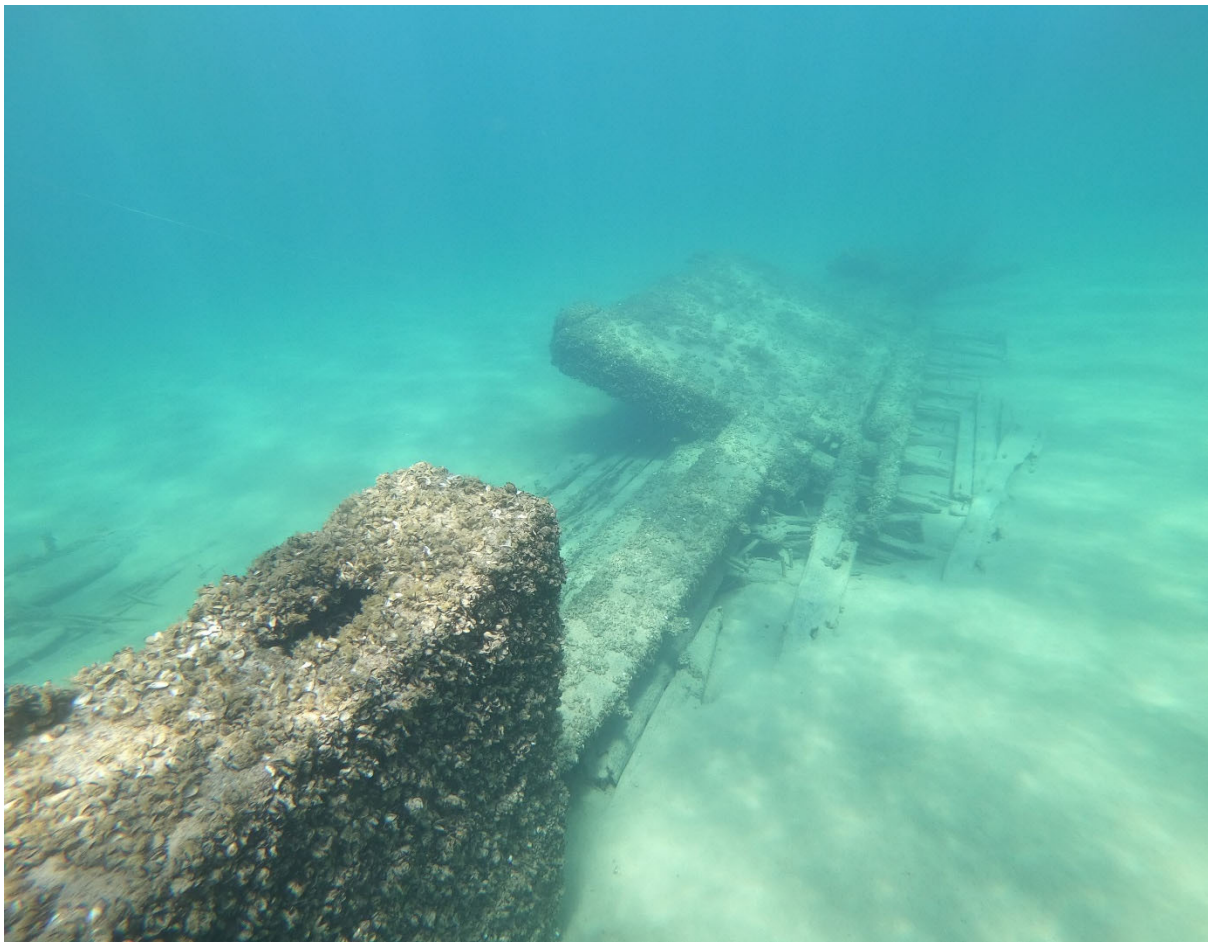
A Tale of Two Centerboards: Double Centerboard Sailing Ships of the Great Lakes

Final Report



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WISCONSIN HISTORICAL SOCIETY

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Cover Photo: Schooner *Emeline* (Wisconsin Historical Society)

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The previous lack of scholarship on double centerboard sailing ships combined with the results of this concise project suggest that many more vessels were built with double centerboards (and other forms of double retractable boards such as daggerboards) than had been previously thought. We hope this report encourages future investigation into double centerboard sailing ships throughout the Great Lakes and beyond. This is just the beginning (doubled).

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Abstract

On sailing vessels, centerboards are moveable boards made of wood or iron that angle downwards on a pivot point into the water from the bottom of a vessel's hull. Centerboards increase the lateral resistance of sailing vessels while not permanently increasing their draft of water, allowing vessels to sail closer to the wind in deep water and still enter shallow bodies of water. Centerboards became common on shallow and often constricted bodies of water – such as harbors, rivers, and canals – and gained popularity in the Great Lakes starting in the early 1800s. Vessels with double centerboards were much more uncommon, or at least that appeared to be the case prior to the completion of this project. This report details 26 examples of double centerboard (or daggerboard) vessels that operated on the Great Lakes, including 17 known shipwrecks and nine double centerboard sailing ships known only through archival records.

Of the 26 double centerboard sailing vessels identified during the course of this project, nine are known only from archival records, ten are known shipwrecks in the Great Lakes outside of Wisconsin – including six in Lake Erie, two in Lake Ontario, and two in Lake Michigan – and seven are known shipwrecks in Lake Michigan in Wisconsin. The 26 vessels comprise eleven schooners, eight barkentines, three schooner barges, one brigantine, one bark, one scow schooner, and one unknown. The following report describes these 26 vessels, with an emphasis on the shipwrecks that have been modeled using photogrammetry and/or archaeologically recorded, such as the seven examples in Wisconsin. Additional investigation of double centerboard shipwrecks offers the potential to better understand this hull feature and its typological, regional, and chronological variations.

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Chapter 1: Introduction

The centerboard is a moveable board made of wood or iron on a vessel that angles on a pivot point downwards into the water from the bottom of a vessel's hull. The pivot point – called a pivot pin or king bolt – is located on the forward, lower end of the centerboard while the chain or wire used to lower the centerboard is located on the aft, upper end of the centerboard. Centerboards are contained within watertight trunks, called centerboard trunks, in which the centerboard is stowed when not deployed. Centerboards and centerboard trunks were a common feature on historic sailing vessels that needed to routinely enter shallow areas while retaining the ability to sail close to the wind. Addition of a centerboard to a shallow draft vessel increases the vessel's lateral resistance without permanently increasing its draft of water. Centerboards are still often used on modern sailing yachts. The Great Lakes feature and connect to a multitude of shallow waterbodies – such as harbors, rivers, and canals – so sailing vessels on the inland seas needed the exact advantages offered by centerboards. It is then unsurprising that centerboards were a common hull appendage on sailing vessels throughout the Great Lakes. Numerous shipwrecks found beneath the five Lakes feature the remains of centerboards and centerboard trunks. In the nearly 40 years since the inception of the Maritime Preservation and Archaeology Program of the Office of the State Archaeologist (OSA) in the State Historic Preservation Office (SHPO) at the Wisconsin Historical Society (WHS), program researchers have studied numerous centerboard shipwrecks. Shipwrecks featuring double centerboards, however, are far less common. Interestingly, archaeological investigation of the first double centerboard shipwreck studied by WHS maritime archaeologists coincided with the creation of the program itself in 1988. As the intervening years passed, program staff began to take note of the gradually increasing number of identified double centerboard shipwrecks in Wisconsin.

By early 2021, WHS had identified six shipwrecks with double centerboards in Wisconsin's waters. Intrigued by the lack of available archaeological or maritime history scholarship on double centerboards, WHS maritime archaeologists applied for and received a grant from University of Wisconsin Sea Grant to conduct a study investigating the origins and history of double centerboard vessels in Wisconsin, the Great Lakes, and beyond. As a result of this study, WHS has identified 26 vessels with double centerboards (including both daggerboards[1] and centerboards) that were constructed and operated on the five Great Lakes. The known dates of construction of these vessels range from 1814 to 1889, with the possibility of earlier and later construction dates for two vessels whose identities have not been definitively established. Of the 26 identified vessels, nine are known only from archival records, ten are shipwrecks in the Great Lakes outside of Wisconsin, and seven are shipwrecks identified and archaeologically investigated in Wisconsin waters.

It is important to include a note on terms and terminology. A variety of names have been used for the various forms of retractable boards that were lowered into the water from a sailing vessel to increase its ability to sail closer to the wind. These terms include leeboards, daggerboards, centerboards, drop keels, barn doors, slide or sliding keels, slip keels, revolving keels, and more. Note that variations of these terms also exist as open, closed, or hyphenated compound words, sometimes with alternate spellings (i.e., lee board, drop-keel, centre board, etc.). Some of these words also possess definitions today that may not align with their historic definitions. Of the many kinds of retractable boards, those that passed directly through the bottom of a vessel were enclosed in a watertight

[1] Daggerboards, a precursor to the centerboard, functioned similarly but slid straight up and down rather than angling up and down on a pivot point like centerboards.

structure called a trunk, box, or case (i.e., centerboard trunk). Regarding double centerboards, archival records rarely use dedicated terminology for this double feature. Occasionally, they are labeled twin centerboards. More frequently, in the rare instances when this doubled feature is mentioned, descriptions simply indicate that a vessel had two centerboards with no term or label used. This lack of a specific term makes it difficult to identify vessels with two centerboards in historic newspapers and archival records. In addition, since double centerboards on shipwrecks have received little archaeological attention and description, it is possible that double centerboards have not been recognized or have been misinterpreted on some wrecks identified in the Great Lakes. Extensive discussions with avocational maritime historians and archaeologists have revealed a few examples that had not otherwise been described in the literature. More such examples may be known by individuals who have not yet been contacted. These factors likely contributed to the difficulty encountered during this research project in identifying historical and archaeological examples of double centerboard vessels.

This report is divided into seven chapters, including this introduction. Chapter Two consists of a brief history of the development of the centerboard. Chapter Three examines the development of the double centerboard, possible theories on its initial use in Wisconsin, eventual sanctioning of its use on Great Lakes vessel, and its persistence despite this restriction. Chapter Four discusses double centerboard vessels known through archival records only as well as double centerboard shipwrecks located outside of Wisconsin's waters. Chapter Five details known Wisconsin shipwrecks with double centerboards. Chapter Six analyses possible reasons for the use of double centerboards, including their continued use following insurance-related sanctions. Chapter Seven summarizes the results of the research and explores avenues for future study.

Chapter 2: Development of the Centerboard

Historic development and use of the centerboard has received dedicated attention from few scholars so a history of the hull appendage's development is provided in this chapter (Clark 1904; Chapelle 1935, 1967; Barkhausen 1990). Retractable boards that were lowered into the water from a sailing vessel in order to increase efficiency, maneuverability, and ability to sail closer to the wind have been used in a variety of forms around the world for hundreds and possibly thousands of years. The origin and use of the first retractable boards in sailing vessels is not definitively known; it is possible the innovation was independently arrived at a number of times in several places around the globe.

Some of the earliest recorded examples of the use of retractable boards in sailing vessels were noted by the Spanish off South America in the early 1500s. Log rafts with sails, called balsa (Spanish for "raft"), were used by the indigenous peoples of the Andean coast of South America for fishing and trading (Fig. 2.1). The balsas incorporated one or more vertical boards that were pushed down through the logs that made up the rafts in order to better control the vessel (Charnock 1801, Clark 1904, Emanuel 2012). Chapelle (1967) claims that the *jangada* sailing raft of Brazil used the same technology. Another iteration of the same idea – the leeboard – was commonly used in the 1600s on Dutch sailing vessels, called jaghts (or yachts). These leeboards were generally shaped like a shoe sole or teardrop and paired; one leeboard was attached to either side of a vessel. Leeboards could be deployed as needed to improve speed and maneuverability. Some have speculated that the Dutch invented leeboards after learning about balsa boards from the Spanish, but no clear evidence supports this hypothesis (Clark 1904, Barkhausen 1990). Alternatively, the Dutch may have learned of leeboards from their interactions with the Chinese. Many types of historic Chinese vessels, or junks, incorporated retractable boards that were similar to leeboards, daggerboards, and centerboards. This was especially true of flat-bottomed junks in certain regions of China that operated both in shallow areas and on the open ocean. One of the earliest known types of Chinese vessels, the Formosan bamboo sailing raft of what is now Taiwan, was strikingly similar to the Andean balsa and featured both leeboards and centerboards (Donnelly 1924; Needham, Wang, and Lu 1971:393,618-620). The use of retractable boards to increase the depth profile of sailing vessels and thereby improve their lateral resistance when sailing close to the wind certainly appears to have been discovered and implemented in many places around the world at different times.

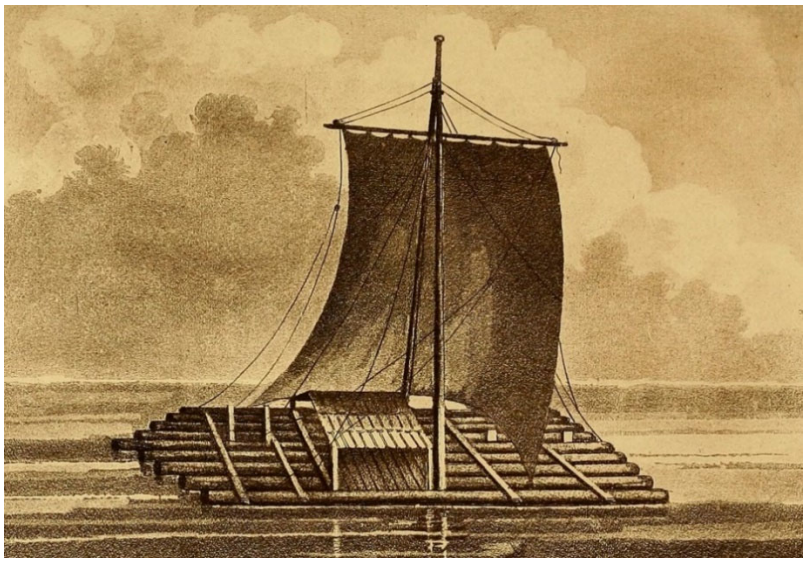

Figure 2.1. South American balsa (Clark 1904:26).

The first North American use of a retractable board – the sliding keel, drop keel, or daggerboard – is credited to Captain John Schank of the British Royal Navy (Fig. 2.2). While stationed at Boston in 1774, Schank devised and supervised construction of a vessel for Earl Percy (né Hugh Smithson), who later became the Duke of Northumberland. The vessel featured a single, long sliding keel housed within a watertight trunk; the sliding keel ran approximately three-quarters of the length of the vessel (Chapelle 1935, Barkhausen 1990). Schank may have built similar vessels on Lake Champlain in 1776 (Cooper and Kreisa 1991). A long, single board was probably unwieldy, which would explain why Schank later modified his design and proposed use of three separate sliding keels with trunks. This tripart design was employed on the Royal Navy Cutter *Trial*, which was built at Plymouth, England, in 1790. The *Trial* measured 65 feet long and 21 feet 5 inches in beam with a depth of hold of 7 feet 2 inches; the sliding keels were deployed using two hoisting winches per keel.

