many locals, she lay undisturbed in the river bank until 1961. A three-year effort to salvage the ironclad resulted in the destruction of most of the surviving hull structure. To facilitate the transfer of the vessel to its new museum location, the hull was cut into three sections with chainsaws. *Neuse* was reassembled and placed in an outdoor display. An open-air shelter was erected over the remains five years later. Approximately 15,000 artifacts were recovered during the project, representing one of the largest collections surviving from a Confederate



Figure 59. Partial restoration of stern section of USS *Cairo* at Pascagoula, Mississippi, 1965. (Smithsonian Institution)

naval vessel. Today, the remains of *Neuse* are suffering from more than two decades of exposure to the elements and dry rot has infested most of the hull.¹³⁴ (Figure 60)

CSS *Jackson* was a twin-screw ironclad launched at Columbus, Georgia, in December 1864. She was captured and burned by Union troops in April 1865. Her remains, thought initially to be those of *Chattahoochee*, were found partially

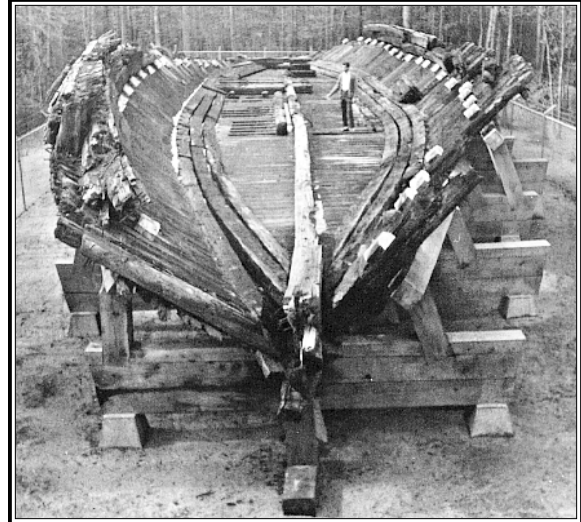


Figure 60. CSS *Neuse* shortly after her recovery and as she looks today, with the addition of an open-air shelter. (North Carolina Department of Cultural Resources)

buried in the river bank in 1960. The wreck was recovered in two sections and has been on outdoor display at the Confederate Naval Museum in Columbus since that time. (Figure 61) CSS *Chattahoochee*, a wooden sidewheel gunboat, was built on the Chattahoochee River in 1862-1863. *Chattahoochee's* innocuous service ended when she was burned by the Confederates during the evacuation of Columbus on April 16, 1865. The gunboat was located by the Corps of Engineers during dredging operations in the early 1960s, and a salvage effort was mounted to recover the remains. Once again the cable method was employed to lift the vessel out of the river. As with *Cairo*, her stern, including the motive machinery, was severed from the hull and recovered. This section was placed on

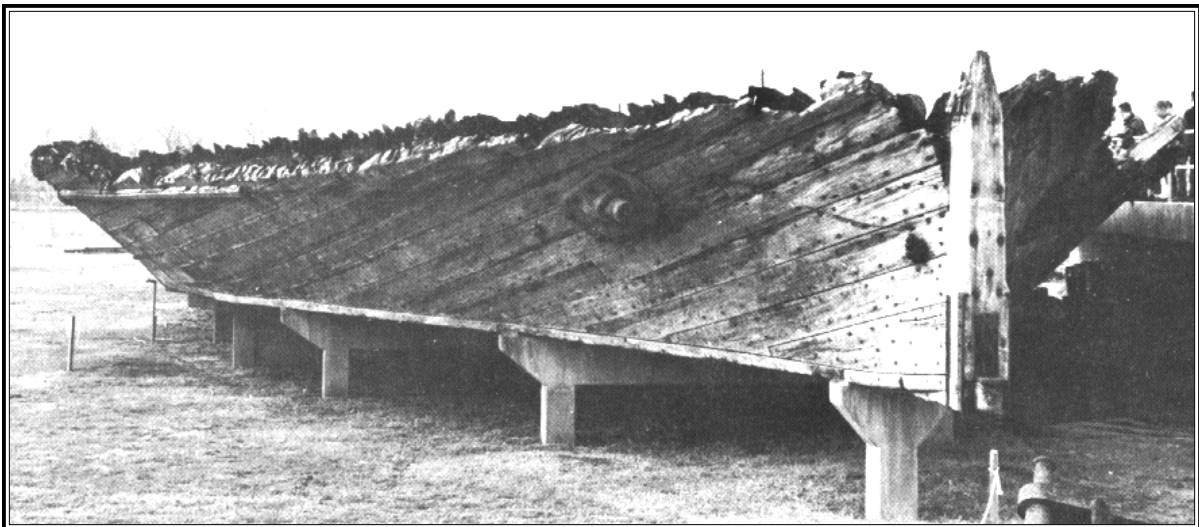


Figure 61. Stern view of the remains of CSS *Jackson*. (Confederate Naval Museum)



Figure 62. Machinery and hull remains of CSS *Chattahoochee*. (Confederate Naval Museum)

outdoor display at the Confederate Naval Museum where it remains today. (Figure 62) The small portion of surviving hull fabric of these two ships are found in the same deteriorating condition as the other Civil War-era gunboats receiving little or no conservation in an outdoor environment.¹³⁵

Perhaps the saddest tale told, and the most important lesson learned, is the fate of *Alvin Clark*. *Alvin Clark* was a topsail schooner built on Lake Michigan in 1846. In June 1864, she capsized during a squall off Door Peninsula, in Green Bay, Wisconsin. One hundred and three years later *Alvin Clark* was found by a fishing trawler's net, perfectly preserved, with her masts and rigging still standing. A local diver obtained the rights to the wreck and *Alvin Clark* was raised in 1969 with no thought at all given to its conservation. On the surface, the perfect state of her preservation was even more evident. She was a time capsule from the day of her loss. A plastic shed was built over the ship and live steam was circulated to provide a controlled-drying atmosphere. After drying, she was painted with raw linseed oil. The owners set her up in an outdoor display as a tourist attraction. By 1990, the combination of outdoor exposure and no conservation funds had reduced *Alvin Clark* to a ruined hulk.

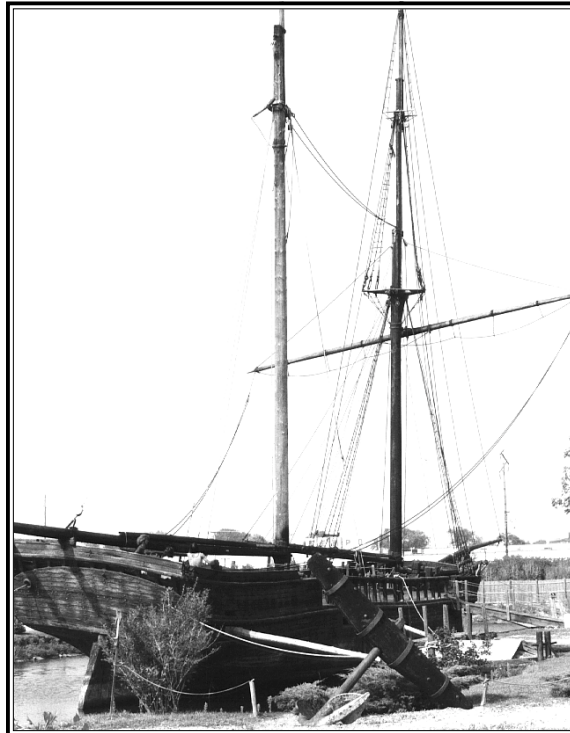
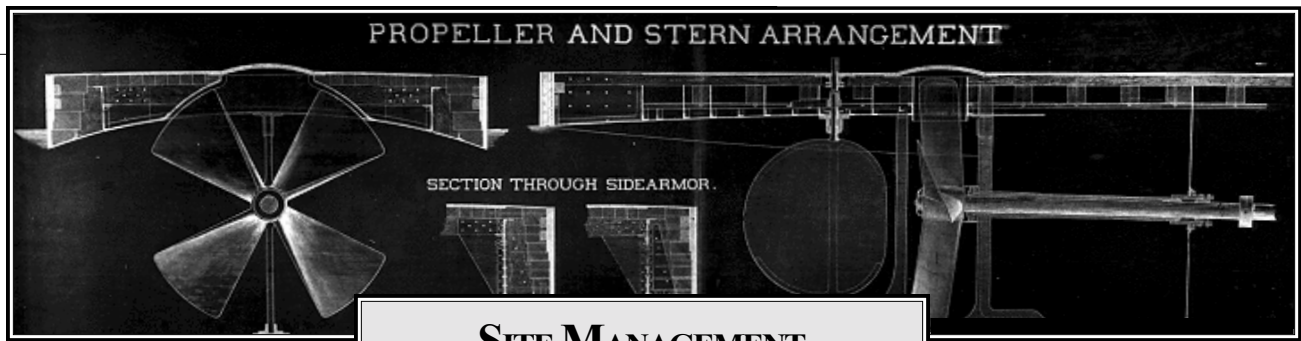


Figure 63. *Alvin Clark*, ca. 1979. (Wisconsin Maritime Museum)

In 1994, the only surviving example of a nineteenth-century Great Lakes merchant schooner was destroyed.¹³⁶ (Figures 63-64)



Figure 64. *Alvin Clark*, ca. 1994. (Wisconsin Maritime Museum)



MANAGEMENT AUTHORITY

In April of 1993, the Director of Naval History formally requested and received the transfer of custody of *Tecumseh* from the General Services Administration to the Department of the Navy. Since the time of the attempted sale of the vessel by the Treasury Department in 1873, the question of ownership or accountability was vague and remained unresolved through the turn of the century. In 1901, the wreck was deemed unsalvageable by the Navy Judge Advocate General (NJAG) who considered it “abandoned..., so far as its further use for naval purposes,” and that “its disposition would seem... to be cognizable by the Secretary of the Treasury.” Custody resided nominally with the Treasury Department until the creation of GSA in 1949. During the time of the centennial of the American Civil War, a “salvage fever” infected the countryside with disastrous results. Several private organizations recovered sunken warships in Mississippi, Georgia, and North Carolina, and what remains of these once mostly-intact wrecks provides a cautionary tale.¹³⁷

Tecumseh did not escape the attention of would-be salvagers. In 1965, a group in Mobile, Alabama, expressed an interest in raising and exhibiting *Tecumseh*. GSA could legally sell the vessel to qualified salvagers if they provided for the removal and burial of the crew, as stipulated in the Joint Resolution of 1876. The Director of Naval History, Rear Admiral E.M. “Judge” Eller, attempted to intervene through the NJAG office. His overriding concern was that the salvage would be undertaken by “unqualified parties [which] would lead to the destruction and indiscriminate piecemeal disposition of valuable artifacts.” That same year, the Smithsonian Institution expressed an interest in conducting its own salvage and restoration project. Title to *Tecumseh* was temporarily transferred to the National Armed Forces Museum Advisory Board (NAFMAB). This arrangement was satisfactory to the Navy Department as they were unable to commit the assets necessary for the recovery and preservation of the wreck. Unfortunately, in the title

transfer agreement with GSA, language referring to “abandonment of the vessel” by the Navy was included.¹³⁸

The final challenge to the ownership of *Tecumseh* was raised at the outset of the Smithsonian project. A local Mobile businessman claimed to have found the vessel, registered the discovery, and obtained salvage rights from the State of Alabama. The abandonment issue was finally addressed in Federal court in 1967. The prosecution asked for dismissal on the grounds that the Smithsonian, as a branch of the Federal government, cannot be sued. More importantly, he stressed that abandonment of government property requires an act of Congress and no such legislation for *Tecumseh* had been passed. The Court agreed and the case was dismissed in May of 1967.¹³⁹

The advances in the technology of SCUBA diving and underwater remote sensing devices in the last thirty years have put once inaccessible historic resources within the reach of treasure hunters, as well as civic-minded but poorly trained amateur archaeologists. These threats to historic properties throughout the world have caused the Department of the Navy to reassess its policy concerning its own submerged cultural resources. The Director of Naval History, as Curator for the Navy, is responsible for the protection and preservation of historic naval shipwrecks and aircraft. Navy custody of its wrecks is based on the “property clause” of the U.S. Constitution and international maritime law, as well as Articles 95 and 97 of the Law of the Sea Convention. These laws establish that right, title, or ownership of federal property is not lost to the government due to the passage of time. Only by congressional action can government property be declared “abandoned.” Additionally, the Department of the Navy retains custody of all of its naval vessels and aircraft, whether lost within U.S., foreign, or international boundaries through the “sovereign immunity” provisions of Admiralty law. Court cases supporting this doctrine include *Hatteras Inc. vs. the USS Hatteras* (1984) and *U.S. vs. Richard Steinmezt* (1992) (also known as the “Alabama bell case”).¹⁴⁰

As with the National Oceanic and Atmospheric Administration's (NOAA) management responsibilities related to the USS *Monitor* National Marine Sanctuary, the U.S. Navy must comply with the Federal Archeology Program as outlined in Executive Order 11593 and the National Historic Preservation Act of 1966, as amended. Under these provisions, federal agencies are tasked with the management of their cultural resource properties in a way that emphasizes preservation and minimizes the impact of undertakings that might adversely affect them. The Director of Naval History, therefore, is empowered through the following Federal laws and regulations with management responsibilities for all historic navy material:¹⁴¹

- Antiquities Act. (16 U.S.C. 433)
- National Historic Preservation Act of 1966, as amended. (16 U.S.C. 470)
- Archeological and Historic Preservation Act of 1974. (16 U.S.C. 469)
- Archaeological Resources Protection Act of 1979. (16 U.S.C. 470aa)
- Theft of Government Property. (18 U.S.C. 641)
- Abandoned Shipwreck Act of 1987. (43 U.S.C. 2101)
- Documents, Historical Artifacts, and Condemned or Obsolete Combat Material: Loan, Gift, or Exchange. (10 U.S.C. 2572)
- Archaeological Resources Protection Act, Final Uniform Regulations. (32 U.S.C. 229)
- Protection of Historic Properties. (36 CFR 229)
- Secretary of the Interior's Standards for Historic Preservation Projects. (36 CFR 800)
- Abandoned Shipwreck Act Guidelines. (55 FR 50116)
- National Register of Historic Places. (36 CFR 60)
- Determinations of Eligibility for Inclusion in the National Register of Historic Places. (36 CFR 63)
- Recovery of Scientific, Prehistoric, and Archeological Data. (36 CFR 66)
- Curation of Federally-Owned and Administered

Archeological Collections. (36 CFR 79)

- Secretary of the Navy Instruction 4000.35, 8/17/92 on Naval Historical Preservation and SECNAV Instruction 5755.1A, 7/30/92 on Navy Museums.

MANAGEMENT OPTIONS

There are two ships in the United States that share the most in common with *Tecumseh*, in terms of historical context and resource management problems. USS *Monitor* and USS *Arizona* (BB-39) are two of a group of historic American warships that are singularly important in our cultural heritage. Their places in history point to times of social and cultural upheaval in the United States and throughout the world. Each provided a catalyst for technological and cultural changes which had they not occurred, would have led to a very different world from today.

Ironically, *Monitor*, *Tecumseh*, and *Arizona* share a direct descendant line in the development of naval architecture. Even their destinies were intertwined by three dramatic wartime losses, which preserved their remains for study by students and scholars of varied disciplines. Of the three, *Tecumseh* is probably the least well-known. "The Battle of Hampton Roads" and "Remember Pearl Harbor" evoke emotional memories of hard fought battles, heroism, and great tragedy. Unfortunately, "Damn the Torpedoes!" is remembered as a best-selling record album, and the even more obscure, "After you pilot!," is unknown by most Americans today.

USS *MONITOR*

USS *Monitor* lies in 230 feet of water sixteen miles south of Cape Hatteras, North Carolina. She rests upside down and partially buried on a hard sand bottom, with the displaced turret under the port stern. After the identification of the *Monitor* site in 1974, further studies revealed that there was extensive damage to the lower hull and the stern. It was determined that the sinking and natural deterioration processes alone could not account for the amount of damage observed. Research suggests that depth-charging during World War II is the most-likely explanation for the structural loss. *Monitor* was abandoned by the U.S. Navy in 1953. A survey

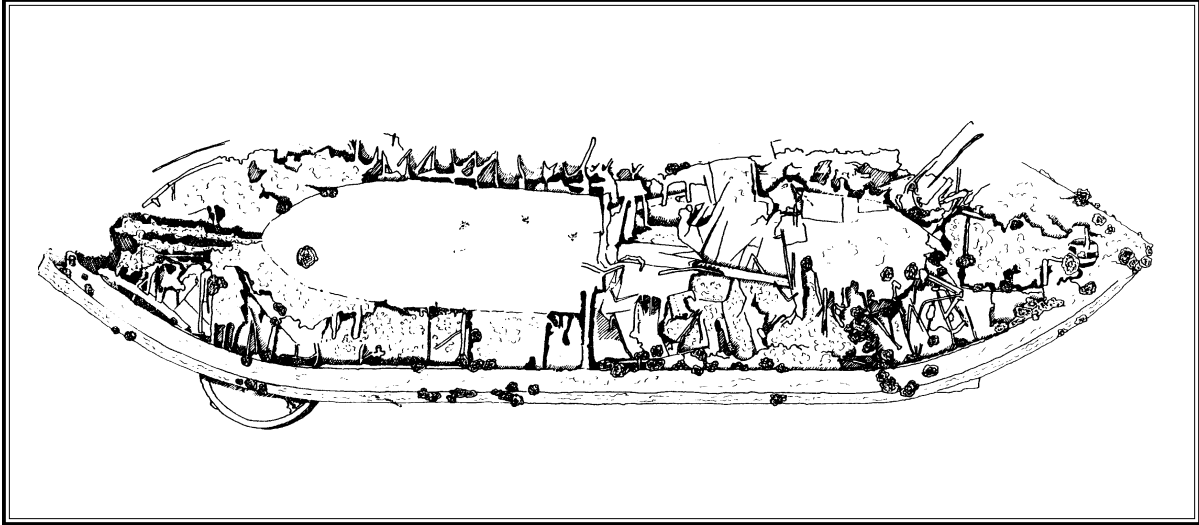


Figure 65. Overhead schematic of the remains of USS *Monitor*. (National Oceanic and Atmospheric Administration)

of state or federal statutes identified Title III of the Marine Protection, Research and Sanctuaries Act of 1972 as the most feasible means of protecting the remains of the wreck. On January 30, 1975, *Monitor* was designated the nation's first marine sanctuary under the jurisdiction of NOAA.¹⁴² (Figure 65)

Since 1975, NOAA has conducted seventeen expeditions to the wreck site. Research objectives included the study of the condition of buried structural remains and artifacts, systematic photography and video taping of the vessel, corrosion studies, sonar and magnetometer surveys, and biological studies of the marine life on the wreck. Recent expeditions to the site have confirmed that sections of the lower hull and stern are collapsing. Damage to the skeg and rudder assembly has caused the propeller and shaft to drop down into the aft overhang. Ongoing research at the site will concentrate on the collection of data that will enable the sanctuary managers to assess options ranging from stabilization to the recovery of selected structural components. Full salvage has been eliminated as an option at this time.¹⁴³

USS ARIZONA

In 1983 the National Park Service (NPS) began a five-year project to document submerged cultural resources within the boundaries of the Pearl Harbor National Historic Landmark. This included an examination of the USS *Arizona* Memorial. With the assistance of the NPS Submerged Cultural Resources Unit (SCRU), and the U.S. Navy's Mobile Diving and Salvage Unit One (MDSU-1) park

managers began a two-year program as part of Project SeaMark to assess the overall condition of the wreck and produce an accurate site map based on archeological surveys. The results of this work have provided Park personnel with a better understanding of the environmental processes at work on the site. Drawings and a detailed model of the wreck were produced as interpretive tools for the general public.¹⁴⁴

USS *Arizona* is located in the shallows of a protected harbor. Although the currents are low, the wreck is affected by the high energy action of boat wakes, wind-driven chop, and tidal cycling. These impacts are observed mainly on the upper hull and superstructure areas. In 1986, the NPS project team began a long-term study of the corrosive processes at work on the site. One hundred and twenty-eight locations, vertical, horizontal, and edged surfaces, were tagged for examination and monitoring. Generally, they observed that marine growth had created a stable hard layer of fouling over most of the hull and superstructure. The most serious deterioration had occurred in the high-energy zone near the surface. The teak decks of the vessel appeared to be in remarkably good condition under several inches of silt.¹⁴⁵ (Figures 66-68)

The problems facing the managers of *Monitor* and *Arizona* are numerous and complex. Questions concern the disturbance of grave sites, the taking of fabric samples for analysis, and the excavation and removal of artifacts or structural components. Should wrecks that have reached a certain level of equilibrium be disturbed by attempts to introduce cathodic protection or artificial structural support? If the wreck site is considered a sacred memorial for

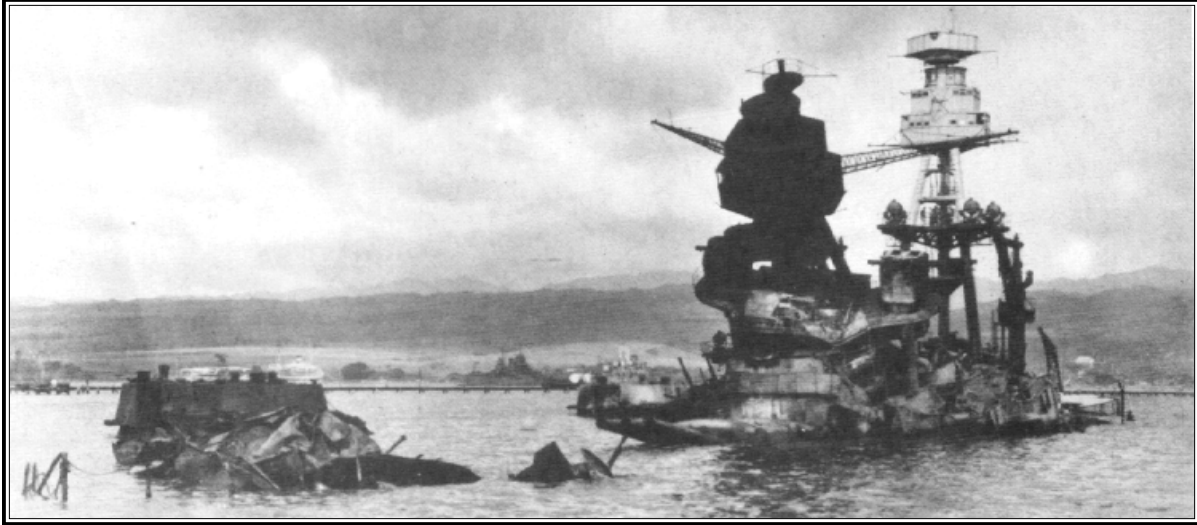


Figure 66. USS *Arizona*, port side looking aft, December, 1941. (National Park Service)

those who perished in the defense of their country, how can their tomb be allowed to deteriorate, and eventually disintegrate? These sets of problems are unique for each site, and some of the questions seemingly have no answers.

