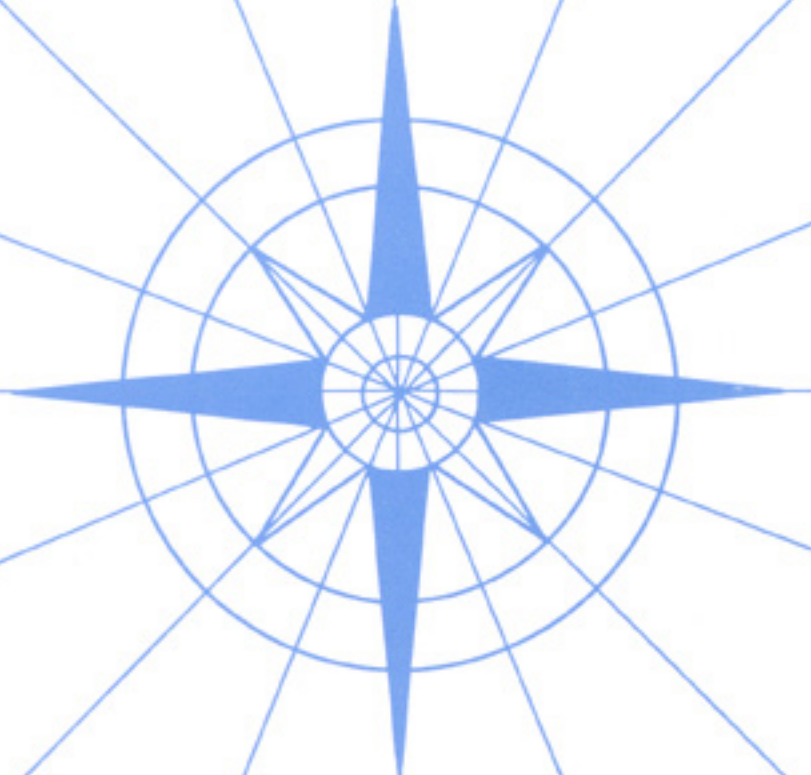


Submerged Cultural Resources Site Report

NOQUEBAY

APOSTLE ISLANDS NATIONAL LAKESHORE



By **TONI CARRELL**
SUBMERGED CULTURAL RESOURCES UNIT
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**SUBMERGED CULTURAL RESOURCES SITE REPORT:
NOQUEBAY**

Apostle Islands National Lakeshore

by
Toni ~~CARR~~ **CARR**ELL

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One of the volunteer sport divers who participated whole-heartedly in the NOQUEBAY documentation project was LaMonte Florentz. Unfortunately, for all of us who share a love of maritime history and particularly shipbuilding traditions, Monte lost his life in an automobile accident on October 29, 1985. Monte's enthusiasm and dedication to the understanding and preservation of the tangible remains of our maritime history is sorely missed. This publication is respectfully dedicated to Monte's memory. It is also dedicated to all of the other people who, like Monte, are working to enrich our lives through the study of our maritime heritage.

SUBMERGED CULTURAL RESOURCES UNIT REPORT AND PUBLICATION SERIES

The Submerged Cultural Resources Unit is a part of the Southwest Cultural Resources Center, Southwest Regional Office in Santa Fe, New Mexico. It was established as a unit in 1980 to conduct research on submerged cultural resources throughout the National Park System with an emphasis on historic shipwrecks. One of the unit's primary responsibilities is to disseminate the results of research to National Park Service managers, as well as the professional community, in a form that meets resource management needs and adds to our understanding of the resource base. The following publication and report series has been initiated in order to fulfill this responsibility. The report "types" listed below represent the sequential stages of research activity that the unit is conducting or initiating in each park with a submerged cultural resources base. The reports are designed to be cumulative so that, in the ideal case, each marine or freshwater park would eventually have a "maritime archeology" publication which would have been preceded in most cases by an assessment, survey, and inventory. This would put the parks in compliance with any reasonable professional and legal requirement to protect and interpret the underwater cultural resources under their custodianship.

Submerged Cultural Resources Assessment

First line document that consists of a brief literature search, an overview of the maritime history and the known or potential underwater sites in the park, and preliminary recommendations for long-term management. It is designed to have application to GMP/DCP's and to become a source document for a park's Submerged Cultural Resources Management Plan.

Submerged Cultural Resources Survey

Comprehensive examination of blocks of park lands for the purpose of locating and identifying as much of the submerged cultural resources base as possible. A comprehensive literature search would most likely be a part of the Phase I report but, in some cases, may be postponed until Phase II.

Phase I -- Reconnaissance of target areas with remote sensing and visual survey techniques to establish location of any archeological sites or anomalous features that may suggest the presence of archeological sites.

Phase II -- Evaluation of archeological sites or anomalous features derived from remote sensing instruments to confirm their nature and, if possible, their significance. This may involve exploratory removal of overburden.

Submerged Cultural Resources Inventory

A document that discusses, in detail, all known underwater archeological sites in a given park. This may involve test excavations. The intended audience is managerial and professional, not the general public.

Submerged Cultural Resources Site Report

Exhaustive documentation of one archeological site which may involve a partial or complete site excavation. The intended audience is primarily professional and incidentally managerial. Although the document may be useful to a park's interpretive specialists because of its information content, it would probably not be suitable for general distribution to park visitors.

Maritime Archeology Series

This a series of publications on specific parks designed for appeal to a general audience including subject matter specialists, managers and the public at large, e.g., The Maritime Archeology of Isle Royale National Park. It fulfills an educational and interpretive function but meets professional standards in accuracy and substance.

Submerged Cultural Resources Special Report Series

These may be in published or photocopy format. Included are special commentaries, papers on methodological or technical issues pertinent to underwater archeology, or any miscellaneous report that does not appropriately fit into one of the other categories.

Daniel J. Lenihan

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Historian Kate Lidfors and Chief Ranger Bill Ferraro contributed to all aspects of the project including coordination between the two Regional Offices and the park, organizing the on-site accommodations for the VIPs, and the transportation of equipment and people out to Stockton Island. Thanks also go to Bill Ferraro for arranging both the hot water shower to thaw the crew out at the end of the day and the mechanic to "fix" the airlift compressor. Without those two vital pieces of equipment we would not have been able to complete the work. A special thank you goes to Elen Maurer, the Stockton Island ranger. Her help in all aspects of the field work from on-site logistics to diving was invaluable. In addition to Elen's regular duties she also spent many extra hours helping to convert the raw field data from NOQUEBAY into a preliminary base map. Steve Kacvinsky's piloting skills of the LCM were thoroughly tested by shifting winds and reluctant anchors.

The success of the NOQUEBAY project is also due to the willingness of the volunteer sport divers who participated in the archeological investigations. They contributed not only their time, equipment and effort, but more importantly, their enthusiastic support for the long term preservation of valuable shipwreck resources in the Great Lakes. The result has been a shining example of what can be accomplished when concerned individuals and park staff work together to understand and preserve cultural resources for the enjoyment of all. The efforts of all of the VIPs are sincerely appreciated.

Jack Jones, owner of the Seaview Diving Center, provided us with the equipment needed to excavate several test trenches through critical areas of the site. We now know a great deal more about the construction of schooners from the 1870s because of Jack. Fran Potvien, Bob Bailey, and Monte Florentz gave more than their share to the field work. The centerline keelson, artifact drawings, the ship's wheel and steering gear details are tangible evidence of their contribution.

Joe Strykowski contributed his expertise as the project photographer. He caught our best and worst moments and shared with us his enthusiasm for shipwrecks. Since the completion of the field work, Joe has continued to contribute to the National Park Service by giving numerous public presentations about the work conducted on NOQUEBAY.

C. Patrick Labadie participated in the documentation of NOQUEBAY and provided help with analysis, both on-site and afterward. Several of his drawings have been reproduced in this report. Patrick also provided thoughtful review of the manuscript and made available copies of the historic photographs of the vessels. Jerry Livingston turned all of our hasty maps and drawings into the excellent graphics included in this publication. Dan Lenihan, Chief of the Submerged Cultural Resources Unit, reviewed this manuscript in draft form and made several helpful suggestions. Finally, Andy Ketterson, Chief of Cultural Resources Management, Mid-west Regional Office, has been supportive of this project since its inception and obtained funding for publication of this report.

Toni Carrell

EXECUTIVE SUMMARY

During the investigations of the historic wooden vessel in Julian Bay, no single piece of evidence was located that would conclusively prove that the vessel under investigation was the schooner barge NOQUEBAY. When taken together, however, the historic record and the physical remains strongly suggest that the shipwreck located off Stockton Island is indeed NOQUEBAY.

The vessel is in an excellent state of preservation with more than 90% of the hull present and exposed, at least on a seasonal basis. Other than evidence of burning in the bow and on the keelsons, the wood used to construct NOQUEBAY is still hard and the structural integrity of the various components, as they appear today, is uncompromised. Little rusting has occurred on any of the metal elements or artifacts found at the site. The bow contains a rich assemblage of small portable artifacts which, by their nature, are highly susceptible to looting. For that reason protection of this site is particularly important and is urged.

NOQUEBAY's superb state of preservation and the potential richness of the artifact assemblage make it a strong candidate for nomination to the National Register of Historic Places and addition to the National Park Service List of Classified Structures.

Because of her shallow deposition, this vessel is a prime candidate for interpretation. The shallowness and clarity of the water over the site, plus its protected location would not present any safety hazards to snorkelers or even inexperienced scuba divers.

It is not recommended that the site be permanently closed to visitation in order to protect it. However, a management plan and some agreement with the State of Wisconsin, that will directly address daily management and protection, is

needed prior to making the site accessible to the public. An energetic education campaign directed at both the non-diving and diving publics on the importance of leaving artifacts and the site unaltered is also necessary to protect NOQUEBAY over the long run.

I. INTRODUCTION

This study of the remains of a historic wooden vessel located in Julian Bay on Stockton Island has been designed within a park management framework. The project was geared toward generating information that would be useful in submerged cultural resources site protection, visitor safety, and interpretation, in meeting Federal compliance requirements, in contributing to the story of the park and the maritime history of the Great Lakes, and in answering questions of general archeological and historical importance.

Projects, like the one at Apostle Islands, which are anticipated to run over several years, field sessions, or where funding, time constraints and park priorities dictate a segmented approach, require special attention in the planning of phases and the segmentation of work undertaken. The results of each segment should meet specific management needs and be able to stand alone as individual management documents. The overall submerged cultural resources management approach may be conceptualized as distinct phases or steps; the ideal course of research leading in a logical sequence through initial assessment, survey of portions of a park, and then inventory of all known submerged resources in an area. Each of these steps is discussed in greater detail, as separate report formats of the Submerged Cultural Resources Unit, elsewhere in this report. This sequence of steps may be physically divided by time, space, and reporting, or conducted concurrently and reported on in one document when a project runs continuously.

Park funding, priorities, and other constraints rarely permit the ideal research sequence to occur. More commonly it is segmented and conducted in response to specific management needs. The Apostle Islands project falls into the latter category, being undertaken to document a recently discovered, highly sensitive resource which, by its accessibility, is quite vulnerable to visitor impact.

The field research undertaken in 1984, and reported here, presents the results of investigations at the site and provides recommendations for the long term management, interpretation, and protection of the shipwreck remains identified as NOQUEBAY.

Project Objectives

The goal of this project was to thoroughly document the remains of a historic wooden vessel, located off Stockton Island, in an effort to determine the nature and extent of the wreckage which would lead to its possible identification and a determination of its historical significance. The purpose for gathering this information was for the short and long term management of the site by the National Park Service in cooperation with the State of Wisconsin.

Research Design

The questions this research was designed to address were primarily descriptive in nature and fall into three categories: 1) What is the nature of the maritime construction and technology displayed by the historic wooden vessel (i.e., presumably a schooner barge circa 1872) off Stockton Island, 2) How have shallow-water wrecking processes affected site deterioration/preservation and research potential; and 3) What social, economic, and environmental conditions extant on the Great Lakes, particularly Lake Superior, have affected the nature and deposition of shipwreck remains in the Apostle Islands region and how does the vessel at Stockton Island fit into this historical context.

The primary objective of the project was site documentation and identification. Therefore, specific questions were posed addressing general vessel construction, that is, hull configuration and framing, internal or external strengthening, hatch arrangement, centerboard construction, and alterations or repairs. These are addressed primarily in Chapter IV.

The question of shallow-water wrecking processes and their impacts to physical site integrity and research potential are addressed in Chapters IV and V.

Finally, the relationship between the deposition of shipwrecks in the Apostle Islands region, specifically the vessel at Stockton Island, and the social, economic and environmental milieu on the Great Lakes around the turn of the century is addressed in Chapters II and III.

Funding

This project was funded from the Apostle Islands National Lakeshore ONPS (Operation of the National Park System) account, and by the Submerged Cultural Resources Unit, Southwest Cultural Resources Center.

Project Mandate

The Apostle Islands enabling legislation specifically addresses the need for protection of cultural resources for public enjoyment and "... understanding of the unique natural, historical, scientific and archeological features of the Apostle Islands" The park's Master Plan (1971) and Statements for Management (1977, 1982) reinforced the enabling legislation regarding cultural resources and states that:

Cultural resources preservation [goals are] to identify, inventory, and preserve the Lakeshore's cultural resources in accordance with legislative and executive requirements and NPS historic preservation policies.

Additional objectives are:

to acquire information through surveys, research, and other means; [and] to protect known cultural sites by mitigating known damage

The field work undertaken in this initial effort to document one of the shipwreck resources in Apostle Islands National Lakeshore meets these objectives. The study was designed to maximize data returns from a very limited time, funding, and

personnel base in order to begin "filling in the blanks" for a total submerged cultural resources inventory of the park.

Project Dates and Participants

Field work began on September 17 and concluded on September 27, 1984. All activities took place within the Lakeshore locality of Stockton Island. Ten National Park Service employees, from the Midwest and Southwest Region and 14 Volunteers-in-Parks participated in the 11-day project. The project involved 24 individuals; a total of 54 persondays of diving and approximately an additional 20 persondays of work were completed, excluding donated preparation and planning time of key personnel in the two Regional Offices, the Park, and the Southwest Cultural Resources Center.

The following people contributed to the success of the 1984 research project at Apostle Islands National Lakeshore:

Pat H. Miller - Superintendent, Apostle Islands National Lakeshore
Daniel J. Lenihan - Chief, Submerged Cultural Resources Unit

Apostle Islands National Lakeshore

Bill Ferraro - Chief, Division of Ranger Services
Kate Lidfors - Park Historian, Division of Planning and Resources
Elen Maurer - Division of Ranger Services; diving assistance
Steve Karcvinsky - Division of Maintenance; research boat operation
Brent McGinn - Division of Ranger Services
Bob Hatton - Division of Maintenance
Lydia Ferraro - Division of Maintenance

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Bob Bailey - Smith Diving; diving assistance
Dick Boyd - Petrie ScubaLab; diving assistance
Tom Caine - Diving assistance
Tim Carpenter - Wisconsin State Parks; diving assistance
Gary Cholwek - Self Propelled Shop; diving assistance
LaMonte Florentz - Scuba Outlet Store; diving assistance
Tim Huelster - Seaview Diving Center; commercial diving operations and diving assistance
Pat Huschka - cook
John "Jack" Jones - Seaview Diving Center; commercial diving operations and diving assistance
James Keller - Self Propelled Shop; diving assistance

Teresa Keller - cook

C. Patrick Labadie - Canal Park Marine Museum; diving assistance, site analysis

Fran Potvien - Land of the Loons Scuba; diving assistance

Joe Strykowski - Divecon; photography

Submerged Cultural Resources Unit

Toni Carrell - Archeologist; Principal Investigator

**II. THE PLACE OF NOQUEBAY
IN
APOSTLE ISLANDS MARITIME HISTORY AND
IN GREAT LAKES VESSEL DEVELOPMENT**

Shipwreck Resources

The potential variety of shipwreck resources that lay within the Apostle Islands region mirrors the maritime history of the Great Lakes. Small craft used by native populations for subsistence, trade, and coastal travel, were followed by the canoes of French explorers and traders, possibly as early as 1630, along the south shore of Lake Superior (Quimby 1966). Near exclusive trade with the French continued through the mid-1700s when British and American traders appeared. All three groups remained active in the area through the early 1800s (Salzer and Overstreet 1976). Canoes, and later bateaux, remained the major form of water transport on Lake Superior until the early 1800s. Sailing vessels began appearing on the Lake after 1802 (C.P. Labadie, personal communication). The vessel ASTOR was among the earliest, appearing in 1835 (Ericson 1962). After 1850, schooners, brigs, barks, paddlewheel steamers, schooner barges, wooden screw steamers, then later composite, iron- and steel-hulled vessels appeared in rapid succession transporting lumber, coal, wheat, passengers, and mixed freight. In addition to the large commercial vessels, there were various smaller fishing craft, tugs, sail, and motor boats used throughout the region. In the 1800s, an increased demand for raw materials, in quantities sufficient to support the rapid industrial and population growth throughout the Great Lakes region, resulted in the development of specialized vessels to carry quantities of bulk freight and package goods.

The historically documented shipwreck population in the Apostle Islands region includes a cross section of vessel types representative of the diversity of Great Lakes maritime activities and commerce. A preliminary list of casualties revealed more than 500 accidents or losses occurring between 1870-1940. Nearly 75 of those vessel casualties are believed to have left some physical remains on the Lake bottom (Holden 1985). Of those, approximately 20 are in the immediate vicinity of those islands which are part of the Apostle Islands National Lakeshore (Figure 1).

Vessels engaged in the transportation of passengers, package and bulk freight, salvage activities, and fishing evolved to meet economic and environmental needs of the Great Lakes. The role of these special purpose vessels in the industrial and economic growth of the Lakes, and their context within the maritime development of Great Lakes vessels, are important elements in our understanding of the historical significance of individual vessels.

Figure 1. Survey of Vessel Types
in the immediate vicinity of
Apostle Islands National Lakeshore*

<u>Name(s)</u>	<u>Construction Type Propulsion</u>	<u>Date Built/ Data Lost</u>	<u>General Location</u>
M. R. WARNER	wood schooner barge sail/tow	1873/1894	Sand Island
KAKABEKA	wood passenger/package screw steamer	1885/1898	Sand Island
MAY CARGAN/ MARY CARGAN	wood passenger/package screw steamer	Pre 1887/ 1891	Sand Island
SEVONA aka EMILY P. WEED	steel bulk freight screw steamer	1890/1905	Sand Island
ELIZA	wood tug screw steamer	1892/1902	Sand Island
HERRING KING aka FISH HAWK	wood fish tug screw gas	n.d./1917	Sand Island
UNIDENTIFIED Harold Dahl, owner	unknown const. screw gas	n.d./1928	Sand Island
FRED & WILL	wood tug screw steamer	1867/1878	Between Sand Island & Mainland
CHARLES SCHUPE	wood schooner gen. cargo sail	n.d./1870	Between Sand Island & Mainland
PRUSSIA	wood passenger/package screw steamer	1873/1885	Between Sand Island & Raspberry Island
NOQUEBAY	wood schooner barge sail/tow	1872/1905	Stockton Island

Figura 11. Continued

DISPERSE	wood schooner/gen. cargo sloop	1810/1817	Michigan Island
R. G. STEARNS	wood passenger/package screw steamer	1815/1838	Michigan Island
AUSTRALASIA	wood bulk freighter screw steamer	1824/1838	Michigan Island
TRIFURIA	wood schooner cargo sloop	1820/1838	Outer Island
EGYPTIAN	wood bulk freighter screw steamer	1817/1838	Raspberry Island
MARION/MARINA	wood bulk freighter screw steamer	1820/1838	Raspberry Island
UNIDENTIFIED Francis Buchanan, owner	wood sloop	1810/1838	Basswood Island
UNIDENTIFIED Charles Cook, owner	unpowered sloop screw gas	1810/1825	Basswood Island
T. W. CAMP	wood bulk/package freight screw steamer	1818/1820	Between Basswood & Mauldin Islands
UNIDENTIFIED Billy Safford, owner	wood sloop screw gas	1810/1828	Between Basswood Island & Mainland

^ compiled from Engler 1976, Holzer 1985, Kallen 1987, and 1988

Vessel Context and Development

Schooners

Great Lakes schooners and schooner barges evolved to meet the need for the movement of passengers, general cargo, and bulk freight throughout the region. These vessels were limited in overall size and draft by the width and depth of channels, canals, and rivers connecting the six Great Lakes. Because of the difficulty of traveling up to Lake Superior, the use of these vessels on that lake lagged far behind the four other lakes. It was because of this difficulty that canoes and bateaux were the vessels of choice up to the early 1800s on Superior.