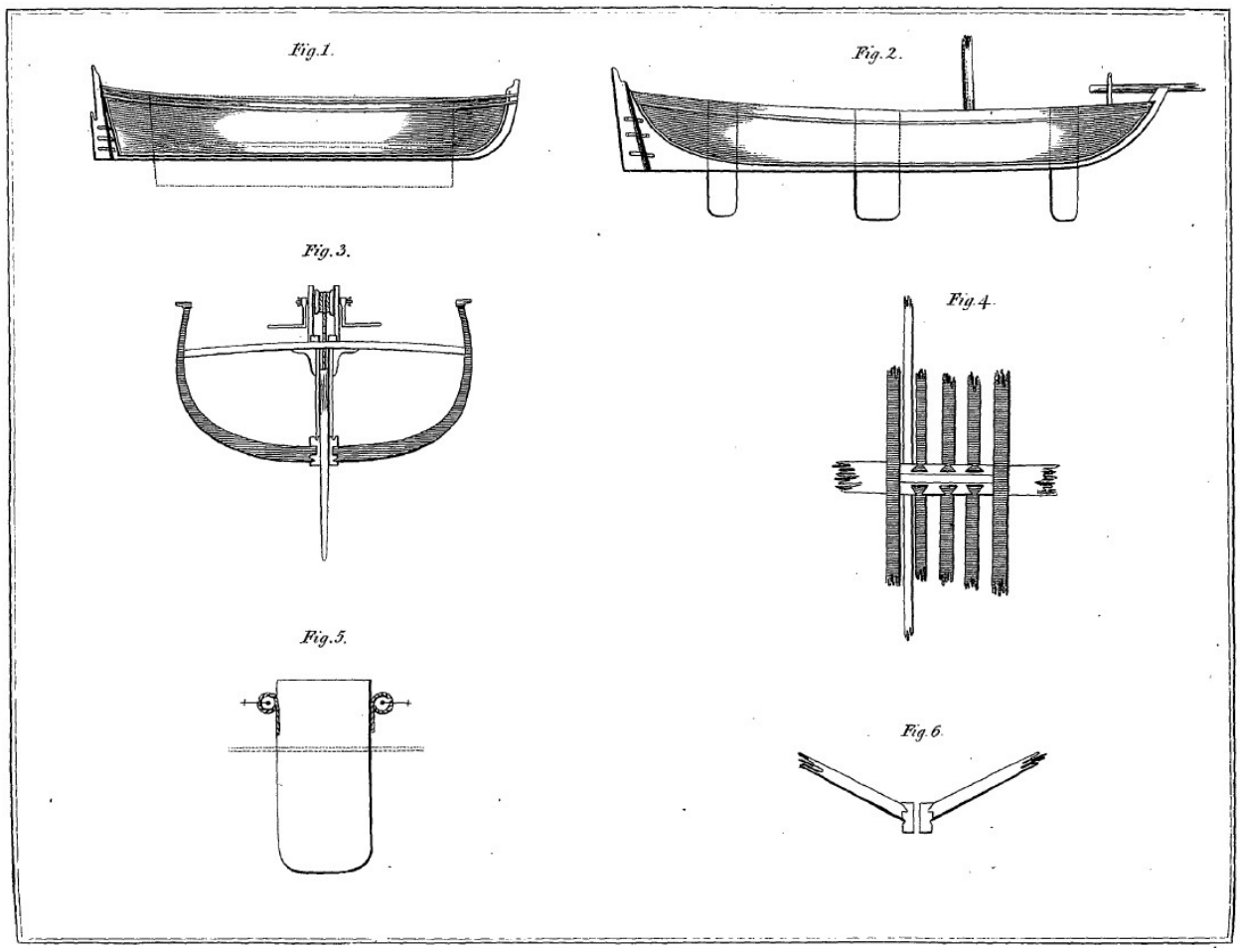

Figure 2.2. Captain John Schank's sliding keels and cutter *Trial* (Charnock 1801:365).

Over the course of two years, the *Trial* sailed with numerous Royal Navy vessels. Official reports and interviews indicate that the *Trial* outmaneuvered and outsailed these other vessels, convincing many in the Royal Navy of the merits of such a design (Chapelle 1935, Barkhausen 1990). According to Chapelle (1935), the Admiralty was sufficiently impressed that they subsequently ordered the construction of 34 vessels with sliding keels from 1796 to 1797. Despite early interest, it appears the Royal Navy did not continue to utilize vessels with sliding keels. Chapelle (1935) argues that the strengths of the design were mitigated by the difficulty in keeping the trunks watertight. The design may also have suffered

from deployment issues. The sliding keels would likely have required significant effort to raise and lower when underway in certain conditions (Barkhausen 1990). Additionally, in an 1851 issue of *Mechanics' Magazine*, British Royal Navy officer Molyneux Shuldham noted that the sliding keels frequently jammed in the trunks if not hoisted or deployed evenly on both sides (Shuldham 1851). Possibly due to these design issues, Schank's innovation did not gain significant traction in England.

The same cannot be said across the Atlantic. There appears to have been continuing interest in sliding keels, or daggerboards, in North America and the Great Lakes in particular. The daggerboard was used quite early on the Lower Lakes. Although an exact date for the introduction of the daggerboard to the inland seas is not known, historical accounts suggest the feature was first incorporated into lake vessels in Oswego, New York, around 1806 or 1807 (Barkhausen 1990). These accounts are supported by the discovery of two shipwrecks with daggerboards in Lake Ontario. One is an unidentified schooner with two daggerboards found near Oak Orchard, New York. The other, which has a single daggerboard, was found off Oswego, New York, and identified as the schooner *Three Brothers*, built in 1827 on Galloo Island, New York (Kennard 2008, 2014). Other historic accounts record the construction of the schooner *Union* in 1814 in Ohio on Lake Erie. The vessel was built with two "slip-keels," which were likely daggerboards (Walker 1902). Additional research into early Great Lakes vessels may reveal other instances of daggerboards in early use on the lakes.

Although the daggerboard seems to have gained limited use both England and North America, the design certainly still suffered from the deficiencies mentioned above. A less temperamental, more sturdy design was needed. British naval officer Molyneux Shuldham claimed that he invented the pivoted centerboard, which he called a "revolving keel," while he was imprisoned by the French in Verdun in 1809. His invention featured a board that angled downwards from a single pivot point similar to a leeboard, rather than moving straight up and down like a daggerboard. The board was also housed in a trunk along the centerline of the vessel like Schank's sliding keel. Shuldham indicated that he created a model of the design while imprisoned, smuggled it out of prison upon his release, first exhibited it in "the Adelaide Gallery in 1829," and later donated the model to the Ipswich Museum (Shuldham 1851:431). In 1811, a similar device was patented by Jacocks Swain, Henry Swain, and Joshua Swain of Cape May, New Jersey (Clark 1904, Barkhausen 1990). Since Shuldham states that he did not publicize his device until 1829, it is possible the Swain family independently arrived at the concept of the pivoted centerboard.

In any case, following the invention of the pivoted centerboard, the daggerboard appears to have fallen out of favor as shipbuilders gradually turned to the new, less temperamental design. While references are sparse, centerboards began to be used in more and larger vessels in North America during the early 1800s. Both Chapelle and Barkhausen offer examples, such as that of the British Royal Navy double centerboard schooner *Union* built sometime before 1828, the centerboard schooner *Santiago* built in 1833, and the centerboard schooner *Rio* built before 1835 (Chapelle 1935, 1967; Barkhausen 1990; Fig. 2.3). The prototypical Hudson River sloop, a vessel type that reached its zenith in the 1830s, carried a large centerboard (Chapelle 1967). Use of the pivoted centerboard was also adopted on the Great Lakes, where the shallow harbors, channels, and rivers that made the centerboard particularly useful predominated (Cooper and Kriesa 1991). Centerboards became increasingly common on the lakes after approximately 1825 and were incorporated into all manner of hull types (Chapelle 1967, Labadie 1989:20). Sailing vessels on the Great Lakes and elsewhere typically featured a single centerboard. Less frequently, vessels carried two centerboards. As more people moved west and shipbuilders with experience on the Lower Lakes began to immigrate to the Upper Lakes, the concept and use of the centerboard moved with them. This trend is archaeologically evident in Wisconsin's

submerged resources. The earliest located shipwreck in Wisconsin – the schooner *Gallinipper*, built as the *Nancy Dousman* in 1833 – has a standing keel (i.e., a solid keel with no slot for a centerboard or other retractable board) while the next earliest shipwreck in Wisconsin – the schooner *Home* built in 1843 – features a single centerboard (Meverden and Thomsen 2009a, 2009b). Future identification of shipwrecks in Wisconsin waters that date to the 1830s and early 1840s has the potential to provide important information about the transition from standing keels to centerboards.

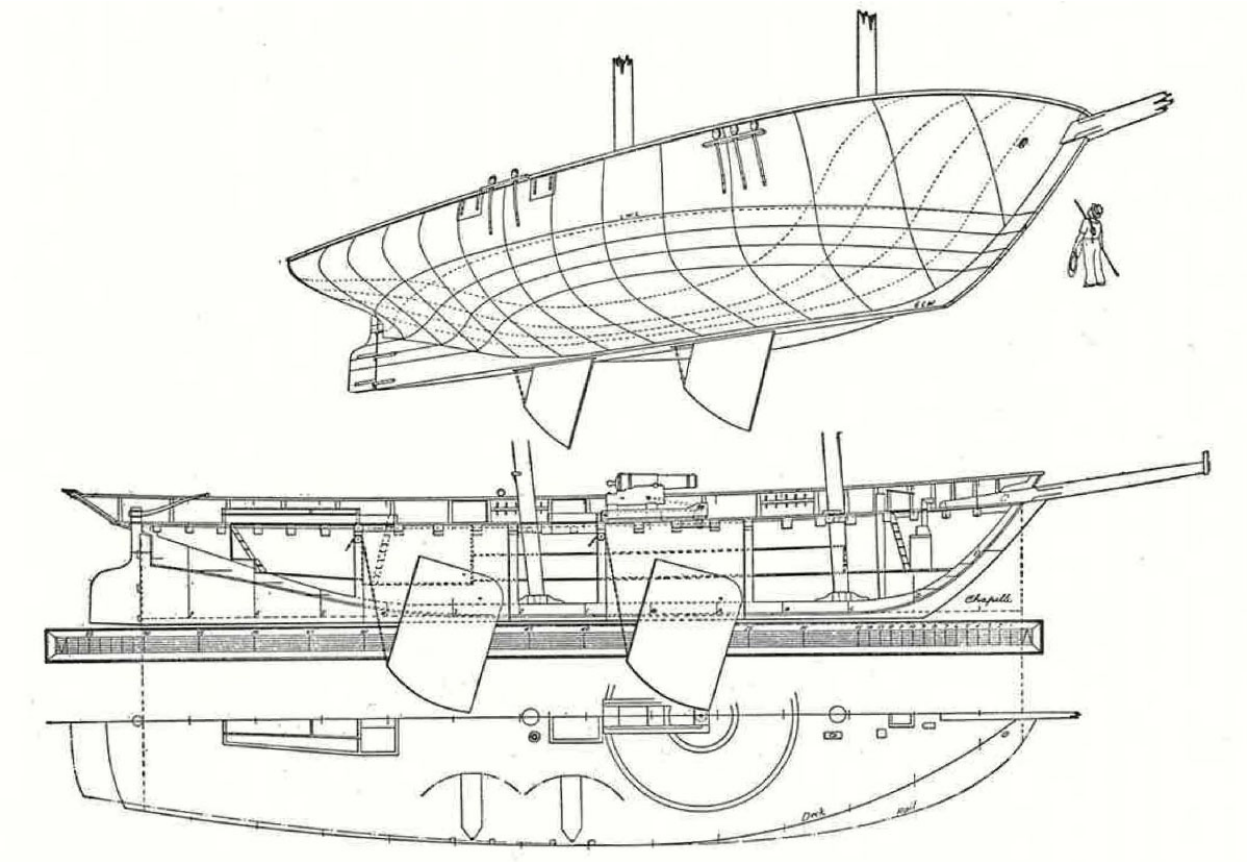

Figure 2.3. Inboard profile and deck plan of early centerboard schooner *Union* (Chapelle 1935:171).

The use of sailing vessels with centerboards came to permeate merchant shipping in the Great Lakes and connecting waterways. Numerous shipwrecks with centerboards have been found, investigated, photographed, and described – often archaeologically – all over the Great Lakes, the St. Lawrence River, and Lake Champlain. Double centerboards, however, have received much less attention. The following chapter examines the development and use of double centerboards in the Great Lakes, particularly as it relates to Wisconsin.

Chapter 3: Development of Double Centerboards in Wisconsin and the Great Lakes

As described above in the discussion of Schank's sliding keels, the concept of multiple retractable boards in sailing vessels in North America and Europe developed nearly as early as the concept of the retractable board itself. The idea of double centerboards appears to have accompanied or closely followed the spread of the single centerboard westward from the eastern Lower Lakes to the western Upper Lakes. In Lake Ontario, an unidentified schooner with two daggerboards found near Oak Orchard, New York, likely dates to the early 1800s (Kennard 2008). One source suggests that St. Lawrence sailing batteaux and early schooners built in Bronte, Ontario (located on the northern coast of Lake Ontario between Toronto and Hamilton) were outfitted with two centerboards (McKenzie n.d.). The schooner *Union*, built on Lake Erie in 1814, had two "slip-keels" (Walker 1902). This project has revealed six double centerboard vessels built on Lake Erie in New York, one built on Lake Ontario in Canada, and one built on Lake Michigan in Wisconsin, all of which were constructed between 1851 and 1854. Future research has the potential to elucidate the use of double centerboards on the Great Lakes and connected waterways in the early and mid-1800s.