Through the years, lively debates have taken place over the options for *Tecumseh*. Resource management has been a minor concern and, in most cases, the only alternative discussed was recovery and display. However, the formulation of management options should focus on the ultimate goals that managers would stress for the site. The primary goal, under any option, is stabilization and preservation of the physical remains. More recently, discussions among a wide variety of cultural resource management specialists have identified

three options, or levels of protection and study for *Tecumseh* which include the following: Preservation-In-Place; Limited Archeological Survey and Excavation; and Full Excavation, Recovery, and Conservation.

OPTION 1: PRESERVATION-IN-PLACE

The status of *Tecumseh* as Navy property and a government-owned wreck was clearly established with the dismissal of Wintzell vs. the Smithsonian Institution, et al., in 1967. However, until the transfer of custody of the vessel from GSA to the NHC on April 26, 1993, no federal agency had provided resource management or protection for the

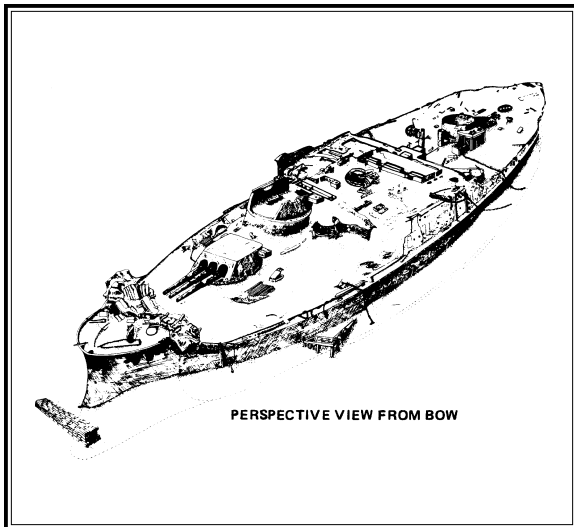


Figure 67. USS *Arizona* by Jerry Livingston. (National Park Service)

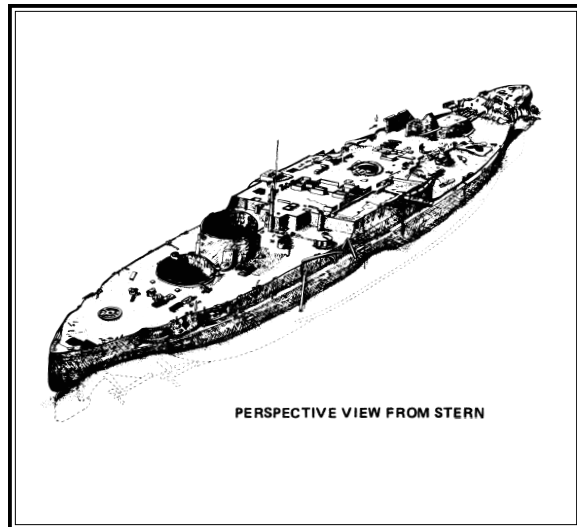


Figure 68. USS *Arizona* by Jerry Livingston. (National Park Service)

site. In the past, nominal security was provided by Fort Morgan State Park. This was specifically restricted to the normal operating hours of the park's staff.

As a result of the Smithsonian's recovery effort, a buoy was placed at the site for the first time since the USS *Huron* survey in 1877. The wreck was added to the NOAA chart with a note in Coast Pilot #5. This note gives the coordinates for the buoy and cautions against, but does not prohibit, anchoring in the area. Many believe that marking the wreck with a buoy and listing latitude and longitude coordinates is too great a temptation for relic hunters. Most watermen and history buffs, often one in the same, know the location of most submerged obstructions and wrecks in their local area. However, these concerns are well founded at sites where the remains of a vessel or historic structure lie exposed on the bottom. At shallow water sites, a SCUBA team operating from a small boat can make several surface collections in a day. The less direct approach used by shell fishermen with buckets and tongs is potentially more damaging to the site and can yield large quantities of artifacts. Several factors, however, preclude this problem with *Tecumseh*. The wreck is intact and lies bottom up; it is 99% buried in bottom sediments; and the buoy does not mark the exact location. Since access hatches on the capsized deck lie nearly twenty feet below the bottom, entry is most directly made through the hull plating. A determined relic hunter would require a dive platform, equipped with surface-supplied air, cutting tools, and dredging equipment to gain entrance into the wreck.

Unfortunately, this is exactly what has happened in the past. For more than 130 years, nature provided the only, and perhaps best, protection *Tecumseh* has received. However, it has not been enough to deter the efforts of determined and unscrupulous treasure hunters. The evidence of unauthorized disturbance of the site is clear-cut. It is now the responsibility of the cultural resources community to move from a passive to an active, perhaps even aggressive, role in the management of this irreplaceable national treasure. In order to make decisions concerning long-term resource preservation and options, a number of short-range goals must be addressed and implemented. These include: site protection, public education, and site monitoring and analysis.

SITE PROTECTION

The *Tecumseh* site is marked with an orange and white Coast Guard buoy. This buoy is a non-lighted 3C type can, which was installed during the Smithsonian project in 1967. The latest NOAA charts for Mobile Bay (Nos. 11376 & 11378) list the buoy as YC "T". A descriptive note for mariners in Coast Pilot #5 identifies the buoy as "The wreck of the Civil War vessel TECUMSEH.... The vessel is reported to be in an unstable condition, and ammunition and powder aboard could be detonated if the vessel shifts. Mariners are cautioned not to anchor in the area of the buoy..." These are the only markers and restrictions for the site.¹⁴⁶ (Figure 69)

The waters off Fort Morgan State Historic Site are a high traffic area. Recreational boating and



Figure 69. *Tecumseh* buoy, YC "T". Fort Morgan is in the upper right.

fishing occurs all around the site, and commercial shipping passes only a few hundred yards west of the buoy. As mentioned previously, security for the site has been minimal. Nominal surveillance is provided by the staff at Fort Morgan and is strictly limited to their daylight hours of operation. If the staff observes a vessel anchoring near the buoy, their single option is to call local law enforcement offices, including the Coast Guard. However, with no official enforcement mandates in place, these agencies are either unable or unwilling to respond. (Figure 70)

In an effort to address this problem, important contacts have been established with local maritime officials, which hopefully will develop into partnerships for the protection of submerged cultural resources statewide. These organizations include U.S. Coast Guard Group Mobile, U.S. Coast Guard Aviation Training Center Mobile, the Alabama Marine Police, and the Mobile Bar Pilots Association. Each of these groups can offer mission-specific assistance, which will be invaluable to the overall protection plans for *Tecumseh*.

U.S. Coast Guard Base Mobile serves as home for Coast Guard Group Mobile (CGGM), Station Mobile (CGSM), Aids To Navigation Team (ATON), and the cutters *Chincoteague*, *Cushing*, *Sweetgum*, *Saginaw*, *Axe*, and *White Pine*. Base Mobile provides support for Coast Guard cutters and small boats, overhaul and fabrication for aids to navigation, and construction kits for the maintenance of the waterway systems, and command and control for Group Mobile. Group Mobile is responsible for 400 miles of coastline from Biloxi,

Mississippi, to St. Marks, Florida, and 1,300 miles of navigable river systems including the Mobile and Alabama rivers. The Group's primary missions are Search and Rescue (SAR), Marine Environmental Protection (MEP), Enforcement of Maritime Laws and Treaties (MLE), and Aids to Navigation. Additionally, they assist Coast Guard Aviation Training Center Mobile with small boat support for fixed-wing and helicopter training programs, and Coast Guard Marine Safety Office Mobile with the enforcement of security zones and pollution spill response in the central Gulf area. The Group also operates a SAR team at Dauphin Island during the summer months.¹⁴⁷

The Coast Guard Aviation Training Center Mobile (CGAT) was established in 1966 to provide standardized pilot and crewmen training for fixed and rotary-wing aircraft. It is the largest air unit in the Coast Guard and supports the Eighth Coast Guard District missions, which include SAR, MEP, and MLE. Training flights routinely fly in and out of the bay at Mobile Point. The Center's operations division has agreed to assist with surveillance of the *Tecumseh* buoy during the course of normal operations.¹⁴⁸

The Alabama Marine Police (AMP) is a division of the State Department of Conservation of Natural Resources. The Division provides boating and public safety services through a comprehensive program of enforcement and public education. Specific functions include the establishment and overview of a waterway hazard and control marking program, assistance to local, state, and federal officers related to maritime and waterways

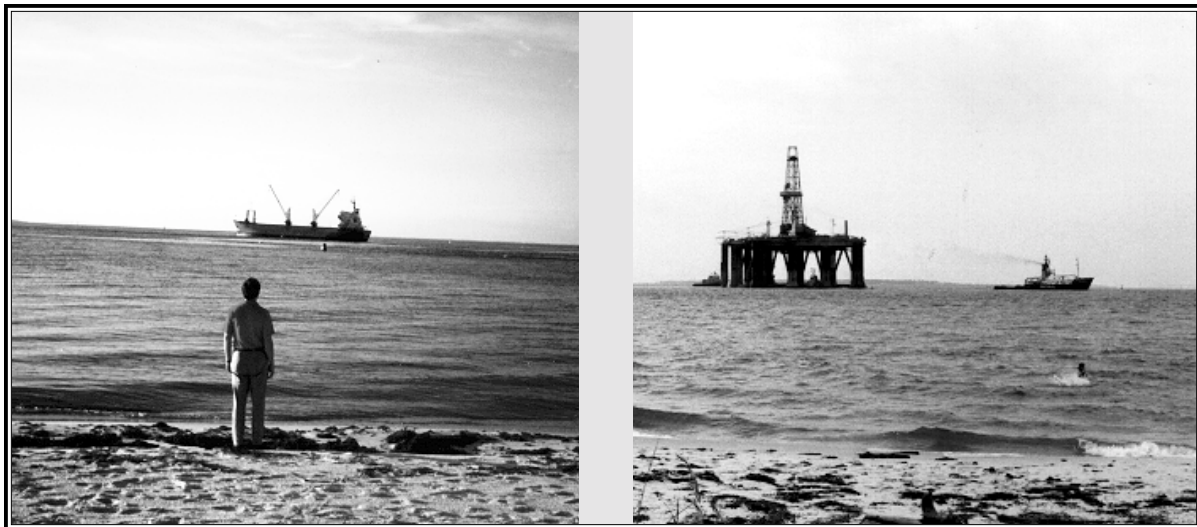


Figure 70. Two examples of marine traffic anchored near the *Tecumseh* buoy. (John H. Friend & Ft. Morgan State Historic Site)

smuggling and drug interdiction, recovery of stolen property (boats, motors, and accessories), search and rescue, and special details (Amtrak disaster). A district office with two SAR patrol craft, recently opened in the lower bay at Alabama Point (Perdido Pass). Bill Garner, Director of the Marine Police Division, has agreed to assist with surveillance of *Tecumseh*. Until such time as a formal agreement is reached between the NHC and the appropriate state and federal administrators in Alabama, Mr. Garner has made the new office available as the first point of contact for requests of assistance at the site.¹⁴⁹

The Mobile Bay Pilots Association (MBPA) was formally organized after the Civil War. Captain Sidney Dorgan, Association President, is a descendant of the original bay pilots licensed after statehood in 1819. Based at the Dauphin Island Marina, the Association operates with twelve pilots and two pilot boats to guide shipping to and from the Mobile Ship Channel. In 1994, 2,261 vessels were piloted through Mobile Bay. The frequency and varying times of day that the pilot boats pass Mobile Point and the *Tecumseh* buoy, affords a perfect opportunity for additional surveillance. Captain Dorgan has agreed to help in this endeavor.¹⁵⁰

In order to provide law enforcement officials with a clear statutory authority for arrest and prosecution of unauthorized activity at the site, it is necessary to designate a no-anchoring zone at the site. This can best be accomplished by the establishment of a Regulated Navigation Area (RNA). An RNA is described in 33 CFR 165.10 as “a water area within a defined boundary for which regulations for vessels navigating within the area have been established...” Vessels may transit the area but will not be allowed to stop or anchor within the RNA. Additionally, no swimming or diving will be allowed within a 100 yard radius of the *Tecumseh* buoy. (Figure 71) Requests for an RNA are sent to Commander Eighth Coast Guard District, New Orleans and, upon approval, notifications may be made through the local notice to mariners, marine broadcasts, and publication in the *Federal Register*. Coast Pilot #5 and the NOAA charts should be changed to reflect the new navigation restrictions. Additionally, a three-sided sign should be placed on the buoy to identify this as a restricted area.¹⁵¹ (Figures 72 & 74)

The size of the proposed RNA will impact on an existing area designated, “Anchorage For Explosives” (AFE) due north of the *Tecumseh* site. This large (1,500 yard diameter) AFE was first established in 1940 to secure vessels during the “lading and

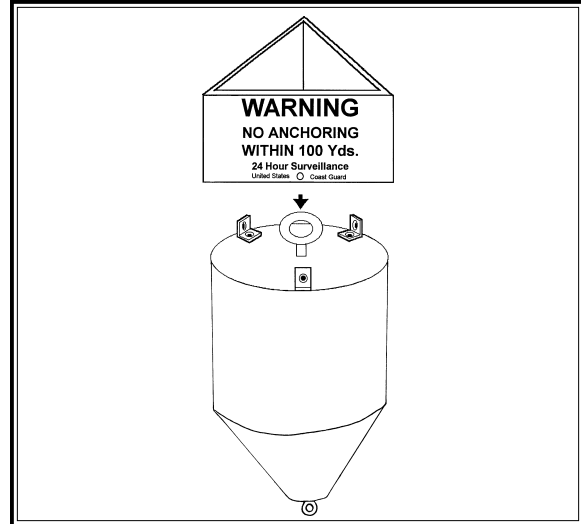


Figure 72. Warning sign for Regulated Navigation Area (RNA) placed on *Tecumseh* buoy. (Todd Croteau)

discharging of explosives or inflammable material or other dangerous cargo...” (Figure 73) According to Captain Dorgan (MBPA), the area has not been used as this type of anchorage since the war. In 33 CFR 110.194 (2) it states, “No vessel shall occupy this anchorage without obtaining a permit from the Captain of the Port.” Both the Captain of the Port and the Harbormaster for the Port of Mobile agree that this area is not utilized for its intended purpose and support the proposal to have it removed in conjunction with the establishment of the RNA.¹⁵²

Although we do not know who, when, or how, it is possible that the damage to *Tecumseh*'s hull was done at night. The presence of waterway traffic and state park personnel would be a deterrent to daylight



Figure 74. Buoy placed by Coast Guard and U. S. Navy to mark and protect site of *U-1105* in the Potomac River, Maryland. (Maryland Historical Trust)

looting operations. Therefore, the installation of automatic surveillance equipment at Fort Morgan will greatly enhance our ability to protect the site at night. A high resolution closed circuit camera system mounted at the fort will provide 24-hour surveillance in concert with the Mobile Bar pilots and GCATC training flights. The system would include a high resolution camera with zoom lens, infrared illuminator for night viewing, monochrome monitor, and a time lapse VHS cassette recorder. These systems are available at a cost of \$8,000 to \$10,000.¹⁵³

PUBLIC EDUCATION

Over the past ten years, public awareness of shipwrecks and other maritime disasters has never

seemed higher. Perhaps beginning with the *Mary Rose* recovery, it has continued to escalate with the high-profile discoveries of the *Titanic*, *Bismarck*, and *Lusitania*. In the past year, cable television appeared almost top-heavy with shows entitled, "Pirates," "Shipwrecks," "Discoveries Underwater," and "Treasure Hunters." Several of these programs promote responsible practices, and in some cases an archaeological approach to diving on sites. Unfortunately, many are nothing more than training videos for promoting the destruction of publicly-owned sites and causing irreversible damage to our knowledge of the past. With the rapid growth of the sport diving community, such shows could simply encourage looting.

It is important that we are at the forefront of education and training to enhance public awareness

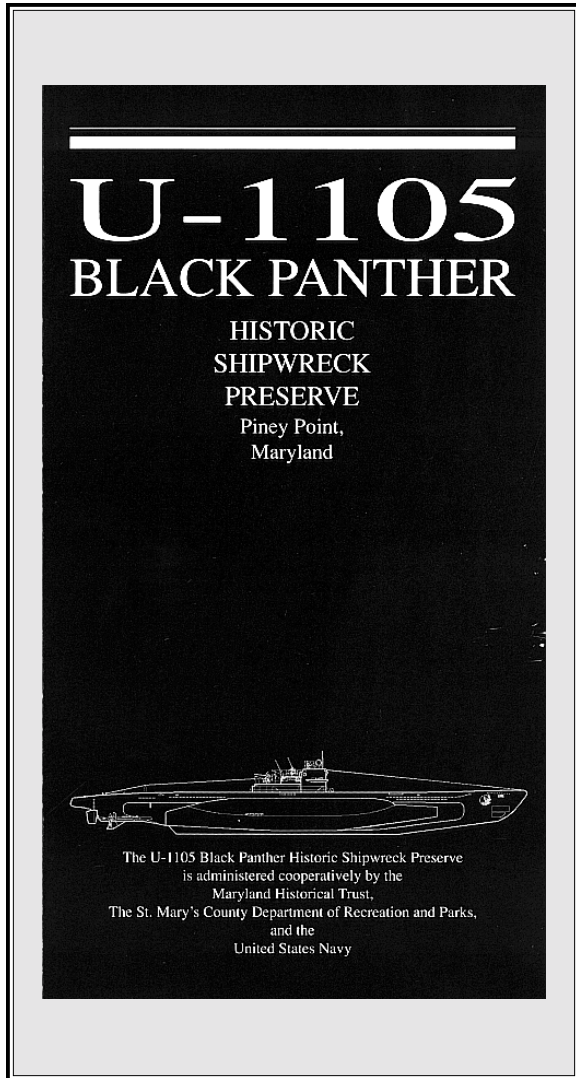


Figure 75. Educational brochure produced cooperatively by the Maryland Historical Trust and U. S. Navy.



Figure 76. Educational brochures produced cooperatively by Panamerican, Inc. and the U. S. Navy.

and understanding of the importance of all facets of resource protection. The *Tecumseh* site provides an ideal opportunity to accomplish some of these goals. Permanent and traveling exhibits incorporating models, artifacts, and illustrations are useful as visual tools to explain the wreck and its environment. These displays can reach a diverse audience at schools, universities, civic centers, and historical societies throughout the local region. Historical and archeological presentations and workshops to area boating and diving groups (Power Squadron, Bay Watch, Coast Guard Auxiliary) help to promote a better understanding of the site and the laws that protect it. These relationships can foster a spirit of volunteerism and public support, which can be invaluable to underfunded and understaffed resource protection programs.

Through the publication of informative brochures and booklets, the public will have a better understanding of the importance of cultural resource management throughout the bay and the steps being taken to increase surveillance and protection of sites like *Tecumseh*. A brochure similar to those produced for USS *Cumberland* and CSS *Florida* in Virginia, and *U-1105* in Maryland, provide information on vessel history, site information, and restrictions. (Figures 75-76)

SITE MONITORING

Preservation-in-place for *Tecumseh* takes many factors into consideration. These include options for covering the site, closing the holes, periodic inspection dives for site disturbance, and depositional pattern studies.

Paramount among the concerns related to the management of *Tecumseh* is site disturbance. The debate centers on the fragile equilibrium that has been reached between the wreck and its surrounding environment. What level of testing and investigation can be conducted without altering this delicate balance? The Smithsonian project involved a massive site disturbance, the impact of which has yet to be determined. We do know that the stability of the corrosion processes of the hull fabric was severely altered by their dredging work which removed approximately 1/4-inch of scale and concreted iron.

The removal of the protective sediment covering a site immediately exposes the remains to attack from biological forces, particularly bacteria and marine organisms. The natural uncovering and

recovering of *Tecumseh* is apparently frequent enough to deprive these organisms of the oxygen they require to survive. The small area of the hull, that is almost always exposed, has formed a protective calcareous crust in conjunction with the by-products of corrosion. The question of the feasibility of using cathodic protection for the vessel has been raised on a number of occasions. The conservators consulted all agreed that *Tecumseh* is a poor candidate for cathodic protection because the site is buried.

A popular remedy suggested for protection is burying or "armoring" the site. This is the process of burying or impacting the area with a material, which will help to slow erosion and prevent access to the site. Materials that have been suggested for the *Tecumseh* site include concrete, riprap, and dredge spoil. The detrimental impact of the introduction of concrete or riprap to the site is immediately obvious. The dumping of dredge spoil from channel maintenance operations would appear to have some merit, however, the dynamic nature of the ebb-tidal zone off Morgan Point would probably require the frequent replenishment of materials. Additionally, Environmental Protection Agency (EPA) regulations require that the Corps of Engineers unload spoil at predetermined dumping sites. Corps officials suggested that the permitting process for dumping spoil at the site would be daunting, if not impossible. The feasibility of using other coverings such as cloth, sandbags, artificial sea grass, and anti-erosion netting should be investigated.