The first passenger and general purpose cargo transports on the Great Lakes and on Lake Superior were the birch bark canoes of the native populations. They were quickly adopted by the French, in the early 1600s, and then by British and American explorers, trappers, and traders as they each entered the area. These vessels varied in size from 13 to 35 feet in length and were capable of carrying up to 1,000 lbs. It was the larger canoes, the canots du maitre, that were used between Montreal and the head of Lake Superior, and smaller 25 foot canoes, the canots du nord, that were used on Lake Superior to points north and west, first by the French, then by the British and Americans (Barry 1973:28). The bateau was in use on the Great Lakes by 1687 for military purposes, and then later it was used for transportation of passengers and general freight. This vessel is closely related to the North Atlantic dory with its nearly flat bottom, longitudinal planking, and pointed bow and stern. A bateau of normal size was approximately 40 feet long with a beam of 6 feet and was capable of carrying 3 to 5 tons of cargo. These vessels were low, open boats that had a mast, sail, oars and setting poles, for use in the shallows, and were manned by a crew of 5 or 6 (Barry 1973:30). Because of its lightness and portability it quickly joined the canoe on Lake Superior.

The first full-fledged sailing vessel to appear on the Great Lakes was GRIFFON, built by La Salle in 1679. The ship was probably 60 to 70 feet long, 16 feet wide with a depth of 8 feet. Typically, the galliot, of which GRIFFON was a member, was a round vessel with a curved stem and high, round stern, designed for handling mixed cargo (Ericson 1962:3). She may have had three masts, two of which were square-rigged and the third, the mizzen, lateen-rigged (Barry 1973:14). In 1726 schooners appeared on the Great Lakes; these were typically rigged with square topsails on both the fore and mainmasts. The officers' quarters were aft under a raised quarter deck and the crew was forward. These vessels were 75 to 80 feet in length and could accommodate 40 to 80 soldiers and a crew of 10 to 12 (Ericson 1962:5). With the appearance and threat of British control of the Great Lakes in 1755, a flurry of vessel construction by both the French and British occurred. At the end of the Seven Years War in 1763 there were better than a dozen vessels on Lake Ontario, of various sizes and descriptions, under the British flag.

Several vessels were built by the British between 1763 and 1813 for both upper and lower lake service. Following the Revolution, many American merchant ships began to appear, primarily on Lake Ontario. Most of these vessels were small sloops and schooners (Ericson 1962:13). Although the British had ceded the southern shores of the the Great Lakes to the United States, strong British control over the area retarded the passage of any but British government vessels. Protests over the situation led to the licensing of private shipbuilding. The North West Company responded, and in 1785 the 75-ton sloop OTTER was built on Lake Superior; most likely the first full rigged merchant sailer on the lake (Barry 1973:24).

After the war of 1812 merchant shipping flourished on the Great Lakes. Vessels were adapted to varying local conditions of wind and weather, shallow harbors and interconnecting canals, narrow rivers, and the steep choppy waves of the open lakes. Observations made by naval experts as early as 1788 defined the fore-and-aft rig as the most suitable for lake vessels. Later combination rigs were developed; three-masted barks, square-rigged on the two forward masts

with a fore-and-aft mizzen, and barkentines with only the foremast square-rigged, were often used. The two-masted square-rigged brig gave way to the brigantine with one fore-and-aft mainmast and a square-rigged foremast. Despite these modifications the topsail schooner was the most widely used rig on the lakes (Ericson 1963:15-17).

Throughout the early 1800s there was expansion in vessel development and construction in the Great Lakes as well as along the Eastern Seaboard. New ideas were rapidly introduced and sailing ships became larger and more efficient. Lake sailers were usually built with a square stern and a mizzenmast that was shorter than the fore- and mainmasts. They had shallow-draft hulls and most had a drop keel or centerboard, useful in shoal water.

Lake vessels changed as commerce increased and harbors, canals, and channels were developed. The early upper lake trade required portage of cargo at Sault St. Marie and vessels navigating the St. Lawrence were limited by existing canals to a 6 foot draft, 100 foot length, and 20 foot beam. The opening of the Welland Canal in 1829 allowed vessels to bypass Niagra Falls between Lakes Erie and Ontario. Only a few vessels were on Lake Superior as late as 1839; in 1845 the small fleet was supplemented by the addition of 6 schooners portaged across the Soo (Barry 1972:68). In 1849 the St. Lawrence was improved and a vessel with a draft of 9 feet could pass. The opening of the Soo locks in 1855 resulted in a dramatic increase of shipping on Lake Superior. Later, the development of the iron and lumber trades in the region required larger ships; shipbuilders responded with construction of sailing vessels topping 200 feet in length.

In the early 1800s the steamer appeared on the Great Lakes. Side paddlewheelers carried passengers primarily, as well as package freight, throughout the lakes. By the 1850s lake paddlewheel steamers had become large and ornate. They quickly developed a reputation for reliability and speed that was extremely attractive to the passenger trade. It was not uncommon for these vessels to carry 400 to 500 passengers, in addition to twice that number of emigrant passengers in steerage. The schooner could not readily compete

against the steamer for passenger traffic, but they were well suited for bulk and package cargos. It was the schooner, therefore, that dominated the commercial trade on the Lakes. By 1870 more than 2,000 sailing ships were listed on the upper lakes; eighty percent of these being schooners (Ericson 1963:19).

A typical lumber schooner of the 1850s was LAFAYETTE COOK. A "canaller," that is a vessel capable of passing through the Welland Canal, COOK had a boxy hull and flat bottom, was 113 feet in length, 21-1/2 feet wide, had an 11 foot depth of hold, and a draft of 9 feet. She was equipped with a centerboard, to minimize leeway (sideways) drift and to increase maneuverability, and her bowsprit and jibboom were canted up at a steep angle to clear the lock gates. Lumber schooners, like LAFAYETTE COOK and NOQUEBAY, were lightly built in comparison to timber schooners which had thicker spars and sturdier hulls. Lumber schooners carried lumber both in their holds and on the decks and had to be able to withstand extensive wear and tear (Barry 1972:64). NOQUEBAY had her developmental roots in vessels similar to LAFAYETTE COOK.

Schooner Barges - The Place of NOQUEBAY in Great Lakes Vessel Development

Sailing vessels still dominated Great Lakes trade following the Civil War; bulk freight almost exclusively being carried by schooners. At this time ship owners began experimenting with towing. They quickly found that it was economically more feasible to tow than to sail heavily laden vessels through tricky channels with undependable winds, thus initiating the "consort" system. In 1867 the steam donkey engine was developed and first used on the Great Lakes (Barry 1974:94). This simple device quickly revolutionized the unloading of bulk cargos (Barry 1974:94), thus reducing the turn around time necessary to complete a trip. The combination of these two, seemingly unrelated, events accelerated the already rapidly growing demand for bigger more efficient vessels capable of carrying larger bulk cargos.

The response of lake shippers was to extend the use of tows while developing or adapting vessels for bulk shipments. Following the panic of 1857 there were

numerous large steamboats sitting idle and available for conversion to barges. The use of the tow or schooner barge spread rapidly throughout the Great Lakes as well as the Eastern Seaboard during the late 1860s and early 1870s (Barry 1974; Morris 1984). These vessels, pulled in tandem by a tug, were able to transport larger cargos on each round trip, more efficiently and more reliably, than the sailing schooners. In 1871 the use of a steam barge, rather than a tug, was introduced on the Great Lakes (Mansfield 1899:411), although they had been used elsewhere since the middle 1860s. LIZZIE MADDEN, a steam barge, regularly towed NOQUEBAY, along with several other schooner barges.

The schooner barge differed from other barges in that she carried some sails on masts that were reduced in size from a traditionally rigged schooner. The sails provided additional power to move the tow when the wind was favorable, and they were also used if the vessel broke free or had to be cast loose during an emergency. Because of the limited sail carried by the schooner barge, i.e. usually nothing above the lower courses and a fore staysail, fewer crew members were required. The savings to the owners on crew wages and the increased capacity of a multi-barge tow resulted in the rapid demise of the sailing schooner for bulk cargo transport. By the time the last fully rigged schooner was launched at Manitowoc in 1889, the success of the consort system (towing barges with schooner barges) was unquestioned (Morris 1984:1-2).

Because of a world-wide depression during the 1870s and 1890s, and the success of the schooner barge, many sailing vessels were out of work. Often sold at a fraction of their original cost, they were purchased by shipping companies engaged in bulk trade and converted to schooner barges. By this time the method of conversion from a sailing ship to a schooner barge had become standardized. Both conversions and construction of new schooner barges resulted in vessels with similar overall construction elements.

During a conversion, the rigging was cut down to just the lower section of each mast and the bowsprit was cut off flush with the stem. Lower sails were left in place, although reduced in number. Vessels constructed as schooner barges had

similarly short masts, which were normally 2 to 3 in number. The foremast and the remaining masts were set up with two backstays; the headstay from the foremast secured aft of the tow bitts and forward of the windlass. Sails were usually rigged "running" so that they could be moved out of the way during loading and unloading operations. Running rigging was made fast to a pin rail at each mast or to pin rails inside the backstays. Most schooner barges were built without chainplates or channels; instead their backstays ended with turnbuckles at the deck inside the rail. Gaff rigging was common.

Morris (1984:11-27) provides a general progression for schooner barge conversions. Briefly summarized, during a conversion the forward deckhouse was often removed and a continuous series of hatches were added that ran the entire length of the main deck. Extra timbers were normally added when the hatches were extended or enlarged, in an effort to offset the structural weakening which occurred during modification. Vessels constructed as schooner barges also exhibited a clear, unbroken deck and continuous hatches. Enlarged or extended hatches often resulted in the tendency of vessels to become "hogged" or lose sheer, requiring some additional longitudinal strengthening of the hull.

The pilothouse was located on top of the afterhouse in order to provide the pilot a clear view of the tug and barges ahead and behind. A small steam donkey engine was placed forward, below decks; the stack protruding up through the main deck slightly aft of the windlass. This engine was used to hoist anchors, sails, work the pumps and in some cases to provide assistance with the loading and unloading of cargo. Running lights were located forward, in the shrouds several feet above the rail. Tow bitts, for the line, were placed forward and aft along with a bow chock over the head or alongside of the stem. Although the freeboard of a converted vessel may end up reduced, the overall cargo capacity of the schooner barge usually remained about the same. Schooners and schooner barges always carried a lifeboat or yawlboat (Morris 1984:11-27).

NOQUEBAY, built in 1872 by Alvin A. Turner of Tremont, Michigan, was constructed as a schooner barge for the lumber and coal trades. At 205 feet in

length, and capable of carrying 1,024,000 board feet of lumber or 1,350 tons of coal, she exhibited many of the construction elements discussed above and was typical of the schooner barges of her day.

Lumber production in the Great Lakes region reached a peak in 1882, 10 years after NOQUEBAY was built. Movement of lumber via lake shippers began to decline in the late 1890s as forests close to lake ports were depleted and shipment by rail became more efficient and economical. Coal shipment by lake carriers steadily increased after the completion of canals and railroads, from mines to shipping ports in the early 1850s. It was not until the early 1880s that railroads began to successfully compete with lake carriers. NOQUEBAY was active in the lumber trade during its peak and was transporting coal and bulk salt across the lakes before rail traffic was feasible.

Schooner barge construction and conversions continued through the 1890s. The construction of schooner barges, beginning in the late 1860s, peaked before the turn of the century and then saw steady decline due to the widespread adoption of the bulk freighter, which had been introduced in 1869 (Barry 1974; Morris 1984). In 1868, 28 schooner barges with a tonnage of 4238 were constructed on the Great Lakes; 1869 saw the construction of 35 barges with a tonnage of 5458. In 1872, the year NOQUEBAY was built, there were less than half the number constructed as in 1869, however, they were larger vessels capable of carrying larger cargos. By 1876, only 6 barges were constructed, and the peak of barge construction had passed. The efficiency of steel bulk freighters and the after effects of the panic of 1873 both contributed to the demise of the schooner barge.

Construction figures for schooner barges closely paralleled the number of registered vessels on the lakes. In 1868 the number of barges registered was 64, by 1872 that number had jumped to 161, and in 1874 there were 216 barges registered. Just 6 years later the decline was evident with only 165 barges registered and in 1887 their numbers had dropped to 84; by 1890 only 54 barges were registered (Mansfield 1899:438-441). Schooner barge construction

flourished for a relatively short period of time, from the early 1860s to the middle 1870s, although they continued in use well beyond 1890. In their heyday on the lakes, schooner barges were active participants in the rapid growth of the midwest and upper lake regions during their micro industrial revolution. In addition, the schooner barge contributed to the establishment of many lake cities as major industrial ports.

III. NOQUEBAY BACKGROUND

Vessel History

NOQUEBAY was built by Alvin A. Turner, master shipbuilder, in Trenton, Michigan in 1872. She was first enrolled at the Port of Chicago on July 13, 1872, for owner Thomas W. Beebe, president of the Peshtigo Company, Peshtigo, Wisconsin. The vessel was an exact duplicate of PESHTIGO (1869) and MAUTENEE (1873), which were built in the same yard for the same owners. NOQUEBAY was built for the bulk lumber and coal trades and was capable of carrying 1,024,000 board feet of lumber and 1,350 tons of coal. At the time of her enrollment at the Port of Chicago, A. Keith was the vessel's master.

Beebe retained ownership of NOQUEBAY until April 17, 1874, when, during a change of company officers, she was transferred to William E. Strong, the new company president. A change in masters also took place and William Nicholson assumed command. She remained based out of Chicago until March 8, 1875 when there was a change in her home port to Milwaukee and a change in her master.

Another change of ownership occurred in April, 1876, when William A. Ellis, secretary of the Peshtigo Company received the vessel; Nicholson once again became NOQUEBAY's master. While NOQUEBAY was owned by the Peshtigo Company she was towed by a number of company vessels, among which were CLEMATIS, WILLIAM LIVINGSTON, ADM. D. D. PORTER, and BOSCOBEL (later renamed OTTAWA), which was eventually lost off Outer Island in the Apostles not far from NOQUEBAY's final resting place.

Although Milwaukee remained her home port, NOQUEBAY was transferred to the Stephenson Transportation Company in Marinette, Wisconsin, on March 1, 1893. Ellis still retained title to the vessel as secretary of the new company.

Thomas F. Madden, along with James H. Madden and John J. Madden, purchased NOQUEBAY and her sister ship MAUTENEE on March 15, 1895. Based out of Bay City, Michigan, the new owners, each with a 1/3-share, moved NOQUEBAY to a new district and a new home of Port Huron. On March 29, 1898, Lizzie Madden replaced James Madden as a 1/3-owner of the vessel. John J. Madden turned over his 1/3-share to Thomas Madden in January of 1899 and on January 19, 1899, Elizabeth Madden became the sole registered owner of NOQUEBAY. Elizabeth retained ownership of the vessel until her loss on October 8, 1905.

NOQUEBAY and MAUTENEE were frequently towed by the wooden propeller LIZZIE MADDEN (Plate 1); the trio made regular trips between the ports of Duluth or Ashland and Buffalo or Tonawanda, major lumber producing and distribution centers. The vessel's masters under Elizabeth's ownership were P. H. "Paddy" Ryan (4/29/99-9/9/02), W. H. Lohr (9/9/02-9/18/02), Fred Watson (9/18/02-3/17/03) and Andrew Bigger (3/17/03-10/8/05). A summary of the vessel's documents of enrollment is provided in Appendix A.

In 1876 NOQUEBAY was rated B1 and valued at \$23,000. During her life she underwent several repairs and some major modifications. In 1884 she had timbers replaced fore and aft, was rated B1, and valued at \$14,000; she was recaulked in 1892, rated A2-1/2, and valued at \$10,000. She was recaulked again in 1896 and rebuilt in 1900 with a new keel and sails; her new rating was A2 and she was valued at \$9,000. At this time, she was described as having a centerboard, steel arches, steam pumps, and was capable of carrying 13-1/2 foot deckloads (Great Lakes Register).

NOQUEBAY's last 6 months of operation were probably typical of the vessel's movements under Madden ownership (Figure 2).

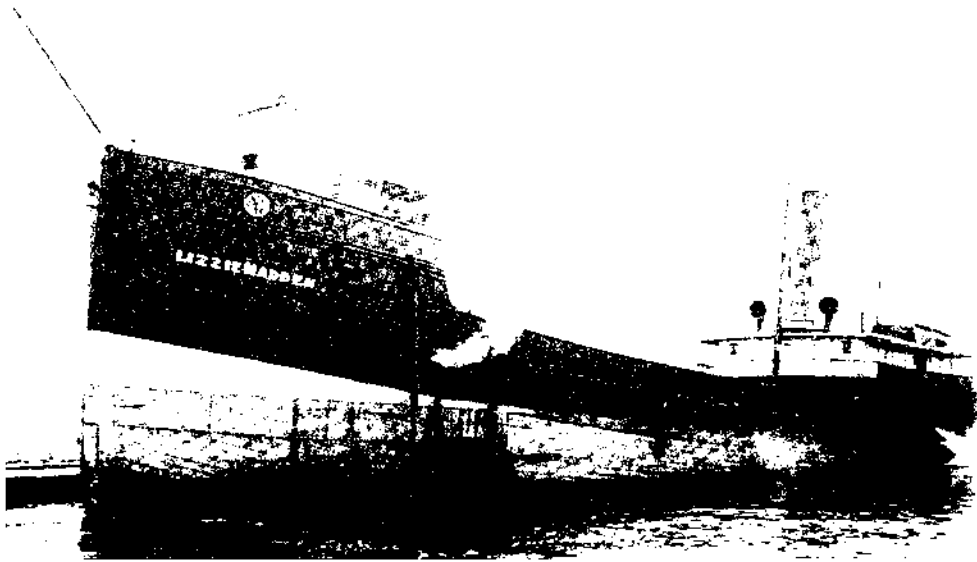


Plate 1: The steambarge LIZZIE MADDEN frequently towed both NOQUEBAY and MAUTENEE. Photo courtesy of C. P. Labadie, from Herman G. Runge Collection, Milwaukee Public Library.