In Wisconsin, the first use of double centerboards on sailing vessels may be attributable to a prolific shipbuilder named William Wallace Bates (Fig. 3.1). Bates, a shipwright from the eastern U.S. who moved to and made his name in Wisconsin, was born to Stephen Bates and Elizabeth Wallace Bates in 1827, possibly in Nova Scotia, Canada. While Bates was still young, his family moved to New Brunswick and then Calais, Maine. Stephen Bates taught his son the shipbuilding trade in or around Robbinston, Maine, a shipbuilding center near Calais. Bates' education in the trade began when he was only 12 years old after he completed about eight years of schooling. In 1845, when Bates was only 18, he traveled to Detroit, Michigan, spending the winter in Huron and Sandusky, Ohio. The country was in the grips of an economic depression and Bates was scouting for a more promising location for his family to establish a shipyard. Bates moved to Manitowoc sometime in 1848 or 1849. His wife, father, and brothers joined him in 1851 and Stephen and William established the Bates & Son shipyard (*Marine Review* 1891, Valli 1982, Colson 2012). The first vessel built at the Bates yard was the clipper schooner *Challenge*, which launched in 1852. The *Challenge* and the schooner *Clipper City*, built by Bates in 1854, were the first clipper schooners to be built on the Great Lakes; both had sharp ends, clipper bows, and single centerboards. They became renowned for their grace and speed and gave the City of Manitowoc its moniker of "Clipper City." In 1853, in-between construction of the *Challenge* and the *Clipper City*, Bates launched the barkentine *Mary Stockton*, which garnered local and national praise for its clean lines and swift sailing (Valli 1982, Urban 1985). Unlike the other two vessels, the *Mary Stockton* had two centerboards instead of one (Bates 1904). The *Mary Stockton* may have been the first vessel built in Wisconsin to carry two centerboards.

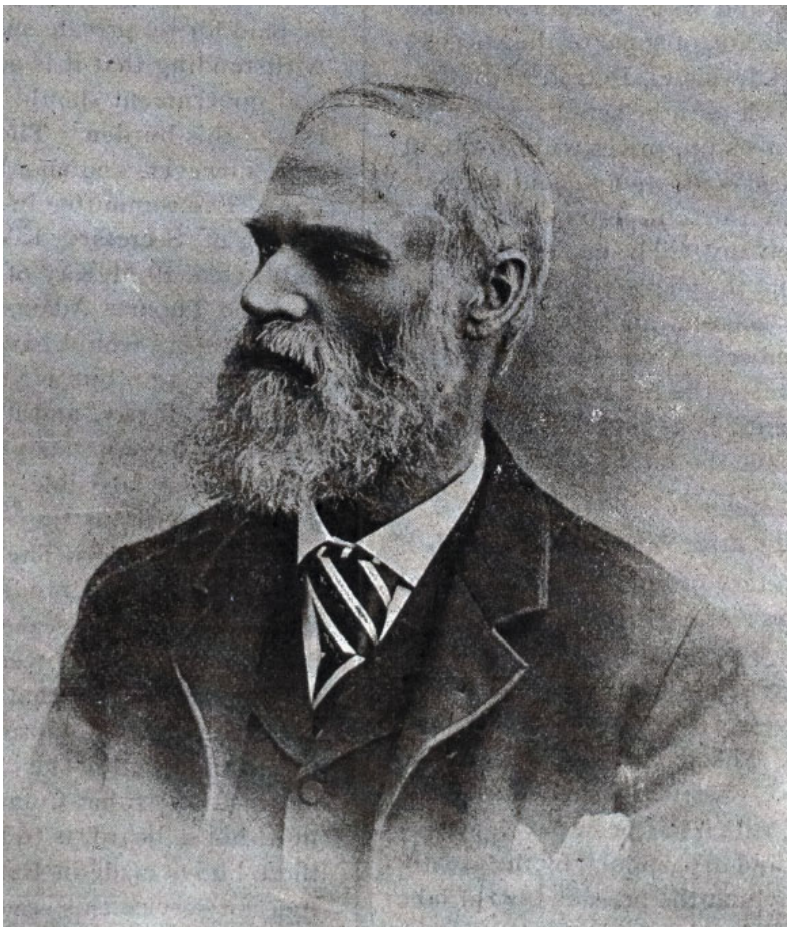

Figure 3.1. Captain William Wallace Bates (*Marine Review* 1891).

It is not clear why Bates chose to build the *Mary Stockton* with two centerboards. In an effort to ascertain whether Bates encountered the idea of double centerboards during his early shipbuilding career, WHS maritime archaeologists communicated with colleagues in Maine and nearby to learn if double centerboards were part of a maritime tradition Down East (David Robinson 2023, elec. comm.; David Trubey 2023, elec. comm.; Warren Reiss 2023, elec. comm.; Nathan Lipfert 2023, elec. comm.; Matt Wheeler 2024, elec. comm.; Ben Fuller 2024, elec. comm.; Jon Johansen 2024, elec. comm.; Cipperly Good 2024, elec. comm.; Douglas Lee 2024, elec. comm.). This communication revealed that there was a very localized maritime tradition of two centerboards, or twin centerboards, on sailing canal boats on the Cumberland & Oxford Canal, which connected the seaport of Portland, Maine, to the many large lakes in southern Maine. The canal, which opened in 1832 when Bates was only five years old, extended for 38 miles from Portland through Sebago Lake to Harrison at the northern end of Long Lake. The "classic" form of the Cumberland & Oxford Canal boat featured two masts and twin centerboards (Jordan 1922, Eastman 1980, Cozzi 2000:238-240). A limited, avocational archaeological investigation of one such twin centerboard canal boat was conducted in the 1980s, resulting in minimal information and an informal site plan (Gerber 1989; Fig. 3.2). Maritime archaeologist Warren Reiss of the University of Maine conducted a historical resource study of the Cumberland & Oxford Canal but did not recall investigating any canal boats with twin centerboards (Warren Reiss 2023, elec. comm.). Whether Bates ever traveled the Cumberland & Oxford Canal on a traditional canal boat or was familiar with the canal's prototypical vessel is unknown. Portland is located about 180 nautical miles away from Robbinston along the coast, but it is possible that the Maine shipbuilding community maintained strong ties across

regions and that Bates or his father were aware of the Cumberland & Oxford Canal boatbuilding tradition.

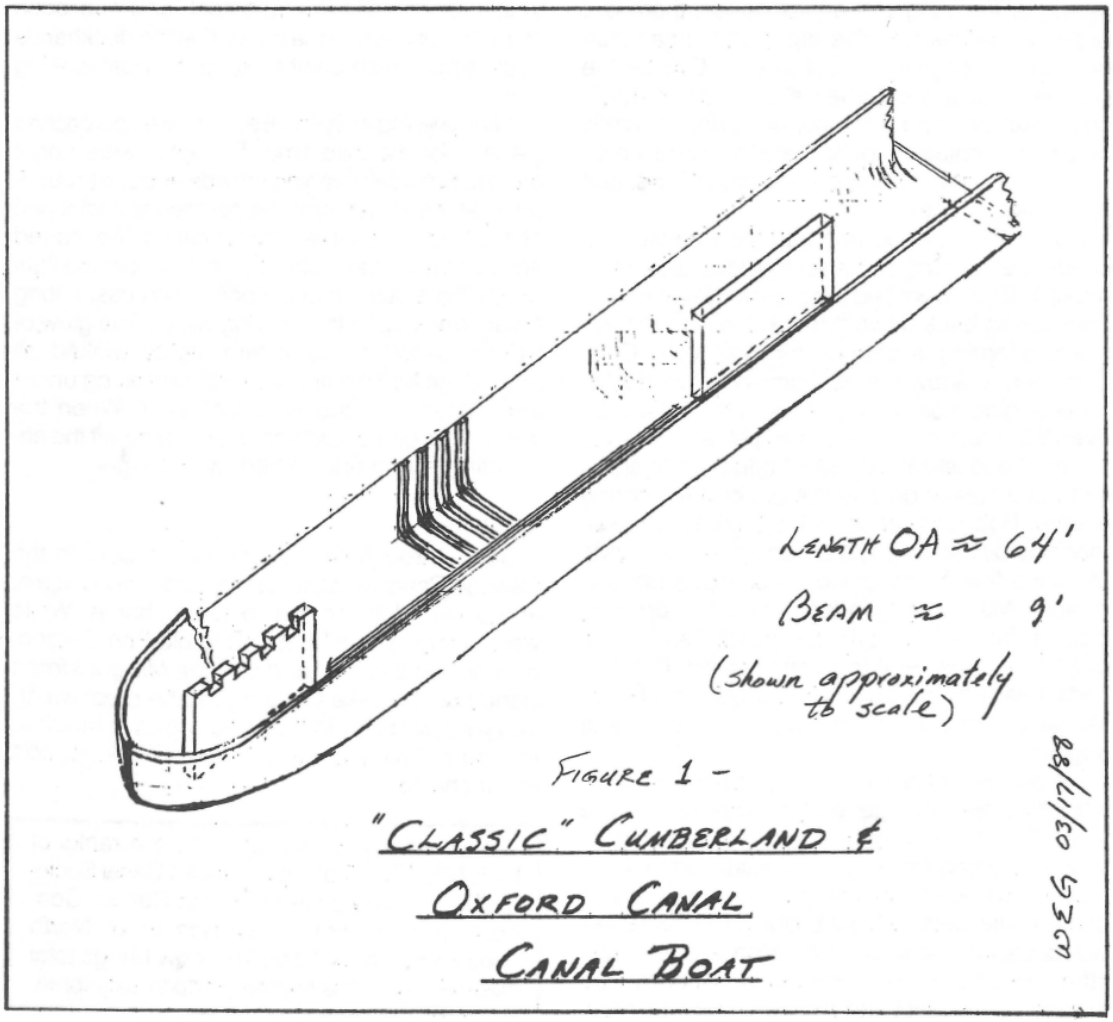

Figure 3.2. Informal site plan, Cumberland & Oxford canal boat wreck (Gerber 1989)

It is also possible that Bates was testing a feature that was under active discussion within the Great Lakes shipbuilding community. Of the 26 double centerboard vessels identified during this research project, over thirty percent of the total (9) were built between 1851 and 1854. These include six built in New York – the *Tuscola*, *Indiana*, *Trade Wind*, *Danube*, *Montgomery*, *Republic*, and *Sonora*; one built in Ontario, the *Lafayette Cook*; and one built in Wisconsin, the *Mary Stockton*. Since Bates both followed and contributed to discussions of naval architecture and developments in the field, he may have been aware of an early 1850s trend towards use of double centerboards, particularly in New York. However, it is not clear such a trend existed because of the small sample size identified during this project and because a second centerboard was sometimes added to a vessel later in its career, often when it was rebuilt and lengthened. While archival records demonstrate or strongly indicate that the *Indiana*, *Trade Wind*, *Danube*, and *Mary Stockton* began life as double centerboard vessels, it is not clear if the same is true for *Lafayette Cook*, *Tuscola*, *Montgomery*, *Republic*, and *Sonora*. The *Lafayette Cook* and *Tuscola* were both rebuilt, the *Montgomery* was rebuilt and lengthened, the *Republic* was rebuilt, and not enough information is available about the *Sonora* (Payerchin 2016; Thomsen, Zant, and Kiefer 2018;

Wisconsin Maritime Museum [WMM] 2023c, 2023g; Swayze 2024). Bates himself stated in a 1904 editorial in the *Nautical Gazette*, "In 1852, I built at Manitowoc, Wis. (Lake Michigan), the barkentine Mary Stockton, with two centre-boards. *Several other vessels built that year and subsequently had two boards*" (emphasis added; Bates 1904). Research into vessels built in Manitowoc between 1852 and 1853 revealed that 12 vessels were built in the city during those two years (*Manitowoc Pilot* 1881b, Falge 1911).[2] But no evidence was located that revealed which of the vessels were built with double centerboards other than the *Mary Stockton*. Further research into these and other 1850s Great Lakes vessels may reveal whether the *Mary Stockton*, *Indiana*, *Trade Wind*, and *Danube* were anomalies or whether the early 1850s was a key era for double centerboards on the Great Lakes.

Another hypothesis, supported by Bates's own words, is that the construction of the *Mary Stockton* with two centerboards was a scientific experiment. Bates was a serious student of naval architecture and continually strove to test various features and aspects of marine architecture in his designs. He argued for use of the scientific method in shipbuilding rather than adherence to tradition and the "rule of thumb" (Griffiths and Bates 1856, Valli 1982). Bates was likely familiar with Schank's multiple drop keel design and may have chosen to test the use of two pivoted centerboards, rather than one, when constructing the *Mary Stockton*. If Bates's use of a double centerboard on the *Mary Stockton* was an experiment, his later writings suggest that the test was a failure. As early as October 1854, Bates and his naval architect colleague John Willis Griffiths, founders and co-editors of the *Monthly Nautical Magazine and Quarterly Review*, stated, "The adoption of two boards has followed partly as a necessity, and partly as an experiment, in adding the third mast. We may remark that they cost more than one board, and are not so effective" (Griffiths and Bates 1854:15). In November 1855, Griffiths and Bates reiterated the point, "In three-masted-vessels two centre-boards have been used, but no longer find favor with seamen who have had experience with them; they do not work satisfactorily" (Griffiths and Bates 1855:99). At the time, Griffiths and Bates provided no specific complaints or examples that supported their assertions.