The immediate goal for the site managers, in cooperation with their local partners in the state, should be the implementation of an annual or biannual nondisturbance inspection regime. With equipment and personnel provided by the state or other local groups, and under the direction of a qualified archeologist, a thorough examination can be made of the exposed area of the hull and the holes. The exact number of holes, their size and frame locations should be recorded as early as possible. Any post-disturbance material such as rebar, nylon lines, and plastic bags, should be recorded and removed, if possible. Depending upon the size of the exposed area, there may be opportunities to examine and record other anomalies along the hull. If equipment and funding are available, a seasonal investigation would provide for the compilation of data on the turbidity and depositional patterns of the site. In light of the extremely fluid nature of the sediment around the hull, we might consider forming a storm "hit squad" that could dive the wreck immediately after a

significant weather event in the lower bay to assess and record changes to the site.

Depending upon a number of unknown factors, including the condition of the iron, consideration should be given to sealing the holes in the exposed area. Although the holes have filled with sediment, a device similar to, but less intrusive than the Smithsonian patches, will provide additional safety and security at the site.

The information collected from these investigations will provide site managers with the necessary data to determine the best course for site stabilization and protection.

OPTION 2: LIMITED EXCAVATION AND RECOVERY

Any discussion of the seemingly insurmountable problems associated with the recovery of *Monitor* or *Tecumseh* eventually lead to the feasibility of raising selected portions of the vessels, particularly their turrets. The site configurations of the ironclads are similar. Both vessels capsized while sinking and came to rest with the turret under the deck. A number of problems are immediately apparent and difficult to solve. The reports of the Smithsonian divers indicate that *Tecumseh's* turret lies in its original position along the centerline of the deck. The hull and turret/pilothouse assembly did not roll to a 180° position, but lies at a 20° to 25° angle off the bottom. At the outset, the project will involve a major excavation on the offshore side of the vessel at least forty feet wide and thirty feet deep. This job will take many hours of airlifting to complete, plus additional time to maintain the excavation in an open water environment.

Removal of the turret will require more dredging along the deck and the insertion of mechanical bracing to support the hull. After this task is completed, the turret would have to be examined to determine its condition and relationship to the hull. There is the possibility that one side of the turret is wedged against the deck, and the hull would have to be lifted slightly to pull it free. However, the major difficulty will be in removing the turret from under the hull without damaging or collapsing the pilothouse. The removal of the contents of the turret (guns, carriages, ammunition, and the remains of the crewmen) may facilitate the sliding and lifting of the structure away from the hull. However, it is almost impossible to remove this material (including two 42,000-lb gun tubes)

without entering the hull to gain access to the floor of the turret.

All of these factors are compounded by the problems associated with conducting an open water project. The archaeologists and engineers consulted believe that this work, if conducted *within* the controlled confines of a cofferdam, would take at least twelve months and more than \$2 million to complete.¹⁵⁴

Equally problematic is the suggestion that selected compartments of the vessel could be excavated and a limited number of artifacts recovered for conservation and display. Designated areas of the hull would be uncovered to allow access to the interior. Silt barriers, similar to those used on the *Maple Leaf* project, might be effective in reducing the amount of sediment reentering the hull. This scenario again raises the question of the effects of such disturbance to the equilibrium of the site. The uncovering of previously buried areas exposes the hull to the corrosive effects of oxygen and bacteria. The opening of new holes or the enlargement of existing ones to a size adequate for excavation, further weakens the hull fabric and requires the placement of more closure plates.

During the excavation of the interior, divers will undoubtedly encounter the remains of the crew. *Tecumseh's* status as a war grave precludes the piecemeal removal of these remains, therefore, the archeologists would have to excavate around them to retrieve artifacts. This work would prove to be extremely tedious, if not impossible, even under perfect diving conditions.

CONSERVATION

The most practicable aspect of the recovery of the turret/pilothouse assembly would be the conservation. The turret is nine feet high and twenty-one feet in diameter. It is built up of ten layers of one inch wrought iron plates, riveted through. The pilothouse rises another six feet above it and is similarly constructed. A central wrought iron spindle supports the turret and pilothouse. Routine electrolytic reduction can be used to remove the salts, clean, and stabilize metallic artifactual materials, particularly ordnance related items. Hydrogen reduction might be more effective for the treatment of smaller materials. Hydrogen reduction is a process where iron artifacts are treated in an oxygen-free environment at temperatures of up to 1200 degrees F. The conservation of the turret/

pilothouse assembly is more problematic because of the nature of its construction. We have to assume that salts have permeated each of the plate's layers, therefore, the decision would have to be made whether to conserve the structure intact or dismantle it. To conserve it intact would require several years of immersion and electrolytic reduction and there is no guarantee that this treatment will be successful. The hydrogen reduction process is highly volatile and that has not always been successful on large artifacts such as cannon and anchors. An accident with an oven large enough to hold the turret/pilothouse assembly would be of *Hindenburg* proportions.¹⁵⁵

Cost

The recovery of the turret/pilothouse assembly and its associated artifacts would not require the construction of a use-specific conservation facility. As a cost saving measure, conservation services could be contracted to existing facilities that specialize in the treatment of material from underwater sites. Those that come immediately to mind are the North Carolina Underwater Archaeology Unit at Fort Fisher, the Maryland Archaeological Facility at St. Leonard, Maryland, and the Florida Archaeological Lab in Tallahassee, Florida. The conservators consulted estimated that the turret/pilothouse assembly and its associated artifacts could be conserved and prepared for display within five years at a cost of \$280,000.¹⁵⁶

OPTION 3: EXCAVATION, RECOVERY, & CONSERVATION

The goal of the Smithsonian's *Tecumseh* Project was the recovery, restoration, and display of *Tecumseh* as the centerpiece of the National Armed Forces Museum Park at Fort Washington, Maryland. It was an ambitious undertaking, but the envisioned rewards were inspiring. Looking at the conceptual drawings for her display, one could imagine walking the decks of the only intact, surviving example of a Civil War-era ironclad monitor, viewing the torpedo-damaged hull from below, studying the fourteen-foot tall propeller and rudder, and touring the engine room, berth, deck, and turret. The opportunities for interpretation, living history, and reenactments were, and still are, mind-boggling. Equally mind-boggling, as the Smithsonian discovered, is the level of commitment in terms of funding and resources necessary to accomplish this task.

Once the decision is made to recover the ironclad, all aspects of the project, from the initial engineering studies and site testing, through conservation and final display, must be outlined and funded in detail. The project can be divided into four phases: 1) a site profile; 2) design and installation of a cofferdam; 3) excavation and recovery of hull and contents, and recovery of turret/pilothouse component; and 4) conservation.

Prior to the installation of the cofferdam, additional studies of the site conditions should be developed. The exact location of the hull and its orientation on the bottom would be plotted to determine the positioning for the cofferdam. Profiles of the sedimentation characteristics in and around the wreck including core samples in the area of the cofferdam would be recorded. A series of remote sensing surveys would include bathymetric, sonar, and sub-bottom profiles. If necessary, new iron and wood samples would be taken from the hull. This work could be accomplished in two to three months.

The value of a cofferdam as a tool for underwater excavation work was illustrated on the Yorktown Shipwreck Archaeological Project in Virginia. In 1982, a cofferdam was constructed around the remains of an eighteenth-century British transport vessel sunk in the York River during the Siege of Yorktown. This was the first use of a wet cofferdam for the excavation of a shipwreck. Although the vessel is much smaller than *Tecumseh* and constructed primarily of wood, their site environments are quite similar. The Yorktown wreck lies in twenty feet of water approximately 500 feet from shore. Tidal currents of up to three knots run through the site carrying heavy debris and silt, which, like *Tecumseh*, has covered and preserved the wreck. Visibility on the bottom was never greater than one foot. To alleviate these problems the archeologists decided to surround the site in a cofferdam. The structure was made of interlocking sheet-steel pilings enclosing an area ninety-seven feet long by forty-five feet wide. Two commercial pool filtration systems were used to clarify the water. (Figures 77-78)

Over the course of the six-year project, numerous problems arose. The intrusion of outside river water introduced new sediment and algae, which hindered the filters and lowered visibility. However, through the latter part of the project the average visibility inside the cofferdam was better than ten feet and occasionally exceeded thirty feet.



Figure 77. Aerial view of the Yorktown Shipwreck Project cofferdam. (National Geographic Society)

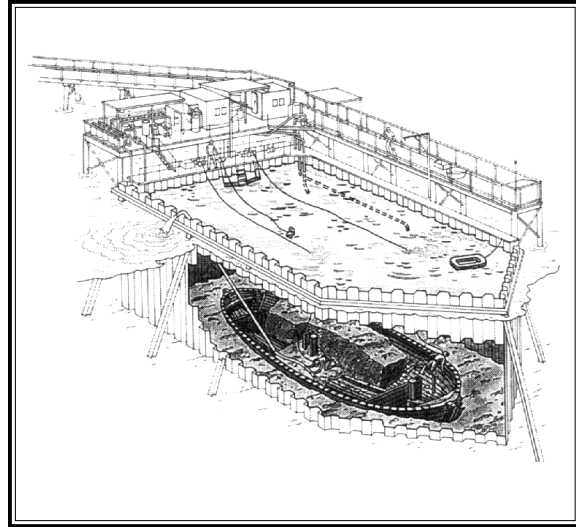


Figure 78. Artist conception of Yorktown cofferdam illustrating position of exposed wreck remains. (National Geographic Society)

Studies have also indicated that the enclosure produced a 10:1 reduction in the population of invertebrate organisms and no live shipworms were found. Overall, the Yorktown cofferdam experiment can be rated a success. The cofferdam provides protection from man-made and natural threats to the site. It also offers a safe working environment for the divers, which improves the accuracy and rate of excavation.¹⁵⁷

The Yorktown cofferdam is an important model for study if the recovery of *Tecumseh* is undertaken. The Smithsonian initially considered a cellular wall cofferdam that would allow for 100% dewatering. (see Figure 49) Two factors, the enormous cost of the structure, and the exposure of the artifacts to the elements over the long recovery period, precluded the use of this type of enclosure.

Tecumseh will require a sheet-steel enclosure approximately 300-feet long by 100-feet wide. Because of the size of the structure, and the weight of the hull and its contents, it will be necessary to frame and brace the top of the cofferdam to support lifting. The ends of the enclosure should mirror the shape of the hull to conform with tidal and weather patterns at the site. One end can be removed or designed to open so a submersible barge or dry dock can be maneuvered under the wreck. An industrial strength filtration system will be installed to clarify the water, therefore, this should be a sealed enclosure that does not allow the water to rise and fall with the tide. Like Yorktown, a pier can be built connecting the cofferdam with the shore. Although it is unknown whether there will be adequate visibility from the surface, tourists could be allowed to watch the

operations from an observation deck. Historical interpretations and the details of ongoing excavations can be provided by docents. The pier can also serve as a conduit for supplies and utilities which will lower the cost incurred by the use of numerous surface support vessels. During this phase, it will be necessary to begin the design and construction of the first section of the conservation facility.

Other than their conservation, the excavation and recovery of the artifacts from the hull will be the most time-consuming aspect of the project. After the installation of the cofferdam, the outer hull can be exposed and thoroughly examined and mapped for the first time. As the underside, or deck, is exposed, lifting frames can be assembled and inserted under *Tecumseh* and attached to the support frame over the cofferdam. These frames will hold the vessel in position as the supporting sediment is removed from underneath. Large sections of hull plate will be removed and deck hatches opened to allow divers to begin the excavation of the interior. Once all 50,000-plus artifacts have been removed and placed in conservation, preparations can be made to recover the hull.

A number of suggestions for recovering *Tecumseh* have been offered over the years. These range from a sled-drag method using strongbacks and beach gear to drag the vessel ashore, to the direct lift method employing strongbacks and heavy marine cranes to lift *Tecumseh* onto a floating dry dock. Many of the proposals viewed this as strictly a marine salvage problem, and without addressing the archaeological factors of the site. Some salvage experts have suggested that the hull should be

sectioned to alleviate the problems inherent in a single lift. Each section could be recovered and transported separately to the restoration area, and after conservation, the hull would be reassembled for display. (Figure 79)

Whether or not the hull remains intact or is sectioned, its removal will require a heavy cradle and lifting mechanism. With the hull free from the mud, the lifting frames along the deck will form a cradle which can be raised with cables by the cofferdam's overhead support frames or conventional marine salvage cranes. A submersible barge or floating dry dock would move into the open end of the enclosure and the cradle would be transported to the conservation facility. This same method can be used to recover the turret/pilothouse assembly in a second lift. The painstakingly slow pace at which the sediment and artifacts will be removed from each compartment of the vessel, followed by the recovery of the hull, turret, and pilothouse, is estimated to require approximately eleven years.¹⁵⁸

CONSERVATION

Once the decision to recover *Tecumseh* is made, the selection of the method for her final display will drive the decision-making process concerning conservation techniques. Methods of display include the following: exhibit of the vessel and its artifact collection in a museum environment; or exhibit of the vessel in a conservation pool designed for underwater viewing, similar to an aquarium, with the artifact collection on display in an adjacent museum building.

The conservation problems associated with *Tecumseh* are almost incomprehensible. There are 1,775,782 pounds of iron and 17,037 square feet of wood that will require preservation. The overlapping plates of the hull strakes and the wood and iron construction of the armor belt would not respond to the normal electrolysis treatment. Exhibition out of the water in a museum environment would entail the complete dismantling of the vessel for conservation. After separation and conservation of the various components, reassembly will probably require additional artificial support and the fabrication of missing or severely degraded pieces. The recovery and conservation of an ironclad vessel submerged for 131 years in a saltwater environment is a monumental and untested undertaking.

The project would require the construction of a



Figure 79. *Mary Rose*, in her support cradle, is lifted by the giant crane barge *Tog Mor*. (Margaret Rule)

dedicated conservation facility near the recovery site at Morgan Point. Initially, a lab would have to be constructed in conjunction with the installation of the cofferdam to process the contents of the vessel prior to its salvage. Before the recovery of the hull and turret, the decision must be made as to the location of their conservation. The lab at Fort Morgan could be expanded to house these components, or an existing shipyard building or dry dock could be converted on the Mobile waterfront. Locating on the Mobile waterfront could prove to be a cost-saving measure as the hull conservation wing will require an access channel to the bay that can accommodate the floating dry dock transport.

Although there are tens of thousands of artifacts ranging in size from sewing needles to 15-inch Dahlgren smoothbores, these items can be conserved in the conventional manner at a state-of-the-art facility. The artifact conservation wing would need a curation wing, treatment laboratories with large artifact tanks, offices, a library, and a meeting room. A minimum of 40,000 square feet would be required for this facility.

If the decision is made to conserve the entire

assemblage at Fort Morgan, an additional 40,000 square feet would be needed to house and curate the hull and turret. The central feature of this "ship house" would be a basin or pool 300-feet long by 50-feet wide by 25-feet deep for the hull and turret/pilothouse component. The pool will require a water treatment plant, which will include a reverse osmosis system for deionization and cleaning of the water. Two overhead cranes (minimum 30-ton capacity) would move separate components (sections of the hull, engines) or large artifacts such as the cannons, carriages, or propeller from the basin area to the conservation tanks. These tanks will range in size to accommodate the guns, gun carriages, and large structural members. If the hull is sectioned during recovery, the large pool could be redesigned as smaller individual pools for these components. This part of the complex would have to be near or on the water to facilitate the transfer of the hull and turret/pilothouse component to the holding pool.¹⁵⁹

If *Tecumseh* is to be left underwater for an aquarium-type exhibit, a deeper, glass-enclosed holding pool will have to be constructed. This would necessitate the continuous monitoring and maintenance of the light and oxygen levels to control the corrosion process.

Cost

The potential cost of the salvage and conservation of *Tecumseh* is one of the major reasons the vessel has not been recovered. In 1974, the Wheeler Tecumseh Memorial Corporation estimated the cost for a two-year recovery program at \$10 million. The two-year time frame encompassing design and development to final display was certainly a conservative estimate. Today the cost of recovery and preservation of the vessel are estimated to be nearly tenfold to that of the Wheeler figure.

The design and construction of a cofferdam adequate to enclose *Tecumseh* and provide support for a long-term excavation and recovery project will take a minimum of twelve months to complete and cost approximately \$4.3 million. The structure can be removed or cut down to the bottom if an appropriate use is unavailable at the end of the project. The pier might be saved for recreational use by Fort Morgan State Park.

The excavation of the hull and recovery of all its contents, will require a separate workforce from the

actual salvage of the hull and turret/pilothouse component. A core team of archeologists supported by volunteers will painstakingly uncover and record the interior of the hull, compartment by compartment. Once the vessel is empty, professional salvage crews will undertake the removal of the vessel. This phase of the work will cost approximately \$15.5 million over ten years. An additional year will be needed for the excavation and recovery of the turret/pilothouse component. Estimates for this project run in the \$2 to \$2.25 million range. This equals twelve to thirteen years for the excavation and recovery at a cost of \$22 to \$23 million. Of course, these estimates can be worked up or down depending on the amount of progress made and the unforeseen problems encountered. A great deal of the costs can be absorbed off-budget by donated goods and services.

Initially, the largest outlay of funds for conservation will be for the construction of the physical plant. As mentioned earlier, the construction of this facility can be completed in two phases. The first will be the construction of the main conservation lab, which will be ready to receive artifacts upon completion of the cofferdam. The decision to treat the hull at Fort Morgan or take it to Mobile will determine the course of funding and construction for the shiphouse. However, certain known costs can be applied for the construction of the entire facility at Mobile Point. An 80,000-square-foot building (unfinished laboratory spaces), with two 30-ton overhead cranes and a central environmental control system, will cost approximately \$4.9 million. This does not include the cost of the pool or the canal that would have to be dug from the beach to the ship house.

The cost of the laboratory area including a water treatment system, holding tanks, chemicals, tools, computers, and miscellaneous supplies, will run approximately \$2.5 million (plus pool treatment). Salaries for staff and other personnel over the course of a ten-year project would total \$3 million.

These figures represent minimum project costs. Also, there will be the costs of operating and maintaining the water treatment plant, environmental control systems (HVAC), and utilities which will run at least \$100,000 annually. An additional 20 to 30% should be added for unknown contingencies such as overtime, equipment failures, and Murphy's Law.¹⁶⁰

An integral part of the planning for the project will be the solicitation of donated services in the

form of funds, equipment, and expertise. The resources of the industrial and scientific communities will be invaluable to the success of the project and will help to defer some of the costs during the recovery and conservation phases. Additionally, U.S. Navy assets can be tapped for equipment (barges, cranes, and floating dry docks), personnel (Mobile Diving and Salvage Units, reservists), the removal and disposal of ordnance (EOD), and the recovery of crew remains (Bureau of Medicine and Surgery).

EDUCATION

The display of *Tecumseh* and her artifact assemblage in a museum environment presents educational and interpretational opportunities rivaled only by those of *Vasa* and *Mary Rose*. The ideal location for her display, in terms of site significance, would be near Fort Morgan at Mobile Point. The visitor would, perhaps, view an interpretive exhibit on the history of *Tecumseh* and Admiral Farragut's attack on the bay. After a tour of the ship, a short walk to the fort would take you to the site of her loss and eventual recovery. There are two factors, however, that make this site a less than ideal location for the permanent display of *Tecumseh*. Mobile Point is accessible by road only from the east along Morgan Peninsula. To the west, a small car ferry crosses the bay between Fort Morgan and Dauphin Island, which is equally isolated from major highways or population centers. Another important consideration is the weather. Morgan Peninsula is a low, featureless spit of land that is exposed to violent storms from the bay and the Gulf of Mexico. The threat of a hurricane to *Tecumseh* and its exhibit facility would be too great a risk.

The most logical site for display of the vessel would be in Mobile, either at the USS *Alabama* Battleship Park, or as a part of the future Mobile Maritime Museum complex. Mobile lies at the juncture of two major highways between the East Coast and the Mississippi River. This location provides access to the service and support facilities, and, more importantly, tourist revenues. More than one million tourists visit *Mary Rose* and *Vasa* annually and it is estimated that *Vasa* is worth \$200 million annually to the Swedish economy. It is not known if *Tecumseh* could match these numbers, however, the display of the only intact Civil War monitor would attract worldwide interest.¹⁶¹

MANAGEMENT RECOMMENDATIONS

Hydrographic data indicates that the sand in the immediate area of *Tecumseh* is accreting and Mobile Point is migrating westward. Theoretically, if this process continues and the site remains unaltered into the next century, *Tecumseh* would eventually lie permanently buried under the Point. By this time of course, the wreck will be the concern of resource managers who will face mounting pressure to conduct a terrestrial archeological investigation of the vessel. Perhaps they will recommend the construction of a wet cofferdam to facilitate the excavation and recovery of artifacts.

Today, however, our primary concern is the protection and continued preservation of *Tecumseh* as a unique and irreplaceable cultural resource. The long term management of *Tecumseh* is an emotionally-charged issue. The debate centers on the need for protection and preservation versus the desire to exhibit the tangible evidence of her existence. Do we embark on a risky and expensive program of recovery from which, once begun, there is no stopping? Or do we attempt to preserve the vessel in place and interpret its history to future generations through the archival and artifactual materials already collected?