Figure 2. Summary of NOQUEBAY Vessel Passages
During Her Last 6 Months of Operation*

May 8, 1905:	Pass: Detroit, downbound. MADDEN and consorts; 6:40 am.
May 16, 1905:	Pass: Detroit, upbound. MADDEN and consorts; 9:20 pm.
May 16, 1905:	Pass: Port Huron, upbound. MADDEN and barges; 11:30 pm.
May 18, 1905:	Pass: Sault Ste. Marie, upbound. LIZZIE MADDEN, MAUTENEE, NOQUEBAY.
May 28, 1905:	Arrived: Duluth-Superior, Minnesota. MADDEN, MAUTENEE, NOQUEBAY.
May 30, 1905:	Cleared: Duluth-Superior, downbound to Lake Erie Ports [Buffalo]. LIZZIE MADDEN and MAUTENEE.
May 31, 1905:	Cleared: Duluth-Superior, downbound to Lake Erie Ports [Buffalo]. NOQUEBAY.
June 2, 1905:	Pass: Sault Ste. Marie, downbound. LIZZIE MADDEN, NOQUEBAY, MAUTENEE; 3:30 pm.
June 4, 1905:	Pass: Detroit, downbound. LIZZIE MADDEN and barges; 7:20 pm.
June 9, 1905:	Arrived: Buffalo, New York. LIZZIE MADDEN and barges.
June 9, 1905:	Cleared: Buffalo. LIZZIE MADDEN and barges.
June 12, 1905:	Pass: Detroit, upbound. MADDEN and consorts; 9:30 am.
June 12, 1905:	Pass: Port Huron, upbound. MADDEN and barges; 2 pm.
June 14, 1905:	Pass: Straights of Mackinaw, upbound. MADDEN and consorts; 10:15 am.
June 16, 1905:	Arrived: Racine, Wisconsin. LIZZIE MADDEN, NOQUEBAY, TILDEN.
June 20, 1905:	Cleared: Racine, Wisconsin, upbound to Little Current, Ontario. MADDEN, NOQUEBAY, TILDEN.
July 13, 1905:	Cleared: Buffalo, New York. NOQUEBAY to Sault Ste. Marie.
July 14, 1905:	Arrived: Buffalo, New York. LIZZIE MADDEN from Sault.

July 17, 1905: Pass: Detroit, upbound. MADDEN and barges; 3:30 am.

July 25, 1905: Pass: Sault Ste. Marie, upbound. LIZZIE MADDEN, NOQUEBAY, MAUTENEE; 7 am.

August 3, 1905: Pass: Sault Ste. Marie, downbound. LIZZIE MADDEN, NOQUEBAY, MAUTENEE; 2:30 pm.

August 9, 1905: Arrived: Buffalo, New York. MADDEN and barges.

August 11, 1905: Cleared: Buffalo. MADDEN and barges to Duluth.

August 25, 1905: Pass: Sault Ste. Marie, upbound. LIZZIE MADDEN, MAUTENEE, NOQUEBAY; 7 am.

August 28, 1905: Arrived: Duluth, Wisconsin light for lumber to Buffalo. LIZZIE MADDEN and barges.

August 29, 1905: Arrived: Ashland, Wisconsin. LIZZIE MADDEN, NOQUEBAY, MAUTENEE.

August 31, 1905: Cleared: Duluth. LIZZIE MADDEN and barges. Lumber to Buffalo.

September 8, 1905: Pass: Port Huron, downbound. MADDEN and barges; 5:40 am.

September 19, 1905: Pass: Port Huron, upbound. MADDEN and barges; 1:30 am.

September 21, 1905: Pass: Sault Ste. Marie, upbound. MADDEN, NOQUEBAY, MAUTENEE, WESCOTT; 8 am.

September 30, 1905: Arrived: Ashland, Wisconsin. NOQUEBAY.

October 4, 1905: Cleared: Ashland for Lake Erie Ports. LIZZIE MADDEN, MAUTENEE, NOQUEBAY.

October 8, 1905: NOQUEBAY caught fire and burned while en route to Buffalo. She was beached in Julian Bay, near Presque Isle Point, Stockton Island. The loss was reported in the Detroit Free Press, October 10, 1905.

*(from Detroit Free Press, Toledo Blade, Duluth Evening Herald)

Review of the passages provides some insights into NOQUEBAY's trade pattern and general running times between ports (Figure 3). Gaps in reporting passages are evident, however, an understanding of the basic activities of the vessel can still be gleaned from this information. The above notes are loosely grouped by trip and are reported as they appeared in contemporary newspaper accounts.

It is generally accepted that NOQUEBAY received her name from the bays located in Michigan, Little Bay De Noc and Big Bay De Noc. Various spellings of the vessel name have appeared, some as two words, others as one. On her documents of enrollment it appears as NOQUEBAY, while in Mansfield's History of the Great Lakes (1899) it appears as NOQUE BAY. Contemporary newspaper accounts have the vessel's name spelled both ways, while the name painted on her bow appears to be two words. The documents of enrollment are the vessel's official records and the spelling there is considered correct.

Lumber production in the Great Lakes region reached a peak in 1882, 10 years after NOQUEBAY was built. Movement of lumber via lake shippers began to decline in the late 1890s as forests close to lake ports were depleted and shipment by rail became more efficient and economical. Coal shipment by lake carriers steadily increased, after the completion of canals and railroads, from mines to shipping ports in the mid-1800s. It was not until the early 1880s that railroads began to successfully compete with lake carriers. NOQUEBAY was active in the lumber trade during its peak on the Lakes and was transporting bulk salt and coal across the lakes before rail transportation was feasible.

Historic Description

There are no known plans for NOQUEBAY or her sister ships MAUTENEE and PESHTIGO (Plate 2). The only information that is available on her construction comes from her documents of enrollment, which includes only general specifications, and historic photographs of the vessel in tow or docked. Most of the information presented below was generated as a result of the field work conducted on the site in September 1984.

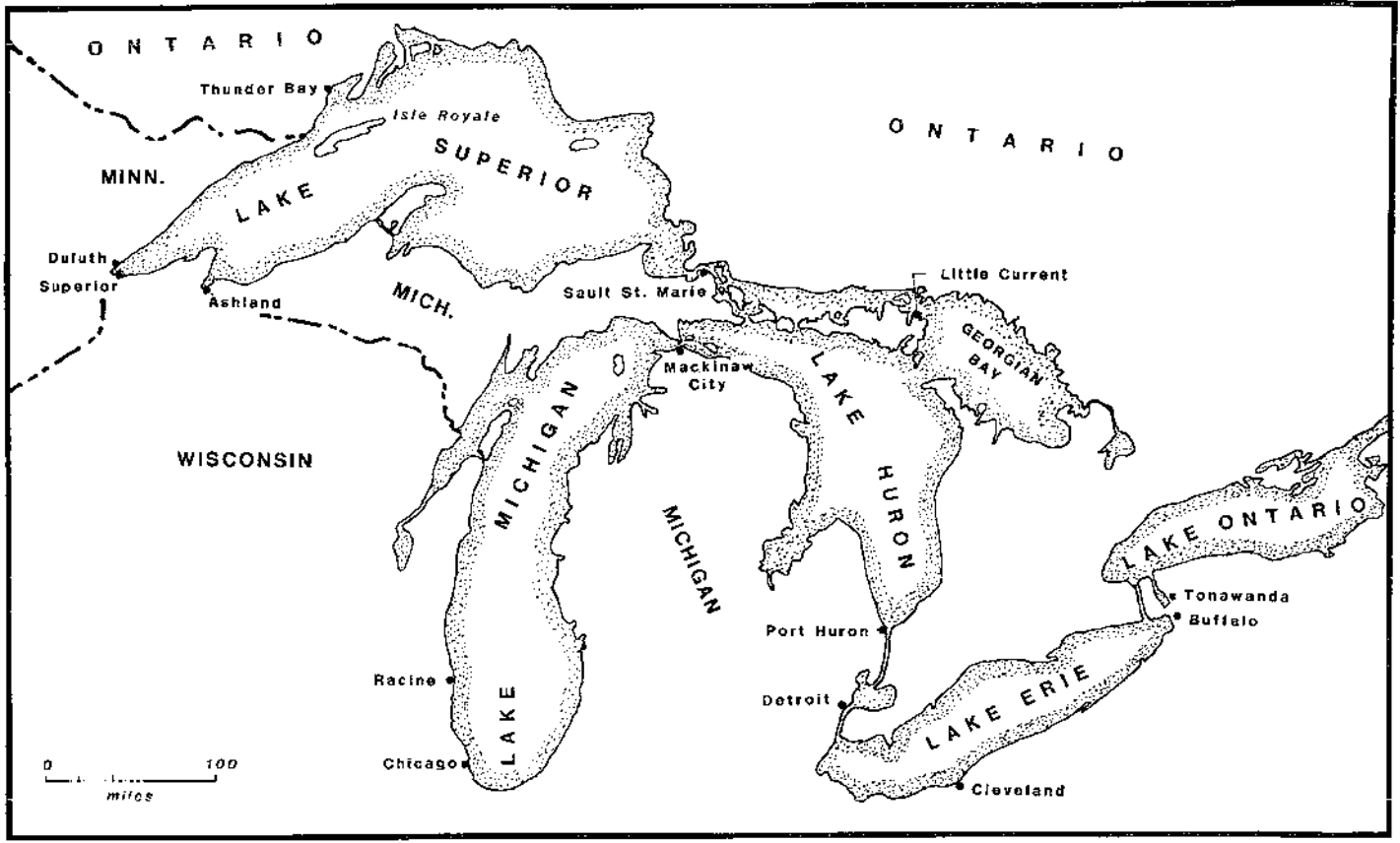


Figure 3. NOQUEBAY's Ports of Call



Plate 2: NOQUEBAY's sister ships, MAUTENEE and PESHTIGO, were built in 1873 and 1869, respectively. MAUTENEE, shown here at the Central Grain Elevator in Milwaukee, is waiting for a cargo. This view of the vessel, from her port stern, clearly shows the after deck house and stern detail. Photo courtesy of C. P. Labadie, from Herman G. Runge Collection, Milwaukee Public Library.

NOQUEBAY was a schooner barge built in 1872 to carry bulk cargos of lumber and coal (Plate 3). She was 205.2 feet long, 34.7 feet in beam, and the depth of her hold was 12.5 feet. The vessel's gross tonnage was 684.39 and 652.05 was her net tonnage. From keel to rail she was built of wood; a double hull and double frames were used throughout. She had one deck and a large unbroken hold. NOQUEBAY had a square stern, plain (straight) bow, and two short masts. She was rigged as a modified schooner, i.e. schooner barge, with the fore- and mizzenmasts reduced to a lower mast. These masts were set up with two backstays each; the headstay from the foremast was secured aft of the tow bitts and forward of the deck winch. She was probably rigged "running" so that her sails could be moved out of the way during loading and unloading. The running rigging was made fast to a pin rail at each mast or to pin rails inside the backstays. She was probably built without chainplates or channels; rather her backstays would have ended with turnbuckles at the deck inside the rail.

NOQUEBAY had a clear, unbroken deck with three cargo hatches plus a booby-hatch. This deck and hatch arrangement often resulted in the tendency of a vessel to become "hogged" or lose sheer. As a result she was strengthened with an internal strap and rod arrangement. The pilothouse was aft, possibly atop the aft deckhouse which served as crew quarters. A small steam donkey boiler was placed below decks in the forecastle. A deck winch and a windlass, also forward, were used to hoist anchors, sails, work the pumps, and possibly to help with loading and unloading of cargo. At the time of her loss NOQUEBAY's lower hull was painted white as was her forecastle (Plate 3), while a portion of her hull, up to the level of the main deck was painted a dark color, probably black.

Description of Loss -- The Wreck Event

NOQUEBAY and MAUTENEE, in tow of LIZZIE MADDEN, departed Bayfield, Wisconsin, on Sunday morning, October 6, 1905, for Bay City, Michigan. NOQUEBAY was loaded with 600,000 board feet of hemlock lumber (Ashland Daily Press 10/10/05) bound for Buffalo's lumber yards. When the trio had traveled

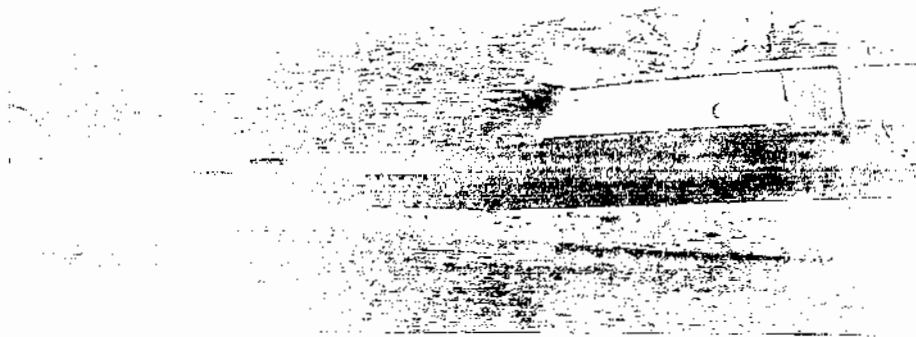


Plate 3: NOQUEBAY, a lumber schooner, was built in 1872 at Trenton, Michigan, for the Peshtigo Company. This photo, taken in the 1890s, shows the vessel heavily laden with a lumber cargo. Photo courtesy of C. P. Labadie, from Herman G. Runge Collection, Milwaukee Public Library.

approximately 20 miles east of Bayfield, NOQUEBAY caught fire in the forward part of the ship, apparently around the donkey boiler. It was reported in contemporary newspaper accounts that the fire started while the crew was eating their noon meal in the after deckhouse. As a result, crew members did not notice the smoldering flames until they had become widespread and, at that point, were unable to successfully fight them.

LIZZIE MADDEN immediately started toward Stockton Island, the nearest landfall, in an effort to beach the burning vessel in shallow water. The crew was able to toss overboard approximately 175,000 board feet of lumber before they were forced to abandon ship. NOQUEBAY was reported to have burned to the waterline, coming to rest in Julian Bay near Presque Isle Point on the east side of Stockton Island, in approximately 12 feet of water (Plate 4). She was valued at \$7,000 at the time of her loss, and was insured for \$5,000 (Detroit Free Press, October 10, 1905).

LIZZIE MADDEN and MAUTENEE proceeded to Sault St. Marie, where they wired to Buffalo that NOQUEBAY and her cargo had burned.

Post-depositional Impacts

Immediately following the loss of NOQUEBAY, Captain C. H. Flynn, of Duluth, traveled to the site on the tug FASHION to assess the damage and determine a course of action for salvage of the vessel. He was able to recover the 175,000 board feet of lumber along with the ship's anchors. Due to the extent of damage to the vessel, no attempt was made to raise her, although that possibility was reported by the Bayfield County Press on October 13, 1905. No other reports of contemporary salvage efforts have come to light.

NOQUEBAY lies in a shallow cove which is exposed to wind driven waves by winter storms. Storms during the winter of 1905 most likely contributed to the breaking up of the vessel. Ice shelving that winter, and during subsequent

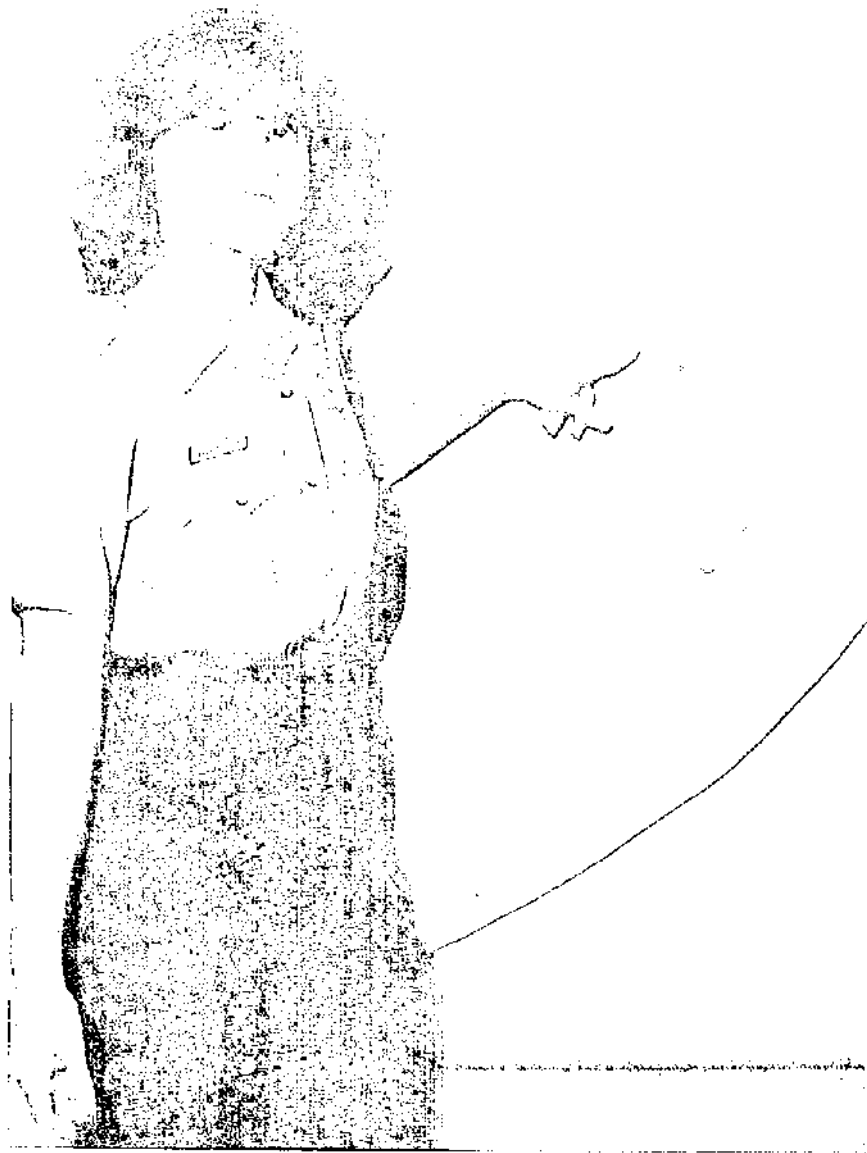


Plate 4: Park Ranger Elen Maurer points out the approximate location of NOQUEBAY on the east side of Stockton Island. Photo by Fran Polvien.

winters, contributed to the vessel's break up and probably damaged some exposed portions of the vessel.

The first documented visit to the vessel by divers occurred during a training course at Apostle Islands National Lakeshore in July 1984. Up to that time no known sport diving visitation had occurred at the site. It is not known whether any looting of the site had occurred prior to its "discovery" in 1982.

Prior Research

Until 1982 NOQUEBAY rested undisturbed and nearly forgotten. Park Historian Kate Lidfors first spotted an "unusual shadow or feature" off Stockton Island during an overview flight in a small plane. Later, Stockton Island Ranger Elen Maurer took the park boat out to the location that Lidfors had described and looked at the site through a scuba face mask. Maurer confirmed the presence of wooden structure and made a rough sketch of the site (Maurer 1982).

The site was visited briefly by Submerged Cultural Resources Unit archeologists and sport divers in July 1984, during a cultural resources training session. During subsequent dives on the vessel it was determined that the integrity of the site was very high and that it represented a significant new resource within the park. Later, in a trip report Lenihan (1984) recommended that the site be documented and considered for possible eligibility to the National Register of Historic Places. In September 1984, the site was mapped, photographed, and videotaped under the direction of a Submerged Cultural Resources Unit archeologist. The results of the September documentation effort are reported in this document.