Bates continued to make similar negative remarks for the rest of his career, becoming increasingly more critical of double centerboards as he aged. In 1874, Bates was appointed as secretary of the Council of Ship Builders, an organization of prominent Great Lakes shipbuilders, and chairman of the Council's internal committee that set out to revise and update the 1866 rules of construction, or "Building Book." The 1866 rules, themselves a revision and update of the 1856 rules, consisted of a set of best practices for ship construction on the Great Lakes (Board of Marine Inspectors 1856, Board of Lake Underwriters 1866, Dorr 1876). These rules were sponsored and approved by the Board of Lake Underwriters (BLU), an association of insurance companies that insured vessels operating on the Great Lakes. The BLU sponsored and approved the rules of construction with the goal of codifying best practices for ship construction so that vessels could be correctly classified and appropriately insured. That is, similar to insurance companies today, the BLU was organized to assist insurance companies in avoiding large insurance payouts, particularly on the loss of substandard vessels that should not have been insured the same as their more seaworthy counterparts. Between 1874 and 1876, Bates

[2] These 12 vessels included the *Challenge*, built in 1852 by Bates & Son (with a single centerboard); the *Defiance*, built in 1852 by William Ham; the *Convoy*, built in 1852 by Joseph Edwards, Sr.; the *Mary Stockton*, built in 1853 by Bates & Son; the *Mary C. Platt*, built in 1853 by James Harbridge or James Hughes; the *North Yuba*, built in 1853 by Bates & Son; the *Lamira* (or *Lomira*), built in 1853 by C. Sorenson; the *William Jones*, built in 1853 by James Harbridge or C. Ryerson; the *Black Hawk*, built in 1853 by Bates & Son; the *Gesine*, built in 1853 by G. S. or H. Rand; the *Colonel Glover*, built in 1853 by C. Sorenson; and the *Magic*, built in 1853 by Bates (*Manitowoc Pilot* 1881b, Falge 1911).

spearheaded the effort to revise and update the 1866 rules of construction. While the 1856 and 1866 rules of construction make no mention of nor prohibition against multiple centerboards, the published 1876 rules, or "Centennial Building Book," differ markedly (Board of Marine Inspectors 1856, Board of Lake Underwriters 1866, Dorr 1876; Fig. 3.3). The 1876 rules contain an explicit sanction against double centerboards, "Center-Boards shall be situated in the central line of the keel; and no vessel of the first class shall have more than one" (Dorr 1876:46). In other words, per the 1876 rules, no vessel with more than one centerboard could obtain an A1 rating. This highest rating merited the lowest insurance premiums and was sought by owners whose vessels engaged in the lucrative grain trade, a commodity more susceptible to water damage compared to coarse freights like lumber, stone, and coal. Considering Bates's vocal negative opinions on double centerboards, the 1876 sanction against double centerboards can be reasonably attributed to him. Almost 30 years later in a 1904 editorial in the *Nautical Gazette*, Bates provided a lengthy explanation of his dissatisfaction with double centerboards:

> It was found from experience that the second centre-board was not an improvement upon one; and long before the vessels having two boards were worn out the after one was unshipped and put ashore, the opening in keel closed up securely, and the "centre-box" removed. Where one board is unsatisfactory in its working it is usually not sufficiently forward, or it may be too small, or not dropped plumb up and down. Where there are two boards, the after one runs in water that has been pushed lewardly (sic) by the forward board, and its action is of little account. I once put a single board 4 ft. forward of where I located it in a sister vessel (of same model, length, and rig) with this result: that she would surely stay in rough water where the other vessel might misstay if not watched sharply. Two-board vessels always stayed well under the forward board alone, but it was not always convenient to hoist the after one when going in stays (Bates 1904).

Bates's main argument against double centerboards is simply that the aft centerboard was unnecessary, if a ship was constructed properly, and operation of two centerboards resulted in extra effort that could be avoided by use of a single centerboard of appropriate size, construction, and placement.

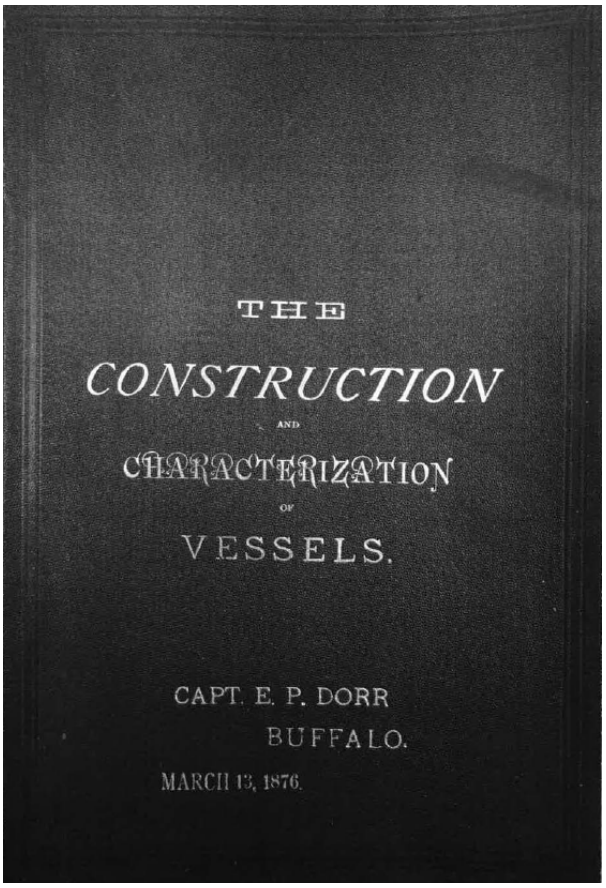

Figure 3.3. Rules of Construction / Centennial Building Book, Board of Lake Underwriters (Dorr 1876)

Regardless of the 1876 sanction against double centerboards in the BLU's Centennial Building Book and Bates's arguments that a second centerboard was ineffectual and superfluous, vessels with double centerboards continued to be constructed well into the late 1880s. Of the 26 double centerboard vessels identified during this project, seven were constructed in 1877 or later. Clearly, incorporation of two centerboards on sailing vessels provided useful benefits or was necessary for a variety of factors despite the approbations of William W. Bates and the potential of non-insurability at first class (A1) rating per the BLU's 1876 rules of construction.

Chapter 4: Double Centerboards – Archival Only and Shipwrecks Outside of Wisconsin

Considering the relative invisibility of double centerboard vessels in archaeological records, WHS maritime archaeologists began to take notice as the list of recorded double centerboard shipwrecks in Wisconsin's waters started to grow. Initial discussions with maritime archaeology colleagues in neighboring states indicated a dearth of known examples of double centerboard vessels in other parts of the Great Lakes. During the course of this project, WHS maritime archaeologists scoured archival records and archaeological reports and contacted maritime archaeology colleagues, State Historic Preservation Offices, shipwreck explorers, avid divers, and avocational archaeologists to inquire about double centerboards on shipwreck sites throughout the Great Lakes. In total, WHS has identified 26 double board vessels (including both daggerboards and centerboards) that were constructed on the Great Lakes between about 1814 and 1889. Nine are known only from archival records, ten are known shipwrecks in the Great Lakes outside of Wisconsin, and seven are known shipwrecks identified and archaeologically investigated in Wisconsin waters (Appendix A).

Double Centerboard Vessels in the Great Lakes – Archival Records Only

Some vessels are known to have possessed double centerboards based solely on archival records with no corresponding archaeological record. This may be because the wreck of a vessel has not yet been located or because a vessel never became a shipwreck; vessels can be dismantled, scrapped, or simply repurposed. Solely historically documented vessels with double centerboards that operated on the Great Lakes include the schooner *Union*, the barkentines *Danube*, *Mary Stockton,* and *Sonora*; the schooners *W. R. Taylor* / *Stuart H. Dunn* and *Monarch* (or *Monarch of Oakville*); and the schooner barge *Magnetic* (*Manitouwoc County Herald* 1853:2; *Oswego Daily Times* 1853a, 1853b; *Daily Milwaukee News* 1868:8; *Milwaukee Republican*-Sentinel 1882:10; Snider 1932a; Labadie 2023a, 2024a, 2024d). There may have been many more vessels with double centerboards operating on the Great Lakes, but as previously stated, it is difficult to identify such vessels in archival records.

Union (1814)

The two-masted schooner *Union* was built in 1814 on Lake Erie by Robert Martin at Put-In-Bay Island and Grand River (now Fairport), Ohio. The vessel, which is credited with being one of the first sizeable merchant craft on the Great Lakes, measured 68 feet long and 22 feet 8 inches in beam with a depth of hold of 7 feet 6 inches and a gross tonnage of 97 35/95 tons. The *Union* was used as a transport by the U.S. government near the end of the War of 1812 and sank in Scajaquada Creek, in Buffalo, New York, In 1815. According to Captain Augustus Walker, who worked as a sailor on the vessel for one season, the *Union* had "two old-fashioned slip-keels" (Walker 1902, Labadie 2024g, WMM 2023a). Since pivoted centerboards had not yet attained widespread use in the early 1800s, the "slip-keels" were probably daggerboards rather than centerboards. The vessel was raised from the creek by Buffalo shipwrights Asa Stanard and Benjamin Bidwell and rebuilt as a hermaphrodite brig, which included "removing the slip-keels and substituting a standing one in their stead" (Walker 1902, Walkowski and Baco 2010). Once rebuilt, the vessel measured 70 feet long and 27 feet 8 inches in beam with a depth of hold of 7 feet 8 inches and a gross tonnage of 104 30/95 tons. Very little information about the *Union*'s career is available, but Captain Walker details shipment of cargoes of salt pork and salt during his short stay on

the vessel. The *Union* operated through at least 1826, but had been abandoned by 1827 (Walker 1902, Labadie 2024g, WMM 2023a). No records could be located that indicate exactly when, where, or how the vessel was abandoned.

Lafayette Cook / Herbert Dudley (1851)

Built in 1851 by Maltese shipbuilder Louis Shickluna at St. Catharines, Ontario, the brigantine *Lafayette Cook* measured 113.5 feet in length and 71.6 feet in beam with a depth of hold of 11.3 feet and a gross tonnage of 220 tons. The vessel was built as a timber drougher (timber carrier) for the firm of D. D. Calvin, a major timber trading outfit on Garden Island, Ontario. Timber droughers were used to ship timber from Lakes Erie, Huron, Michigan, and Superior through the Welland Canal to Lake Ontario. At Garden Island, the timber was unloaded, sorted, and made into rafts that were then floated down the St. Lawrence River to Montreal and Quebec (Department of Marine and Fisheries 1874; Snider 1933; Barry 1996:64; Bowling Green State University [BGSU] 2024e). The vessel was well appointed, even offering running water from brass taps in the galley. In 1875, the *Lafayette Cook* was rebuilt as a schooner and renamed *Herbert Dudley*, increasing the vessel's gross tonnage to 283 tons. After the rebuild, the vessel was involved in the grain trade between Chicago and Canada and later delivered coal on the Toronto waterfront for P. Burns and Company (*Chicago Inter Ocean* 1879, 1881; *Cleveland Plain Dealer* 1886; Snider 1945). Although some records indicate that the *Lafayette Cook* had a single centerboard, Loudon G. Wilson, a maritime artist and researcher, noted in his unpublished manuscript on Great Lakes sailing vessels that the ship had two centerboards (Wilson 1972:27; Fig. 4.1). It is possible that the second centerboard was added when the vessel was rebuilt in 1875.

In 1898, at the Canadian National Exhibition in Toronto, the *Herbert Dudley* was blown up – along with at least three other vessels – as a representation of the demise of the USS *Maine*, which sank due to a mysterious explosion in Havana Harbor on 15 February 1898. The sinking of the *Maine*, which killed over 260 crew members, was one of several factors that precipitated the Spanish-American War (Snider 1932b, 1945; BGSU 2024e; Library of Congress 2024). The disposition of the wreckage of the *Herbert Dudley* is unknown. In an article discussing possible identities for a beached hulk near the Gibraltar Point Lighthouse on the southwest corner of Toronto's Centre Island, Snider (1932b) notes that the remains of the *Herbert Dudley* drifted west following the 1898 explosion. He further clarifies that the unknown Lighthouse wreck appears too old and too small to be the *Herbert Dudley*. It is possible that the wreck of the *Herbert Dudley* may still be located somewhere in Toronto Harbor or along the Toronto shoreline.

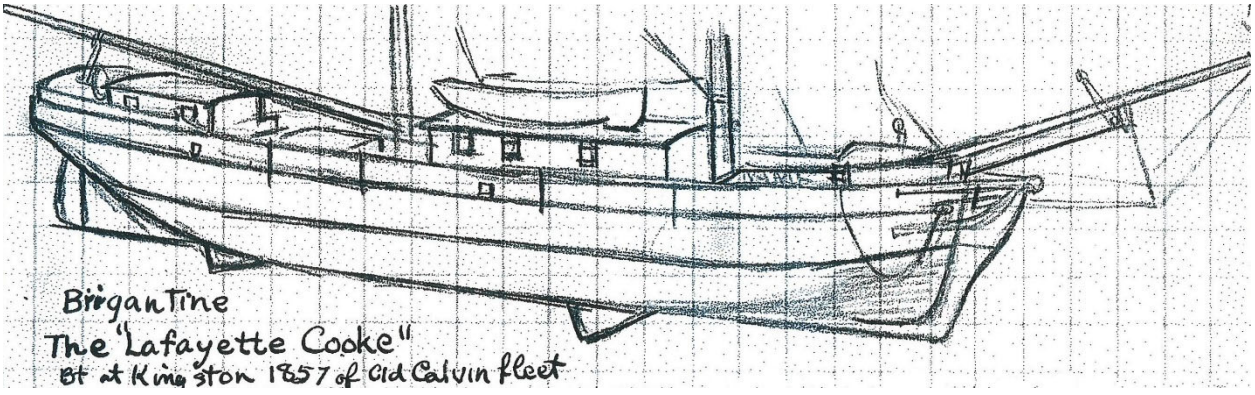

Figure 4.1. Sketch of the brigantine *Lafayette Cook* (Wilson 1972:27)

Danube (1853)

The barkentine *Danube*, which was built in 1853 in Oswego, New York, by James A. Baker, is a possible double centerboard vessel (Labadie 2024d, WMM 2023b). An 1853 article in the *Oswego Daily Times* describes an unnamed barkentine under construction at the James A. Baker shipyard and highlights the vessel's two centerboards. The details of this barkentine – including the measurements, builder, and owners – correspond with those of the *Danube*, which was launched from the Baker shipyard in early May 1853 (*Oswego Daily Times* 1853b; *Oswego Palladium* 1855). The *Danube* measured 134 feet long and 25.5 feet in beam with a depth of hold of 11.5 feet and a gross tonnage of 369 tons (Labadie 2024d). The vessel mainly transported grain – including oats, wheat, and corn – but also carried cargoes of salt, lumber, and iron (*Buffalo Daily Republic* 1853, 1857; *Democracy* 1855; *Buffalo Commercial Advertiser* 1857b, 1859b). The *Danube* was converted to a barge in Saginaw, Michigan, in 1868 and purchased by G. Janssen of Saginaw, Michigan, in 1884. It continued to operate as a barge through late 1885 but was reported as wrecked by 1890 (*Chicago Tribune* 1868, *Cleveland Plain Dealer* 1885:6, WMM 2023b). No records could be located that indicate exactly when, where, or how the vessel wrecked.

Mary Stockton (1853)

The three-masted barkentine *Mary Stockton* was built in 1853 by Bates and Son in Manitowoc, Wisconsin (Fig. 4.2). The vessel, which received national fanfare when launched, was 135 feet long and 29.1 feet in beam with a depth of hold of 9.6 feet and a gross tonnage of 349 99/95 tons. The builder, William W. Bates, stated in a 1904 article that the *Mary Stockton* had two centerboards (Bates 1904). One centerboard was just forward of the mainmast and the other was about three feet forward of the mizzenmast (Chapelle 1967). The *Mary Stockton* operated between Chicago and Buffalo, transporting pig iron, wheat, and other bulk goods. Converted in 1867, the vessel was towed as a barge with bulk cargoes of lumber and cording (*Manitouwoc County Herald* 1853:2, Labadie 2023a). Following many years of service, the *Mary Stockton* met an ignominious end. After failing to find a buyer at public auction in Cleveland in May 1888, the vessel's owners towed the barge "up to the head of the old river bed" where the vessel sat for the remainder of the year, possibly housing a destitute family for the summer (*Marine Record* 1888a, 1888b:1). In late December 1888, the vessel was found to be in the way of dredging operations and "was towed outside [the river] and left to her fate," which resulted in the vessel grounding on the rocky shore near Cleveland's east pier on Lake Erie (*Marine Record* 1888b:1, Burmeister 1889:1). No additional records relating to the vessel could be located, suggesting that the *Mary Stockton* was abandoned in place. It is unknown whether the hulk was later removed or if any buried remnants of the wreck remain on the Cleveland shoreline.