The excavation, recovery, and conservation of *Tecumseh* is a massive undertaking, which will require a tremendous commitment in terms of funding and resources over the course of the project. The excavation and recovery of the vessel is estimated to take at least ten years and cost a minimum of \$20 million. The unique construction of *Tecumseh* still poses many problems for a successful conservation program. The overlapping and laminated iron plates and iron and wood composition of the armor belt and sponson would require the complete dismantling and reconstruction of the hull. Estimates for the construction of an adequate facility and the conservation of the vessel and its artifact assemblage add another ten years and an additional \$60 million to the project. These figures represent the minimum estimates for time and resources. Costs have been purposely rounded off to allow for unforeseen contingencies and inevitable setbacks that plague every archaeological project, particularly submerged ones.

A limited excavation and recovery of artifacts, or structural components such as the turret/pilohouse assembly, would appear to be a valid compromise between preservation and salvage. However, this scenario is fraught with concerns

including the undetermined effects of heavy dredging on the site environment and the opening or enlargement of holes for excavation. Considering the dynamics of the site, the recovery of the turret/pilothouse assembly and its associated ordnance material, will be an extremely difficult and expensive task and perhaps impossible if attempted outside a protective enclosure. However, the question remains; will the rewards of a limited excavation outweigh the costs?

Preservation-in-place is more than an option at this time, it is a necessity. Before either Option 2 or 3 can be considered, a detailed study of the wreck site would have to be completed. The management decisions for *Tecumseh* must be based, in part, on the most up-to-date and reliable data concerning the condition of the wreck and its environment. Normally, a management plan is not developed twenty-eight years after a site is discovered and studied. Subsequently, over time, the limited amount of data we have on *Tecumseh* has become somewhat stale and therefore useless in the decision-making process. The more recent surveys have added little to our knowledge of the site other than evidence of physical damage and possible looting.

The immediate goals for managers of *Tecumseh* should be site protection, public education, and monitoring and analysis. Site protection can be accomplished with the assistance of law enforcement agencies in the bay area, and through the establishment of the RNA indicating a no-anchoring zone around the *Tecumseh* buoy. The publication of this information in NOAA charts and notices to mariners, combined with warning signs and surveillance equipment, will help to deter any unauthorized work at the site. Because of the sensitive nature of the site, particularly its status as a war grave, diving on *Tecumseh* requires the permission of the Director of Naval History. A letter of authorization from the Director outlines the purpose of the investigation, and a clear statement of the limitations placed upon the investigator.

A vital element in the management decision-making process is the implementation of an annual or biannual, nondisturbance inspection regime. These investigations will add important information to the existing database concerning the condition, number, and size of the holes in the hull, and the turbidity and depositional patterns of the sediment in and around the site.

An equally important aspect of the planning for the protection of *Tecumseh*, is the development of

education programs that will enhance public awareness of the history and significance of the site. These programs include, but are not limited to, permanent and traveling exhibits, onshore markers, and historical and archaeological presentations. Through the publication of informative brochures and booklets, the public will have a better understanding of the importance of cultural resource management throughout the bay, and the steps being taken to increase surveillance and protection of these sites. Outreach programs such as these help to promote contacts between the sport diving community and preservation officials. These contacts would hopefully grow into volunteer and stewardship programs, which would be mutually beneficial to both groups.

The current climate of governmental reorganization and down-sizing, particularly throughout the Department of Defense, hinders the Navy's ability to conduct large scale exploration or recovery projects on its submerged historic resources. The most expedient way to accomplish the short range goals envisioned for *Tecumseh* is through cooperative programs and partnerships created by the establishment of Memorandum of Agreements (MOAs). These agreements, between the Naval Historical Center and agencies and institutions at the state and local level (Alabama SHPO, U.S. Coast Guard, Alabama Marine Police, Maritime Museum of Mobile, Mobile Bar Pilots Association, Friends of Fort Morgan), provide for the sharing of responsibilities for the protection of the site. This includes the funding, donations, and in-kind services necessary to conduct activities authorized under the management plan. Similar programs have been successfully implemented for several underwater sites including USS *Huron* in North Carolina and the German submarine *U-1105* in Maryland.

Putting the ubiquitous problem of funding aside, the technological expertise necessary to recover and conserve *Tecumseh* is available. However, our present focus must be on an aggressive program of site protection and analysis. The collection and study of this data will enable site managers to develop both short-term protection goals and long-term strategies for the disposition of the wreck. This plan serves as a catalyst for the implementation of these goals and it should be updated annually to include any new data on site conditions or threats.

SUMMARY OF MANAGEMENT RECOMMENDATIONS

Develop & Initiate a Program for Site Protection

- Establish and formalize Cooperative Agreements/MOAs with U.S. Coast Guard, Alabama SHPO, Alabama Marine Police, Maritime Museum of Mobile, Mobile Bar Pilots Association, Defenders of Fort Morgan, etc., with the assistance of the Alabama Maritime Task Force and the USS *Tecumseh* Association
- Establishment of Regulated Navigation Area (RNA), 100-yard radius, centered on the *Tecumseh* buoy (No anchoring, stopping, diving, or swimming); Remove Anchorage for Explosives area (AFE)
- Install closed circuit surveillance system at Fort Morgan
- Work toward the creation of a Cultural Heritage Zone for Battle of Mobile Bay sites in the lower bay (ref: N.C. Cape Fear Civil War Shipwreck District) or assist the National Park Service with expansion of the Fort Morgan National Historic Landmark.

Develop & Initiate Educational Programs

- Cooperate with partners at state and local levels
- Promote importance of protection and preservation of the site
- Increase public awareness and importance of cultural resource management
- Through historical and archaeological presentations, workshops, and brochures
- Through travelling exhibits

Develop & Initiate a Program of On-site Investigations (annual or biannual)

- Begin current database for the site
- General inspections for evidence of unauthorized diving at the site
- Determine condition of hull (number of holes, thickness of iron and closure plates)
- Monitor deterioration of the hull fabric
- Deposition patterns of the site (seasonal trends, storm effects)
- Annual condition reports to the Director of Naval History with recommendations for the site

Potential Funding Sources

- State of Alabama
 - Special Appropriations
 - Annual Appropriations
 - Alabama Historical Commission
- City of Mobile
 - Maritime Museum of Mobile
 - City Museums of Mobile
- National Park Service
 - American Battlefield Protection Program
 - National Maritime Heritage Act
- U.S. Navy
 - Legacy
 - Naval Historical Foundation

ENDNOTES

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³J.D.Hardin and others, *Shoreline and Bathymetric Changes In the Coastal Area of Alabama* (Tuscaloosa, 1990), 9, hereinafter cited as Hardin, *Shoreline and Bathymetric Changes*; Hummell, *Main Pass and The Ebb-Tidal Delta*, 4.

⁴Hummell, *Main Pass and The Ebb-Tidal Delta*, 2, 4, 9.

⁵Hummell, *Main Pass and The Ebb-Tidal Delta*, 12, 15.

⁶Chermock, *Estuarine Alabama*, 24.

⁷Hummell, *Main Pass and The Ebb-Tidal Delta*, 8.

⁸Hummell, *Main Pass and The Ebb-Tidal Delta*, 8-9.

⁹Hummell, *Main Pass and The Ebb-Tidal Delta*, 9-11.

¹⁰Chermock, *Estuarine Alabama*, 51-52.

¹¹Hummell, *Main Pass and The Ebb-Tidal Delta*, 19.

¹²Hummell, *Main Pass and The Ebb-Tidal Delta*, 12, 17, 25.

¹³Chermock, *Estuarine Alabama*, 76.

¹⁴Hummell, *Main Pass and The Ebb-Tidal Delta*, 27-28.

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²⁰*Annual Report of the Secretary of the Navy*, December 2, 1861, House Executive Document, Vol. 3, 37th Congress, 2nd Session, 10-14, hereinafter cited as *SecNav Report*, December 1861; Bennett, *Steam*

Navy, 218 - 221. These vessels, rapidly constructed over a three-month period, were generally known as “90-day gunboats.” *Special Report of the Secretary of the Navy*, July 4, 1861, Senate Executive Document No. 1, 37th Congress, 1st Session, hereinafter cited as *SecNav Report*, July, 1861.

²¹Report of the Secretary of the Navy in Relation to Armored Vessels (Washington, 1864), 1-2, hereinafter cited as *SecNav Report, Armored Vessels*; Richard S. West, Jr., *Gideon Welles: Lincoln's Navy Department* (New York, 1943), 149, hereinafter cited as West, *Gideon Welles*; Bennett, *Steam Navy*, 263.

²²Edward M. Miller, ed., *Project Cheesebox: A Journey Into History*, I (Annapolis, 1974), 25-27, hereinafter cited as Miller, *Project Cheesebox*; Bennett, *Steam Navy*, 69-70.

²³Baxter, *Ironclad Warship*, 257 & 260-266; White, *Yankee From Sweden*, 202 & 211; Watts, “U.S.S. Monitor”, 40, 42, & 44.

²⁴William C. Davis, *Duel of the Ironclads* (Garden City, 1975), 46-47, hereinafter cited as Davis, *Duel*; Watts, “U.S.S. Monitor,” 95. Bennett, *Steam Navy*, 295; White, *Yankee From Sweden*, 210-213; West, *Gideon Welles*, 154-155. In June 1861 Confederate Navy Secretary Stephen R. Mallory initiated his ironclad construction program by ordering the hulk of the screw frigate USS *Merrimack* converted into the armored casemate ram, CSS *Virginia*. Although the Confederates had a three-month head start on *Monitor*, problems in obtaining *Virginia*'s armor, ordnance, and supplies delayed her commissioning until late February 1862. With workmen still on board, *Virginia* sailed on March 8 to attack the Union blockade fleet in Hampton Roads.

²⁵West, *Gideon Welles*, 156; Bennett, *Monitor and the Navy*, 120-124. Baxter, *Ironclad Warship*, 302.

²⁶Baxter, *Ironclad Warship*, 238 & 281-284; Bennett, *Steam Navy*, 339.

²⁷Lt. Richard H. Webber, USNR, *Monitors of the U.S. Navy: 1861-1937* (Washington, 1969), 10-13, hereinafter cited as Weber, *Monitors*; Wegner, “High Priest,” 28.

²⁸John Ericsson, “The Monitors,” *Century Magazine*, XXXI (December, 1885), 285, hereinafter cited as Ericsson, “The Monitors.”

²⁹Cracknell, “U.S. Navy Monitors,” 283 & 286.

³⁰Baxter, *Ironclad Warship*, 306-309; Webber, *Monitors*, 10. USS *Lehigh* and USS *Patapsco* carried one XV-inch Dahlgren smoothbore and one 150-pdr. Parrot rifle each. USS *Camanche* carried two XV-inch Dahlgrens.

³¹James Stokesberry, “How to Build a Monitor,” Unpublished manuscript, S. L. “Buster” Miller Papers, Manuscript Collection, City Museums of Mobile, Mobile, Alabama, 1-2, hereinafter cited as Stokesberry, “How to Build a Monitor,” CMM.

³²Secor & Co. to John Lenthall, September 1, 1862, Letters Received by the Chief of the Bureau of Construction and Repair, Records of the Bureau of Ships, Record Group 19, Entry 71, National Archives, Washington, D.C., Hereinafter cited as RG 19, Entry 71; Smith, *Report of Navy Department Documents*, 782 and 788-789.

³³Stokesberry, “How to Build a Monitor,” CMM, 1-2; Smith, *Report of Navy Department Documents*, 742-743 and 756-757; The dimensions of each vessel varied depending on the builder. *Tecumseh*'s final dimensions were 225' x 44' x 13', with a displacement of 2,100 tons.

³⁴Stokesberry, “How to Build a Monitor,” CMM, 3-4.

³⁵Progress Reports of the Local Inspectors, November 19, 1862, Reports of Vessels and Steam Machinery to the General Superintendent of Ironclads; Bureau of Ships, Record Group 19, Entry 1249, National Archives, Washington, D.C., hereinafter cited as Progress Reports of Local Inspectors, RG 19, Entry 1249; *Investigation of Navy Department*, May 22, 1872, House Report No. 80, 42nd Congress, 2nd Session, 14, hereinafter cited as House Report No. 80; *Secor & Co. and Perine, Secor & Co.*, February 20, 1895, House

Report No. 1867, 53rd Congress, 3rd Session, 1-2, hereinafter cited as House Report No. 1867; *Petition and Statement of Secor & Co. and Perine, Secor & Co.*, RG 19, Entry 186, 2.

³⁶Alban Stimers to Secor & Co., December 2, 1862, RG 19, Entry 1250. *Petition and Statement of Secor & Co. and Perine, Secor & Co.*, RG 19, Entry 186, 2-3; Progress Reports of Local Inspectors, December 11, 1862, RG 19, Entry 1249.

³⁷Progress Reports of the Local Inspectors, February 2, 1863, Reports from Superintendents Outside of Navy Yards to the Bureau of Construction and Repair, Records of the Bureau of Ships, Record Group 19, Entry 68, National Archives, Washington, D.C., hereinafter cited as Progress Reports of Local Inspectors, RG 19, Entry 68; Progress Reports of Local Inspectors, February 13, 1863, RG 19, Entry 68.

³⁸Stokesberry, "How to Build a Monitor," CMM, 4.

³⁹Samuel DuPont to Gideon Welles, April 15, 1863, ORN, I, XIV, 8; D. M. Fairfax to Samuel DuPont, April 8, 1863, ORN, I, XIV, 16; Smith, *Report of Navy Department Documents*, 1170; Alban Stimers to Secor & Co., June 16 & 18, 1863, Letters to Contractors and Local Inspectors Concerning Harbor and River Monitors from General Inspector of Ironclads, Records of the Bureau of Ships, Record Group 19, Entry 1252, National Archives, Washington, D.C., hereinafter cited as RG 19, Entry 1252.

⁴⁰Alban Stimers to Secor & Co., June 16, 1863, RG 19, Entry 1252.

⁴¹Alban Stimers to Secor & Co., June 18, 1863, RG 19, Entry 1252.

⁴²"Notes from the Journal of Lieutenant T.A.M. Craven, U.S.S. DALE, Pacific Squadron, 1846-49," *United States Naval Proceedings*, XIV (1888), 119-120, hereinafter cited as "Journal of Lieutenant T.A.M. Craven"; Gideon Welles to T.A.M. Craven, April 15, 1863, Letters Relating to Officers Appointments, Orders, and Resignations, Records of the Bureau of Naval Personnel, Record Group 24, Entry 1513, National Archives, Washington, D.C., hereinafter cited as RG 24, Entry 158; Gideon Welles to T.A.M. Craven, June 3, 1863, RG 24, Entry 158; Gideon Welles to T.A.M. Craven, June 22, 1863, RG 24, Entry 158; Smith, *Report of Navy Department Documents*, 977; Francis Gregory to Alban Stimers, August 24, 1863, RG 19, Entry 1235; T.A.M. Craven to Francis Gregory, September 16, 1863, RG 19, Entry 1235.

⁴³Smith, *Report of Navy Department Documents*, 1100.

⁴⁴Eugene B. Canfield, *Notes on Ordnance of the American Civil War: 1861-1865* (Washington, 1960), 7-9, hereinafter cited as Canfield, *Notes on Ordnance*; T.A.M. Craven to Francis Gregory, January 6, 1864, RG 19, Entry 1235; Alban Stimers to Francis Gregory, January 6, 1864, RG 19, Entry 1248.

⁴⁵T.A.M. Craven to Francis Gregory, January 25, 1864, RG 19, Entry 1235; Alban Stimers to Secor Co., February 6, 1864, RG 19, Entry 1252.

⁴⁶John Ericsson to Alban Stimers, February 3, 1864, Letters Received by the General Inspector of Ironclads, Records of the Bureau of Ships, Record Group 19, Entry 1255, National Archives, Washington, D.C., hereinafter cited as RG 199, Entry 1255; Francis Gregory to Gideon Welles, January 9, 1864, RG 19, Entry 1236; Francis Gregory to Gideon Welles, February 24, 1864, RG 19, Entry 1236; John Ericsson to Francis Gregory, March 5, 1864, RG 19, Entry 1235; Alban Stimers to Francis Gregory, March 9, 1864, RG 19, Entry 1248; Smith, *Report of Navy Department Documents*, 986. Progress Reports of the General Inspector of Ironclads, March 24, 1864, RG 19, Entry 1249.

⁴⁷Ulysses S. Grant, "Preparing for the Campaigns of 1864," Robert U. Johnson and Clarence C. Buell (eds), *Battles and Leaders of the Civil War*, 4 vols. (New York, 1887-1888), IV, 97, 102-103, hereinafter cited as Grant, *Battles and Leaders*; Allan Nevins, *The War for the Union: The Organized War to Victory, 1864-1865*, 8 vols. (New York, 1971), VIII, 6-7, 9, hereinafter cited as Nevins, *Organized War*.

⁴⁸William T. Sherman, "The Grand Strategy of the Last Year of the War," Robert U. Johnson and Clarence C. Buell (eds), *Battles and Leaders of the Civil War*, 4 vols. (New York, 1887-1888), IV, 247-248, hereinafter cited as Sherman, *Battles and Leaders*; Grant, *Battles and Leaders*, 104; Nevins, *Organized War*, 9.

⁴⁹Sherman, *Battles and Leaders*, 247-248; Grant, *Battles and Leaders*, 104; Nevins, *Organized War*.

⁵⁰Instructions from Rear Admiral Samuel P. Lee, May 4, 1864, *ORN*, I, IX, 724-725; William F. Smith, "Butler's Attack on Drewry's Bluff," Robert C. Johnson and Clarence C. Buell (eds), *Battles and Leaders of the Civil War*, 4 vols. (New York, 1887-1888), IV, 207, hereinafter cited as Smith, *Battles and Leaders*; Ulysses S. Grant to Benjamin Butler, April 28, 1864, *ORN*, I, IX, 713; Nevins, *Organized War*, 18.

⁵¹Samuel P. Lee to Gideon Welles, May 6, 1864, *ORN*, I, X, 3; Smith, *Battles and Leaders*, 207-208; Hans L. Trefousse, *Ben Butler: The South Called Him Beast* (New York, 1957), 148, hereinafter cited as Trefousse, *Ben Butler*; Times (New York), May 6, 1864.

⁵²Samuel P. Lee to John Clitz, May 6, 1864, *ORN*, I, X, 3-4; John C. Beaumont to Samuel P. Lee, May 6, 1864, *ORN*, I, X, 9; Samuel P. Lee to Gideon Welles, May 8, 1864, *ORN*, I, X, 26; W. J. Tenney, *The Military and Naval History of the Rebellion in the United States* (New York, 1865), 563-564, hereinafter cited as Tenney, *Military and Naval History*; James R. Soley, "Closing Operations on the James River," Robert U. Johnson and Clarence U. Buel (eds), *Battles and Leaders of the Civil War*, 4 vols. (New York, 1887-1888), IV, 706, hereinafter cited as Soley, *Battles and Leaders*; Samuel P. Lee to Benjamin Butler, May 18, 1864, *ORN*, I, X, 65.

⁵³P.G.T. Beauregard, "The Defense of Drewry's Bluff," Robert U. Johnson and Clarence C. Buel, (eds), *Battles and Leaders of the Civil War*, 4 vols. (New York, 1887-1888), IV, 196-203, hereinafter cited as Beauregard, *Battles and Leaders*; Smith, *Battles and Leaders*, 208; Bern Anderson, *By Sea and By River* (New York, 1962), 275, hereinafter cited as Anderson, *By Sea and By River*; Smith, *Battles and Leaders*, 208-211.

⁵⁴Grant, *Battles and Leaders*, 148-149; Nevins, *Organized War*, 44; Samuel P. Lee to Gideon Welles, June 7, 1864, *ORN*, I, X, 129; Benjamin F. Butler to Samuel P. Lee, June 15, 1864, *ORN*, I, X, 195; Soley, *Battles and Leaders*, 707; Julius W. Pratt, "Naval Operations on the Virginia Rivers in the Civil War," *United States Naval Institute Proceedings*, XLV (February 1919), 191-192, hereinafter cited as Pratt, "Naval Operations on the Virginia Rivers"; Samuel P. Lee to T.A.M. Craven, June 15, 1864, *ORN*, I, X, 151.

⁵⁵T.A.M. Craven to Samuel P. Lee, June 20, 1864, *ORN*, I, X, 195-196; Since the Civil War, the course of the upper James River has been straightened, isolating most of the bends in the river. Today the area of Trent's Reach is nothing more than a shallow oxbow lake.

⁵⁶William N. Still, Jr., *Iron Afloat: The Story of the Confederate Armorclad* (Nashville, 1971), 177, hereinafter cited as Still, *Iron Afloat*; John K. Mitchell to Squadron Commanders, June 21, 1864, *ORN*, I, X, 185; Alexander C. Rhind to Samuel R. Lee, June 23, 1864, *ORN*, I, X, 183; John K. Mitchell to Stephen R. Mallory, June 22, 1864, *ORN*, I, X, 187; John K. Mitchell to Stephen R. Mallory, June 22, 1864, *ORN*, I, X, 186-187; T.A.M. Craven to Samuel P. Lee, June 23, 1864, *ORN*, I, X, 178-179.

⁵⁷Gideon Welles to T.A.M. Craven, May 28, 1864, *ORN*, I, X, 100; Samuel P. Lee to Gideon Welles, July 10, 1864, *ORN*, I, X, 248; Smith, *Report of Navy Department Documents*, 1454.

⁵⁸John A. Dahlgren to Gideon Welles, July 10, 1864, *ORN*, I, XV, 565; Charles L. Lewis, *David Glasgow Farragut: Our First Admiral* (Annapolis, 1943), 221, hereinafter cited as Lewis, *Our First Admiral*; David G. Farragut to David D. Porter, January 15, 1864, *ORN*, I, XXI, 39-40.