Administrative Status of NOQUEBAY

The site was closed to all sport diving immediately following the July discovery. The site remained closed for the winter months of 1984-85 pending a decision by the U.S. solicitor on ownership and jurisdiction over the vessel. In February 1985,

Apostle Islands National Lakeshore received the solicitor's opinion which determined that, although the site was within the 1/4 mile offshore boundary of the park, the vessel did not come under park jurisdiction as the State of Wisconsin has retained ownership of the lake bottomlands (Ferraro, personal communication 1985). The site will remain closed to the public until a resource management approach has been jointly agreed upon by the Lakeshore and the State of Wisconsin.

IV. NOQUEBAY SITE DISCUSSION

Site Location

The remains of a historic wooden vessel lie in a small cove, known as Julian Bay, on the eastern side of Stockton Island, within the Apostle Islands group (Figure 4). The vessel is approximately 5 miles northwest of Gull Island Light and 1 mile north of Presque Isle Point. The site can be located by traveling in a northeasterly direction from Bayfield, approximately 20 miles to Stockton Island, rounding Presque Isle Point and traveling on a bearing of 361^o toward a marsh and small stream outlet (Figure 5). Its unprotected location (Plate 5) is subject to heavy surge and breaking waves from winter storms which come out of the east/northeast. Summer storms normally do not impact the site as their direction of travel is out of the west/southwest. Sand, deposited over the site throughout the summer months, is scoured out by winter storms. Ice shelving and movement over the site has done little overall damage, other than directly contributing to the vessel's initial break up.

Research Methodology

A total of 54 persondays of diving were completed on the wreck. Several specific objectives were outlined for the Apostle Islands shipwreck project, they included: 1) obtaining a verbal description and photographs of the site location; 2) determining the nature and extent of the wreckage present; 3) developing a base map, with photo and video documentation, of the site to aid in analysis, identification, and interpretation; 4) testing in selected areas to determine the method of construction and internal structural support used in the vessel; 5) familiarizing the Lakeshore diving, cultural resource, and protection staff with the resource; 6) providing additional training in submerged resources documentation

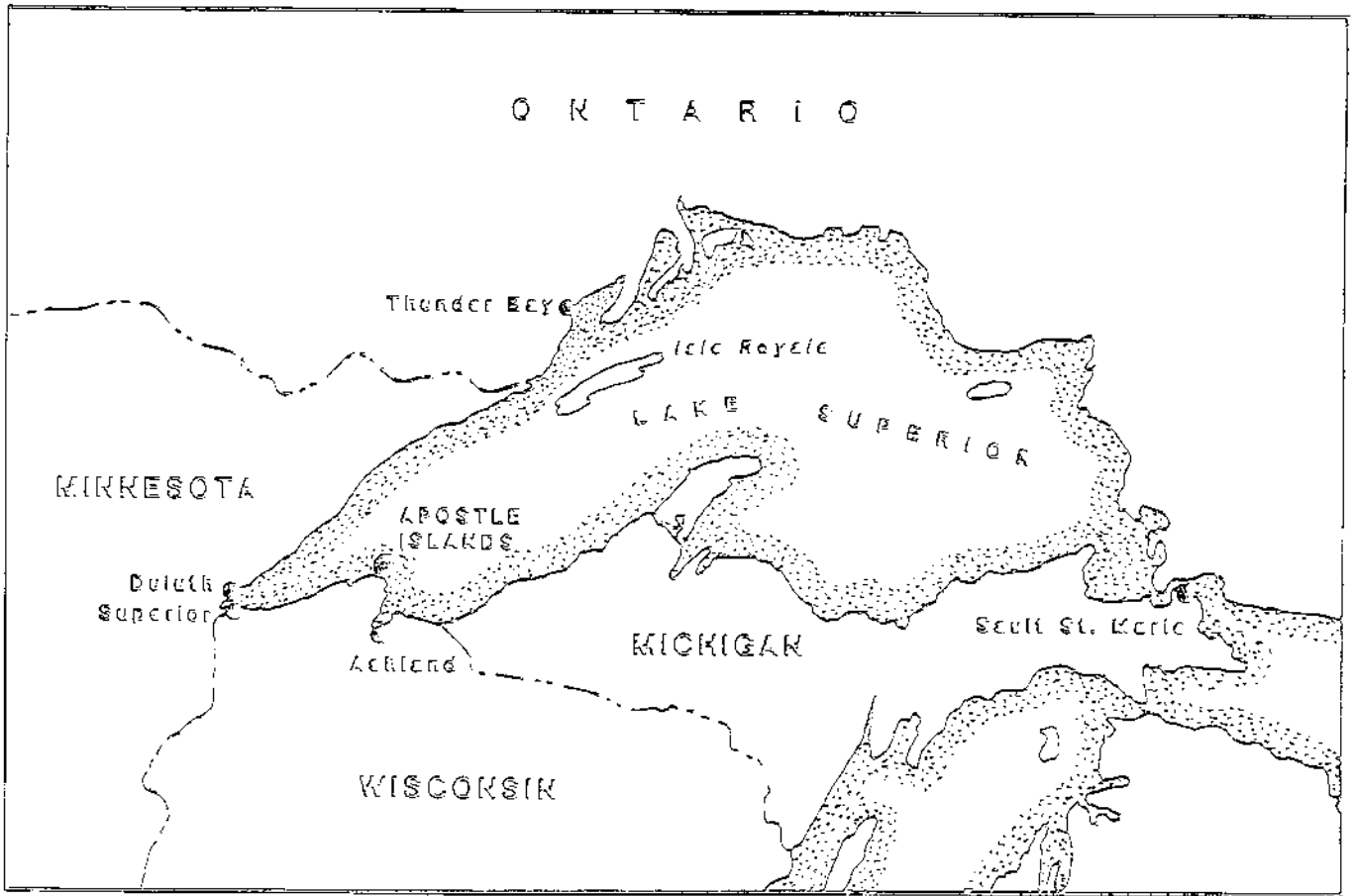


Figure 4: Location of Apostle Islands National Lakeshore

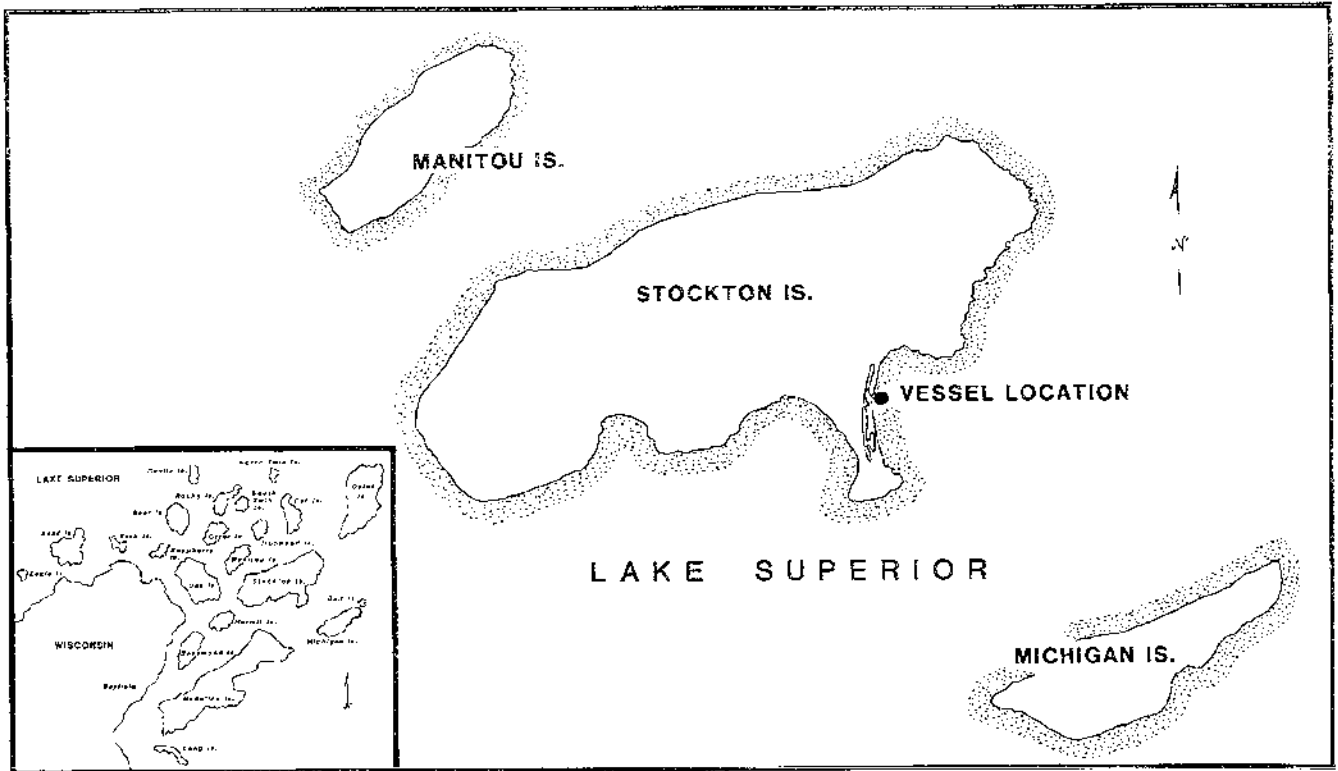


Figure 5: Location of Stockton Island and NOQUEBAY

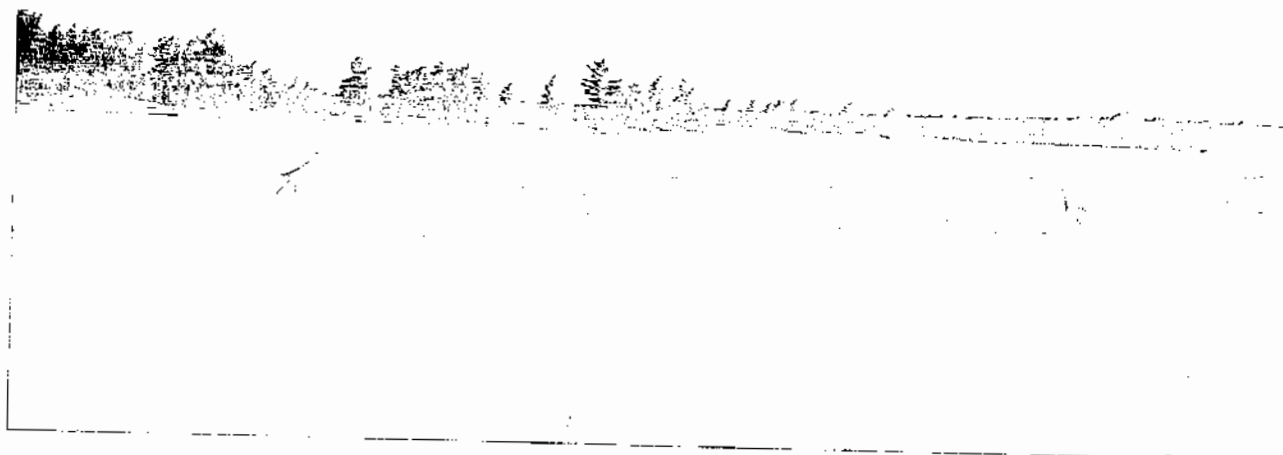


Plate 5: View of Julian Bay, looking west, toward Stockton Island. The remains of the historic wooden vessel, NOQUEBAY, are buoyed at the donkey boiler (right) and at the stern deadwood (left).

techniques to the 12 VIP divers participating in the project; and 7) providing recommendations for the vessel's management.

The methodology used to meet these objectives included trilateration measurements of all wreck elements; photographs of construction details; videotaping of all significant features and major elements; detailed measurements of artifacts, centerline and sister keelsons, and the steering gear assembly; limited removal of sand overburden in transects on the starboard side of the vessel, along the limberways and keelsons; removal of overburden at the wheel and steering gear assembly; and testing in an area in the stern, and in a very small area in the bow. Both an air lift and jet pump were used to remove the sand overburden. This activity was monitored by diver-to-surface hardline communications and by on-site inspections by the principal investigator. The VIP divers, who donated and used the excavation equipment, displayed sensitivity to the resource and worked well under archeological supervision. Diver reconnaissance of the area was also conducted in an effort to locate additional pieces of wreckage. With the exception of a large section of truss rod protruding from the sand just east of the main wreckage concentration, no new wreckage was located.

Site Description

The vessel lies broken and scattered directly offshore on a coarse sand bottom which gradually slopes eastward toward the open lake. Depth of water over the site ranges from 8 to 12 feet and visibility averaged 15 to 25 feet. There is no site number presently assigned to the vessel, either by the park or by the State of Wisconsin.

The wreckage field trends in a North/South direction for approximately 230 feet and is nearly 125 feet wide. The site covers 28,750 square feet; close to 2/3 of an acre. Large intact sections of port and starboard side (hull) are present, as well as 154 feet 6 inches of intact bottom (hull). Structural support elements consisting of truss rod and hogging strap are well represented across the site.

The bow has broken away and lies port side up with more than half of the structural remains buried in the deep sand. Numerous small artifacts are scattered in this general area of the site including nails, a cast iron pot, pipes and fittings, tackle blocks, pad eyes, wire rope, a spiral wood auger, a mooring bit, jib hanks, and a boiler grate. Pieces of coal and small pieces of burned wood are also present. None of the lumber cargo was found at the site.

Three major pieces of machinery were identified on the site. A donkey boiler, in good condition, with associated piping is resting on its side near the bow section. Pieces of a windlass, manufactured by Globe Iron Works of Cleveland, are nearby. The ship's wheel, only partially exposed, lies east of the stern.

The depth of the sand overburden across the site, based on test excavation and probes, ranges from a few inches to better than 5 feet. The sand has directly contributed to the excellent condition of this vessel's remains. It has served as a protective covering against ice shelving and storm driven waves. Little or no organic impacts have occurred at the site.

Site Analysis

A verbal description of the site location (see above) and photographs of the area were the first pieces of data generated. The vessel's remains consist of five major components: ship's wheel, bottom of the hull and keelsons, port side, starboard side, and bow; these are indicated on the base map (Figure 6, located in the pocket inside the back cover of this report). Numerous small artifacts are also present; these were plotted in and listed but not individually represented on the map. Their general location is indicated as an artifact scatter.

A base line was laid from an arbitrary point near the ship's wheel, to the stern deadwood, along the centerline keelson, passed the bow section to an arbitrary point adjacent to the bow. Two three-foot sections of rebar were pounded into the sand bottom; these served as the beginning and ending datum points for the base line. The base line, consisting of number 18 nylon line, was measured off in

10-foot increments, beginning at the wheel in the stern area, and marked with numbered Plexiglas tags. In all a base line 260 feet long was laid.

The arrangement of the various components clearly represents a vessel which settled squarely on the bottom of the hull. As wave action, surge, winter storms and ice shelving attacked the partially burned vessel, the expected wrecking processes began. The vessel began coming apart at points of structural weakness, in this case just above the turn of the bilge and in the areas of the bow and stern deadwood. Port and starboard side sections fell outward, leaving the entire centerline keelson and bottom exposed.

For purposes of clarity and the following discussion, five major components or features on the site have been indicated on the base map. They are: the ship's wheel, keelsons and bottom of the hull, port side of the hull, starboard side of the hull, and bow. The following discussion addresses each component separately. In addition a summary of NOQUEBAY's key construction attributes is provided in Appendix B.

Ship's Wheel

The wheel, which was found partially exposed in the deep sand that covers the site (Plate 6), is 67 feet southeast of the stern deadwood on the starboard side of the vessel. The zero point on the base line was placed adjacent to the wheel (Figure 6). Identified as a mechanical steering gear, after excavation, the wheel is articulated with the steering mechanism (Plate 7). The mechanical or "patent steering gear" came into use in the latter half of the 1800s (Paasch 1890). The rear standard, rudder head (or stock) and stuffing box (through the main deck) were not present. No evidence of the wheel box, emergency tiller, or log reel were located during excavation.

The wheel is in remarkably good condition, the only obvious attrition being the deterioration of the wood on the handgrip spokes, bending of the three exposed outside handgrip spokes or handgrips and a crack in the rim. The diameter of



Plate 9: NOQUEBAY's wheel, partially exposed in the deep sand, was located during a submerged cultural resources training course. The manufacturer's name, Coffin and Woodward, are embossed on the wheel's rim. Photo Joe Strykowski.

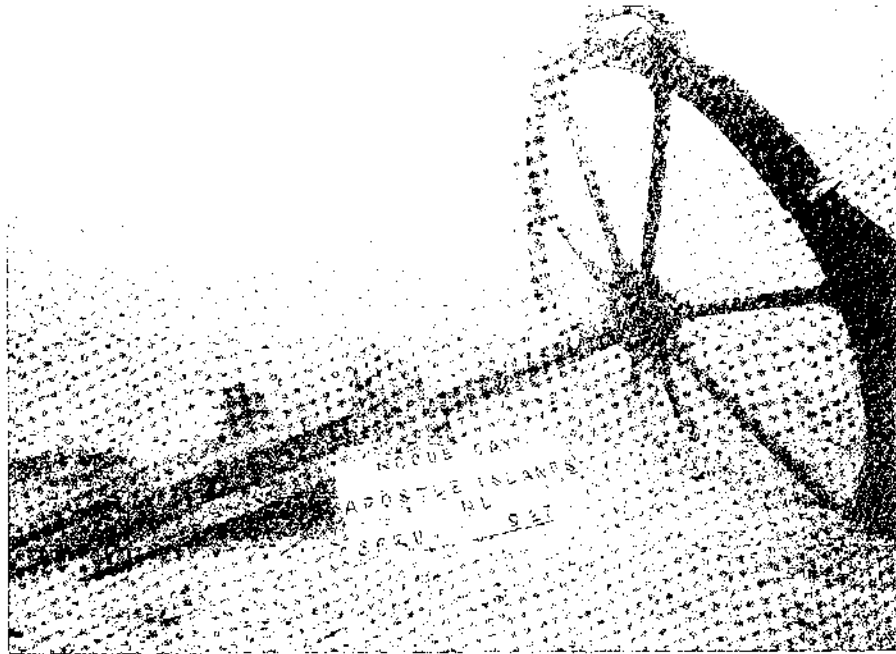


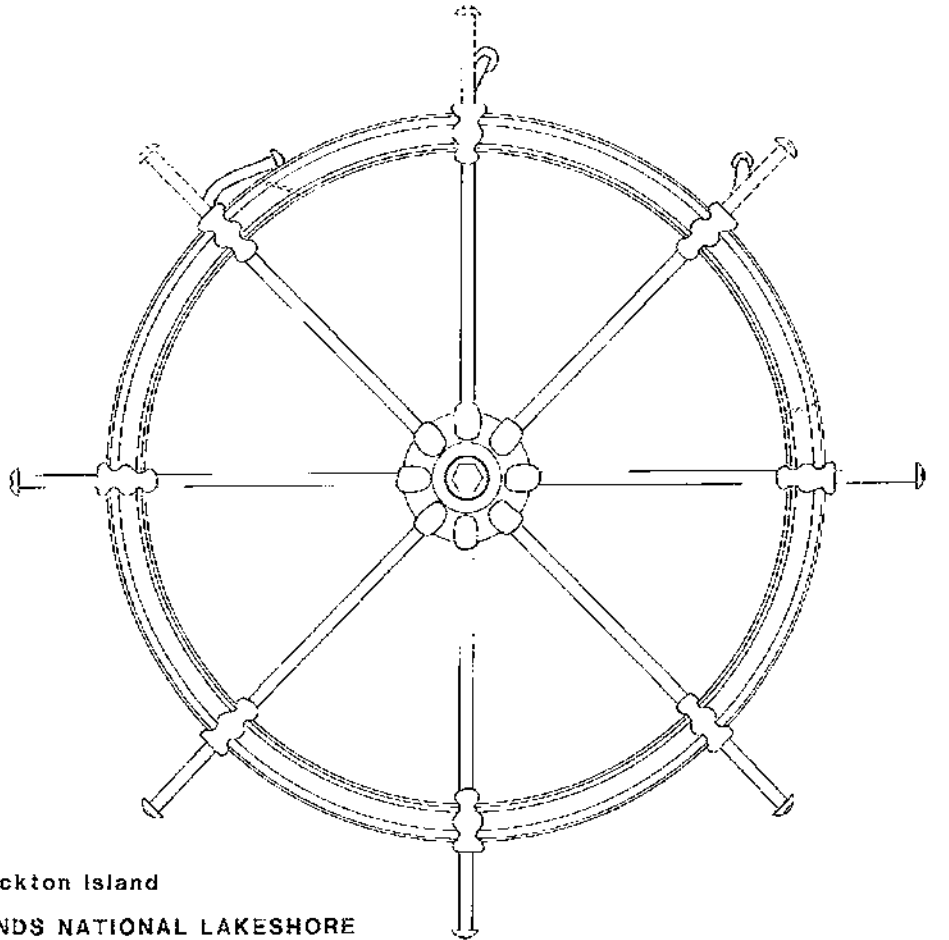
Plate 7: After excavation, the entire wheel and steering assembly were exposed. The mechanical, or "patent steering gear," came into use in the latter half of the 1800s. The wheel and worm gear are in an excellent state of preservation.

the wheel is 4 feet 5 inches, while the 8 spokes each measure 22-1/2 inches overall (Figure 7). The spokes, center hub and hex nut are bronze; the wheel rim is steel. The spokes are 7/8 inch in diameter with a 1-1/2 inch cap. The center hub diameter is 8-1/2 inches overall with a 1-7/8 inch center hex nut backed by washers. The name of the manufacturer of the wheel and steering mechanism is still visible on the wheel rim; they are Coffin and Woodward, Boston, Massachusetts.