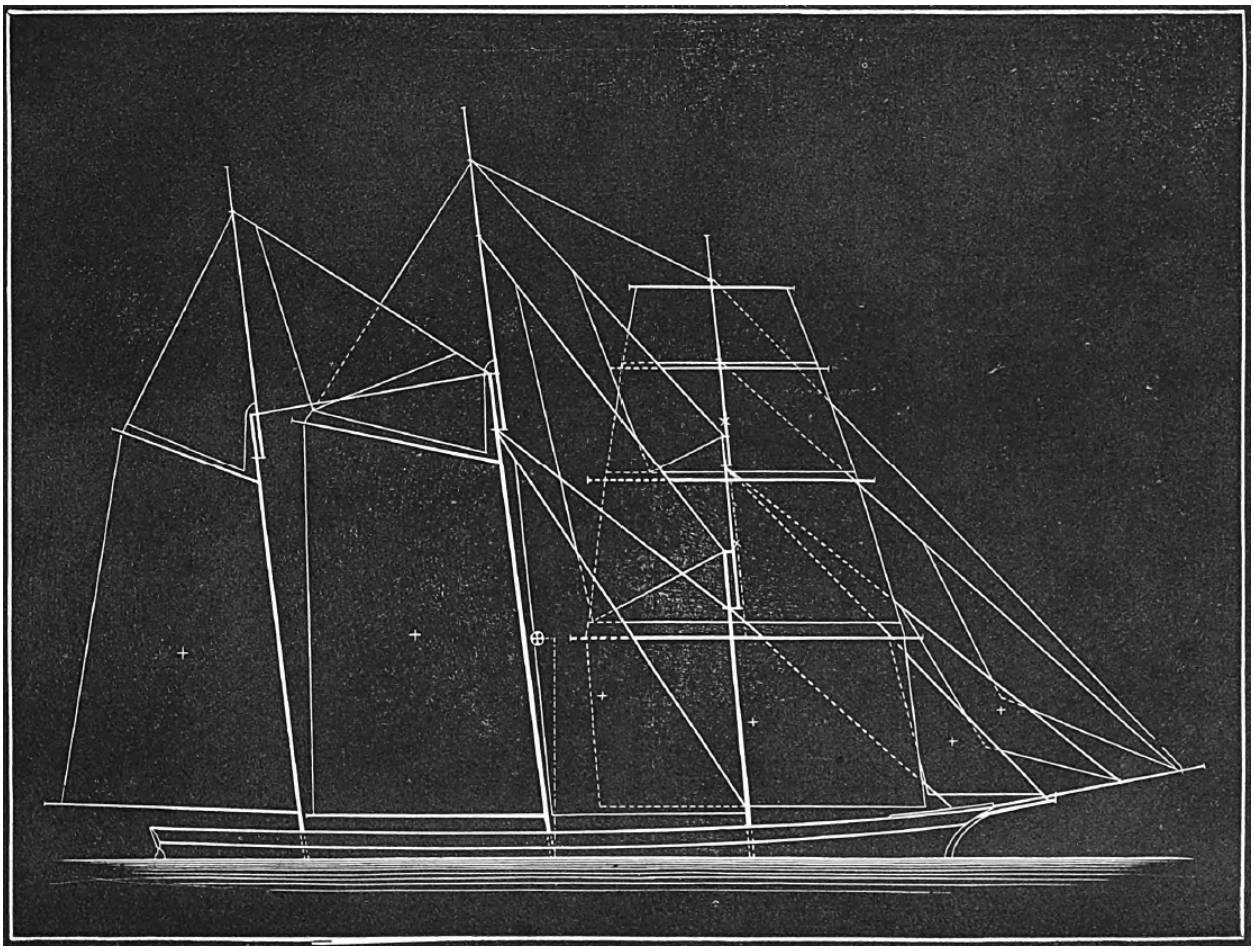

Figure 4.2. The barkentine *Mary Stockton* (Griffiths 1853:Plate 8)

Sonora (1854)

In 1854, the barkentine *Sonora* was built by Philo Ellenwood at Sackets Harbor, New York, for the Upper Lakes trade. The vessel measured 136 feet in length and 25 feet 8 inches in beam with a depth of hold of 11 feet 6 inches and a gross tonnage of 371 68/95 tons (*Buffalo Daily Republic* 1854a, WMM 2023c). The vessel engaged in the grain and lumber trades during its career and was converted to a barge in early 1871 (*Buffalo Commercial Advertiser* 1857a, 1859a, 1862, 1871). The only indication that the vessel had two centerboards is found in an 1868 newspaper article, "The bark Sonora carried away both of her centerboards during the last trip to Menominee" (*Daily Milwaukee News* 1868:8). As the vessel aged, it appears the crew began to take risks to make up for reduced profits. Accounts from 1896 detail the arrest of the *Sonora*'s captain and at least two sailors after stolen goods were discovered onboard. Police officers from the patrol boat *Governor Morton* fought their way on to the vessel despite concerted efforts by the *Sonora*'s crew to fend them off. Police later learned from one of the sailors that the purloined goods consisted of rope lines stolen off the steamer *Dominion* while the two vessels were anchored in Georgian Bay at Wiarton, Ontario (*Buffalo Evening News* 1896, *Cleveland Plain Dealer* 1896:7). The vessel was purchased by Frank Chamberlain in 1897 and continued to operate through late 1897, but appears to have been abandoned by 1899 (*Milwaukee Daily Sentinel* 1897:6; Bureau of Navigation 1898, 1899; WMM 2023c). No records could be located that indicate exactly when, where, or how the vessel was abandoned.

Monarch (1863)

Built in 1863 by John Simpson or Duncan C. Chisholm in Oakville, Ontario, the schooner *Monarch* (or *Monarch of Oakville*) measured 135 feet long and 24 feet in beam with a depth of hold of 10.8 feet and a tonnage of 378 tons (Labadie 2024e, WMM 2023d). Little information is available about the career of the *Monarch*, but the vessel is reported to have served in the grain, lumber, and coal trades (*Chicago Inter Ocean* 1874b, Snider 1943). Maritime researcher, artist, and former sailor C. H. J. Snider of Toronto remarked that the vessel had two centerboards, with "the second being in line with the first but set abaft the mainmast" (Snider 1932a). In 1868, the *Monarch* was rerigged as a barkentine and enrolled as an American vessel (WMM 2023d). While en route from Cleveland to Portage City with a cargo of coal in September 1874, the *Monarch* stranded at Detour, Michigan, on Lake Huron and was declared a total loss (*Chicago Inter Ocean* 1874a, 1874b). No additional records relating to the vessel have been located, suggesting that the *Monarch* may have been abandoned in place. It is unknown whether the vessel was later removed or refloated or if any buried remnants of the wreck remain along the shoreline near Detour.

Wilfred R. Taylor / Stuart H. Dunn (1877)

In 1877, the *Wilfred. R. Taylor* (*W. R. Taylor*) was built by George Dixon (or Dickson) at Cooper's Yard in Marysburgh, Ontario (Fig. 4.3). At the time of its launch, the three-masted canal topsail schooner measured 131.25 feet long and 25.17 feet in beam with a depth of hold of 12.5 feet and a gross tonnage of 483.73 tons. Built as a "timber drougher," the *W. R. Taylor* transported coarse freight like timber and coal through the Welland Canal. In 1889, after grounding in Lake Erie, the vessel was floated; rebuilt and lengthened in Port Robinson, Ontario; and renamed the *Stuart H. Dunn*. After lengthening, the vessel measured 164.8 feet long and 26.8 feet in beam with a depth of hold of 12.7 feet and a gross tonnage of 458 tons. C. H. J. Snider noted several times in "Schooner Days," his long running *Toronto Telegram* column, that the *Stuart H. Dunn* had two centerboards. Having served onboard the *Stuart H. Dunn* early in his life, Snider was intimately familiar with its features. His writings also reveal that the *W. R. Taylor* was originally built with only one centerboard between the foremast and mainmast. The second centerboard was added between the mainmast and mizzenmast when the vessel was lengthened and renamed (Snider 1932a, 1935, 1941, 1947a, 1947b, 1949; Bascom 1972, 1982; WMM 2023e; Labadie 2024f). After being rebuilt, the *Stuart H. Dunn* carried squared oak timbers between Toledo, Ohio, and Garden Island, Ontario. In the early 1900s, the vessel was purchased by the Conger Coal Company of Toronto to carry coal from the south shores of Lake Ontario to Toronto. In 1910, the vessel was converted to a barge, but continued to transport coal to Ontario and St. Lawrence River ports. Between about 1924 and 1926, the barge languished in ship graveyards in Toronto and then Whitby, Ontario. Sometime around 1926, the hulk was towed to deep water in Lake Ontario and scuttled (Snider 1947b, 1949; Bascom 1982). No records could be located that indicate exactly when, where, or how the vessel was scuttled. The wreck of the *Stuart H. Dunn* may still rest unlocated or unidentified in Lake Ontario.

Figure 4.3. Schooner *Wilfred R. Taylor* (BGSU 2024a).

Melitta (1881)

Built in 1881 at the Jasper Hanson and Hans M. Scove shipyard in Manitowoc, Wisconsin, the two-masted schooner *Melitta* measured 70.6 feet in length and 20.2 feet in beam with a depth of hold of 6.3 feet and a gross tonnage of 57.65 tons (*Manitowoc Pilot* 1881a, BGSU 2024f; Fig. 4.4). The small schooner conducted a brisk trade in forestry products, transporting lumber, shingles, lath, bark, ties, and cordwood up and down the coast of Wisconsin. For many years, the vessel operated out of Racine, Wisconsin (*Racine Times* 1889, 1892, 1894, 1895, 1899). The vessel was rebuilt and lengthened in 1889 in Holland, Michigan. Changes included the addition of a third mast, installation of a new deck, and increase in measurements to 88 feet in length and 20.4 feet in beam with a depth of hold of 7.2 feet and a gross tonnage of 83.27 tons (*Detroit Free Press* 1889, BGSU 2024f). Early records do not indicate whether the *Melitta* was initially constructed with two centerboards, so it is possible that the second centerboard was added when the vessel was lengthened. By 1911, the *Melitta* was operating out of Michigan (*Racine Daily Journal* 1911). Similar to the schooner *Rouse Simmons* (see Chap. 5), the *Melitta* participated in the Christmas tree trade between Michigan and Chicago late in its career (Neuschel 2007).

The vessel was abandoned in Detroit in 1923 (BGSU 2024f). In 1935, Loudon Wilson and Ferdinand Bock recorded basic measurements of the wreck at the foot of Dubois Street in Detroit. Wilson included sketches and measurements of the wreck of the *Melitta* in his unpublished manuscript on Great Lakes sailing vessels. The sketches indicate that the forward centerboard trunk measured 13 feet long and 0.9 feet wide, the aft trunk centerboard measured 9.8 feet long and 0.9 feet wide, and the space between the two trunks measured 14.7 feet long. The aft end of the forward centerboard was located just

forward of the mainmast while the forward end of the aft centerboard was located several feet aft of the mainmast (Wilson 1972:47; Figs. 4.4 and 4.5). It is unknown whether any buried remnants of the wreck remain along the Detroit shoreline.

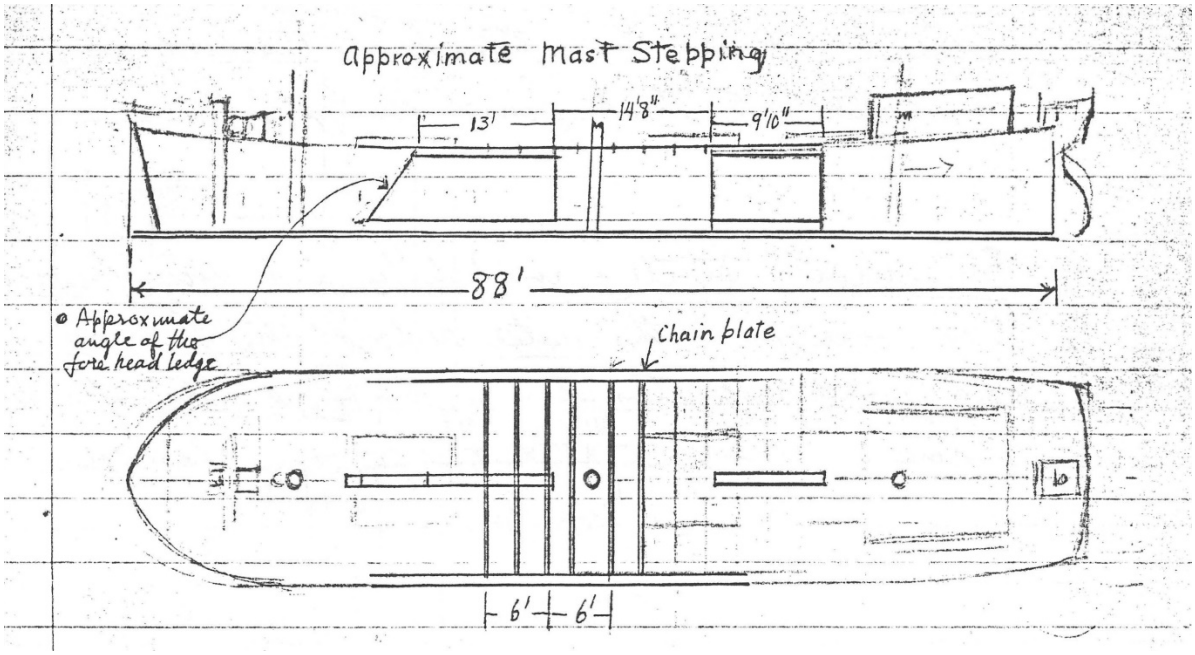

Figure 4.4. Sketch of the wreck of the schooner *Melitta* (Wilson 1972:47).