⁵⁹Charles L. Lewis, *Admiral Franklin Buchanan: Fearless Man of Action* (Baltimore, 1929), 215, hereinafter cited as Lewis, *Admiral Franklin Buchanan*; Report of Thornton A. Jenkins, January 15, 1864, *ORN*, I, XV, 35; James D. Johnston, "The Ram 'Tennessee' at Mobile Bay," Robert U. Johnston and Clarence C. Buel (eds), *Battles and Leaders of the Civil War*, 4 vols. (New York, 1887-1888), IV, 401, hereinafter cited as Johnston, *Battles and Leaders*; Lewis, *Admiral Franklin Buchanan*, 216; Still, *Iron Afloat*, 191-192.

⁶⁰Still, *Iron Afloat*, 187; Report of Thornton A. Jenkins, January 15, 1864, *ORN*, I, XXI, 36; Lewis, *Admiral Franklin Buchanan*, 219-220; Edward R.S. Canby to Henry W. Halleck, August 9, 1864, R.N. Scott and others (eds), *The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies* (Washington, 1880-1901), Series 1, Vol. XXXIX, part I, 403, hereinafter cited as *ORA*; Report of Thornton A. Jenkins, January 15, 1864, *ORN*, I, XXI, 36; Report of John B. Marchand, February 15,

1864, *ORN*, I, XXI, 107; Memorandum of Albert J. Myer, July 7, 1864, *ORN*, I, XXI, 363-363; Albert J. Myer to David G. Farragut, July 13, 1864, *ORN*, I, XXI, 373; Milton F. Perry, *Infernal Machines: The Story of Confederate Submarine and Mine Warfare* (Baton Rouge, 1965), 158-159, hereinafter cited as Perry, *Infernal Machines*; Lewis, *Our First Admiral*, 224; Albert J. Myer to David G. Farragut, July 13, 1864, *ORN*, I, XXI, 378; Perry, *Infernal Machines*, 158-159.

⁶¹Still, *Iron Afloat*, 201-202; Johnston, *Battles and Leaders*, 401; Richard B. Irwin, "The Red River Campaign," Robert U. Johnston and Clarence C. Buel (eds), *Battles and Leaders of the Civil War*, 4 vols. (New York, 1887-1888), IV, 356-360, hereinafter cited as Irwin, *Battles and Leaders*; David G. Farragut to Gideon Welles, May 9, 1864, *ORN*, I, XXI, 267; David G. Farragut to William Smith, May 21, 1864, *ORN*, I, XXI, 291; David G. Farragut to James S. Palmer, May 26, 1864, *ORN*, I, XXI, 300.

⁶²Gideon Welles to James W.A. Nicholson, June 7, 1864, *ORN*, I, XXI, 323; Gideon Welles to David D. Porter, June 9, 1864, *ORN*, I, XXI, 379-380; David D. Porter to Gideon Welles, June 14, 1864, *ORN*, I, XXVI, 368; Gideon Welles to David D. Porter, June 25, 1864, *ORN*, I, XXVI, 438; Gideon Welles to David G. Farragut, June 25, 1864, *ORN*, I, XXI, 344.

⁶³David G. Farragut, General Order No. 10, July 12, 1864, *ORN*, I, XXI, 397-398.

⁶⁴Diagram of Rear Admiral Farragut's Line of Battle, August 4, 1864, *ORN*, I, XXI, 404; David D. Farragut to James S. Palmer, July 18, 1864, *ORN*, I, XXI, 398.

⁶⁵David G. Farragut, General Order No. 11, July 29, 1864, *ORN*, I, XXII, 398.

⁶⁶Percival Drayton to Thornton A. Jenkins, August 1, 1864, *ORN*, I, XXI, 394; David G. Farragut to William Smith, August 1, 1864, *ORN*, I, XXII, 395; David G. Farragut to Thornton Jenkins, August 1, 1864, *ORN*, I, XXII, 395-396.

⁶⁷David G. Farragut to Thornton A. Jenkins, August 2, 1864, *ORN*, I, XXII, 401; Lewis, *Our First Admiral*, 259; Edward R.S. Canby to David G. Farragut, July 29, 1864, *ORN*, I, XXI, 390; David G. Farragut to Gordon Granger, August 3, 1864, *ORN*, I, XXI, 403.

⁶⁸Percival Drayton to Thornton A. Jenkins, August 3, 1864, *ORN*, I, XXI, 402; David G. Farragut to Percival Drayton, August 3, 1864, *ORN*, I, XXI, 403; David G. Farragut to Thomas H. Stevens, August 4, 1864, *ORN*, I, XXII, 404.

⁶⁹Abstract log of the USS *Brooklyn*, August 4, 1864, *ORN*, I, XXI, 783; Abstract Log of the USS *Oneida*, August 4, 1864, *ORN*, I, XXI, 838; Abstract from Journal of Captain Marchand, August 4, 1864, *ORN*, I, XXI, 818; Report of Rear-Admiral Farragut, August 12, 1864, *ORN*, I, XXI, 416-417; Lewis, *Our First Admiral*, 263-264; John Coddington Kinney, "Farragut at Mobile Bay," Robert U. Johnston and Clarence C. Buel (eds), *Battles and Leaders of the Civil War*, 4 vols. (New York, 1887-1888), IV, 386-387, hereinafter cited as Kinney, *Battles and Leaders*; Report of Rear-Admiral Farragut, August 12, 1864, *ORN*, I, XXI, 416.

⁷⁰James Alden to David D. Farragut, August 5, 1864, *ORN*, I, XXI, 508; Kinney, *Battles and Leaders*, 387-389; Lewis, *Our First Admiral*, 267; Alfred T. Mahan, *The Gulf and Inland Waters*, (New York, 1885), 231, hereinafter cited as Mahan, *Gulf and Inland Waters*.

⁷¹Kinney, *Battles and Leaders*, 388-389; *Daily Picayune* (New Orleans), August 9, 1864; Chief Engineer John Faron was among those lost in the sinking. Faron had been one of the *Tecumseh's* local inspectors during construction and had left the hospital in Pensacola to participate in the attack.

⁷²David B. Conrad, "What the Fleet-Surgeon Saw of the Fight in Mobile Bay, August, 1864, Whilst on Board the Confederate Ironclad 'Tennessee'," *The United Service* (27) XXVII (September, 1892), 262, hereinafter cited as Conrad, "What the Fleet-Surgeon Saw"; Kinney, *Battles and Leaders*, 388-389; Richard S. West, Jr., *Mr. Lincoln's Navy* (New York, 1957), 266, hereinafter cited as West, *Mr. Lincoln's Navy*; Kinney, *Battles and Leaders*, 388-389.

⁷³Charles F. Langley and Gardner Cottrell to David G. Farragut, August 6, 1864, *ORN*, I, XXI, 490-491; *Daily Picayune* (New Orleans), August 9, 1864.

⁷⁴James Alden to David G. Farragut, August 5, 1864, *ORN*, I, XXI, 508; James Alden to David G. Farragut, August 5, 1864, *ORN*, I, XXI, 508; Alfred T. Mahan, *Admiral Farragut* (New York, 1901), 278, hereinafter cited as Mahan, *Admiral Farragut*; Kinney, *Battles and Leaders*, 390-391; Conrad, "What the Fleet-Surgeon Saw, 262-263.

⁷⁵Richard L. Page, "The Defense of Fort Morgan," Robert U. Johnston and Clarence C. Buel (eds), *Battles and Leaders of the Civil War*, 4 vols. (New York, 1887-1888), IV, 409-410, hereinafter cited as Page, *Battles and Leaders*; Report of Admiral Farragut, August 12, 1864, *ORN*, I, XXI, 417 & 418; Tenney, *Military and Naval History*, 647.

⁷⁶David G. Farragut to Gideon Welles, November 9, 1864, *ORN*, I, 724-725.

⁷⁷David G. Farragut to Gideon Welles, November 9, 1864 *ORN*, I, XXI, 724-725; Gideon Welles to David G. Farragut, November 15, 1864, *ORN*, I, XXI, 427-428.

⁷⁸H. Crane Miller to James J. Stokesberry, March 2, 1967, Correspondence Files, USS *Tecumseh* Collection, Armed Forces History Division. Naval Section. National Museum of American History, Smithsonian Institution, Washington, D.C., hereinafter cited as USS *Tecumseh* Collection, NMAH.; John D. Long to W. C. Taylor, March 26, 1901, USS *Tecumseh* File, Ships' History Branch, Naval Historical Center, Washington Navy Yard, Washington, D.C., hereinafter cited as USS *Tecumseh* File, NHC.

⁷⁹Dudley W. Knox to W. V. Dowling, June 29, 1938, USS *Tecumseh* File, NHC; "Various Naval Items," *Army and Navy Journal*, XIV (July, 1877), 782-783, hereinafter cited as "Various Naval Items," *ANJ*; Joint Resolution #23, August 15, 1876, 44th Congress, 1st Session, USS *Tecumseh* File, NHC.

⁸⁰Ernest W. Peterkin to Robert M. Calland, March 4, 1967, "*Tecumseh* Project" Files, National Armed Forces Museum Advisory Board, Smithsonian Institution Archives, Smithsonian Institution, Washington, D.C., hereinafter cited as "*Tecumseh* Project" Files, SIA; "Various Naval Items," *ANJ*.

⁸¹John D. Long to W.C. Taylor, March 26, 1901, USS *Tecumseh* File, NHC.

⁸²John D. Long to W. C. Taylor, March 26, 1901, USS *Tecumseh* File, NHC; James E. Moore to E. Holmgaard, April 29, 1965, USS *Tecumseh* File, NHC.

⁸³E.M. Miller to Navy Judge Advocate General, September 1, 1965, USS *Tecumseh* File, NHC.

⁸⁴Act of August 30, 1961, Sec. 1 (a), Sec.2(a), Sec.3(a), National Armed Forces Museum Advisory Board Files, Eisenhower Institute for Historical Research, Smithsonian Institution, Washington, D.C., hereinafter cited as NAFMAB Files, EIHR; J. Nicholas Brown to S. Dillon Ripley, December 20, 1974, NAFMAB Files, EIHR; Copy of Agreement Between the Smithsonian Institution and the General Services Administration, June 3, 1966, TECUMSEH Files, Robert S. Edington Papers, Private Collection, Mobile, hereinafter cited as TECUMSEH Files, Edington Papers.

⁸⁵*Tecumseh* PROJECT CHRONOLOGY, October 3-10, 1966, *Tecumseh* Project Files, SIA; Smithsonian Institution, *U.S.S. Tecumseh: Capsule of History*, (Washington, 1970), vi-vii, hereinafter cited as Smithsonian, *Capsule of History*; "TECUMSEH TO BE RAISED," *PORT OF MOBILE*, (August, 1969), 19, hereinafter cited as "TECUMSEH TO BE RAISED," *POM*; *Star* (Washington), February 17, 1967; *News* (Detroit), February 17, 1967; *Times* (New York), February 17, 1967; *Wall Street Journal* (New York), February 17, 1967.

⁸⁶J. O. Wintzell, Jr. vs. SMITHSONIAN INSTITUTION, WESTON INSTRUMENTS, INC., etc., February 20, 1967, TECUMSEH Files, Edington Papers; *Post-Herald* (Birmingham), February 22, 1967; William G. O'Rear to Milo B. Howard, February 20, 1967, TECUMSEH Files, Edington Papers; Milo B. Howard to William G. O'Rear, February 28, 1967, TECUMSEH Files, Edington Papers; Joseph D. Bennett to WHOM IT MAY CONCERN, March 8, 1967, TECUMSEH File, Edington Papers; Claude D. Kelley to Joseph D. Bennett, March 15, 1967, TECUMSEH Files, Edington Papers; Copy of House Joint Resolution #9, Alabama House of Representatives, March 28, 1967, TECUMSEH Files, Edington Papers; Robert S. Edington to John H. Magruder, III, April 24, 1967, TECUMSEH Files, Edington Papers; John H. Magruder, III to Robert S. Edington,

May 10, 1967, TECUMSEH Files, Edington Papers.

⁸⁷*Press-Register* (Mobile), March 26, 1967; *Press-Register* (Mobile), May 9, 1967, August 3, 1967, and December 31, 1967; *Post-Register* (Mobile), July 7, 1967; U.S. District Court of the Southern District of Alabama, Civil Action No.4512-67, hereinafter cited as Wintzell, Civil Action No. 4512-67.

⁸⁸Log of OPERATION Tecumseh, July 7-13, 1967, S. L. "Buster" Miller Papers, Manuscript Collection, City Museums of Mobile, hereinafter cited as Miller Papers, CMM; *Press-Register* (Mobile), July 7 & 11, 1967.

⁸⁹Log of OPERATION TECUMSEH, July 17, 1967, Miller Papers, CMM; Hull plating in ironclads, and planking in wooden vessels, is laid in a continuous line from stem to stern. The inner most strake lying adjacent to the keel is called the garboard or A strake. Each successive strake upward is labelled B, C, D, etc.

⁹⁰H. R. Baker, R. N. Bolster, and others, *Examination of the Corrosion and Salt Contamination of Structural Metal From the USS TECUMSEH* (Washington, 1969), 9, hereinafter cited as Baker, *Examination of Corrosion and Salt Contamination*.

⁹¹TECUMSEH PROJECT CHRONOLOGY, August 23, 1967, Tecumseh Project Files, SIA; Memorandum of J. Stokesberry, August 28, 1970, USS Tecumseh Collection, NMAH; Norman Scott to John H. Magruder, June 18, 1967, USS Tecumseh Collection, NMAH.

⁹²Norman Scott to John H. Magruder, June 18, 1967, USS Tecumseh Collection, NMAH; John H. Magruder to Norman Scott, June 24, 1967, USS Tecumseh Collection, NMAH; W. F. Searle, Jr., to John H. Magruder, June 25, 1967, USS Tecumseh Collection, NMAH.

⁹³W. F. Searle, Jr. to John H. Magruder, June 25, 1967 USS Tecumseh Collection, NMAH; The Civil War gunboat USS *Cairo* was salvaged from the Yazoo River, Mississippi, in the early 1960s. Because of inadequate funding the wreck was left to deteriorate for fifteen years at which time the National Park Service began a restoration project.

⁹⁴REPORT ON THE RECONNAISSANCE OF THE USS TECUMSEH: JULY 29-AUGUST 2, 1968, USS Tecumseh Collection, NMAH

⁹⁵Norman Scott to J. Philip Murphy, October 23, 1968, USS Tecumseh Collection, NMAH; Norman Scott to John H. Magruder, November 11, 1968, "Tecumseh Project" Files, SIA; Smithsonian, *Capsule of History*, vii-ix.

⁹⁶Smithsonian, *Capsule of History*, vii-ix.

⁹⁷Smithsonian, *Capsule of History*, vii-ix, 1-2.

⁹⁸S. Dillon Ripley to Norman Scott, January 10, 1969, Tecumseh Files, E. Joseph Wheeler, Jr. Papers, Private Collection, Washington, D.C., hereinafter cited as Tecumseh Files, Wheeler Papers; Norman Scott to John H. Magruder, December 30, 1968, USS Tecumseh Collection, NMAH.

⁹⁹Peter G. Powers to L. Patrick Gray, III, March 19, 1971, "Tecumseh Project" Files, SIA, Norman Scott to Joe Graham, January 29, 1969, Edington Papers, TECUMSEH Files.

¹⁰⁰S. L. "Buster" Miller to TO WHOM IT MAY CONCERN, May 17, 1969, "Tecumseh Project" Files, SIA, TECUMSEH PROJECT CHRONOLOGY, May 3, 1969, "Tecumseh Project" Files, SIA.

¹⁰¹A. W. d'Angelo to Norman Scott, March 28, 1969, "Tecumseh Project" Files, SIA; Memorandum of J. Stokesberry, August 28, 1970, USS Tecumseh Collection, NMAH; CHRONOLOGY, May 15 & 20, 1969, USS Tecumseh Collection, NMAH.

¹⁰²Peter G. Powers to L. Patrick Gray, III, March 19, 1971, "Tecumseh Project" Files.

¹⁰³Peter G. Powers to L. Patrick Gray, III, March 19, 1971, "Tecumseh Project" Files;

CHRONOLOGY, May 20, 1969, USS Tecumseh Files, NMAH.

¹⁰⁴Peter G. Powers to L. Patrick Gray, III, March 19, 1971, "Tecumseh Project" Files, SIA; Peter G. Powers to S. Dillon Ripley, January 11, 1973, "Tecumseh Project" Files, SIA; *Press-Register* (Mobile), July 8, 1969.

¹⁰⁵*Press-Register* (Mobile), March 10, 1970.

¹⁰⁶John J. Pyne to S. Dillon Ripley, August 20, 1970, USS Tecumseh Collection, NMAH; *Press-Register* (Mobile), March 10, 1970.

¹⁰⁷NATIONAL ARMED FORCES MUSEUM ADVISORY BOARD STAFF REPORT ON TECUMSEH, November 23, 1973, "Tecumseh Project" Files SIA; *Press-Register* (Mobile), December 30, 1972.

¹⁰⁸Peter G. Powers to S. Dillon Ripley, January 11, 1973, "Tecumseh Project" Files, SIA; *Press-Register* (Mobile), December 30, 1972; NATIONAL ARMED FORCES MUSEUM ADVISORY BOARD STAFF REPORT ON TECUMSEH, November 23, 1973, "Tecumseh Project" Files SIA.

¹⁰⁹NATIONAL ARMED FORCES MUSEUM ADVISORY BOARD STAFF REPORT ON TECUMSEH, November 23, 1973, "Tecumseh Project" Files SIA; NATIONAL ARMED FORCES MUSEUM ADVISORY BOARD STAFF REPORT ON TECUMSEH, November 23, 1973, "Tecumseh Project" Files SIA; Copy of Agreement Between the Smithsonian Institution and the General Services Administration, June 3, 1966, TECUMSEH Files, Edington Papers; NATIONAL ARMED FORCES MUSEUM ADVISORY BOARD STAFF REPORT ON TECUMSEH, November 23, 1973, "Tecumseh Project" Files SIA; Robert A. Brooks to Arthur F. Simpson, December 14, 1973, TECUMSEH Files, Edington Papers; Jack Edwards to Arthur A. Sampson, December 14, 1973, TECUMSEH Files, Edington Papers; *Advertiser* (Montgomery), January 10, 1974; U.S. District Court, Washington, D.C., Civil Action No. 55-71, hereinafter cited as EUI, Civil Action No. 55-71.

¹¹⁰*Press-Register* (Mobile), January 4, 1974; Robert S. Edington to Director, National Armed Forces Museum Advisory Board, January 24, 1974, TECUMSEH Files, Edington Papers; *Times* (Huntsville), January 17, 1974.

¹¹¹Robert S. Edington to All Members of the Tecumseh Committee, March 5, 1974, TECUMSEH Files, Edington Papers.

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¹¹⁶Robert S. Edington to George C. Wallace, March 27, 1974, TECUMSEH Files, Edington Papers; Henri M. Aldridge to Horace O. Davis, April 23, 1974, Tecumseh Files, Edington Papers; Horace O. Davis to Henri M. Aldridge, April 25, 1974, TECUMSEH Files, Edington Papers; Henri M. Aldridge to Horace O. Davis, April 29, 1974, TECUMSEH Files, Edington Papers.

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¹¹⁹Friend, *Preliminary Considerations*, ii, 10-11, 17-18.

¹²⁰Friend, *Preliminary Considerations*, 18.

¹²¹Friend, *Preliminary Considerations*, 13.

¹²²Friend, *Preliminary Considerations*, ii, 13, 25; *Post-Herald* (Birmingham), August 1, 1974.

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¹²⁴Donald F. Richards to William H. Hamilton, February 17, 1975, Tecumseh Files, Wheeler Papers; George I. Perryman to E. Joseph Wheeler, August 12, 1975, Tecumseh Files, Wheeler Papers.

¹²⁵Log of OPERATION TECUMSEH, July 17 & 23, 1967, Miller Papers, CMM; Norman Scott to John H. Magruder, November 11, 1968, "Tecumseh Project" Files, SIA; The cut made in the B strake was only 12" x 8" because the divers hit one of the ship's frames. The large plate over the battle-damaged area was made from four 4' by 6' plates welded together. Sand bags were packed around the edges of this plate.

¹²⁶William R. Armistead, and others, "Preliminary Underwater Survey of the USS Tecumseh, October 15, 1977," 10, 13, Report on file with Alabama State Historic Preservation Office, Montgomery, Alabama, hereinafter cited as Armistead, "Preliminary Underwater Survey."

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¹²⁸Rod Farb, "Farb Tecumseh Expedition 1991," 1-2, Report on file with the Director, Naval Historical Center, Washington, DC, hereinafter cited as Farb, "Tecumseh Expedition 1991."

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¹³⁰Thorleif Sjøvold, *The Viking Ships of Oslo* (Oslo, 1985), 6, hereinafter cited as Sjøvold, *The Viking Ships of Oslo*; Olaf Olsen and Ole Crumlin-Pedersen, *The Skuldelev Ships* (Copenhagen, 1967), 73, 77-80, hereinafter cited as Olsen, *The Skuldelev Ships*.

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¹³⁵Gordon P. Watts, Jr. and others, *An Investigation of the Remains of the Confederate Gunboat CSS Chattahoochee* (Greenville, 1990), 24-25, hereinafter cited as Watts, *CSS Chattahoochee*; Naval Historical

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¹³⁶National Park Service, *Alvin Clark*, National Register of Historic Places Inventory - Nomination Form, May 16, 1974, 1-5, hereinafter cited as NPS, *Alvin Clark*.

¹³⁷Dean Allard to Allan W. Beres, 2/22/93, USS *Tecumseh*, Underwater Archeology Files, Naval Historical Center, Washington, hereinafter cited as Underwater Archeology Files, NHC; Allan W. Beres to Dean Allard, 4/26/93, Underwater Archeology Files, NHC; John D. Long to W.C. Taylor, March 26, 1901, USS *Tecumseh* File, NHC.