The mechanical steering gear and spindle (Figure 8), also called worm gear or screw gear, are made of steel or iron and are in an excellent state of preservation. The guide rods are in place as is the yoke and yoke bolt. The coupling rods are missing; however, the traverse nuts are in place. Only the cross head top plate was present. The spindle is 34-1/2 inches long, with 15 exposed right-left spindle threads at 1 per inch, and 8 exposed right-left spindle threads at 1 per 3 inches. The steering wheel spindle is 2-1/4 inches in diameter and it is 4 feet 4-1/2 inches long to the wheel. The overall length of the steering mechanism, including the wheel is 5 feet.

Several artifacts were discovered during excavation of the wheel and steering mechanism; they included: a length of wire cable 1 inch in diameter, not attached to the wheel; 9 square spikes varying in size from 5 to 9 inches long by 1/16 inch in cross section; 6 round nails varying in size from 8 to 14 inches and 3/4 inch in diameter; and a 1-by-4 inch piece of tongue and groove board, painted beige, with a small segment of canvas attached via small nails. These items were identified, measured, and left in place under the wheel and steering assembly.

Following the mapping, photo, and video documentation of this feature, it was reburied. This was done to protect the wheel from winter storms, ice action, and possible vandalism.



NOQUEBAY

Julian Bay, Stockton Island

APOSTLE ISLANDS NATIONAL LAKESHORE

Ships Wheel (Obverse View)

L. M. Florentz

DIVERS : Fran Potvlen

21 Sept. 1984

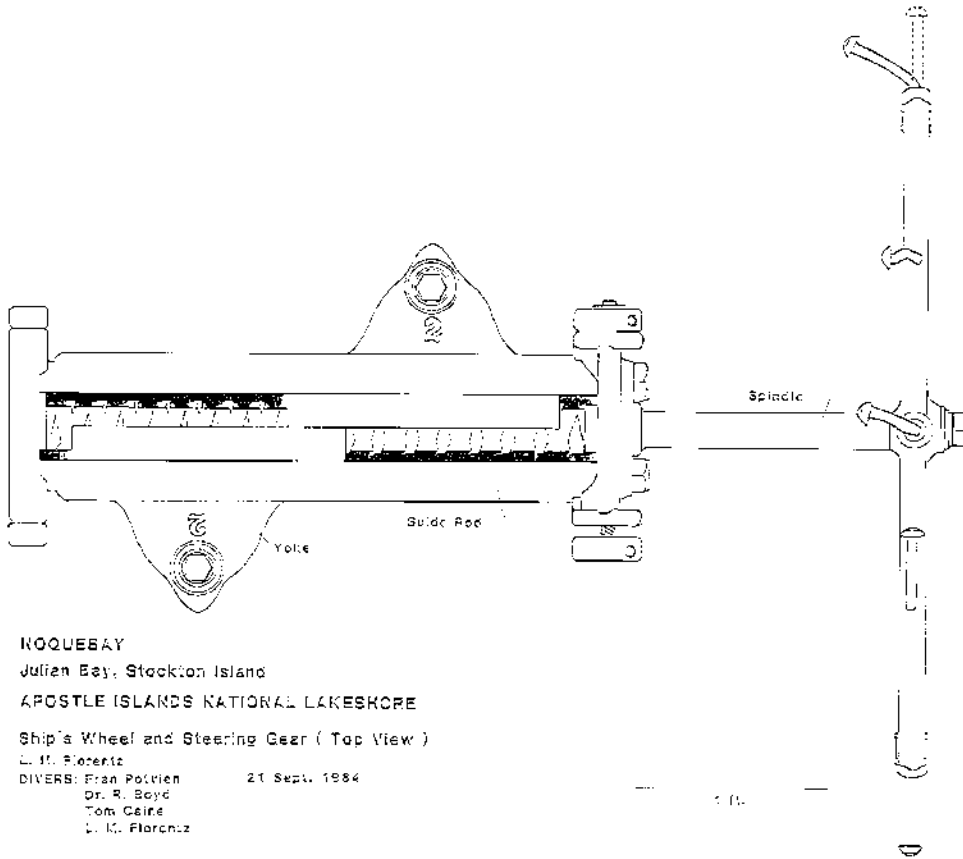
Dr. R. Boyd

Tom Caine

L. M. Florentz

1 ft.

Figure 7: Ship's Wheel



ROQUEBAY
 Julian Bay, Stockton Island
 APOSTLE ISLANDS NATIONAL LAKESHORE
 Ship's Wheel and Steering Gear (Top View)
 L. H. Florentz
 DIVERS: Fran Pockien 21 Sept. 1984
 Dr. R. Boyd
 Tom Cairns
 L. K. Florentz

Figure 8: Steering Gear

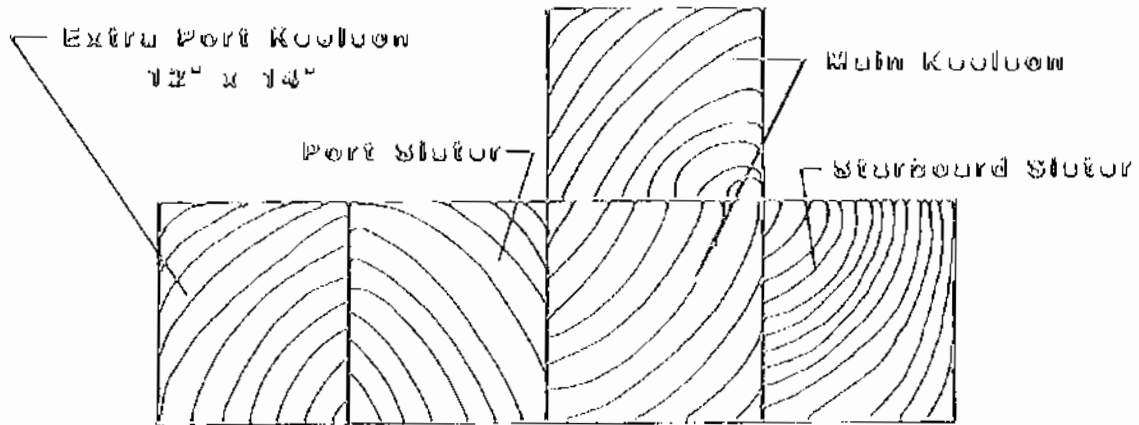
Keelsons and Bottom of the Hull

The centerline keelson, sister keelson, and floor keelsons show very little deterioration. One hundred fifty-four feet six inches of intact bottom is present. The interior width of the bottom to the thick ceiling strakes at the turn of the bilge is 28 feet. Overall the vessel's width, outside, was 34 feet 8 inches. The floor keelsons are 8 feet 6 inches from the sister keelsons and 2 feet 9 inches from the thick strakes of the bilge ceiling at the turn of the bilge. The floor keelsons are 12-inch-by-8-inch timbers. The port side floor keelson is only intermittently exposed due to sand overburden, while a full 83 feet of starboard floor keelson is exposed¹.

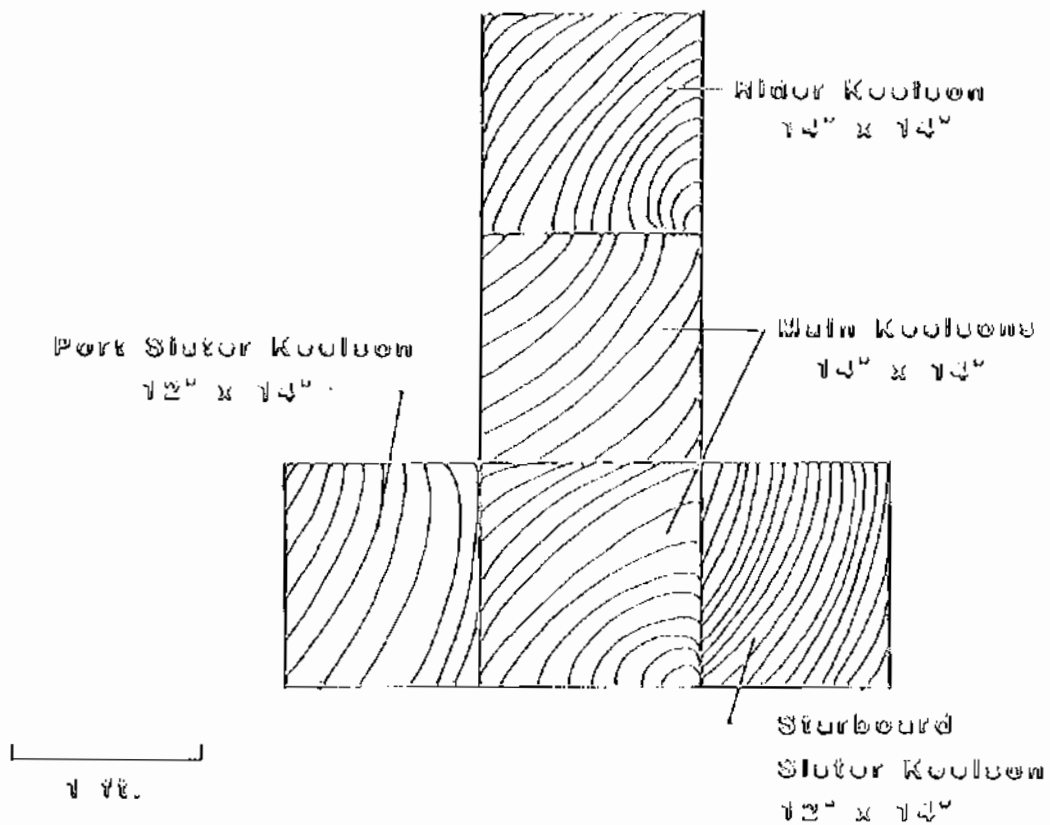
Centerline Keelson: The keelson assembly consists of several elements; the main keelsons, the port and starboard sister keelsons, an extra section or length of port sister keelson, and a rider keelson (Figure 9).

The main keelson is composed of two stacked timbers, each 14 inches by 14 inches. The main keelson broke at a point of weakness, at the scarp in the stern. The scarp joint used on all of the keelsons is the same type, a hooked scarp. The scarps found on the vessel are a uniform 5 feet in length. This followed the ship building rule of the era which called for making the keelson scarps "equal to at least two frame intervals, that is double the room and space" (Desmond 1919:55).

¹The term "floor keelson" is the most technically correct term for the wooden longitudinal strength member which lies outboard of the centerline keelsons but inboard of the turn of the bilge. Floor keelson is not a term which has been used in describing construction elements of salt water craft of the period; it appears this terminology may be unique to the Great Lakes (C. P. Labadie, personal communication). This term has been generally applied, in the available contemporary literature, to wooden lake vessels that have been constructed with an internal arch for longitudinal strength (Buffalo Commercial Advertiser, July 1870, August 1875; Detroit Free Press, July 1886). In vessels of iron or steel the same member is referred to as a "side" keelson or "half-floor" keelson (Paasch 1890:65); de Kerchove 1947:734).



CENTERLINE KEELSON CROSS SECTION
AT BASELINE POINT 170



CENTERLINE KEELSON CROSS SECTION IN STERN

Figure 9: Centerline Keelsons Cross Section

The rider keelson, resting atop the main keelson timbers, is also 14 by 14 inches. A rider keelson is usually added to provide additional longitudinal strength. Its extant length on the vessel is 28 feet 6 inches. When the main keelson gave way, the rider apparently failed with it.

Several features were noted along the main and rider keelsons (see Figure 10 Centerline Keelson Plan located in the pocket inside the back cover of this report). Immediately forward of the main keelson break at base line point 72, a notch or groove 4 inches in diameter, round in cross-section, was found which passes vertically through the rider and main keelsons and extends to the limberway. The groove is clearly visible on the port side of the keelsons. It is most likely a bilge pump access. No remains of the bilge pump were located.

The mizzenmast step is located on the rider keelson at base line point 89. The rectangular step is cut out of the rider from the starboard side; it is 18 inches long by 9 inches wide (see mast step detail, Figure 10). Two wood blocks are fitted into this space, making the mortise overall dimensions 14 by 6 inches. The step is filled with nails, wedged lengthwise, and sand, making it impossible to obtain accurate depth measurements.

The rider keelson ends at base line point 100. It is not broken or removed, at this point it steps down to the main keelson (Plate 8).

Between base line point 110 and 130 several deep grooves across the top of the main keelson were found. These grooves match exactly the size of the nails used for the centerline hold stanchion-post longitudinals. These elements are also referred to as stringers in some contemporary literature (Buffalo Morning Express, September 1882). At this point on the keelson there are no remains of the centerline hold stanchions or the longitudinal strength members. It is not until base line point 146 that remains of these longitudinals are found (Plate 9). The longitudinals are 3 inches wide and 9 inches deep; the extant section at this point measures 11 feet 3 inches. Two stanchion-post remnants are located at

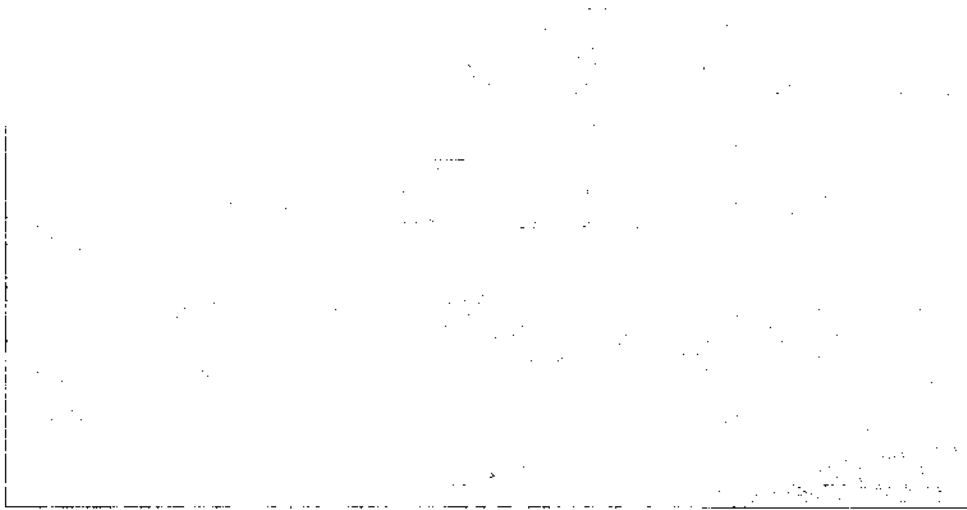


Plate 8: The rider keelson, added to provide longitudinal strength, rests atop the main keelsons. It steps down to meet the main keelsons at base line point 100. A keelson cap and the port sister keelson are visible under the photo board. A small portion of truss rod with a protective plate is present in the lower right of the photo.

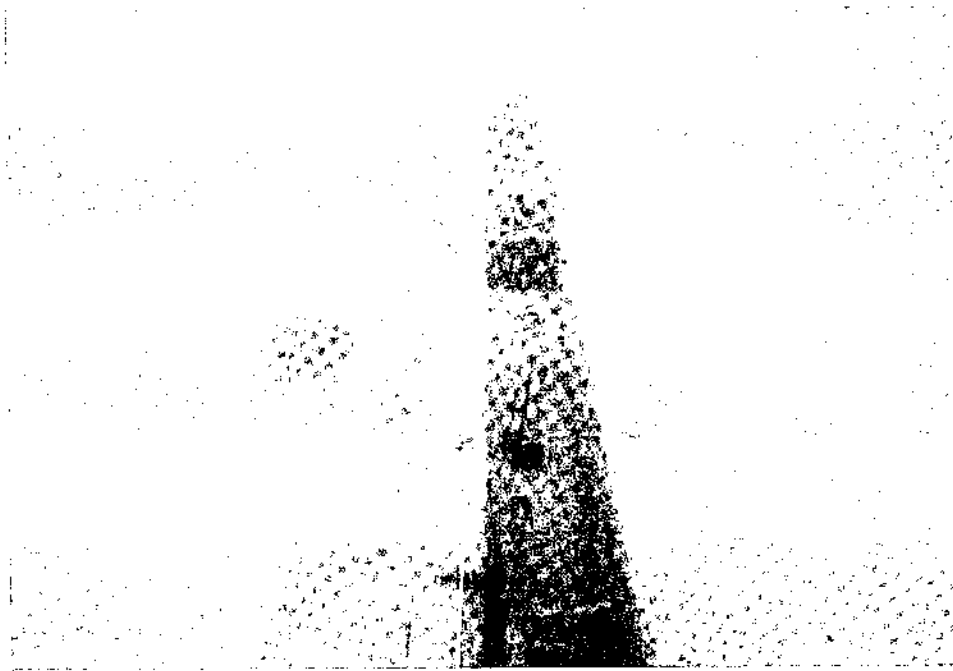


Plate 9: The centerline stanchion-post remnants at base line points 149 and 153, measured 6 by 6 inches. The extant longitudinals at this point were just over 11 feet in length. The additional port sister keelson, presumably in the area of the centerboard, appears on the left of the photo.

base line points 149 and 153. They measure 6 by 6 inches and stand approximately 1 foot high. The longitudinals and stanchions show evidence of rounding and rubbing, possibly from sand abrasion or from ice shelving. Three sections of longitudinals were identified in all; each had remains of stanchion-posts. Portions of four posts remain in place on the site. The spacing between two posts, which appear to be in their original locations, is 4 feet on center.

An unusual feature on the main keelson appears at base line point 206; the keelson narrows to a width of 9 inches and then flares out once again to its full 14 inches (Figure 10). This point is very near the end of the extant main keelson. The length of this narrowed area is 18 inches. Immediately forward of the feature is a wood cap, resting on the top of the keelson, that measures 4 feet 8 inches by 3 inches. A similar piece of wood appears on each side of the keelson. These caps provided both reinforcement and protection for the main keelson. The narrowing of the top timber of the main keelson exposed a platform, 18 inches wide at the keelson's narrowest point, on the bottom timber of the main keelson and the sister keelsons.