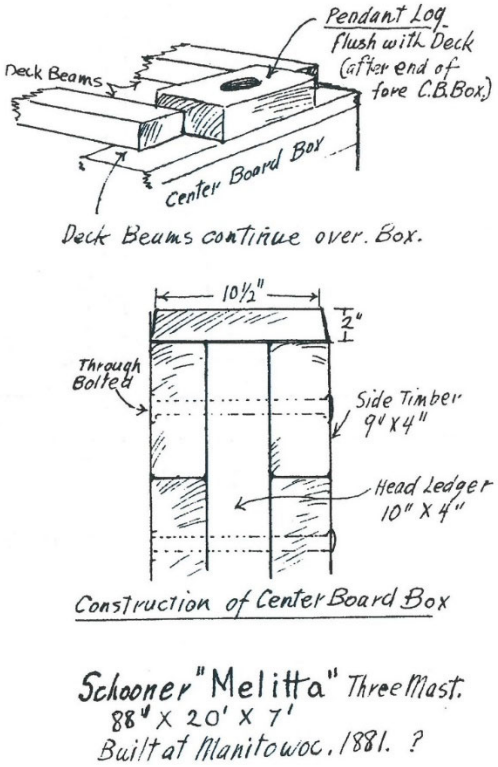

Figure 4.5. Sketches of the centerboard trunks of the schooner *Melitta* (Wilson 1972:42).

Magnetic (1882)

The four-masted schooner barge *Magnetic* was built in 1882 by Presley & Company in Cleveland, Ohio (Fig. 4.6). When launched, the vessel measured 264 feet long and 38.4 feet in beam with a depth of hold of 19.9 feet and a gross tonnage of 1,602 tons (WMM 2023f, Labadie 2024g). According to a news report of the vessel's launch, the *Magnetic* was built with two centerboards and centerboard trunks, with the trunks each measuring 26 feet long (*Milwaukee Daily Sentinel* 1882). The *Magnetic* was specifically constructed as a barge and was towed by various steam vessels while carrying cargoes of iron ore, coal, and similar bulk freight (*Marine Record* 1883, *Daily British Whig* 1890, *Buffalo Morning Express* 1898). On 25 August 1917, the *Magnetic* was carrying a load of 2800 tons of iron ore from Duluth, Minnesota, to Buffalo, New York, while under tow of the steamer *Edward N. Breitung*. A severe storm blew up and the *Magnetic*'s steering gear failed; the crew could no longer control the vessel. The *Magnetic* fell into a trough of the heavy seas, began rapidly taking on water, and finally broke in two and sank. Despite the harrowing weather, the *Breitung*'s crew were able to rescue the captain and all seven crew members of the *Magnetic*. The vessel was reported lost about two miles off Long Point, Ontario, in Lake Erie (*Detroit Free Press* 1917:11, *Buffalo Evening News* 1917:10, Bascom 1983). To date, the wreck of the *Magnetic* has not been conclusively identified in Lake Erie.

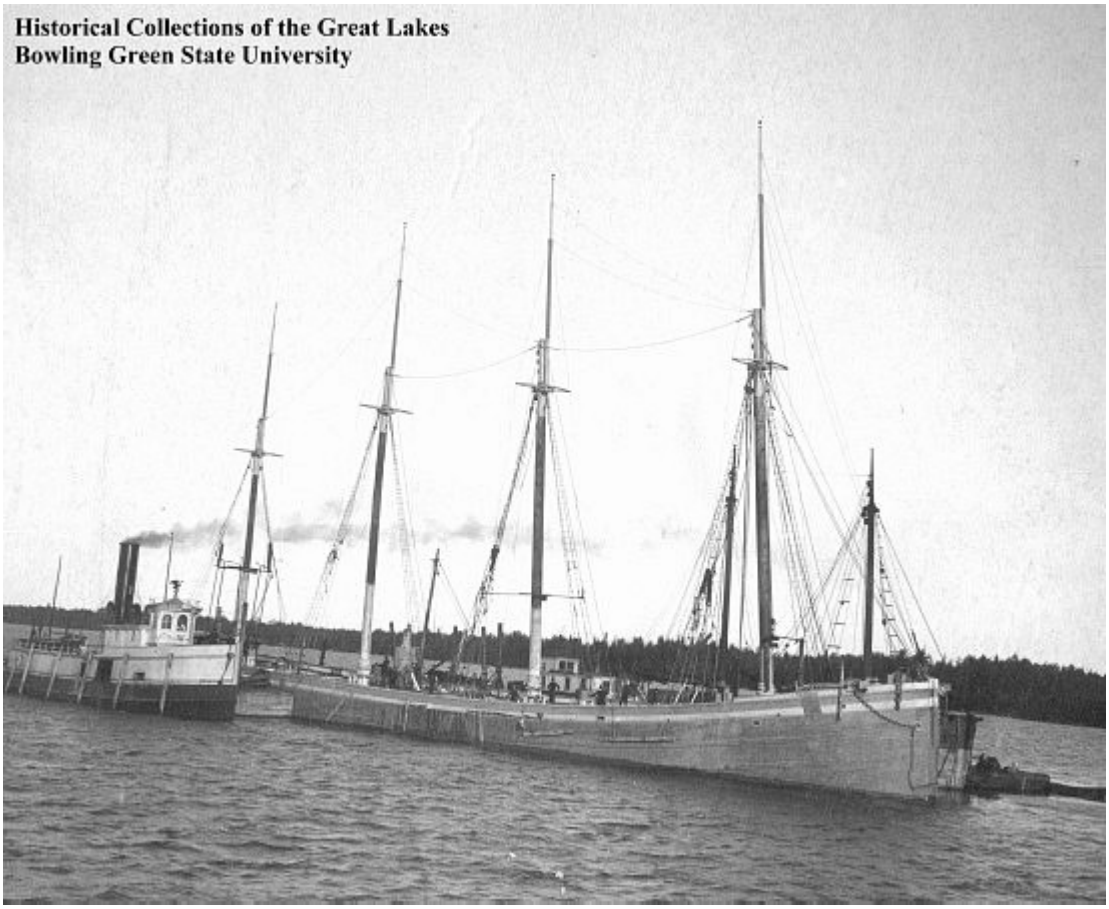

Figure 4.6. Schooner barge *Magnetic* (BGSU 2024b).

Summary

The nine double centerboard vessels described above were built between 1814 and 1882 in New York, Ohio, Ontario, and Wisconsin. These vessels were of several different types, including four schooners, three barkentines, one brigantine, and one schooner barge. Currently, these vessels are known only through archival records. Whether any of them still exist as shipwrecks is unknown; the possibility exists that submerged wrecks of these vessels may be located and archaeologically investigated in the future. The following discussion details known shipwrecks with double centerboards in the Great Lakes located outside of Wisconsin's waters.

Double Centerboard Shipwrecks in the Great Lakes Outside of Wisconsin

Known or reported double centerboard shipwrecks in the Great Lakes outside of Wisconsin include a double daggerboard schooner near Oak Orchard, New York, in Lake Ontario; the schooner *Tuscola* near Chicago, Illinois, in Lake Michigan; the bark *Indiana* near Erie, Pennsylvania, in Lake Erie; the barkentine *Trade Wind* near Long Point, Ontario, in Lake Erie; the barkentines *Republic* and *Cortland* near Lorain, Ohio, and the barkentine *Two Fannies* near Bay Village, Ohio – all in Lake Erie; the barkentine *David Dows* near Chicago, Illinois, in Lake Michigan; the schooner barge *Annabell Wilson* in Dunkirk Harbor, New York, in Lake Erie; and the schooner barge *Aloha* near Kingston, Ontario, in Lake Ontario (Kennard 2008; Jim Jarecki 2023, elec. comm.; Ken Merryman 2023 and 2024, elec. comm.; Georgann Wachter 2024, elec. comm.). The ten known double centerboard (and daggerboard) wrecks in the Great Lakes outside of Wisconsin are described below.

Double Daggerboard Shipwreck (?), Lake Ontario

The double daggerboard schooner shipwreck near Oak Orchard, New York, in Lake Ontario is unidentified, but estimated to date to the early 1800s based on the vessel's features. Daggerboards were a precursor to centerboards, provided similar benefits for sailing vessels, and were in use on the Great Lakes from about 1806 to 1820, when the pivoted centerboard gradually began to replace the daggerboard in popularity. Shipwreck explorers Jim Kennard and Dan Scoville, who located the double daggerboard schooner wreck in the fall of 2008, gathered video of the site using a remotely operated vehicle (ROV) and sonar data using a high-resolution scanning sonar. The two-masted vessel measures about 55 feet long and 15 feet in beam. Since the vessel appears to have been stripped of its anchors, cabin, tiller, and iron fittings, and the masts intentionally cut off about one foot above the deck, Kennard and Scoville hypothesize that the vessel's owners may have been in the process of converting it to a barge when the vessel broke free of its moorings and was swept out on the lake and sank during a severe gale (Kennard 2008). The shipwreck, which rests in over 500 feet of water, has not been archaeologically documented or listed on the National Register. According to Kennard and Scoville, the daggerboards are each about 4.5 feet in length.

Tuscola (1851), Lake Michigan

Built by Frederick Nelson "F. N." Jones in 1851 in Buffalo, New York, the schooner *Tuscola* measured 128 feet long and 23 feet wide with a depth of hold of 8 feet and a gross tonnage of 221.22 tons (Labadie 2024i, Swayze 2024). The three-masted *Tuscola*, which had a reputation as a very fast vessel, primarily transported forestry products – including lumber, staves, laths, casks of ashes, and shingles – but also sometimes carried barrels of flour, salt beef, and tongues (*Buffalo Daily Republic* 1852, 1854b;

Buffalo Commercial Advertiser 1853, 1855; *Buffalo Daily Courier* 1854; *Buffalo Morning Express* 1854a, 1854b). The *Tuscola* is depicted in an 1850s lithograph of Wenona (now Bay City), Michigan, that shows extensive lumber industry activity (Fig. 4.7). Partially visible on the left side of the lithograph, the *Tuscola* is docked and loading lumber in the image (Archives of Michigan 1850s, Gansser 1905:47,180). Although the lithograph appears to show the *Tuscola* with only two masts, the vessel was described as three-masted as early as June 1854 (*Buffalo Morning Express* 1854a). While it is possible that the *Tuscola* was built with two masts in 1851 and then lengthened and another mast added before mid-1854, it seems more likely that the lithograph either incorrectly depicts the vessel or that the mizzenmast is not visible since the aft end of the vessel is not shown in the lithograph.

Figure 4.7. 1850s lithograph of Wenona, Michigan; schooner *Tuscola* on left (Archives of Michigan 1850s).

It is also unknown whether the *Tuscola* was originally built with two centerboards since no detailed description of the vessel at its launch could be located. The second centerboard could have been added when the vessel was rebuilt in Buffalo in 1859 or in Benton Harbor, Michigan, in 1864 (Swayze 2024). The *Tuscola* had a long career on the Great Lakes carrying a variety of coarse freight, but by the late 1870s, the vessel was old and may have been in poor condition. On 21 June 1878, while carrying a cargo of cobblestones from Traverse Bay, Michigan, to Chicago, the *Tuscola* was caught in a storm on Lake Michigan and began taking on water between Milwaukee and Racine. The crew manned the pumps, but were forced to abandon the vessel off Glencoe, Illinois, north of Chicago. The captain, his wife, and the crew were rescued by the schooner *Nassau* and the Goodrich steamer *Chicago*. The *Tuscola*, which sank in 13 feet of water, was declared a total loss (*Chicago Inter Ocean* 1878). The site is located in Lake Michigan in Illinois about 600 feet east of Glencoe. The shipwreck has not been listed on the National Register.

The Underwater Archaeological Society of Chicago documented the shipwreck in 1994 and produced a site plan (Fig. 4.8). Per the site plan, the *Tuscola*'s two centerboard trunks are located 48.3 feet apart

along the vessel's centerline. The forward end of the forward centerboard trunk is located 18.4 feet aft of the vessel's stem. The forward centerboard trunk measures 16.6 feet long and 1.9 feet wide. The aft centerboard trunk is located 83.4 feet aft of the stempost; it measures 15.7 feet long and 1.9 feet wide. The interior slots for both centerboard trunks measure 1.4 feet wide and the centerboards measure 0.5 feet wide. No mast steps are visible on the site plan so it is not clear where the centerboards trunks were located in relation to the vessel's masts.

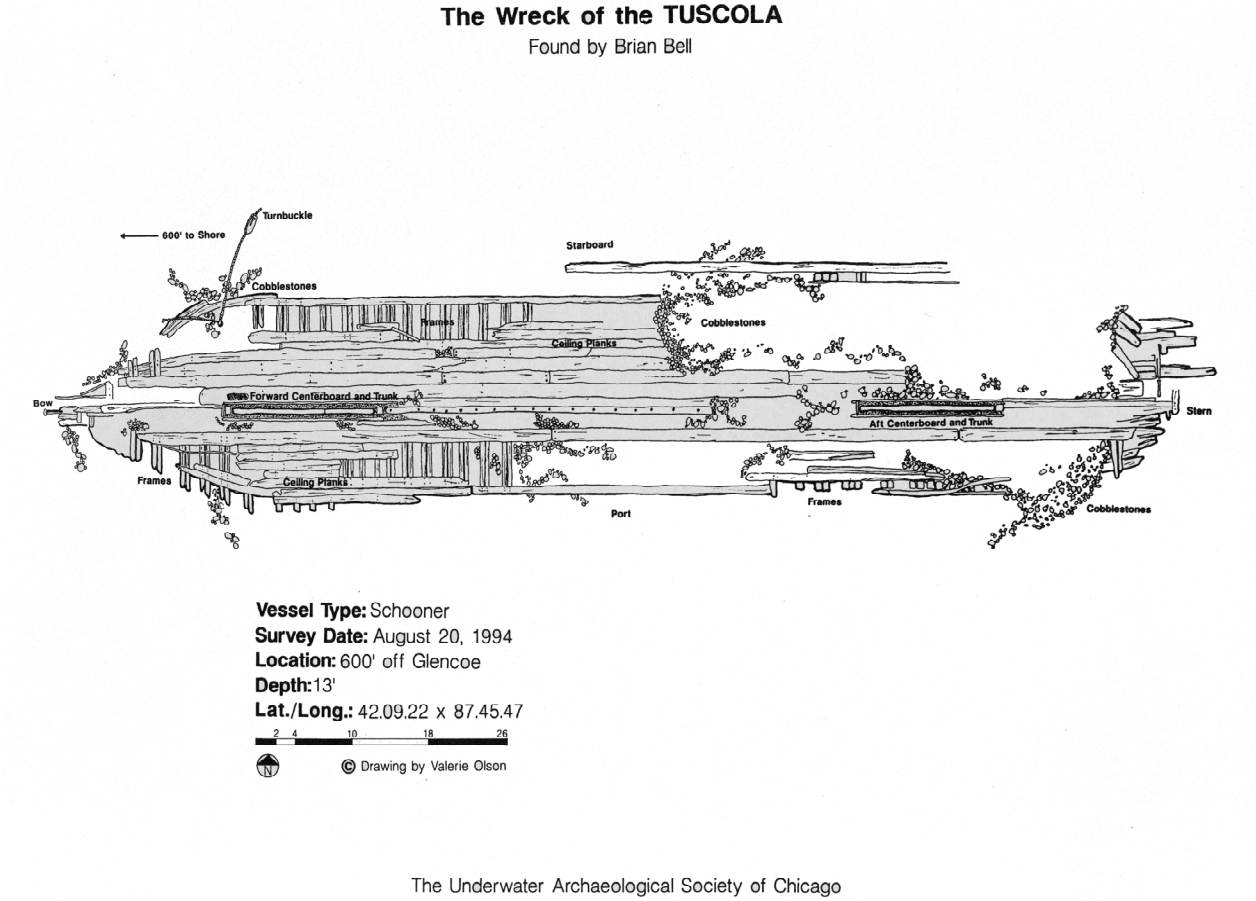

Figure 4.8. Site plan, schooner *Tuscola* (Underwater Archaeological Society of Chicago).