¹³⁸James E. Moore to E. Holmgard, April 29, 1965, USS *Tecumseh* File, NHC; E.M. Eller to Navy Judge Advocate General, September 1, 1965, USS *Tecumseh* File, NHC; Erroneously, the Director believed that legal abandonment proceedings had been executed by the department as a result of the 1901 finding by NJAG and the custody question remained unresolved for another two decades.

¹³⁹J. O. Wintzell, Jr. vs. SMITHSONIAN INSTITUTE, WESTON INSTRUMENTS, INC., etc., February 20, 1967, TECUMSEH Files, Edington Papers.

¹⁴⁰Cooper, *Naval Management Plan*, 8-12.

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¹⁴²National Oceanic and Atmospheric Administration, *A Look at the Monitor National Marine Sanctuary: Past, Present, and Future* (Newport News, 1994), 9-10, hereinafter cited as NOAA, *A Look at the Monitor*.

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Inventory of Artifacts Recovered from USS *Tecumseh* 1967-1968

The only artifacts that have been legally recovered from *Tecumseh* were taken during the three expeditions conducted during the Smithsonian Institution project in July of 1967, and July and November of 1968. Thirty-one items plus an undetermined number of iron and wood structural samples were inventoried and shipped to Washington, D.C. for curation and analysis. The provenance for these items is very general, or in some cases, unknown.

At the end of the Smithsonian Project in 1974, twenty-two items plus iron and wood samples were transferred from the National Armed Forces Museum Advisory Board to the custody of the Naval Historical Center. The iron hull and frame samples and the fragment of the blower housing were sectioned and tested for preservation and tensile strength qualities. Other than the small section of hull plate on loan to the City Museums of Mobile (see page 15), no intact hull plates or frames removed from the vessel survive intact.

There are twenty jars of various sizes containing iron and wood samples which were analyzed by the Smithsonian's Conservaton and Analytical Laboratory. The larger wood samples, still in solution, are the only surviving examples of diagnostic pieces taken from the interior. The provenance of the wood fragments on page 19 is unknown.

The following pages contain an inventory of the artifacts that are accessioned items of the Curator Branch of the Naval Historical Center and the City Museums of Mobile. These include a photograph, a general description, condition, and location of the artifact. Artifacts, which were on the original Smithsonian inventory, or reported as recovered from *Tecumseh* during the project but whose location is unknown, are listed below. (Descriptions in quotes are taken from the Smithsonian inventory). The artifacts listed below were reported as recovered from *Tecumseh* but do not appear on the Naval Historical Center's inventory and their location is unknown.

- Six brass stanchion rails
- Two human bones - scapula and humerus
- Fragments of one ironstone pot
- One glass bottle - manufactured between 1860-1864
- One wooden block and tackle
- One "iron bolt in wood"
- One stick of kindling wood
- Two unidentified "pipe-like" pieces
- One unidentified piece - "perhaps leather thong"
- One "barbell-shaped concretion"
- One silver candlestick
- One saucer - decorated on obverse side - lattice and seashell pattern.



ARTICLE:	Anchor
SIZE:	9' 1 x 4' w
DESCRIPTION:	Ship's anchor, Trotman style
CONDITION:	Good
LOCATION:	Naval Historical Center, Washington Navy Yard, Washington, D.C.



ARTICLE:	Air Register
SIZE:	11 1/4" Diameter
DESCRIPTION:	Iron vent for regulating air flow to compartments
CONDITION:	Good. Painted Gold
LOCATION:	Navy Memorial Museum, Washington Navy Yard, Washington, D.C.



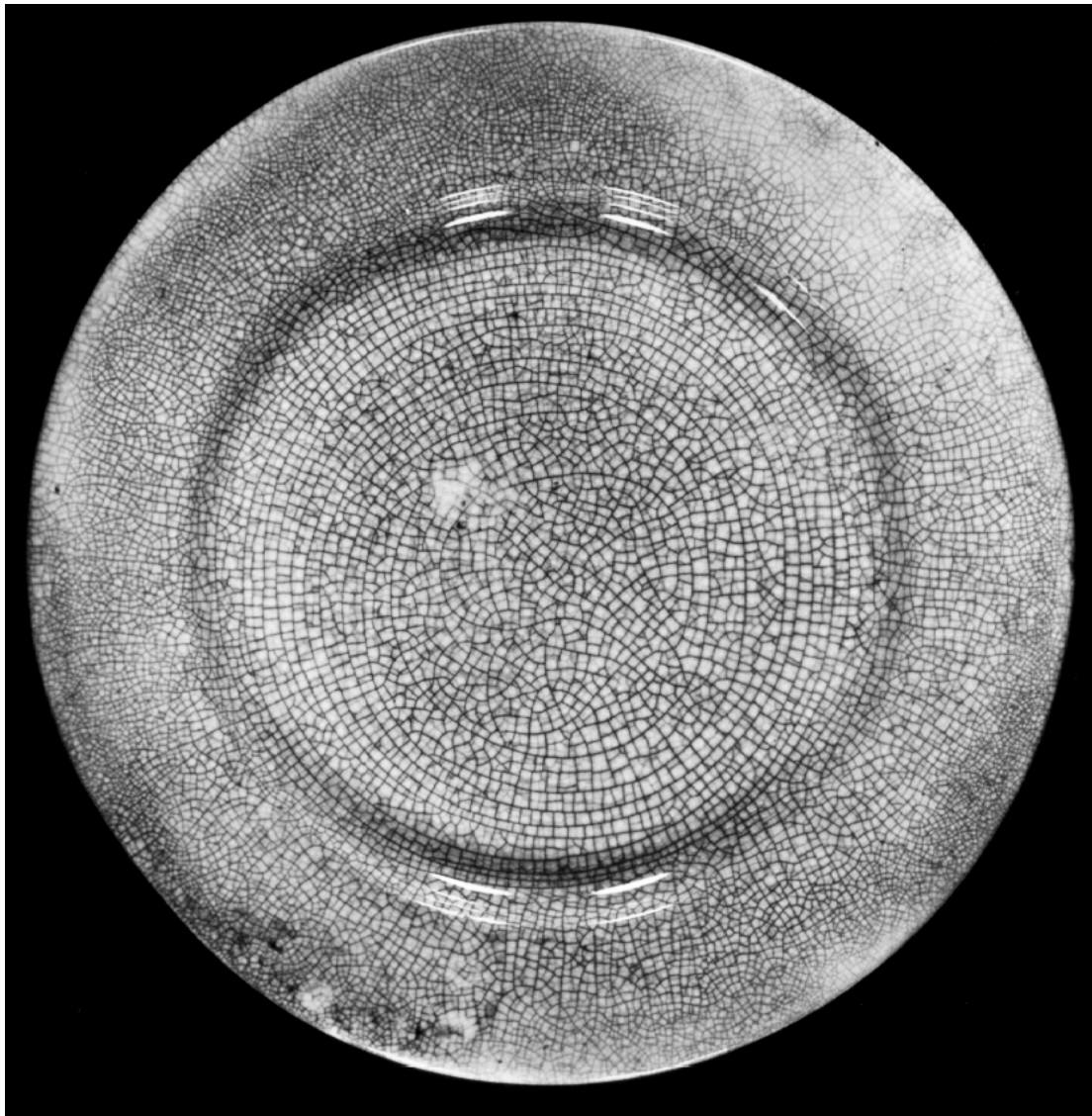
ARTICLE:	Gong
SIZE:	18" Diameter
DESCRIPTION:	Engine room signal gong with clapper
CONDITION:	Good
LOCATION:	Hampton Roads Naval Museum, Norfolk, Virginia



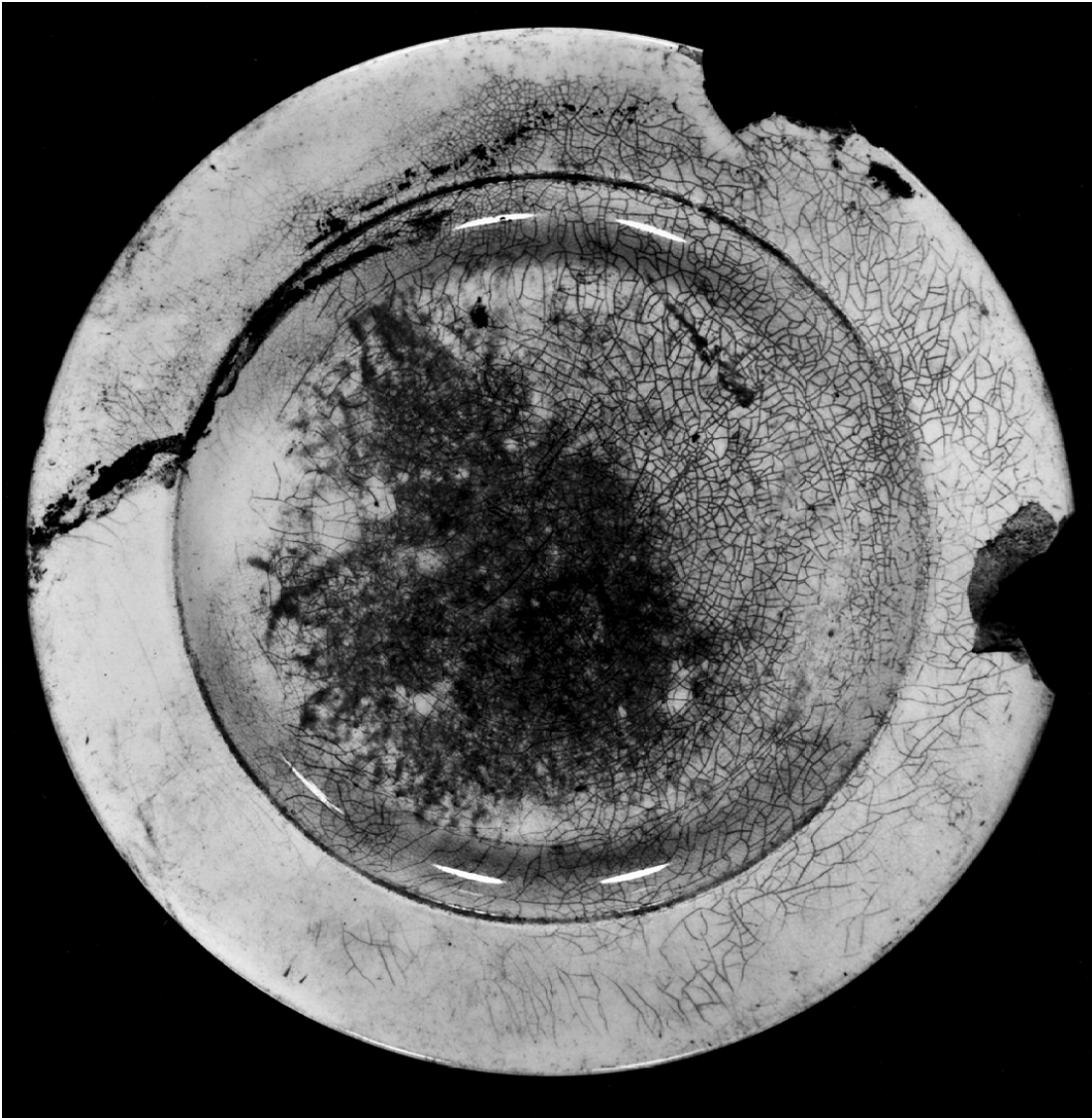
ARTICLE:	Tureen
SIZE:	10 1/4" l x 3 3/4" h
DESCRIPTION:	Ironstone dinnerware from wardroom area
CONDITION:	Good
LOCATION:	Navy Memorial Museum, Washington Navy Yard, Washington, D.C.



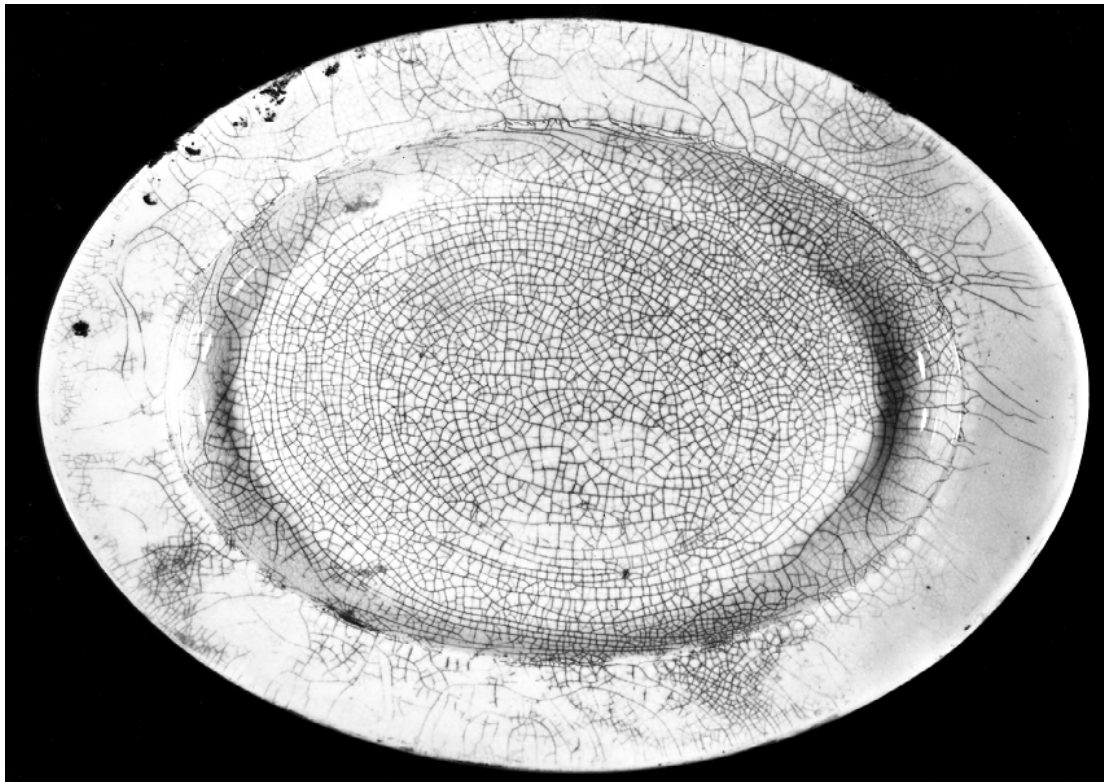
ARTICLE:	Bowl
SIZE:	8 3/8" Diameter
DESCRIPTION:	Ironstone dinnerware from wardroom area
CONDITION:	Good
LOCATION:	Navy Memorial Museum, Washington Navy Yard, Washington, D.C.



ARTICLE:	Plate
SIZE:	9 3/4" Diameter
DESCRIPTION:	Ironstone dinnerware from wardroom area
CONDITION:	Good
LOCATION:	Hampton Roads Naval Museum, Norfolk, Virginia



ARTICLE:	Plate
SIZE:	10 3/8" Diameter
DESCRIPTION:	Ironstone dinnerware from wardroom area
CONDITION:	Fair. Two Large chips at 1 o'clock and 3 o'clock position
LOCATION:	Hampton Roads Naval Museum, Norfolk, Virginia



ARTICLE:	Platter
SIZE:	12 5/8" l x 9"w
DESCRIPTION:	Ironstone dinnerware from wardroom area
CONDITION:	Good
LOCATION:	Hampton Roads Naval Museum, Norfolk, Virginia



ARTICLE:	Plate
SIZE:	8 1/2" Diameter
DESCRIPTION:	Ironstone dinnerware from wardroom area
CONDITION:	Good
LOCATION:	City Museums of Mobile, Mobile, Alabama. Loan from S.L. Miller Family



ARTICLE:	Saucer
SIZE:	5 3/8" Diameter
DESCRIPTION:	Ironstone dinnerware from wardroom area
CONDITION:	Good
LOCATION:	Navy Memorial Museum, Washington Navy Yard, Washington, D.C.



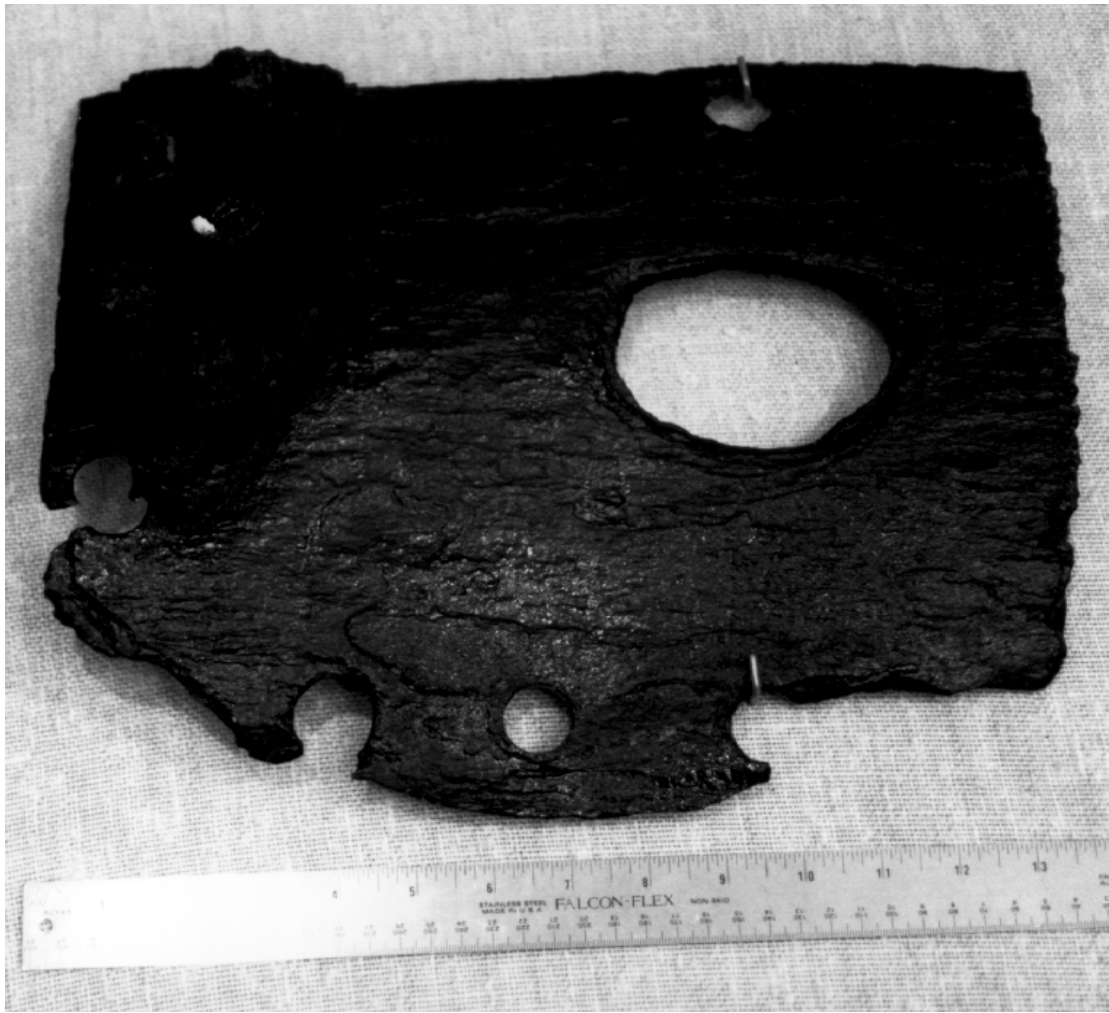
ARTICLE:	Saucer
SIZE:	5 3/8" Diameter
DESCRIPTION:	Ironstone dinnerware from wardroom area
CONDITION:	Good. One Large Chip on Outer Edge
LOCATION:	Navy Memorial Museum, Washington Navy Yard, Washington, D.C.



ARTICLE:	Drinking Glass
SIZE:	4"h x 3"w
DESCRIPTION:	Glass tumbler from wardroom area
CONDITION:	Good
LOCATION:	Navy Memorial Museum, Washington Navy Yard, Washington, D.C.



ARTICLE:	Pulley
SIZE:	10"h x 7"l
DESCRIPTION:	Iron and lignum vitae pulley
CONDITION:	Fair
LOCATION:	Naval Historical Center, Washington Navy Yard, Washington, D.C.



ARTICLE:	Section of Iron Hull Plate
SIZE:	13 1/2" l x 10" h x 1/4" w
DESCRIPTION:	Wrought iron hull plate. Reported to be from torpedo-damaged area.
CONDITION:	Good. Painted black. Corrosion stabilized.
LOCATION:	City Museums of Mobile, Alabama.



ARTICLE:	Chain Links
SIZE:	Three pieces. Two 3" x 2" sections. One fragment, 2" x 2"
DESCRIPTION:	Identified as wrought iron steering chain links
CONDITION:	Fair. Painted Black. Corrosion stabilized
LOCATION:	Fort Morgan State Historic Site, Mobile Point, Alabama



ARTICLE:	Brass Finial
SIZE:	2 1/2"h x 1 3/4"w
DESCRIPTION:	Identified as threaded finial for top of stanchion
CONDITION:	Good
LOCATION:	Naval Historical Center, Washington Navy Yard, Washington, D.C.



ARTICLE:	Coal
SIZE:	1 1/2" x 2" & 1" x 1"
DESCRIPTION:	Two pieces of coal from engine room area
CONDITION:	Good
LOCATION:	Naval Historical Center, Washington Navy Yard, Washington, D.C.



ARTICLE:	Wood Fragments
SIZE:	Various
DESCRIPTION:	Remains of wood samples taken from interior of vessel
CONDITION:	Poor
LOCATION:	Naval Historical Center, Washington Navy Yard, Washington, D.C.