There is no question that this narrowing of the main keelson was purposeful and was most likely done to accommodate a piece of machinery or some other construction element. The location of this narrowed area in proximity to the bow and the reinforcing keelson caps suggests it may have been the point at which the tow bits may have tied into the keelsons. The tow bits are visible in a photograph of NOQUEBAY (Plate 3 Historic Photo).

The last several feet of the main keelson, toward the bow, show clear evidence of burning. The charred timber is intact with numerous nails sticking up which once held the top and bottom main keelson timbers together.

Sister Keelsons: During investigation of the vessel, the port and starboard sister keelsons were cleared of sand to facilitate examination. During this process several artifacts were uncovered on the port side. Their location was

documented and they were measured and photographed. The items uncovered included two hoisting blocks or gins, used with a derrick or cargo boom for loading or unloading cargo; one lifting tackle or purchase with pad eye, used for lifting cargo or machinery; a 3/4-inch ring with two thimbles, used to protect ropes from chafing in conjunction with a tackle; two small pad eyes; and a horse, often placed between the five-rail stanchions to which the leading blocks are rove or secured. Several fasteners were also documented which included four 3/8-inch square spikes, three 3/4-inch rivets. All of these were located on the port sister keelson between base line point 204 and 206.

One hundred twenty-five feet of the port sister keelson remains on the wreck. It ends at base line point 82-6 in the stern. The starboard sister keelson ends at base line point 80 and is extant for 130 feet. Both were covered only by a thin layer of sand. The fact that these keelsons are not the same overall length is not necessarily unusual for wooden vessel construction. The point at which sister keelsons begin and end along the centerline of a vessel is normally where the width of the hull narrows and the deadwood build-up starts. The length of the sister keelsons is dictated by both the narrowing of the bottom hull and the length of the timbers available and used for the sisters.

The sister keelsons are 12-inch-by-14-inch timbers, once again in an excellent state of preservation. With the exception of burning evidence in the area near the bow, they are undamaged. A wood scab, 3 inches thick by 10 feet 6 inches long, is present at base line point 99-6 on the port sister keelson. A similar piece is present on the starboard sister keelson at the same location. This feature appears again on both the port and starboard sister keelsons at base line points 136 and 178-6 (Figure 10). The beginning and ending points of the extant stanchion longitudinals coincides with the placement of these caps. The keelson caps provided some additional protection to the keelsons during the loading and unloading of cargo.

The scabs or keelson caps were clearly placed on the sister keelsons directly under the hatches. Based upon the number of keelson caps found on site, it

appears that the vessel had a total of four hatches. These hatches were not evenly spaced. The spacing varies from 26 feet, between the aft hatch (No. 4) and main hatch (No. 3), 33 feet between the main and forward hatch (No. 2), and 17 feet 6 inches between the forward hatch and the booby hatch (No. 1). All but hatch number 1 are the same size, that is 10 feet 6 inches long. The number 1 hatch size is estimated to be 6 feet 6 inches long, based upon the beginning point of the stanchion post longitudinals and the length of the forward keelson cap.

A feature noted along the port sister keelson is an extra keelson which begins at base line point 188-6 and ends at base line point 151 (Plate 9). This keelson is a single timber, measuring 12 by 14 inches and is 37 feet 6 inches long. This extra keelson is not duplicated on the starboard side. It was reported in Inland Lloyds Marine Register (1902) that, in 1900, NOQUEBAY was equipped with a centerboard. Centerboards came into general use on American schooners about 1815-1825 (MacGregor 1984:141). Although they may have been considered in the design of small lake schooners in the very early 1800s (Chappelle 1951:40). No direct evidence of a centerboard was found during documentation of the vessel. Further, no contemporary newspaper accounts provide information on the removal of NOQUEBAY's centerboard. While remains of a centerboard were not found other anomalous features strongly suggest the area of the extra port keelson as the probable location of the centerboard.

One such anomaly associated with this extra keelson is the abrupt appearance and disappearance of triple frames. The after-most set of triple frames located is at base line point 140. Careful examination of the limberway immediately aft of this point revealed only double frames. The most forward known location of triple frames is at point 180 on the base line (see Figure 10). The change in the framing pattern indicates that some internal reinforcement was deemed necessary by the builders. This may have been to accommodate a centerboard. Triple frames are not used consistently between these two points, rather double frames appeared on either side of the exposed triple frames. The framing pattern also does not fit a straightforward double-triple-double pattern; some other

combination of double and triple frames is employed. One possible combination that fits the exposed double and triple frames is a triple-double-double pattern, however this is speculative. Further examination of the area immediately forward of the extra port keelson would help to clarify the framing pattern.

A second anomalous feature is a rod and shackle tied into the main keelson at base line point 140 (Plate 10). It is attached on the port side of the sister keelson at the level of the limberway immediately aft of the last set of triple frames. No equivalent feature is present on the starboard sister keelson.

Very little descriptive information or ship plans are available on the execution of centerboard keels. One exception is the iron schooner ANNSBRO, built in 1846 in Ireland. According to her plans, described by MacGregor (1984:155), the centerboard or drop keel was pivoted from a point on the main keelson and the pivot point was toward the bow. In the case of the Apostle Islands vessel, the pivot point may have been on the port sister keelson. The pivot point was not located during examination of the vessel. However, some mechanism for raising and lowering the centerboard is required. This mechanism would have been located just aft of the centerboard, if ANNSBRO can be used as an example. It is possible that the rod and shackle found may have been associated with a mechanism for raising and lowering the centerboard.

The fact that an extant centerboard was not located does not discount this vessel having such a feature at one time in her life. The appearance of the extra port keelson and build up of hull frames only in a specific area of the vessel suggest the presence of some constructional element out of the norm; this was probably the centerboard. The extra port keelson most likely covers the hole where the centerboard was once located.

Port Side of Bottom: The port side of the bottom, from the floor keelson to the turn of the bilge, is buried (Figure 6 Base map). The vessel's double frames, constructed of 6-by-12-inch timbers, forming 12-by-12-inch frames on 24-inch centers, are exposed in the stern adjacent to the centerline keelson. They are



Plate 10: An anomalous feature located along the port side of the centerline keelson is this rod and shackle. This feature may have been used in conjunction with the centerboard. One of the two exposed sets of triple frames can be seen immediately in front of the rod.

also visible at the starboard floor keelson and at the turn of the bilge on the starboard side.

A small area of the bottom ceiling is visible on the port side. The planks vary in width from 10 inches to 16 inches with a uniform thickness of 3 inches. The planks are double fastened with 3/4-inch square nails, none of which have clenched washers. Small boulders are present, wedged in between the exposed frames on this side.

Several artifacts were identified in this area. A 5-foot section of 1-1/4 inch diameter pipe, threaded on one end, was lying in the limberway near base line point 75. Additional sections of pipe were found lying in the limberway between base line point 80 and 90. A twisted section of 1-1/2 inch diameter rod with a 16-inch turnbuckle was also present between base line points 90 and 100. A cast iron plate, approximately 11 by 11 inches, was found on the port sister keelson at base line point 103. One side of the plate has three small ridges and the inscription "874 Born". The flip side has one diagonal ridge and a small raised catch or knob on one edge. This may have been part of a small stove used in the aft deckhouse for heating and cooking.

Starboard Side of Bottom: The hull is intact to the turn of the bilge on the starboard side (Figure 6). A narrow strip of the starboard bottom was cleared of a thin layer of sand in the area of the stern (base line point 90). The ceiling planking exposed is similar to that found on the port side. The planking in this area does not extend to the floor keelson, however, frames are intact up to the turn of the bilge. The thick strakes of the bilge ceiling are visible on the starboard bottom between base line points 99 and 113 and again between points 121 and 157. In all 50 feet of the bilge ceiling is articulated on the starboard bottom. One section, 16 feet long, is missing along the exposed bilge ceiling. It broke cleanly at a scarf joint; that joint is 4 feet long.

The thick strakes at the turn of the bilge are 5 1/2 inches thick by 10 to 16 inches wide. Coaks appear for the first time, in the construction of this vessel, in

the bilge ceiling. These are wooden "dowels" which are laid into the surface of two adjoining timbers to prevent slipping or sliding endways, i.e., longitudinally. The bilge ceiling has 2-inch coaks, spaced on 24 inch centers, falling between frames. The bilge ceiling fasteners differ from the ceiling on the bottom only in that the double fasteners alternately have 1-inch diameter clench washers (Figure 11). This fastening pattern begins at the turn of the bilge and continues to the main deck.

A second transect of bottom hull on the starboard side was cleared between base line points 140 and 145. Ceiling planking remains in place in this area up to the break at the turn of the bilge. The same planking and fastening pattern found on the port and starboard stern areas is repeated here.

At base line point 160, adjacent to the starboard sister keelson, a 25 foot section of truss rod begins. This section of rod, with a 22-by-4-inch turnbuckle, is one of several represented on the site. The rod is uniformly 1-1/2 inches in diameter; where it articulates with the turnbuckle it is threaded to facilitate connecting and adjustment. There are 5 articulated turnbuckles exposed on the site that are either 22 inches or 24 inches long. Two of the turnbuckles are 24 inches by 4-1/2 inches and three are 22 inches by 5-1/2 inches. It is probable that at least one additional turnbuckle would have been used on this vessel, making a total of six.

In some of the cases the rod and turnbuckles also had flat plates in association. The turnbuckle on the starboard side near base line point 165 has such a plate. It is 4 feet from the end of the turnbuckle and is 6 by 5 1/2 by 1 inch. The plate is not perpendicular to the rod, rather it is at a slight angle to the rod. Two other similar plates were found on sections of rod, one of which is in association with a turnbuckle. The plate and turnbuckle, located on the starboard sister keelson near base line point 202, is reproduced in Figure 12. The plate with this turnbuckle is the same size as the plate at base line point 165, however this plate is only 1 inch from the turnbuckle and is perpendicular to it. One additional plate

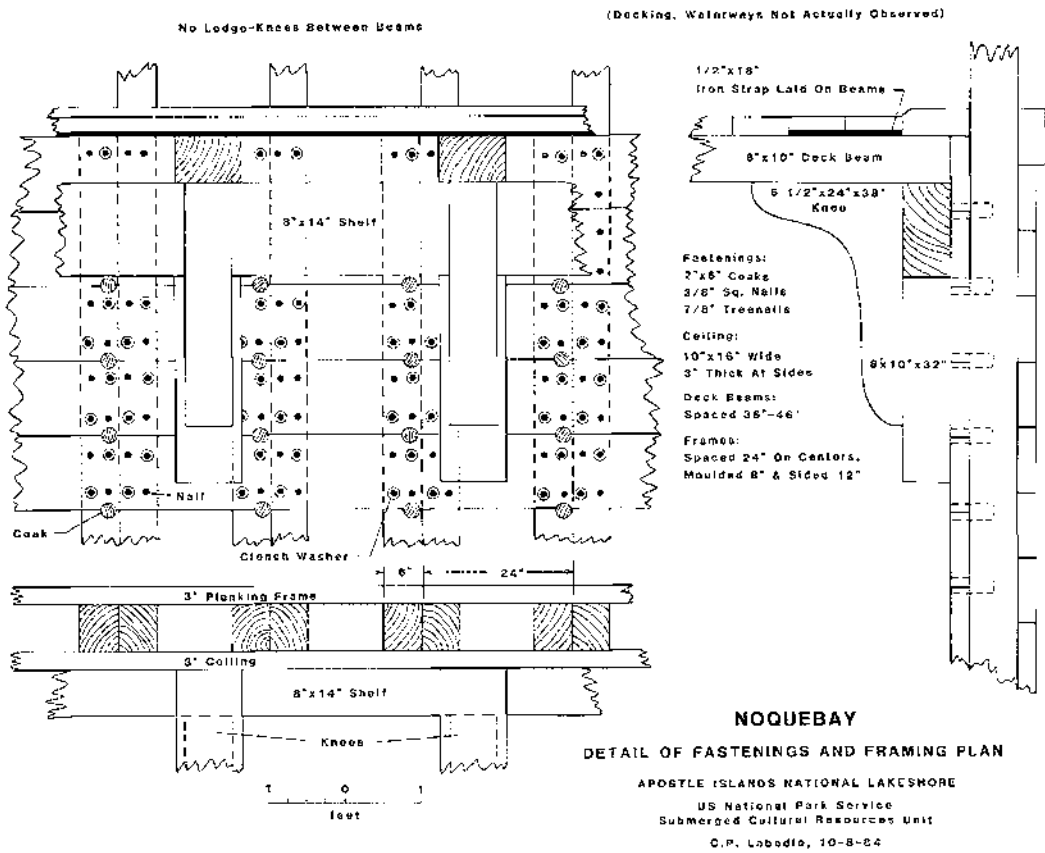
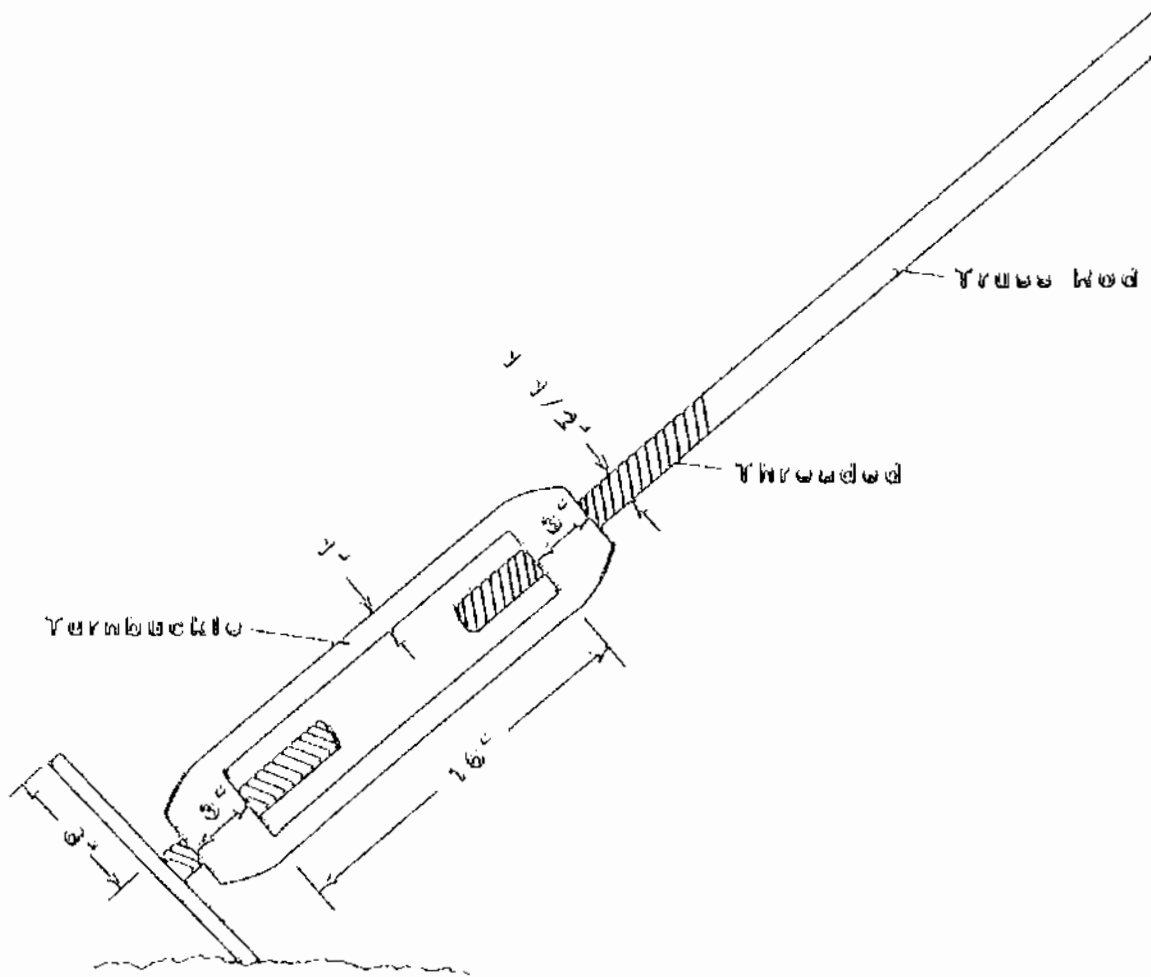


Figure 11: Detail of Fastenings and Framing Plan



NOQUEBAY

Julian Bay, Stockton Island

APOSTLE ISLANDS NATIONAL LAKESHORE

Turnbuckle at Base Line Point 203

Bob Bailey 23 Sept 1984

Figure 12: Detail of Turnbuckles

was located on the site; this one is not associated with a turnbuckle, and it is at an angle to the truss rod.

The truss rod and turnbuckles were used on this vessel as part of her internal hull strengthening. The hulls of wooden vessels, long and relatively narrow like NOQUEBAY, required internal structural support to offset longitudinal and transverse strains. If the hull strength is not sufficient to withstand longitudinal strains the hull will eventually change shape. The ends of the ship may drop or become "hogged," or the middle may drop relative to the ends and "sag."

The truss rod was designed to reduce longitudinal hogging of the hull. The turnbuckles were used to tighten sections of rod, pulling the vessel bow and stern up. It appears that the rod passed up through the deck near the bow, similar to truss rod found on another Great Lakes schooner WILLIE LOUTIT (Plate 11), ran down the deck to the stern and then below again. The plates found on rod were probably for deck reinforcement and protection at the points where the rod passed through the deck planking. Internal strengthening was particularly important on NOQUEBAY, since she had no mainmast and no forestays connecting the remaining masts (see historic photo, Plate 3). If NOQUEBAY had continuous forestays they would have provided some additional longitudinal strength to the hull, perhaps without the necessity for a truss rod. Further, the relatively light planking on this vessel's hull also contributed to the need for longitudinal strengthening (C. P. Labadie, personal communication).

It is not clear exactly how the truss rod articulated with another feature found on the site in both the bow and in the stern area. This feature consists of two flat straps fastened together by means of 18 inch long pins which pass through the bow deadwood (Plate 12). Each strap is 6 inches wide, 1 inch thick, and 7 feet 6 inches long. The overall appearance of the feature is that of a ladder positioned at an angle to the deadwood, with several of its lower rungs passing through the deadwood. Both of the straps have a 2-1/2 inch diameter hole, 2 inches from the bitter end. A similar feature, consisting of one disarticulated strap, is located in the port stern area. No artifacts or other connective devices were found



Plate 11: View of the deck, looking toward the bow, on the schooner WILLIE LOUTIT. This vessel was built in 1873, one year after NOQUEBAY. The truss rods seen in this photo, similar to those found on NOQUEBAY, run across the top of the deck and centerboard housing then back down to the keelson. The winch, on deck just left of the housing, would have been used to raise and lower the centerboard. Photo circa 1906, courtesy of Oliver Birge, Hessel, Michigan.