Indiana (1852), Lake Erie

On 18 October 1852, the bark[3] *Indiana* was launched from the George S. Weeks shipyard in Oswego, New York. The three-masted vessel measured 141 feet 6 inches long and 25 feet in beam with a depth

[3] The terms bark and barkentine were often used interchangeably on the Great Lakes. Per Jim Paskert, maritime historian with CLUE, "It is important to note that the term, bark (sometimes spelled barque), as used on the Great Lakes at the time, referred to a vessel having three masts of which one or two were square rigged. In traditional usage, the term bark referred to a vessel having three masts of which two were square rigged, and the term barkentine (sometimes spelled barquentine) was used to describe a vessel having three masts of which one (the foremast) was square rigged. This differentiation was not always made on the Great Lakes and traditionally-described barks and "barkentines" were often, although not always, collectively described as barks (Paskert 2008:214-215). It is possible that the *Indiana* was the more common barkentine and not an actual bark.

of hold of 10 feet and a gross tonnage of 354 50/95 tons. The vessel's history prior to its last two shipping seasons is not well documented. During the 1869 and 1870 seasons, it shipped oil, naptha, coal, and stone between Great Lakes ports, with most of its time spent on Lake Erie. On 25 September 1870, while hauling a load of curbing stones from Buffalo to Cleveland, the *Indiana* met with a heavy squall and began leaking. The crew manned the pumps for hours but were forced to abandon ship. The captain and crew escaped in the yawl to Erie, Pennsylvania, while the nearly flooded *Indiana* continued to slowly sail southwest, eventually sinking within sight of the Erie lighthouse. The shipwreck lies in 90 feet of water about 10 miles northeast of Erie in Lake Erie. The Pennsylvania Archaeology Shipwreck and Survey Team (PASST) conducted historical research and created a 3D model of the site (Pennsylvania Archaeology Shipwreck Survey Team [PASST] 2023, Regional Science Consortium at Presque Isle 2023; Fig. 4.9). Archaeological documentation of the shipwreck is underway by PASST, but the site has not yet been listed on the National Register.

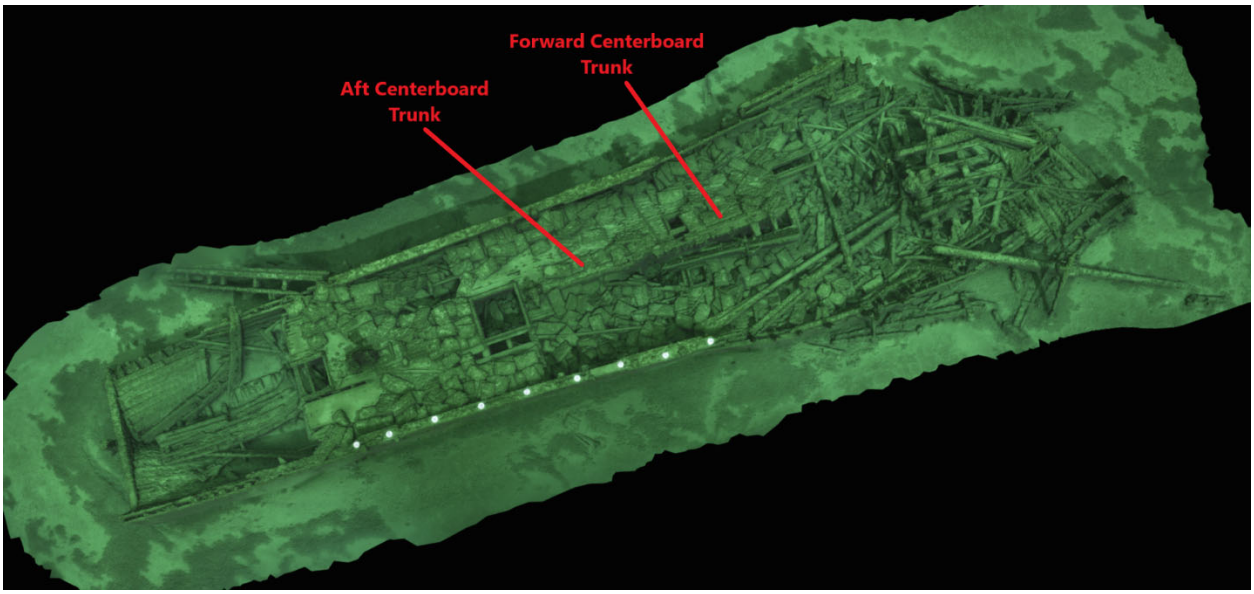

Figure 4.9. Photogrammetric 3D model, bark *Indiana* (Pennsylvania Archaeology Shipwreck Survey Team 2023).

Shipwreck explorer Georgann Wachter and avocational archaeologist Kevin Magee, of the Cleveland Underwater Explorers (CLUE), both reported that the *Indiana* has two centerboards, with one forward of and one aft of the foremast (Georgann Wachter 2024, elec. comm.; Kevin Magee 2024, elec. comm.). The aft centerboard winch is present abaft of the aft centerboard. Based on estimated measurements using the 3D model (which was not photographed with scales), the *Indiana*'s forward centerboard trunk is located 42.9 feet aft of the vessel's stem. The forward centerboard trunk measures about 19.5 feet long and the aft centerboard trunk measures 13.8 feet long; they are separated by 4.6 feet. The centerboard trunks are located on the vessel's centerline.

Trade Wind (1853), Lake Erie

Built in 1853 by Peter Lamoree at Stony Creek near Sackets Harbor, New York, the three-masted barkentine *Trade Wind* measured 136.5 feet long and 25.5 feet in beam with a depth of hold of 11.5 feet. The vessel's career was short lived. After launching in mid-1853, the vessel sank only 18 months later. On 1 December 1854, the *Trade Wind* was on its way from Buffalo to Chicago with a cargo of 1,000

stoves, 200 tons of iron railroad rails, and two Francis metallic government lifeboats when the vessel encountered a severe snow squall off Long Point, Ontario. Blinded by the storm, the *Trade Wind* collided with the brigantine *Sir Charles Napier* and sank quickly. The collision destroyed the *Trade Wind*'s own lifeboat, but the crew was able to unpack and launch one of the government lifeboats and make it to safety with no loss of life. The captain of the *Sir Charles Napier* indicated that his vessel remained nearby after the collision and attempted to call out to the other vessel, which they had been unable to identify. They received no response and, when the storm cleared slightly, they saw no sign of the other vessel. Although damaged, the *Sir Charles Napier* was able to sail to Gravelly Bay near Port Colborne, Ontario, for repairs (*Sloan's Garden City* 1854, Dekina 2015, Lindsay and Lindsay 2024). The wreck of the *Trade Wind* rests in about 120 feet of water south of Long Point, Ontario, in Lake Erie. The shipwreck has not been archaeologically documented.

The vessel is well preserved and substantially intact. Kevin Magee, avocational archaeologist and co-founding member of CLUE, dived the wreck in 2019 and noticed evidence of two centerboards, "An aft centerboard winch is mounted amidships near the capstan, and chain from the forward centerboard winch runs to the port side and falls overboard into the silt, where the winch is presumably buried" (Kevin Magee 2024, elec. comm.). A 3D model of the shipwreck was created as part of efforts by the Great Lakes Shipwreck Preservation Society (GLSPS) to compile a database of 3D models of shipwrecks in the Great Lakes (Goodman, Thomsen, and Merryman 2024; Fig. 4.10). The resolution of the model, the presence of cargo debris on the deck, and the intact deck itself prevents analysis of the below deck centerboard trunks using the 3D model.

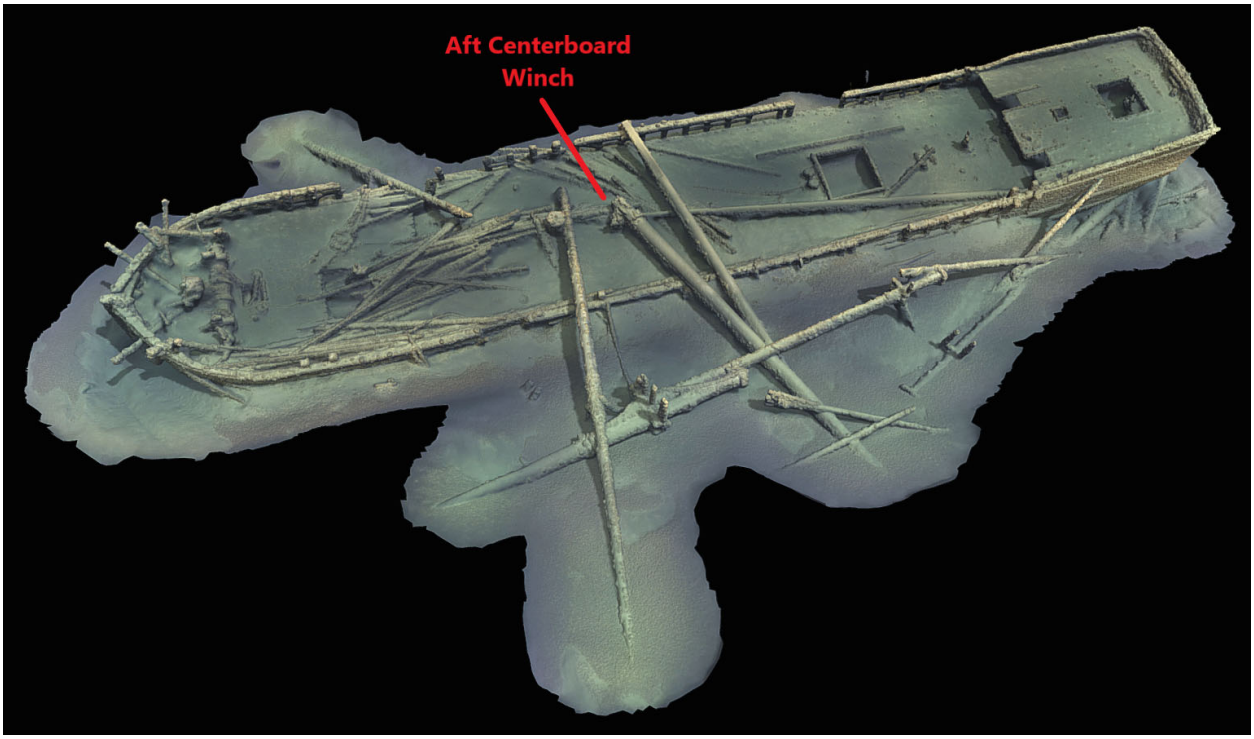

Figure 4.10. Photogrammetric 3D model, barkentine *Trade Wind* (Goodman, Thomsen, and Merryman 2024).

Republic (1854), Lake Erie

The barkentine *Republic* was built in Clayton, New York, in 1854 by John Oades (Fig. 4.11). The vessel measured 140 feet long and 26 feet 1 inches in beam with a depth of hold of 11 feet 6 inches and a gross tonnage of 392 54/95 tons. The *Republic* began its career in the Great Lakes-Welland Canal grain trade and later carried less expensive coarse freight. The vessel underwent major repairs in 1862, was rebuilt in 1872 and 1890, and was rerigged as a schooner at some point during its career. On 30 July 1895, while under tow by the steamboat *Swallow* with a load coal for Detroit, the *Republic* sank during a storm. The crew of the *Swallow* was able to signal for help in time for the tug *Cascade* to rescue the *Republic*'s eight-man crew, who were clinging to the vessel's rigging. The vessel was later salvaged and dynamited to reduce the hazard it represented to navigation. The shipwreck rests in 40 feet of water about 2 miles off Lorain, Ohio, in Lake Erie (*Democracy* 1854, *Detroit Tribune* 1895, Payerchin 2016, WMM 2023g). Local shipwreck explorers reported that the *Republic* has two centerboards (Georgann Wachter 2024, elec. comm.). The shipwreck has not been archaeologically documented or listed on the National Register.

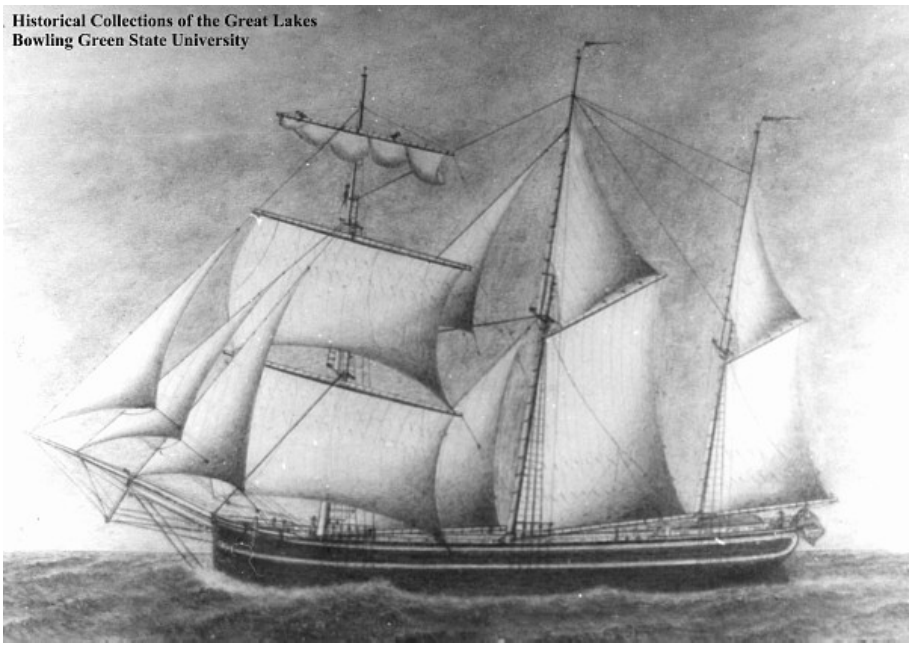

Figure 4.11. Barkentine *Republic* (BGSU 2024c).