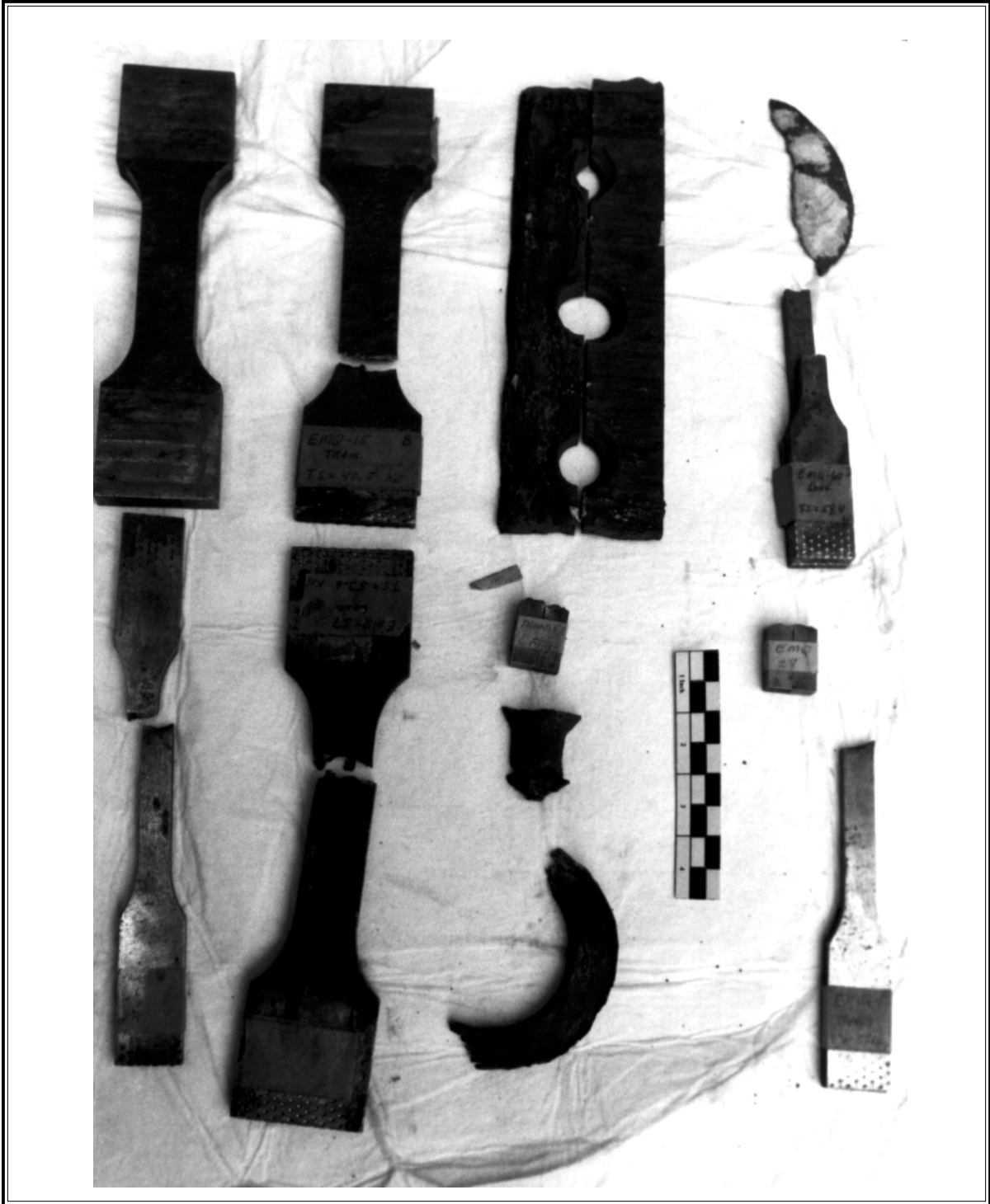
ARTICLE:	Base and Stem
SIZE:	Base: 5" diameter, Stem: 6" long
DESCRIPTION:	Identified as base and stem of pewter salver
CONDITION:	Good
LOCATION:	Naval Historical Center, Washington Navy Yard, Washington, D.C.



ARTICLE:	Burlap Cloth
SIZE:	25 1/2"l x 18"w overall
DESCRIPTION:	Identified as two pieces of burlap cloth taken from engine room area.
CONDITION:	Poor
LOCATION:	Naval Historical Center, Washington Navy Yard, Washington, D.C.



ARTICLE:	Section of Deck Plate
SIZE:	20"l x 4"w
DESCRIPTION:	Section of cast iron deck plate removed from engine room area
CONDITION:	Good
LOCATION:	Naval Historical Center, Washington Navy Yard, Washington, D.C.



ARTICLE:	Hull and Deck Plate Iron Samples
SIZE:	Various
DESCRIPTION:	Remains of hull and deck plate samples taken from vessel for analysis
CONDITION:	Good
LOCATION:	Naval Historical Center, Washington Navy Yard, Washington, D.C.



ARTICLE:	Broken crockery
SIZE:	Unknown
DESCRIPTION:	Ironstone pot from wardroom area
CONDITION:	Unknown
LOCATION:	Unknown



ARTICLE:	Human Bones
SIZE:	Unknown
DESCRIPTION:	Humerus and scapula taken form engine room area of vessel
CONDITION:	Unknown
LOCATION:	Unknown



ARTICLE:	Stanchions
SIZE:	Unknown
DESCRIPTION:	Identified as brass stanchions for deck and turret. From lower turret chamber.
CONDITION:	Unknown
LOCATION:	Unknown

TECUMSEHPROJECT

TASKMILESTONES

Prepared by
National Armed Forces Museum Advisory Board
Smithsonian Institution

November 1968

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TASK NO. I

TENTATIVE SELECTION OF A CONTRACTOR

Objective:

On the basis of preliminary proposals, select a Prime Contractor responsible for the underwater, waterborne, and shipyard operations involved in the recovery of TECUMSEH and moving her to a restoration center in the Mobile area.

Requirements:

1. Contractor must demonstrate understanding of total project.
2. Contractor must demonstrate reliability of potential subcontractors.
3. The Smithsonian Institution (SI) must have adequate finances available to sustain the project once it has begun.

Participants/Interests:

Director, National Armed Forces Museum Advisory Board (NAFMAB).....	Prime interest
Prime Contractor.....	Prime interest
Supervisor of Salvage, U.S. Navy.....	Salvage Advisor to NAFMAB
Subcontractors.....	Advisors to Prime Contractor
Assistant Secretary, SI.....	Advisor to NAFMAB
General Counsel, SI.....	Advisor to NAFMAB
Contracting Officer, SI.....	Advisor to NAFMAB
Chairman, NAFMAB.....	Information
Secretary, SI.....	Information
Assistant Secretary (Science), SI.....	Information
Assistant Secretary (History and Art), SI.....	Information
Director of Museums, SI.....	Information
Assistant to the Secretary (Development), SI.....	Information
Director of Academic Programs, SI.....	Information
Director of Public Affairs, SI.....	Information

Discussion:

At this stage, the prospective prime contractor should be in a position to make a preliminary proposal. On the basis of demonstrated ability and in the absence of any disqualifying factor, it is proper at this time to assure him of a contract to be awarded at such time as all requirements have been met. This permits him to proceed with his planning, subcontract negotiations, and preparation of a detailed proposal.

TASK NO. 2 FINAL ENGINEERING INSPECTION

Objective:

Complete the collection of engineering data to support salvage and restoration planning.

Requirements:

1. Examine selected deck beams and determine: (a) the condition of the bolts and bolt holes where the beams are fastened to the frame members; (b) the condition of the beams with respect to marine borer damage and waterlogging.
2. Take soil samples in the vicinity of the ship to support cofferdam studies.
3. Take hull plate measurements necessary to support the development of a shell plate drawing.

Participants/Interests:

Prospective Prime Contractor.....Prime interest
 Representative NAFMA.....Prime interest and overall project continuity
 Representative, Supervisor of Salvage, U. S. Navy.....Inspection and project continuity
 S. L. Miller, diver (participant in all previous inspections).....Project continuity

Discussion:

Previous inspections have produced information relative to the condition of the iron, the general integrity of the ship, and some indication concerning the condition of the artifacts within, but have stopped short of getting necessary information about the wood structural members.

Information about the shell plate pattern is needed to determine optimum size and location of entryways to avoid degrading the strength of the ship unnecessarily.

From the information thus obtained, the assumptions reflected on the following chart can be narrowed to permit detailed planning.

TASK NO. 2--Cont'd:

	OPTIMISTIC	MOST LIKELY	PESSIMISTIC
<p>CONDITION OF WOOD STRUCTURES</p>	<p>Timbers in good condition and jointures tight.</p>	<p>Timbers show intermittent or minor damage which can be repaired in place.</p>	<p>Timbers are damaged beyond repair and will not support the ship.</p>
<p>EFFECT ON LIGHTENING SHIP & RECOVERING ARTIFACTS</p>	<p>Remove only loose or fragile items.</p>	<ol style="list-style-type: none"> 1. Remove loose or fragile artifacts. 2. Dismantle and remove equipment as necessary to make room for damage control measures. 	<ol style="list-style-type: none"> 1. Remove all loose material. 2. Dismantle and remove ship's equipment.
<p>EFFECT ON SALVAGE METHODS</p>	<p>Any reasonable maneuver.</p>	<p>Choice of maneuvers may be somewhat restricted.</p>	<p>Stripped hull sections and other structures must be lifted separately.</p>

TASK NO. 3

ACTIVATE KEY PROJECT PERSONNEL

Objectives:

To activate a nucleus of project personnel so that familiarization can be completed and functional duties started at the earliest possible time.

To ensure timely recruitment and processing of all permanent project personnel.

Requirements:

1. Initial activation of personnel:
 - Admin. Officer (GS-9 level) - Private funds
 - Historian (GS-9) NAFMAB - Existing SI billet
 - Lab. Supervisor (GS-9 level) - Private funds
2. Program subsequent recruitment as required by T/O's (see pp. 38-39).
3. Non-SI personnel selected for these jobs should be hired for project duration, an estimated three years.

Participants /Interests:

Director, NAFMAB.....Job descriptions, applicant interviews and recommendations as to selection
 Director of Personnel, SI.....Recruit, hire and process
 Chief Conservation Analytical Lab, SI.....Advise on selection of laboratory personnel and consultants

Discussion:

Administrative Officer. The incumbent should be a generalist with wide experience in working with people in various functional areas of administration.

Historian. Maintain day-to-day operational records, keep the project diary, and serve as historical research consultant.

Laboratory Supervisor. Supervise preservation activities. Because of the variety of specialized knowledge and skills involved, he will of necessity rely heavily on the advice of consulting professional and technical conservators.

TASK NO. 4 PROJECT ORIENTATION

Objective:

To define the project and its relation to participants, skills, environment and times.

Requirements:

1. Collation and correlation of all project data.
2. Continued investigation in all areas concerning the project.
3. Briefing of all participants.
4. Establish working relationships.
5. Prepare initial schedules and revise as increased experience visibility permits.

Participants/Interests:

Key Project Personnel.....	Total involvement
Prime Contractor.....	Direct involvement
Project advisors.....	Direct involvement

Discussion:

There is a requirement for an on-site project information center equipped with background correspondence, studies, reports, technical reference material, etc. The project files will be assembled and supervised by the project historian.

At this stage, key project personnel should familiarize themselves with other important ship restoration projects, such as VASA, CAIRO, and STAR OF INDIA.

Briefing will be a continuing process. Emphasis and level of detail will depend on the nature and degree of involvement of the parties concerned, varying from the minute details of a laboratory procedure, to the general information contained in a news release. The importance of appropriate dissemination of information cannot be overemphasized.

In addition to the participants listed above, many other individuals and groups have a bona fide interest in this project. Whether these interests be large or small, real or implied, they must be given proper consideration as indicated in the following:

Smithsonian Institution.....	Responsibility to the American public. Proprietary interest and responsibility.
General Services Administration.....	Legal obligation in the disposition of federal property.
Supervisor of Salvage (U.S. Navy).....	Explicit interest in all salvage matters. The principal consultant to the SI on marine salvage.
Bureau of Medicine and Surgery (U. S. Navy).....	Responsible for remains of the crew.

Director of Naval History (U. S. Navy)..... Appropriate funeral and interment arrangement for remains of the crew.

U. S. Army Corps of Engineers..... Explicit in their responsibilities for rivers and harbors.

U.S. Coast Guard..... Explicit in their mission pertinent to potential hazards to navigation.

Donors (Financial)..... Patronage.

Contributors of labor, knowledge, skills, etc..... Recognition of their services.

State of Alabama..... Implied interest because of geography.

Local communities..... Pride of involvement affect on tourism.

Local museums..... Natural acquisitiveness.

Local historical societies and groups..... The need to identify with local history.

Historians and curators (general)..... A project that promises to provide new insights into an important historical event.

Contractors..... Explicit through contractual agreement.

Descendants of the crew..... Legal disposition of identified remains; perhaps some priority to information.

News media..... Important newsworthy event in the public domain.

General public..... Genuine interest; normal curiosity.

Employees..... Identification with project; sense of achievement.

TASK NO. 5

CONTRACT NEGOTIATIONS

Objective:

To negotiate a contract assigning responsibility for: (1) all aspects of the project involving underwater, waterborne, and shipyard operations; (2) specified tasks relating to restoration.

Requirements:

1. Prime Contractor must have demonstrated understanding of total project.
2. Contractor must have demonstrated reliability of his subcontractors.
3. The Smithsonian Institution must have adequate finances available to sustain the project once it has begun.

Participants/Interests:

Director, NAFMAB.....	Establishes contract requirements
Prime Contractor.....	Meeting requirements and receiving a contract
Supervisor of Salvage, U.S. Navy.....	Principal salvage advisor to Director, NAFMAB
Subcontractors.....	Advisors to Prime Contractors
Assistant to the Secretary (Development).....	Financial resources
General Counsel.....	Legal aspects
Contracting Officer.....	Preparation and awarding of contracts
Chairman, NAFMAB.....	Approve final proposal
Secretary, Smithsonian Institution.....	Approve final proposal
Director of Public Affairs.....	News release
Assistant Secretary.....	Information
Assistant Secretary (History and Art).....	Information
Assistant Secretary (Science).....	Information
Director of Museums.....	Information
Director of Academic Programs.....	Information

Discussion:

At this stage, the Prime Contractor will have completed his studies, selected his subcontractors, and be prepared to enter formal contract negotiations. Preliminary informal conferences between the principals will have established mutual understanding of project: the concept, organization, tasks, requirements, performance standards, restraints and other elements established by the Director, NAFMAB.

The salvage plan in particular to be reviewed and approved by the Supervisor of Salvage.

TASK NO. 6

PREPARE RECOVERY SITE

Objective:

Construct at the recovery site a facility to control the underwater environment and to support recovery operations.

Requirements:

1. Construct a cofferdam to isolate the wreck.
2. Construct facilities and work areas afloat to support salvage operations and the recovery and initial processing of artifacts

Participants/Interests:

Prime Contractor.....	Contract responsibility
Subcontractors.....	Specified responsibilities
Supervisor of Salvage - U.S. Navy.....	Inspection
Corps of Engineer - U.S. Army.....	Cofferdam advisor to Supervisor of Salvage
U.S. Coast Guard.....	Area navigation and water safety
Alabama Water Patrol.....	Territorial
SI Project Personnel.....	Organization of the Artifacts - Recovery Barge

Discussion:

The cofferdam is intended to accomplish the three following principal objectives: (1) insulate salvage site from external sea conditions; (2) permit lowering of water depth in this cofferdam to point where hull is just covered by water; and (3) permit clarification of water inside cofferdam.

Clarification and lowering of water within the cofferdam will afford optimum visibility and significantly increase operational efficiency and safety, as well as providing for a continuous underwater photography capability.

TASK NO. 7

ACTIVATE FIELD PRESERVATION LABORATORY

Objective.

To establish a facility adjacent to the recovery area to perform timely field preservation on all objects recovered from vessel.

Requirements:

1. Prepare, equip and stock a suitable work facility ready to operate in time to meet recovery schedules.
2. Assemble and train Project Personnel (See Tables of Organization, Pages 38-39).

Participants/Interests:

Administrative Officer.....	Functional
Historian.....	Functional
Lab. Supervisor.....	Functional
Fort Morgan Historical Commission.....	Possible use of Fort Morgan facilities
Contractor.....	Coordination and assistance

Discussion:

The Field Preservation Laboratory will be the initial Project headquarters. While its primary function will be preservation and storage of recovered items, it must accommodate the collateral functions of administration and historical record keeping.

The resident Secretary of the Fort Morgan Historical Commission has indicated that facilities within the Fort complex may be available for laboratory and storage space.

Objectives:

To reduce the weight of the hull to facilitate salvage.

To remove loose or fragile artifacts to prevent loss or damage during salvage operations.

Requirements:

1. Disconnect the turret-pilot house assembly.
2. Salvage coal (100+ tons).
3. Desilt interior.
4. Recover artifacts.
5. Establish procedures for handling critical items, such as human remains and ammunition components.
6. Accurate recording of location from which each item is removed.
7. Provide for the safety of loose material to be left in hull until it can be removed in shipyard facility.

Participants/Interests:

Prime Contractor.....	Responsible for underwater activities
Project Personnel.....	Handling of artifacts during the recovery operations
Project Historian.....	Record keeping
Supervisor of Salvage, U.S. Navy.....	Inspections
Various consultants and advisors.....	Specified interests
News media.....	Unusual recoveries

Discussion:

The extent to which the hull must be lightened is a matter for the salvors to determine. It is obvious, however, that the interior must be desilted to permit retrieval of artifacts and lifting of vessel.

During the desilting process, archeological requirements assume major importance. The Salvage Plan must recognize this aspect and provide for close coordination between the salvors and the archeologists.

Past inspections have revealed the presence of human skeletons and indicate that those of more than ninety crew members will be encountered. Special procedures will be established for handling human remains.

A critical factor is the presence of ammunition components. It will be the contractor's responsibility to provide technical expertise in this field and to indoctrinate divers in the identification and safe handling of ammunition components.

It is anticipated that some material, because of its size, will not be removed from the hull at this time (furniture, partitions, removable bulk heads, etc.). Measures must be devised to ensure safe stowage during salvage maneuvers.

TASK NO. 9 DOCUMENT THE PROJECT

Objective:

Record keeping necessary to coordinate all phases of operation and maintain complete historical documentation of the project.

Requirements:

- Maintain the following records: Recovery Log
- Master Inventory
- Laboratory Records
- Restoration Log
- Project Diary

Participants/Interests:

Project Historian.....	Overall record keeping responsibility
Field Lab. Supervisor.....	Maintain Field Laboratory records
Conservation and Analytical Lab. (SI).....	Provide pertinent records
Outside labs.....	Provide pertinent records
Salvage personnel.....	Furnish recovery information
Consulting curators.....	Assistance and advice

Discussion:

The scope of these records should assure complete documentation of project operations. Functions will be fully described in standard operating procedures.

TASK NO. 10

PERFORM FIELD PRESERVATION

Objective:

To take immediate, positive steps to preserve recovered material until it can be removed to a more elaborate facility for scheduled treatment under controlled conditions.

Requirements:

1. Be prepared to treat all materials known or anticipated to be in the hull.
2. Maintain detailed treatment records for each item processed.

Participants:

Lab. Supervisor.....	Prime responsibility
Consulting conservationists.....	Technical advice; establish procedures
Prime Contractor.....	Assistance as required

Discussion

Specialized knowledge and skills will be required in handling the wide variety of materials encountered. It will be necessary to rely heavily on consultants from various departments of the Smithsonian, industry and other research activities.

Objective:

Bring hull to the surface and prepare it for movement to a shore facility.

Requirements:

- 1. See Salvage Plan.
- 2. Anticipate and provide for public interest and participation.

Participants/Interests:

Prime Contractor.....	Supervision
Subcontractor (marine salvage).....	Direct responsibility
Supervisor of Salvage/U. S. Navy.....	Plan approval and operational inspection
Official visitors.....	General and specific interest
General public.....	Curiosity
News media.....	Newsworthy event
U.S. Coast Guard.....	Public safety

Discussion:

The most dramatic event of the project will be when the ship finally breaks surface.

Objective:

Establish a center in the Mobile, Alabama area to receive and restore TECUMSEH.

Requirements:

- 1. Timely activation of the center to ensure continuity of preservation measures already started at salvage site.
- 2. Center must include:
 - Drydock for the hull
 - Inside and outside work and storage areas
 - Provision for maximum public display of the restoration process
 - Security
- 3. Early coordination with local individuals and groups.
- 4. Maximum reliance on local contributions of land use, facilities, and volunteer work.

Participants/Interests:

Director, NAFMAB.....Negotiations for local assistance
 Local individuals and groups.....Participation
 Key Project Personnel..... Coordination; orderly displacement from the Field Preservation Lab.

Discussion:

The TRC will be designed to afford limited, controlled access by the public in such areas as is possible.

TASK NO. 13 MOVE HULL TO SHIPYARD FOR PERMANENT REPAIRS AND STEP I DISASSEMBLY

Objective:

To make hull seaworthy and accomplish major disassembly necessary for cleaning and preservation.

Requirements:

1. Make permanent repairs to the hull.
2. Battle damage to bottom should be preserved.
3. Remove large or heavy equipment, such as boilers, condensers, etc., that cannot be removed except at a shipyard.

Participants/Interests:

Prime Contractor.....	Coordination
Subcontractor (Salvage).....	Deliver the ship
Subcontractor (Shipyard).....	Receive ship and perform necessary work
Project Director.....	Assessment of ship's condition
Various consultants.....	The first opportunity to examine the ship under normal conditions
Project Historian.....	Provide for Recovery Log

Discussion:

This step will be a pivot point in the project, providing opportunity for total assessment of the ship's condition and furnishing a firm basis for planning future operational steps.

TASK NO. 14 RECOVER TURRET-PILOTHOUSE AND SEARCH SITE FOR STRAY ARTIFACTS

Objective:

To recover the turret-pilot house and small artifacts that may have become separated from the ship.