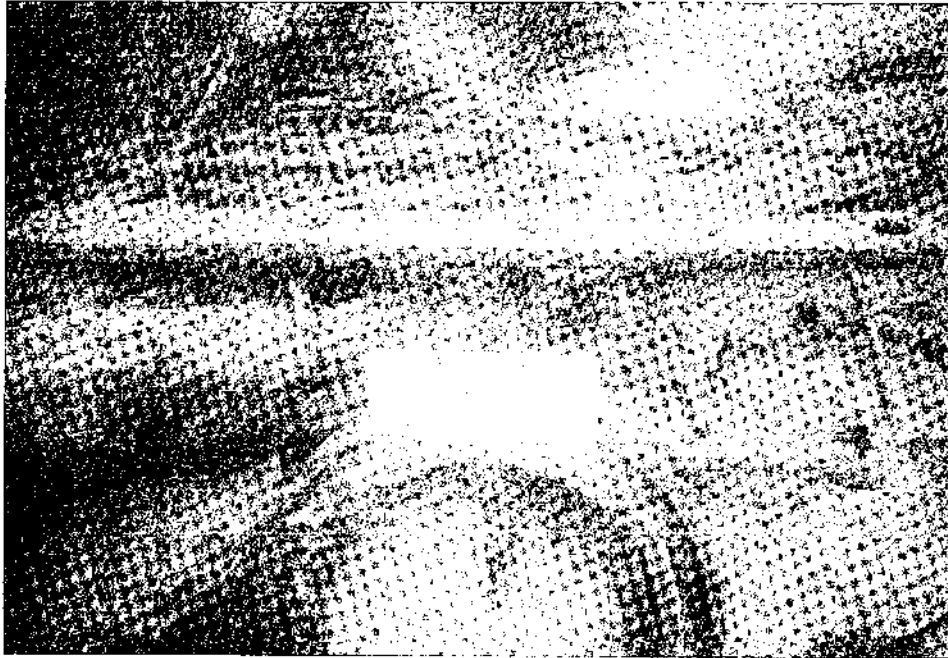


Plate 12: The bow deadwood, constructed of 4 stacked timbers each 16 by 14 inches, has two flat straps which straddle the timbers. These straps would have articulated with the truss rods as part of the vessel's hogging system. The driving wheel from the windlass is leaning up against the deadwood strap.

during examination of the site which would explain exactly how the russ rod and the deadwood straps connected. What is clear about these straps, however, is that they did play a role in the overall internal hull strengthening of this vessel.

Transverse strains cause the sides of a vessel to bow out or in. Transverse strains are much greater than longitudinal strains and as soon as a vessel moves, inclines, or pitches and rolls, transverse water pressure works to alter the shape of the vessel. If the framing, especially at connections between deck beams and side framing, is not strong enough or properly fastened, the knees, as well as the framing of the decks and bilges, will begin to loosen (Desmond 1919:35). In an effort to deal with this problem, the builders used a wide strap (Plate 13), running longitudinally at the level of the main deck. The strap was probably placed directly over the deck beams, at the level of the decking, and tied into the deck beams and knees by fasteners (Figure 13).

One section of hogging strap, lying on the starboard side of the ship's bottom, stretches from the exposed frames at the turn of the bilge, across the starboard floor keelson, to the starboard sister keelson. It is approximately 44 feet long, overall, and is 18 inches wide by 1/2 thick. The 7/8-inch diameter fastener holes match exactly the diameter of the nails found sticking out of the extant knees on the starboard side section. Further, the spacing and angle of these holes correspond to the spacing and angle of the knees verifying that the strap was tied to this feature (Figure 14).

Port Side of the Hull

The visible pieces of port side are broken into three distinct sections (Figure 6 Base Map). One long section is outboard up, a second section of the port side is deeply buried with only the tops of the frames visible, while the third section, just forward of the previous two pieces, is burned, broken, and partially buried.

The deeply buried section is 16 feet long and still has 8 frame timbers plus ceiling planking in place. This section broke above the turn of the bilge where

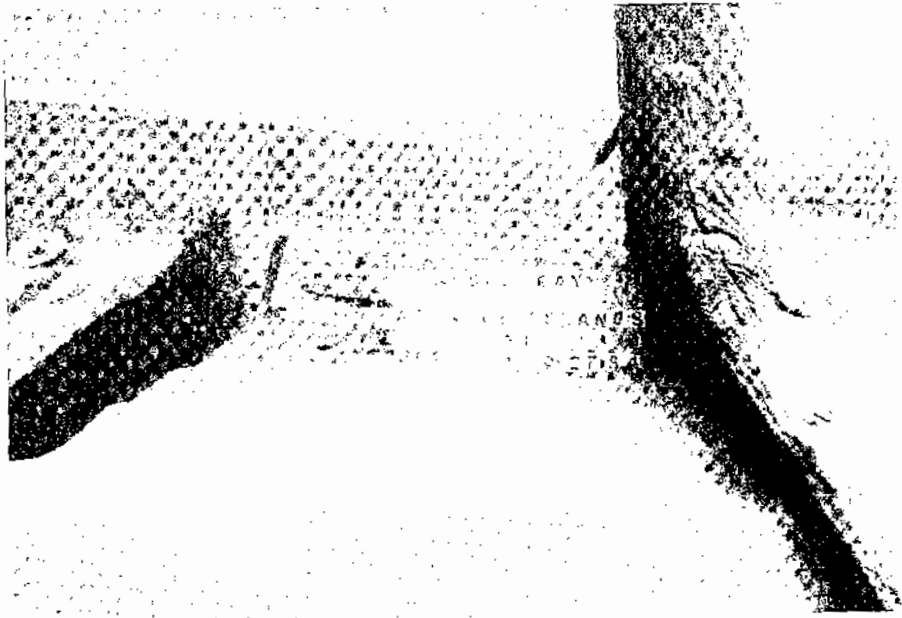
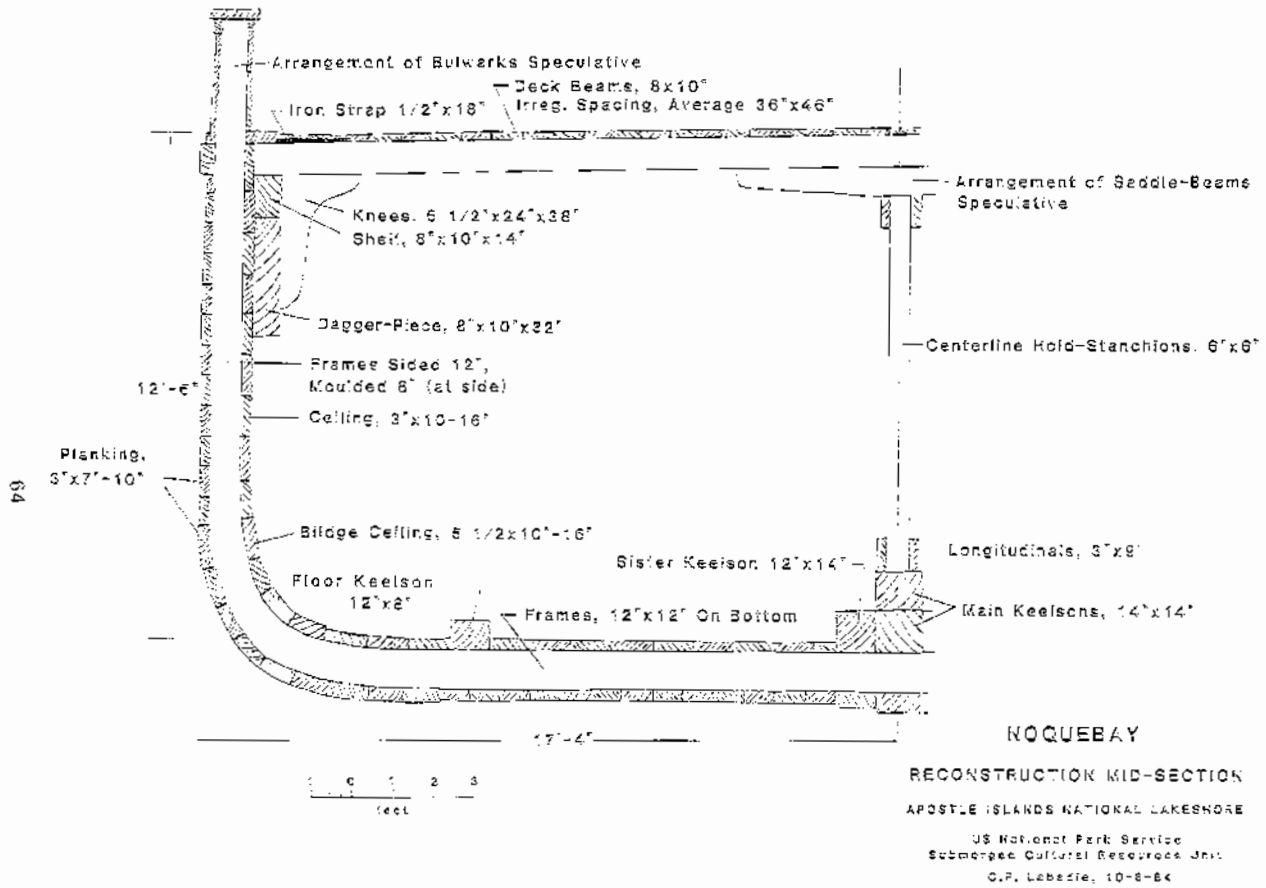


Plate 13: The hogging strap was directly tied into the deck beams and knees at the level of the main deck. Natural knees were used throughout the vessel. Fasteners through the knees are 7/8 nails with clench washers.



NOQUEBAY
 RECONSTRUCTION MID-SECTION
 APOSTLE ISLANDS NATIONAL LAKESHORE
 US National Park Service
 Submerged Cultural Resources Unit
 C.P. Labadie, 10-8-64

Figure 13: Hull Cross Section

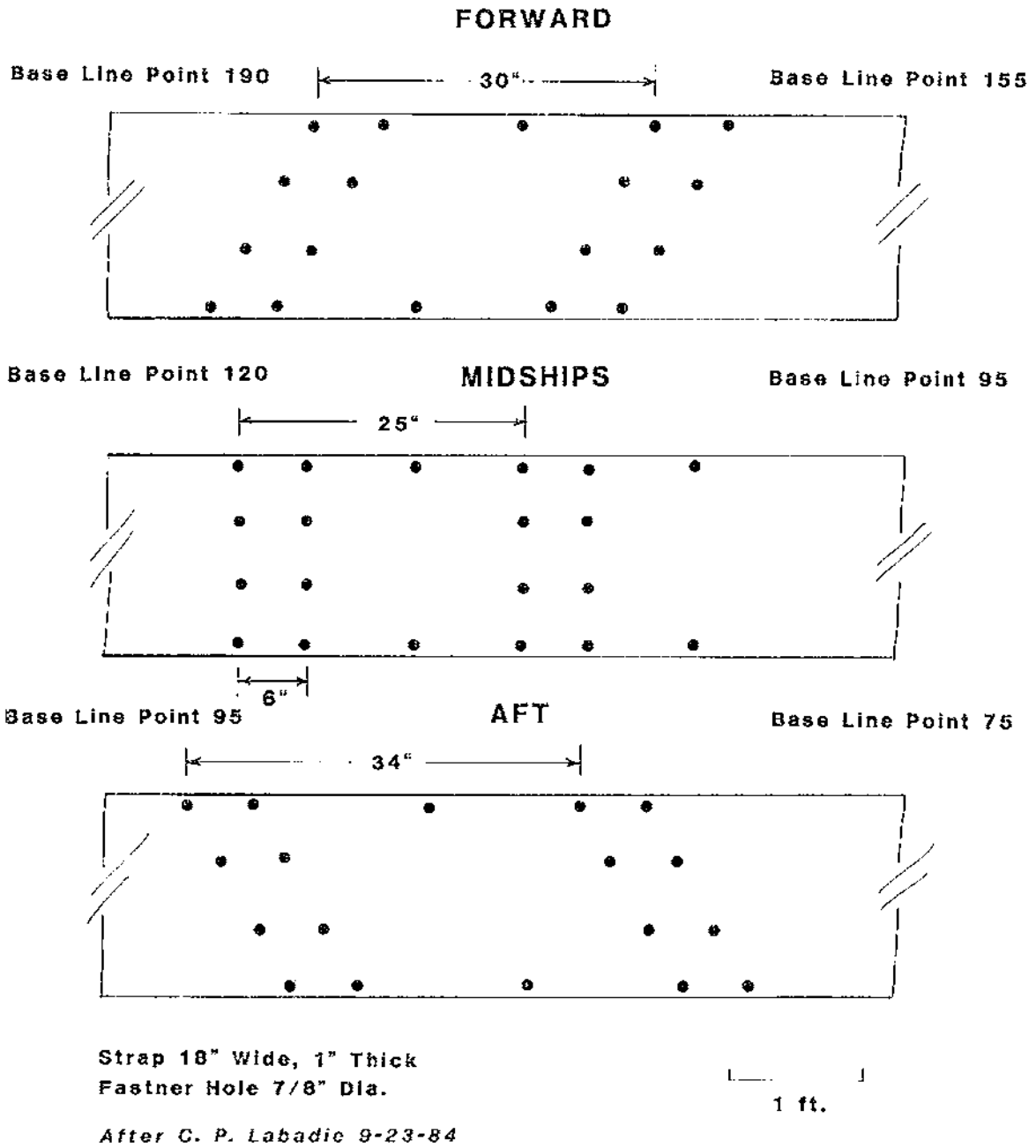


Figure 14: Hogging Strap Detail

the ceiling thickness is reduced from 5 inches to 3 inches. A 29-foot piece of hogging strap is near the frames of this piece.

The outboard up section of port side (Plate 14) is 56 feet 4 inches long and it is 12 feet at its widest point. This piece is resting on, and partially covered by, the sand which has buried much of the site. Hull planking on this piece is uniformly 7 inches wide and 3 inches thick. During her last days of operation, NOQUEBAY's lower hull and forecastle were painted white (see Plate 3). The curvature and length of this piece strongly suggests that this is a portion of the bottom, rather than the side. Small patches of white paint were found at the edge of the seams, between the hull planks, on this piece. In addition, a tar-like substance, probably pitch, was found in the seams. Oakum, a fiber thread, was forced into the the seams of wooden vessels to make them water-tight. After the oakum was in place, pitch was used to fill the seams to prevent the oakum from rotting.

A small chiseled out area, 6 by 4 by 1 inch, is present on one of the hull planks. There is no physical evidence to suggest the purpose or use of this recess.

The last piece of port side is just forward of the outboard up section, in the area between base line points 190 and 220. This area of the vessel shows evidence of the burning that occurred in the bow area when NOQUEBAY was lost. Hull planking, frames, and ceiling planking are all present. This piece broke at the turn of the bilge where the thick strakes of the bilge ceiling appear. The exposed length of articulated hull is 12 feet; the remainder is buried.

In addition to the articulated pieces of ceiling and hull planking and frames, there are several scattered pieces of both hull and ceiling planking along with several frame timbers. These frames are sticking out of the sand, and may still be articulated with the bottom. A section of hogging strap, 23 feet long, lies over this section of port side. In all, 52-feet of hogging strap is present on the port side of the vessel.



Plate 14: Park Ranger Elen Maurer examines a large section of outboard up port side which broke above the turn of the bilge. Fasteners, frames, hull and ceiling planking are exposed. Photo by Joe Strykowski.

The combined length of the port side sections, which are exposed on the site, is 84 feet 4 inches. This represents just over 40% of the ship's port side. Deep sand and limited time on site prevented additional testing on the port side of the vessel to determine whether there is additional port side present on the site.

Starboard Side of the Hull

Two large sections of the starboard side are present on the site. The two are 73 feet and 40 feet long, respectively, and are intact from just above the turn of the bilge to the main deck. Both pieces are partially buried, with only the frames above the turn of the bilge and tips of the knees exposed. Thick strakes of the bilge ceiling are present on both pieces. The double-fastener with clench-washer pattern found on the thick bilge strakes (Figure 11) is identical to that found at the turn of the bilge on the starboard bottom. This pattern continues, uninterrupted, in the coiling planking up to the main deck. Ceiling planks above the turn of the bilge vary in width from 10 to 16 inches and are 3 inches thick.

An area on the 73-foot section of starboard side was cleared of a thin layer of sand in order to gather detailed construction information. The area cleared was selected because it was not deeply buried and several intact knees were present (Plate 13).

The vessel has 6-1/2-by-24-by-38-inch knees that are spaced irregularly between 36 and 46 inches apart (Figure 11). The knee is fastened to an 8-by-10-by-14-inch shelf atop an 8-by-10-by-32-inch dagger knee. Fasteners through the knees are 7/8-inch treenails with 1-inch diameter clench washers. Examination of remnants of the deck beams revealed that they were 8-by-10-inch timbers. Most of the knees have no deck beam remnants, rather they have only the notch where the beam would have fit into the knee and shelf. The deck beam remnants in this area showed no signs of burning, rather they showed evidence of breaking.

Two major construction elements snake their way across the longer starboard side piece. A section of truss rod, approximately 16 feet long, has a 24-inch turnbuckle in place; there are no plates in association with this turnbuckle. The longest section of hogging strap found on the site, nearly 50 feet long, is identical to the other strap sections. Because of the overall length of the strap, running nearly the entire length of the vessel, it was necessary for the builders to piece sections together. In this case, the builders used a 6-foot riveted lap to assure adequate strength of the seam and to prevent slipping sideways. A total of nearly 90 feet of hogging strap is present on the starboard side of the vessel.

The 40 foot long section of starboard side lies just forward of the longer piece. Much clearer evidence of the fire which resulted in NOQUEBAY's loss is present on this section. While the frames at and just above the turn of the bilge are undamaged, the vessel's knees and deck beam remnants are charred and blackened. This piece is more deeply buried than the longer section, and only the ends of the fasteners are still exposed. In an effort to confirm burning of the knees in this vicinity and their present state of preservation, a very small area over two knee remnants was tested. The knee fasteners, in an excellent state of preservation, were the only remaining evidence of the knees. The fasteners are standing upright, securely attached to the hull, while the observable knee remnants are quite burned and charred.

The combined length of the starboard side sections, which are exposed on the site, is 113 feet. This represents just over 55% of the starboard side. Deep sand and limited time on site prevented additional testing on the starboard side of the vessel to determine whether there is additional starboard side present.

Another section of truss rod is located approximately 20 feet east (lakeward) of the 40-foot long piece of starboard hull (Plate 15). The exposed portion of the rod is approximately 26 feet long; the remainder is buried in the sand. This rod section has a turnbuckle, 24 inches long, articulated at one end. In total, there is approximately 80-feet of truss rod and 4 turnbuckles exposed on the starboard side of the vessel.

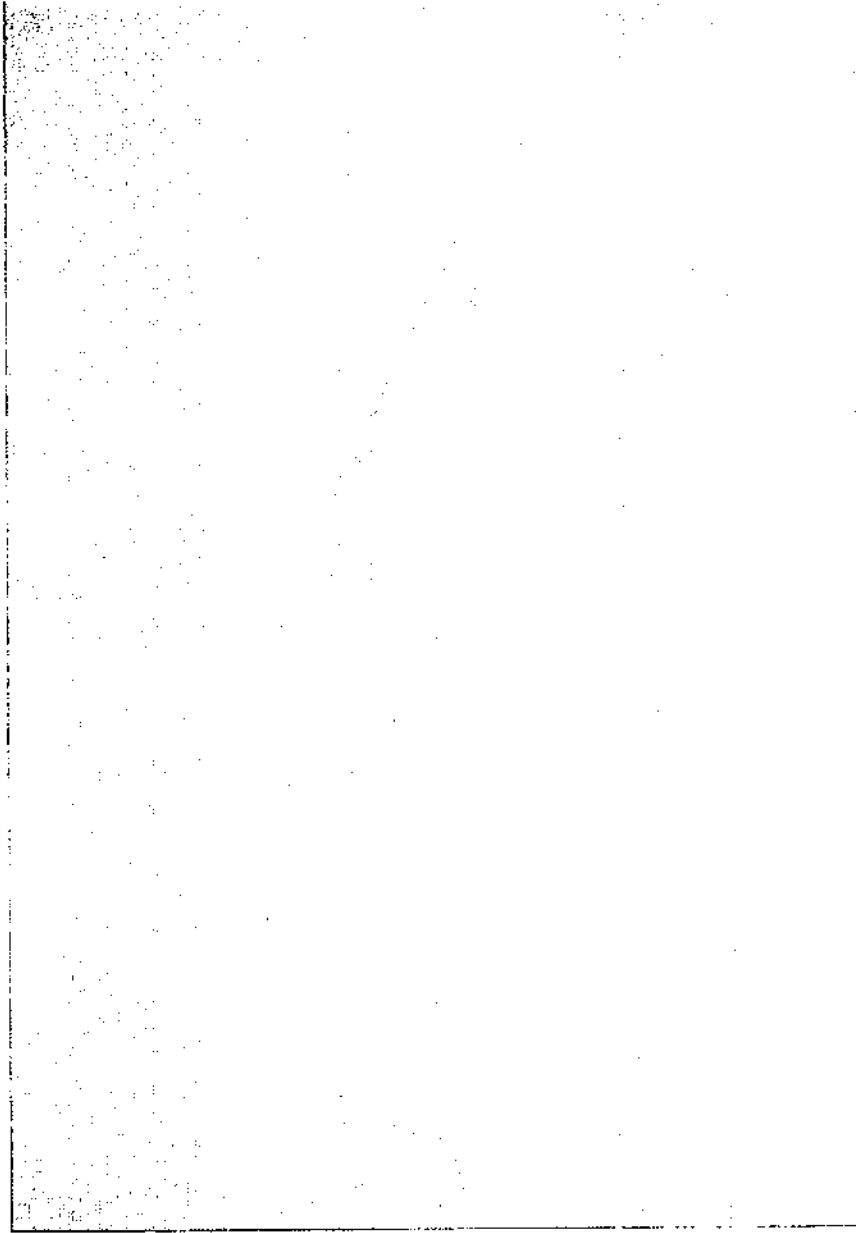


Plate 15: A long section of truss rod was located east of the main concentration of wreckage. The turnbuckle is 24 inches long and is one of 4 found on the starboard side of the vessel.

The Bow

The bow, broken aft of the deadwood, is a short distance away from the bottom of the hull (Figure 6 Base map). This large piece lies on its port side with better than half of the structural remains, including the keel, buried in deep sand.

Frames and hull planking, down to the level of the limberway, and the bow deadwood, are exposed. The hull planking in the bow varies in width from 7 to 10 inches and is uniformly 3 inches thick. The deadwood is composed of four stacked timbers, each 16 inches by 14 inches. Some ceiling planking is in place immediately forward of the deadwood. Ceiling here is similar to that found elsewhere on the site. The stemson, apron, and stem are in situ. Three of the vessel's engraved draft marks are well preserved on the stem. The Roman numerals XIII, XII, and XI are exposed and filled with white paint. The numerals are 6 inches high and are spaced 6 inches apart. A metal strap, 5 inches wide and 1 inch thick is attached to the edge of the stem. This strap probably runs the full length of the stem and was possibly used to provide some protection against floating debris or ice.

The visible evidence of the fire which contributed to this vessel's loss is greater in the bow than anywhere else on the site. The deadwood is badly burned and charring of the frames and ceiling is obvious. Burning and weakening of the timbers contributed to the bow breaking away from the bottom of the hull. Although the break is not exposed, it is highly likely that the timbers, weakened by the fire, broke at a point of structural weakness, i.e., the scarph joints.

Two pieces of machinery are present in the bow area, a cylindrical donkey boiler and a windlass. The donkey boiler is resting on its side just aft of the deadwood. It measures 7 feet long by 4 feet 6 inches in diameter. The crown, funnel and base were not found on the site. Miscellaneous piping, elbows, a grate, and pieces of coal from the boiler are present.

From her historical records we know that NOQUEBAY was equipped with a donkey boiler. This was a vertical fire-tube boiler with the firebox on the bottom and funnel at the top. The boiler shell rested on a cast-iron base that also served as an ash pit. A series of vertical tubes extend from the top of the firebox to the upper end of the shell. The ends of these tubes can be seen in Plate 16. These tubes opened directly into the chimney or funnel. Vertical boilers, with their open-tube construction, were considered dangerous because they were more likely to throw sparks from the funnel (ICS Textbooks 1921: 12-17). The fire that destroyed NOQUEBAY may have resulted from such sparks.

NOQUEBAY's boiler was not used in connection with her propulsion. It was probably used to supply steam to run a bilge pump and for working steam powered deck machinery. Neither the donkey engine, the deck winch, nor the steam pump were located during the site documentation.

The windlass found on the site is located near the deadwood and forward of the donkey boiler. This piece of deck machinery, usually placed on the forward end of an upper or main deck, is used to haul up the anchors. A portion of the geared driving wheel or gear is exposed near the deadwood, while the crosshead and side-bitts or frame lie on and adjacent to the deadwood, respectively (Plate 12). The cast-iron frame is embossed with the name of the windlass manufacturer, Globe Iron Works, Cleveland. While the windlass could have been steam powered, the style of the crosshead is more closely associated with the "common" or hand-powered windlass. No evidence of fittings or other steam connectors were located in direct association with this piece of machinery.

The bow contains a rich assemblage of small, portable artifacts. These include a cast iron cooking pot, a spiral wood auger, jib hanks, two 30-inch trunk or lid hasps, the ship's bell, a mooring bitt, as well as an assortment of fasteners and pipes. These artifacts are covered and uncovered seasonally as the sand on the site builds during the summer months and then is scoured out by winter storms. Disturbance of this area was kept to a minimum during site documentation. The artifact density is greater in the bow than anywhere else on the site.

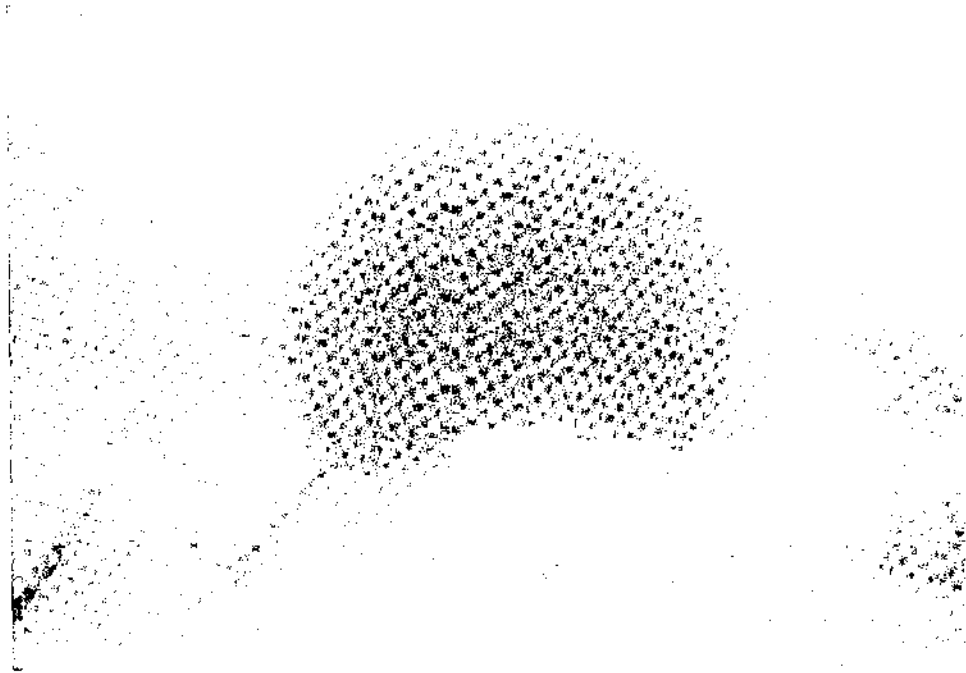


Plate 16: NOQUEBAY's donkey boiler, seen here lying on its side with the top of the boiler tubes exposed, is in an excellent state of preservation. Several pieces of coal, the boiler grates, piping and associated gauges were found in the immediate area.

Summary

During the investigations of the historic wooden shipwreck in Julian Bay, we did not locate any single piece of evidence that would conclusively prove that the vessel is the schooner barge NOQUEBAY. When taken together, however, the historic record and the physical remains strongly suggest that the shipwreck located off Stockton Island is NOQUEBAY.

NOQUEBAY is in an excellent state of preservation. Just the exposed portions of the vessel represent 90% of the bottom, 55% of the starboard side, and 40% of the port side. When taken together more than 90% of the vessel's hull is present and exposed, at least on a seasonal basis.

NOQUEBAY shows little evidence of natural impacts resulting from wind-driven waves and winter storms. It is not unusual for six to nine foot wind-driven waves, from winter storms, to roll and break across the site which ranges from 8 to 12 feet in depth. During documentation of NOQUEBAY a "small" storm forced the team off the site for two days. The breakers coming in from the open lake were six footers. Following the storm, the only on-site evidence of the two day frontal assault, was the partial reburial of the test transects and loss of our delicate nylon base line.

These winter storms do scour out some of the deep sand which covers the site. Artifacts in the bow, covered and uncovered seasonally, are well preserved and their relative positions appear basically unchanged. Even the delicate, engraved draft marks on her stem are undamaged. Paint is present on the stem, in areas on the hull planking, and on the outboard-up piece of port side, lying to the west of the bottom of the hull. Sand movement has not presented much of an adverse impact on this site. Rather, the sand seasonally deposited over the site has contributed to the vessel's preservation.

Despite her exposed location and the potential for damage from ice shelving, NOQUEBAY's donkey boiler and wheel are also in good condition. Ice damage to these fragile elements, seen elsewhere in Lake Superior on some of Isle Royale's wrecks, would have flattened or dented these items. With the exception of bent spokes and a crack in the rim, which could have easily occurred during the wrecking process or at any other time since her loss, NOQUEBAY's wheel is a fine example of a patent steering gear. The donkey boiler shows no signs of flattening or any distortion from its original shape.

Other than evidence of burning in the bow and on the keelsons, the wood used to construct NOQUEBAY is still hard and the structural integrity of the various components, as they appear today, is uncompromised. The vessel's internal strengthening elements, the hogging straps and truss rods with turnbuckles, are structurally sound. Little rusting has occurred on any of the metal elements or artifacts found at the site.

NOQUEBAY's deposition in a very shallow sandy cove, rather than being detrimental, has indirectly contributed to the site's preservation. The common notion that wrecks deposited in shallow water will be hopelessly jumbled and torn apart is incorrect. That notion, however, has probably prevented looters from finding the site; no one expected the vessel to still exist. It is highly likely that NOQUEBAY broke up rather quickly, because of her exposed location and shallow depth, and settled into the sandy bottom while winter storms scoured out the sand under her hull. Spring and summer waves then began the process of covering up the vessel by depositing sand over the site.

Certainly NOQUEBAY's excellent state of preservation and the potential richness of her artifact assemblage forces another look at the complexity of wrecking processes and dispels the myth of the "shallow, jumbled shipwreck" not having enough integrity to yield a great quantity of data.

Post Script

On August 6, 1986, following extensive discussions between the Midwest Regional Office and the Southwest Regional Office, Submerged Cultural Resources Unit, a decision was made to remove the ship's bell from the bow area. VIP divers under the direction of Fran Potvien, who had participated in the initial documentation of NOQUEBAY and had done follow-up monitoring at the site, accomplished the on-site removal. It was hoped that the bell might have the vessel's name embossed on it, thus providing positive identification of the site. The actual removal of the bell was videotaped by the dive team, and still photographs of the bell were taken prior to its removal to the surface. The slightly oxidized and encrusted bell did not have any readily observable markings on it at that time. Presently, the iron bell is being stabilized and temporarily curated at the Midwest Archeological Center Conservation Laboratory. Following stabilization, the bell will be returned to Apostle Islands National Lakeshore for exhibit.

V. CONCLUSIONS AND MANAGEMENT RECOMMENDATIONS

NOQUEBAY is a valuable and significant cultural resource. Its superb state of preservation and the potential richness of the artifact assemblage at this site make it a strong candidate for nomination to the National Register of Historic Places. The background, historical context, and the site analysis discussions included in this report can be used for this purpose. At minimum this vessel should be added to the National Park Service List of Classified Structures. Continued protection by the State and the National Park Service is highly recommended.

While there may be numerous examples of this type of vessel lost within the Great Lakes, very few, in this state of preservation, are currently known to exist within the Great Lakes. For the most part, when a vessel of this vintage is found it is quickly looted of all portable artifacts. For that reason protection of this site is particularly important. Protection will also insure a data bank for future researchers who have specific questions on maritime construction of the period or who wish a source of comparative data for other similar vessels. Further, the artifact assemblage in the bow, the area most likely to be looted, has the potential to yield a great quantity of information which could address questions of an anthropological nature. As with other sites located within the boundaries of National Parks, under no circumstances should the excavation of the site take place without a research design that clearly indicates why it is in the best interest of the public and the resource to engage in excavation. Further, the research design should make it clear why the posed research questions could not be answered without excavation or answered by examination of comparable sites or collections outside of the National Park System.

This vessel, because of her shallow deposition, is a prime candidate for interpretation. It is visible even over the side of a boat, so a park visitor would

not even have to "get wet" to see NOQUEBAY. Snorkelers could easily visit this site, its shallow depth and protected location during the summer months make it a fine choice for an afternoon swim from boat or shore. This wreck is a very safe location for scuba divers. The shallowness and protected nature of the area would not present any safety hazards to even an inexperienced diver.

Management of this site for a variety of visitor uses presents some problems. The most critical of which is controlling artifact loss at the site. As noted in the site analysis, the bow contains a great quantity of portable artifacts, i.e., those easily "collected by hand without mechanical assistance" (proposed Wisconsin State Law 1985-86). The currently proposed law would prohibit the removal of these artifacts if NOQUEBAY is placed within a historic preserve. The removal of artifacts is also prohibited under the proposed law because of the location of the artifacts in association with "...a deserted watercraft..." (proposed Wisconsin State Law 1985-86). Removal of artifacts from historical sites is also illegal on National Park Service owned and managed lands. The loss of artifacts from this site would be a serious impact. Their presence and the site's near pristine condition make it a valuable and significant cultural resource. NOQUEBAY is on land owned by the State of Wisconsin, but within the boundary of the Apostle Islands National Park. Federal legislation is already in place for her protection and State legislation is pending. Apparently all that is needed to insure the site's protection is an agreement between the State and Apostle Islands National Lakeshore on day-to-day management and enforcement responsibilities.

It is not recommended that the site be permanently closed to visitation in order to protect it. A management plan and some agreement with the State of Wisconsin, which will directly address daily management and enforcement, is needed prior to making the site accessible to the public. An energetic education campaign directed at both the non-diving and diving publics on the importance of leaving artifacts in place is also necessary to protect this site over the long run.

The most critical time for site degradation will be in the spring, after the ice has melted and the sand has been scoured away. A video tape taken by VIP diver

Fran Potvien in the spring, 1985, shows just how much of the site is scoured out by winter storms. Artifacts in the bow, not observable in the fall, 1984, were lying on the surface of the sand. Unless quickly reburied, they may be lost to collectors. One course of action would be to do just that each spring prior to opening up the site to visitation. Careful reburial would not adversely impact the artifacts nor would it compromise their relative associations. Further, reburial would put them "out of sight and out of mind" and out of harms way.

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APPENDIX A: SUMMARY OF DOCUMENTS OF ENROLLMENT

Name: NOQUEBAY (NOQUE BAY) Registry: 18747 (U.S.)

Other Names: None listed

Built: Trenton, Michigan, 1872

Shipbuilder: A.A. Turner

Ownership:

- 1) Thos. W. Beebe, President, Peshtigo Co.,
Peshtigo, Wisconsin
July 13, 1872 - April 17, 1874
A. Keith, Master
First enrollment
Port of Chicago
- 2) William E. Strong, President,
Peshtigo Co.
April 17, 1874 - March 8, 1875
William Nicholson, Master
Change of company officers
Port of Chicago
- 3) William E. Strong, President,
Peshtigo Co.
March 8, 1875 - April 8, 1876
William Strong, Master
Change of districts
Port of Milwaukee
- 4) William A. Ellis, Secty, Peshtigo Co.
April 8, 1876 - March 1, 1893
William Nicholson, Master
Change of company officers
Port of Milwaukee
- 5) William A. Ellis, Secty,
Stephenson Transportation Co.,
Marinette, Wisconsin
March 1, 1893 - March 15, 1895
William Ellis, Master
Change of owners
Port of Milwaukee

- 6) T. F. Madden, James Madden, and
John T. Madden (1/3 each)
Bay City, Michigan
March 15, 1895 - March 29, 1898
T. F. Madden, Master
Change of owners. change of districts
Port of Huron
- 7) Thomas F. Madden, Lizzie Madden,
and John J. Madden (1/3 each)
Bay City, Michigan
March 29, 1898 - January 4, 1899
T. F. Madden, Master
Change of owners
Port of Huron
- 8) Thomas F. Madden (2/3 owner) and
Lizzie Madden (1/3 owner)
Bay City, Michigan
January 4, 1899 - January 19, 1899
Thomas Madden, Master
Change of owners
Port of Huron
- 9) Elizabeth Madden, Bay City, Michigan
January 19, 1899 - October 8, 1905
E. Madden, Master (at time of enrollment)
P. H. Ryan, Master, April 29, 1899
W. H. Lohr, Master, September 9, 1902
Fred Watson, Master, September 18, 1902
Andrew Bigger, Master, March 17, 1903

Documents Surrendered: Port Huron, Michigan, December 28, 1905

Cause of Surrender: Total Loss. Burned October 8, 1905, near
Presque Isle Point, Lake Superior.

APPENDIX B: SUMMARY OF NOQUEBAY'S ATTRIBUTES*

Length: 205' 2"

Beam: 34' 7"

Depth of Hold: 12' 5"

Frames Sided and Moulded (at sides): 12" and 8"

Frame Arrangement: double, 12" by 12" each

Frame Spacing: 24" centers

Main Keelson Width/Height: 14" by 14"

Rider Keelson Width/Height: 14" by 14"

Sister Keelson Width/Height: 12" by 14"

Floor Keelson Width/Height: 12" by 8"

Ceiling Plank Width: 10" - 16"

Ceiling Plank Thickness: 3"

Bilge Ceiling Width: 10" - 16"

Bilge Ceiling Thickness: 5-1/2"

Fastening Pattern on Bottom: double, 3/4" square nails, no
clench washers

Fastening Pattern above Turn of Bilge: double, 3/4" square
nails, alternate 1" clench washers

Hull Plank Width: 7" - 10"

Hull Plank Thickness: 3"

Deck Beams Width/Height: 8" by 10"

Centerline Hold Stanchions: 6" by 6"

Knees Width/Height/Length: 6-1/2" by 24" by 38"

Fasteners on Knees: 7/8" treenails with 1" clench washers

Shelf Width/Height/Length: 8" by 10" by 14"

Dagger-piece Width/Height/Length: 8" by 10" by 32"

*Based upon documents of enrollment and field measurements

As the nation's principal conservation agency, the Department of the Interior has basic responsibilities to protect and conserve our land and water, energy and minerals, fish and wildlife, parks and recreation areas, and to ensure the wise use of all these resources. The Department also has major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.