Requirements:

1. Recover the turret-pilot house and all related material.
2. Conduct a thorough, grid-controlled, archeological search of the recovery site to ensure recovery of stray artifacts.

Participants/Interests:

Prime Contractor..... Contract responsibility
Subcontractor (Salvage)..... Contract responsibility
Project Historian..... Maintain record keeping at the recovery site until all operations are completed

Discussion:

The turret-pilot house assembly will contain equipment that will have to be removed before lifting. Most important to future display are the guns, gun carriages, and the fire control equipment.

Ammunition will most certainly be encountered and require special handling. It is also very probable that the 15-inch guns are loaded and will require special handling.

TASK NO. 15

DISPLACE FIELD PRESERVATION LABORATORY TO THE
TECUMSEH RESTORATION CENTER

Objective:

The timely and orderly transfer of activity from the Field Preservation Laboratory (FPL) at Fort Morgan to the Tecumseh Restoration Center (TRC) in the Mobile area.

Requirements:

1. Maintain continuity of record keeping.
2. Maintain physical security of artifacts.
3. Maintain continuity of preservation treatments already started.

Participants/Interests,

Key Project Personnel.....Maintain continuity of activity during transfer
Prime Contractor.....Coordination and assistance

Discussion:

The TRC must be ready to assume the function of the YPL prior to, transfer of activity, materials, and personnel. In the interest of personnel utilization, the transfer should be made as rapidly as possible.

TASK NO. 16 MOVE TURRET-PILOT HOUSE AND OTHER MATERIALS FROM
RECOVERY SITE TO TECUMSEH RESTORATION CENTER

Objective:

To provide for the movement of final recoveries from the recovery site directly to the TRC.

Requirement:

Establish special measures to provide for the protection of final recovery, while in transit to the Mobile area.

Participants/Interests:

Prime Contractor..... Salvage Plan and coordination
Subcontractor (Salvage)..... Deliver material on shore at the Restoration Center
Key Project Personnel..... Preservation measures enroute and after arrival

Discussion:

Because of displacement of FPL, field preservation of final recoveries must be accomplished while enroute to TRC.

Turret, guns, and other large items must be treated with surface corrosion inhibitors.

TASK NO. 17 MOVE DISASSEMBLED EQUIPMENT FROM SHIPYARD TO
TECUMSEH RESTORATION CENTER

Objective:

To provide for the movement of material from the shipyard to the TRC.

Requirements:

1. Maintain necessary anti-corrosion measures during transit.
2. Coordinate delivery of material to TRC.

Participants/Interests:

Prime Contractor.....	Salvage Plan and coordination
Subcontractor (Salvage).....	Deliver material on shore at TRC
Project Personnel.....	Preservation enroute and after arrival

TASK NO. 18 MOVE HULL FROM SHIPYARD TO TECUMSEH RESTORATION CENTER

Objective:

To move hull from shipyard to a prepared graving dock at the TRC.

Requirements:

1. A graving dock at the TRC must be prepared and ready to receive the hull.
2. Protection of hull surfaces from corrosion must be maintained enroute.
3. Close coordination with the TRC to ensure proper tagging of incoming materials.

Participants/Interests:

Prime Contractor.....	Salvage Plan and coordination
Subcontractor (Salvage).....	Deliver material on shore at the TRC
Project Personnel.....	Preservation enroute and after arrival

Discussion:

There is a strong possibility that the turret-pilot house, boilers, and other heavy lifts, must be placed ashore at the TRC before the hull enters the graving dock.

Objective:

To complete the removal and disassembly of equipment to permit total cleaning and preservation.

Requirements:

1. Remove all equipment from the hull that cannot be cleaned in place or that prevents access to other surfaces that require cleaning.
2. Disassembly of equipment as necessary to ensure thorough cleaning and preservation.

Participants/Interests:

Lab. Supervisor.....	Work scheduling
Historian.....	Record-keeping (Recovery Log & Inventory)
Consultants.....	Specific interests
Official visitors.....	Varied interests
General public.....	General interest

TASK NO. 20 CLEAN, PRESERVE, AND RESTORE HULL, SHIP'S EQUIPMENT, AND ARTIFACTS

Objectives:

To clean, preserve and restore all major components of the ship and all related material, preparatory to reassembly.

To provide an opportunity for technical research and developmental study in the field of conservation.

Requirements:

1. Skillful application of proven preservation methods.
2. Make maximum use of consultants from the museum fields and from industrial and other technical research activities.

Participants/Interests:

Lab. Supervisor.....	Work scheduling and overall supervision
Chief, Conservation-Analytical Lab., SI.....	Principal Consultant
U.S. Naval Research Lab.....	Preservation research
Consultants.....	Advise and guidance in specific areas
Participants from Academic Programs.....	Work/Study/Research in specified areas
Contractors.....	(Contract work will be sought for specialized or one-time tasks)
Permanent Project Personnel.....	Work progress and continuity
Volunteers.....	Specific tasks
Director of Academic Programs, SI.....	Select and assign college level interns, graduate students, etc.

Discussion:

The Tecumseh Restoration Center will be manned by the minimum regular force necessary to ensure continuity and steady progress augmented by consultants, volunteers, and participants from academic programs.

A volunteer force recruited through local organizations, such as the Chamber of Commerce, Junior Chamber of Commerce, Junior League, Boy Scouts of America, etc. , should be organized to accomplish special tasks, ranging from docent work and visitor control, to actual participation in restoration work.

The Tecumseh Project should provide unique opportunities for exploitation by the Office of Academic Programs:

1. On-the-job training in a variety of museum specialties.
2. Scholarly study and research.

Objective:

To schedule and perform initial reassembly.

Requirements:

1. Determine the extent of reassembly to be accomplished prior to movement to the Washington, D. C. area.
2. Reassemble and reinstall designated equipment.

Participants/Interests:

Lab Supervisor.....	Planning and supervision
Historian.....	Reassembly Log and Inventory
Contractors.....	Specialized work
Consultants (General).....	Continuing requirement
Consultants (Naval Architecture).....	Weight and balance factors
Regular Project Personnel.....	Normal functions
Academic Program participants.....	Continuing requirement
Volunteers.....	Continuing requirement

Discussion:

The extent of reinstallation will be governed by weight and balance safety factors established for movement of the ship through open water to the Washington, D.C. area.

TASK NO. 22

MOVE HULL AND NECESSARY COMPONENTS TO NORFOLK, VIRGINIA
AREA FOR STEP 2 REASSEMBLY

Objective:

To stage the hull and major components into the Norfolk area for reassembly in a shipyard facility.

Requirements:

1. Determine nature and extent of work to be accomplished at Norfolk and contract for performance.
2. Arrange for movement of hull and material to Norfolk.
3. Coordinate movement and shipyard availability.
4. Prepare material as required to ensure against loss or damage during transit.

Participants/Interests:

Project Director.....	Contract negotiations
Regular Project Personnel.....	Establish shipping priorities
Consultants (Naval Architecture)	Weight and balance of hull, and recommendations concerning safety enroute
Contractors.....	Contractual responsibilities
U.S. Navy.....	Assistance
Director, Public Affairs, SI.....	Normal news releases
News media.....	Normal interest

Discussion:

This step presupposes that, to maintain favorable balance and reserve buoyancy, the hull will be moved through open water without the turret and other heavy items in place.

Norfolk, Virginia is the last area enroute where heavy reassembly can be accomplished, and because the trip from Norfolk to Washington lies within protected waters, movement of the fully reassembled ship will be relatively safe.

The Norfolk area, particularly the James River, TECUMSEH's original battle station, might provide a suitable holding area once she is fully reassembled, should the need arise for a stretch-out in the arrival schedule at the National Armed Forces Museum Park.

TASK NO. 23 PREPARE DISPLAY SITE IN THE NATIONAL ARMED FORCES MUSEUM-PARK

Objective:

Provide final display site for TECUMSEH.

Requirements:

1. Congressional approval of National Armed Forces Museum Park (NAFM-P).
2. Negotiations with National Park Service.

Participants/Interests:

Congress.....	Action on NAFMAB
National Park Service.....	Site negotiations
NAFMAB.....	Planning
Secretary, SI.....	Approval

Discussion:

This is a long range planning item. Detailed coordination will be accomplished as required.

TASK NO. 24

MOVE ARTIFACTS FROM TECUMSEH RESTORATION CENTER TO NATIONAL ARMED FORCES MUSEUM-PARK

Objective:

Assemble all TECUMSEH material at the final display site in the Washington, D.C. area.

Requirements:

- 1. Prepare and ship materials and equipment remaining at TRC, Mobile to final display site.
- 2. Prepare suitable storage facility in Washington area.

Participants/Interests:

Project Director.....	Coordination
Historian.....	Record keeping
Administrative Officer.....	Shipping and receiving
Lab Supervisor.....	Preservation and packaging

Discussion:

The amount of material involved in this task will be determined during Reassembly, Steps I and 2 (see Tasks 21 and 22).

Objective:

The orderly roll-up of the TRC, and transfer of activities to the Washington, D. C. area.

Requirements:

- 1. Determine as far in advance as possible disposition made of facilities and supplies.
- 2. Start phaseout as soon as the work load begins to taper off.
- 3. Follow standard procedures in disposing of surplus property.

Participants/Interests:

Project rear echelon.....	Responsibility
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Discussion:

A Standard Procedure will be prepared to cover property disposal.

TASK NO. 26 MOVE SHIP FROM NORFOLK, VIRGINIA AREA TO DISPLAY SITE

Objective:

To coordinate the activities incident to the arrival of TECUMSEH in the Washington, D.C. area.

Requirements:

1. Arrange for movement and docking of TECUMSEH.
2. Arrange appropriate ceremonies.

Participants/Interests:

Project Director.....	Movement and docking of TECUMSEH
Regular Project Personnel.....	Site preparation and docking
Director, NAFMAB.....	Ceremonies

TASK NO. 27 INSTALL SHIP IN DISPLAY BERTH

Objective:

Install TECUMSEH in her permanent display berth where she can be readied for public display.

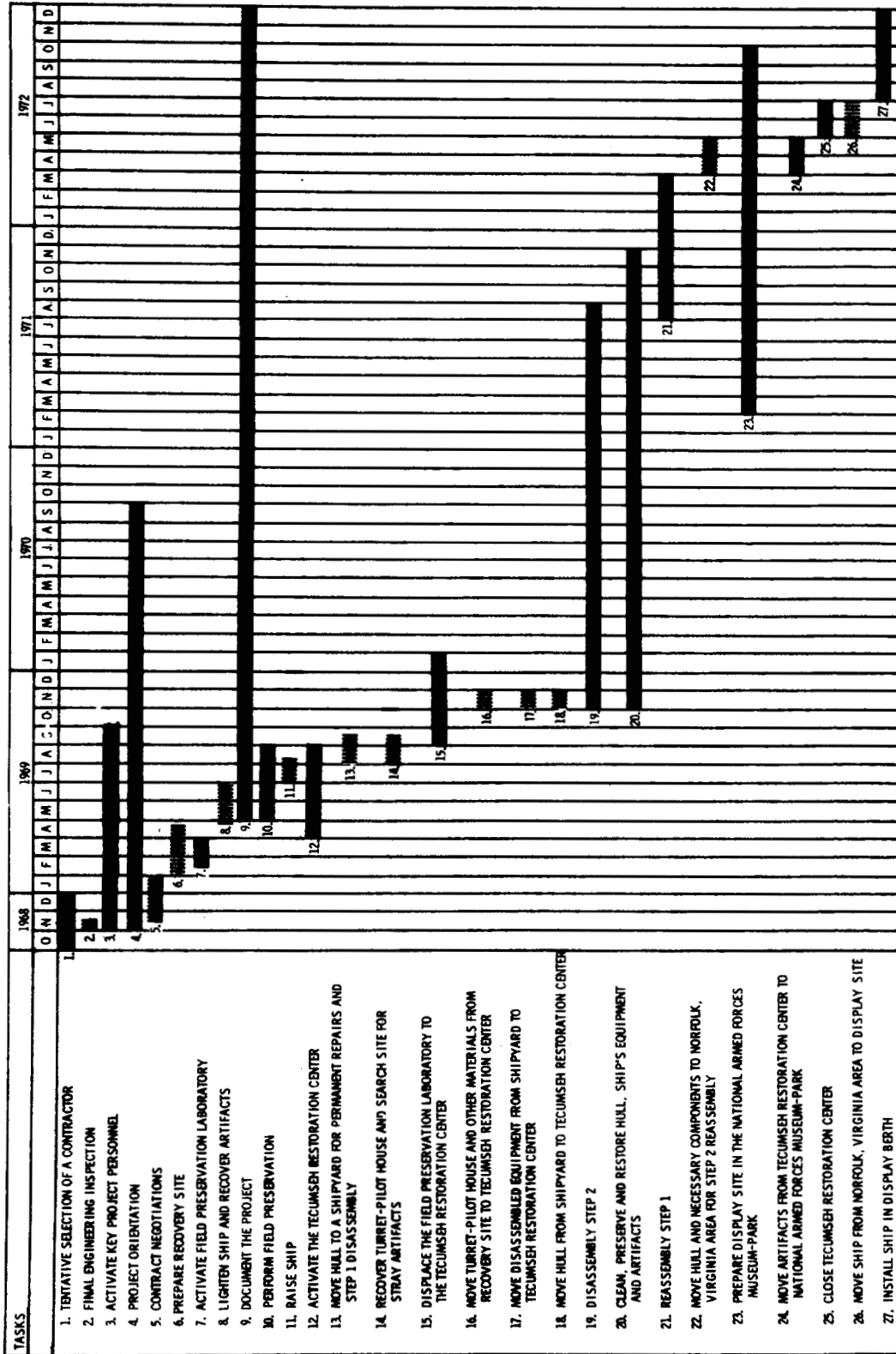
Requirement:

See Display Plan

Participants/Interests:

Display site architect.....Supervise
Prime Contractor.....Install ship

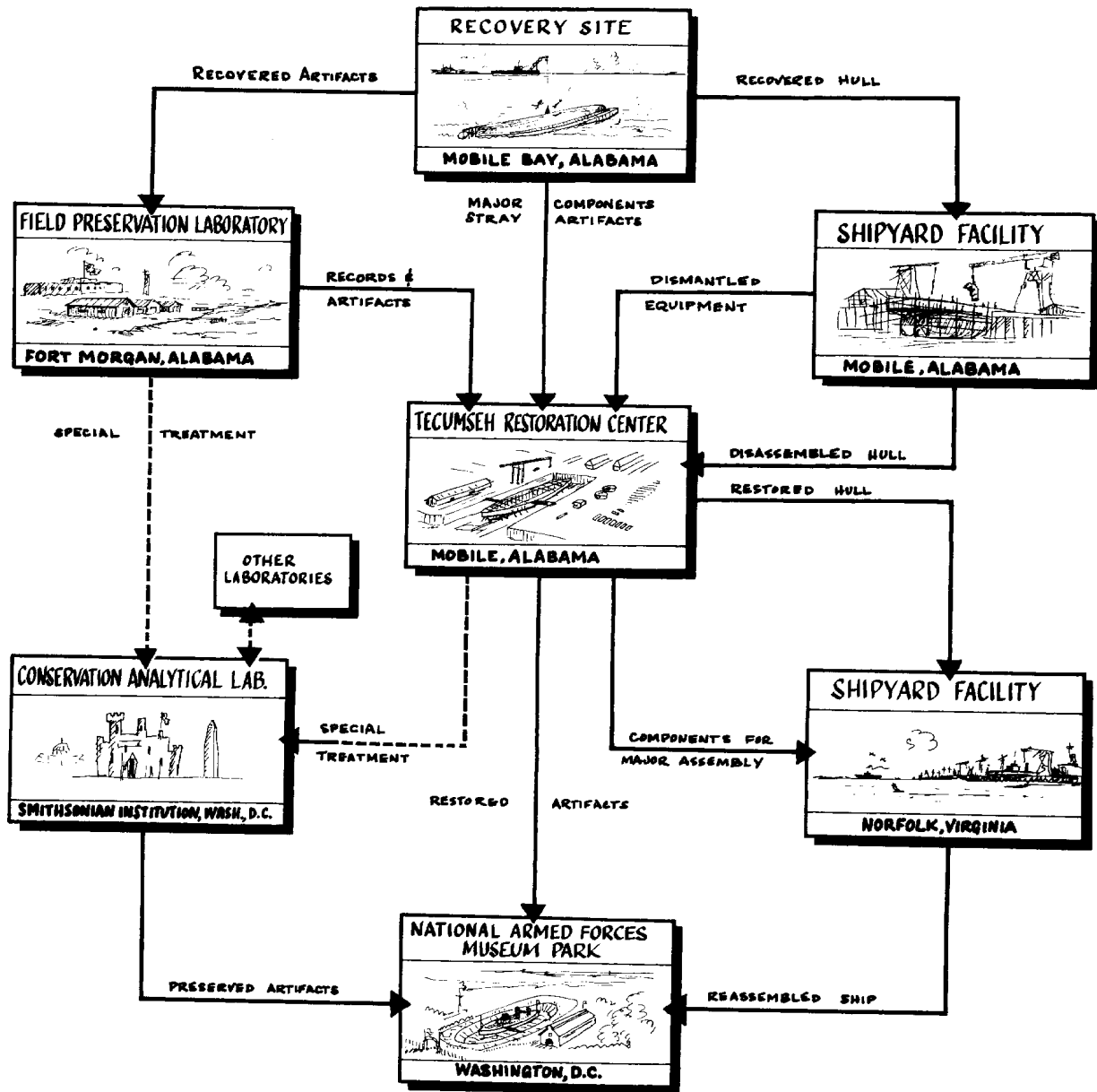
TECUMSEH PROJECT TASK SCHEDULE



SI Responsibility
 Contractor Responsibility

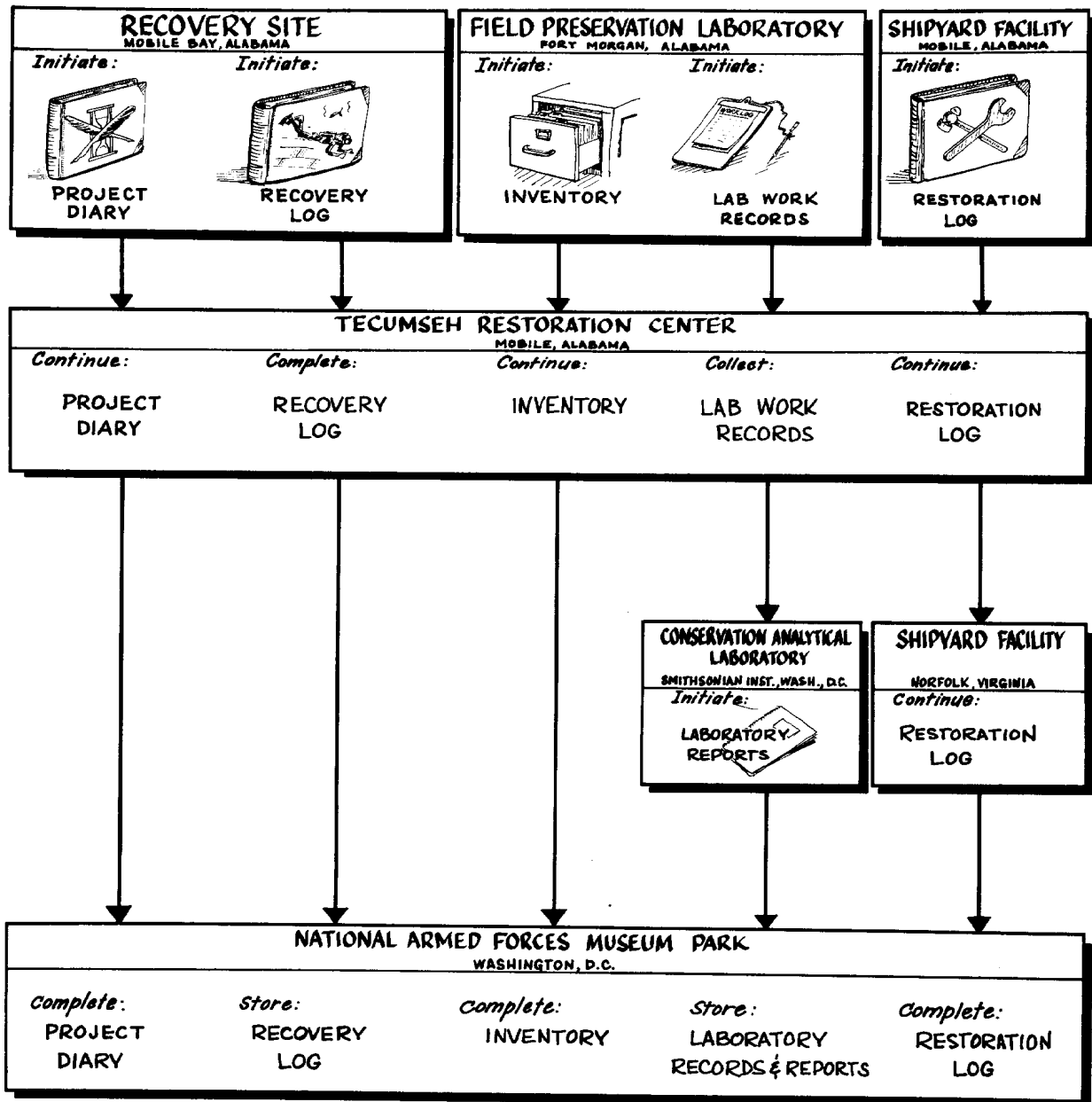
TECUMSEH PROJECT

WORK FLOW PLAN



TECUMSEH PROJECT

DOCUMENTATION FLOW PLAN



TECUMSEH PROJECT PHASE 1 FIELD OPERATIONS TABLE OF ORGANIZATION