Two Fannies (1862), Lake Erie

Built in 1862 in Peshtigo, Wisconsin, by George O. Spear, the three-masted barkentine *Two Fannies* measured 152 feet long and 33 feet in beam with a depth of hold of 12 feet and a gross tonnage of 492. The *Two Fannies* carried lumber and iron ore around the Great Lakes. The vessel underwent major repairs in 1878 and was rebuilt in 1880. While being towed by the tug *Crusader* with a load of iron ore for Cleveland, the vessel sprang a leak due to heavy chop on Lake Erie. The crew attempted to pump out the vessel, but were forced to abandon the attempt and the ship. The captain and crew escaped on the yawl boat and were rescued by the steamer *City of Detroit* and the tug *James Amedeus*. The shipwreck rests in 60 feet of water about five miles north of Bay Village, Ohio, in Lake Erie (WMM 2023h, Ohio Sea Grant 2024a). Shipwreck explorer Georgann Wachter and CLUE co-founder Kevin Magee both reported that the *Two Fannies* has two centerboards (Georgann Wachter 2024, elec. comm.; Kevin Magee 2024,

elec. comm.). The shipwreck has not been archaeologically documented or listed on the National Register.

Kevin Magee dived the wreck in 2009 and recorded information about the two centerboards, "A standing centerboard box is then reached [aft of several large centerposts aft of the windlass] that is about 2' wide and 8' high. On the port side up against the box is a capstan. Above the centerboard box are suspended deck beams and hatch frames, all precariously hanging in space and balanced on the centerboard…. Up against the box sitting on the bottom on the aft starboard side can be seen the centerboard winch. This was used to raise and lower the centerboard to add lateral stability to the ship while it was under sail in deep water. Aft of the centerboard box are more centerposts, and then an identical second standing centerboard box is encountered" (Magee 2009).

Cortland (1867), Lake Erie

In 1867, Albert G. Huntley of the Asahel P. Lyman shipyard built the three-masted barkentine *Cortland* in Sheboygan, Wisconsin. The vessel measured 173.6 feet long, 34.4 feet in beam, and 13.8 feet in depth of hold with a gross tonnage of 676.13 tons. The announcement of the vessel's launch in the *Milwaukee Sentinel* noted that the vessel was built with two centerboards, one 24 feet long and the other 22 feet long (Paskert 2008, Magee and VanZandt 2010). The *Cortland* carried bulk freight, such as grain and ore, to and from ports around the Great Lakes, but the vessel's career was short lived (*Buffalo Express* 1867). On 20 June 1868, only 10 months after launching, the *Cortland* was en route to Cleveland, Ohio, with a load of iron ore from Escanaba, Michigan. While north of Lorain, Ohio, the *Cortland* caught sight of the sidewheel steamer *Morning Star* on the packet's usual route between Cleveland, Ohio, and Detroit, Michigan. Accounts vary as to exactly what happened, but reports suggest the *Cortland* was not displaying adequate navigation lights and did not use its bell to signal its presence until the *Morning Star* was nearly upon the vessel. With no time left to avoid the collision, the *Morning Star*'s bow smashed into the *Cortland* on the starboard side near the mizzenmast. The *Morning Star* sank within 15 minutes, but the *Cortland* drifted for an hour before sinking to the bottom almost a mile from the site of the accident. Numerous individuals were rescued by passing vessels, but about 30 people lost their lives as a result of the collision. The wreck of the *Cortland*, which was located by CLUE in 2005, lies in 60 feet of water about 16 miles north of what is now Lorain, Ohio. The wreck has not been archaeologically documented or listed on the National Register.

The double centerboards on the *Cortland* are not visible because the amidships section of the ship is not visible. The amidships section is either missing, possibly due to salvage of the vessel's cargo of iron ore, or is deeply buried in the soft mud bottom because of the weight of the iron ore (Magee and VanZandt 2010, Cleveland Underwater Explorers 2024, Ohio Sea Grant 2024b). Additional investigation could reveal whether the amidships section is still present; if it is, more data about the centerboards could be collected.

David Dows (1881), Lake Michigan

The five-masted barkentine *David Dows*[4] was built in 1881 by Bailey Brothers in Toledo, Ohio. The vessel measured 265.4 feet long, 37.6 feet in beam, and 18.1 feet in depth of hold with a gross tonnage

[4] The *David Dows* was and still is incorrectly labeled a schooner even though it is recorded as having a fully square-rigged foremast, making it a barkentine (Borgo 2020).

of 1,418.63. According to news reports of the launch of the *David Dows*, the vessel was built with two centerboard and centerboard trunks, with one trunk measuring 27 feet long and the other measuring 25 feet long. At the time of its launch, the *David Dows* was believed to be the largest sailing vessel on the Great Lakes. But the vessel's size restricted its maneuverability and contributed to its collisions with two other vessels, resulting in the sinking of the first vessel and the drowning of four crewmen from the second vessel. The *David Dows* was eventually converted to a barge. On 30 November 1889, while being towed by the steamer *Aurora* from Manitou Island to Chicago with a load of coal, the barge foundered in a severe storm. The crew was rescued by a tug, but the *David Dows* sank in 42 feet of water about 7.5 miles east of Calumet Harbor, Illinois, in Lake Michigan (*Daily Inter Ocean* 1881:6, Borgo 2020, WMM 2023i). Although close to the mid-lake Illinois/Indiana state boundary, the site is located in Illinois. The shipwreck has not been listed on the National Register.

The Underwater Archaeological Society of Chicago documented the shipwreck in 1988 and produced a site plan (Fig. 4.12). Only the stern section of the vessel and its aft centerboard trunk remain. The forward section may have been destroyed when the cargo was salvaged (Jim Jarecki 2023, elec. comm.). Per the site plan, the aft centerboard trunk measures 23 feet long and 3 feet thick. The centerboard itself measures just over 22 feet long. No evidence of any mast steps remain so the aft centerboard's distance to a mast cannot be determined. The aft end of the centerboard is about 55 feet forward of the transom. The placement of the forward centerboard in relation to the vessel's deck layout is also unknown. Loudon Wilson interviewed three men who served on the *David Dows* at various stages in the vessel's career, but their recollections of the placement of the forward centerboard did not align (Wilson 1972:174; Fig. 4.13).

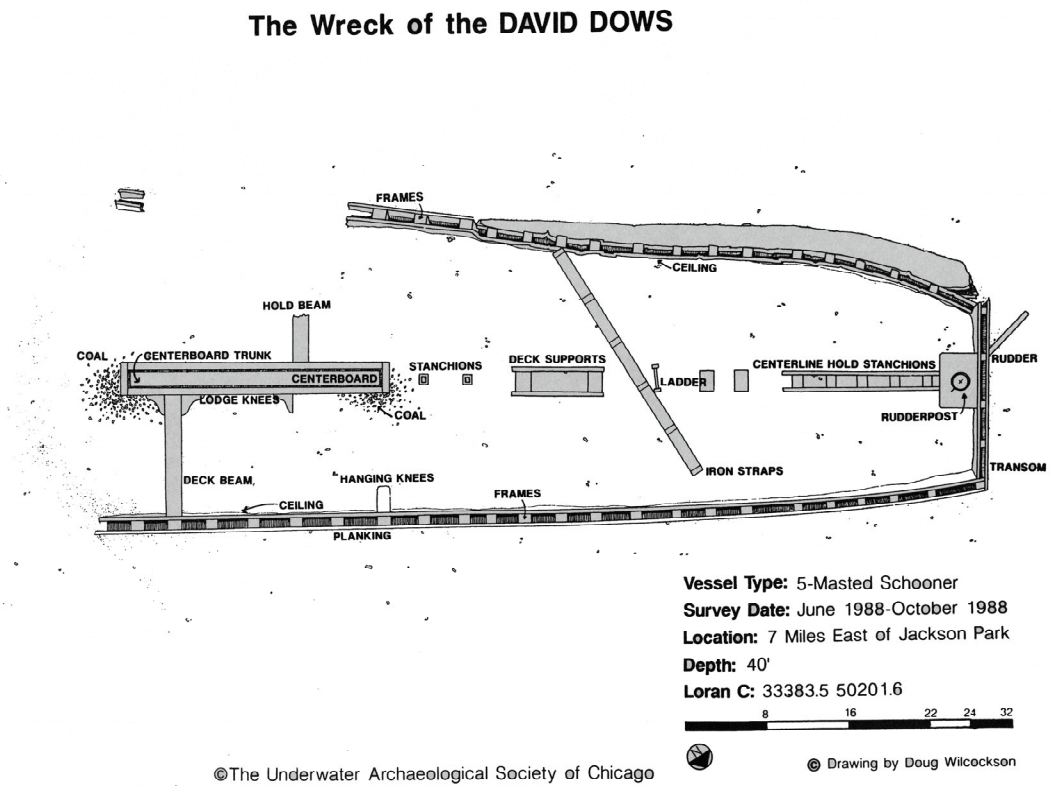

Figure 4.12. Site plan, barkentine *David Dows* (Underwater Archaeological Society of Chicago).

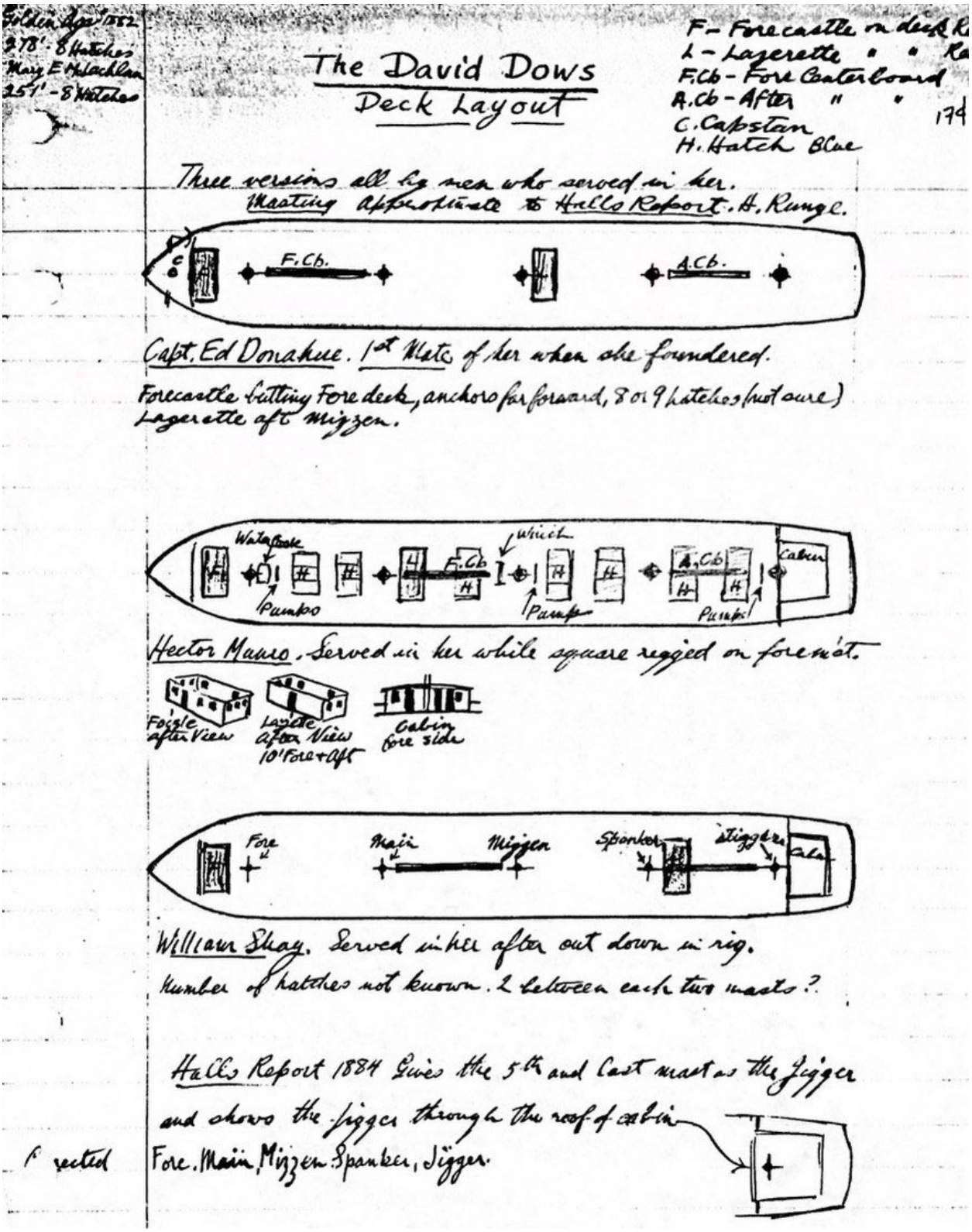

Figure 4.13. Sketches of possible deck layouts of the *David Dows* (Wilson 1972:174).

Annabell Wilson (1887), Lake Erie

Built in 1887 by William Dulac at Mount Clemens, Michigan, the schooner barge *Annabell Wilson* measured 174 feet long and 32.2 feet in beam with a depth of hold of 12 feet and a gross tonnage of 490.63 tons. Constructed as a barge, the vessel served in the Great Lakes lumber and coal trades. Much of its early career was spent in the Lake Superior lumber trade. On 12 July 1913, the *Annabell Wilson* was being towed to Port Colborne, Ontario, by the *Meteor* with a load of coal from Erie, Pennsylvania. The barge began taking on water and sank just outside the harbor of Dunkirk, New York. The rest of the crew were rescued, but the captain and his wife lost their lives. The shipwreck is located in Lake Erie in 50 feet of water about a quarter mile north of the Dunkirk lighthouse on Point Gratiot in Dunkirk, New York, in Lake Erie (Bosveld 2023, Labadie 2024b). The wreck has not been archaeologically documented or listed on the National Register.

A 3D model of the shipwreck was created as part of efforts by GLSPS to compile a database of 3D models of shipwrecks in the Great Lakes (Bosveld 2023). The model clearly shows the double centerboards. Based on estimated measurements using the 3D model (which was not photographed with scales), the *Annabell Wilson*'s forward centerboard trunk is located 58.2 feet aft of the vessel's stem. The forward centerboard trunk measures 7.5 feet long and the aft centerboard trunk measures 7.4 feet long; they are separated by 8.1 feet. The centerboard trunks are located on the vessel's centerline.

Aloha (1888), Lake Ontario

The schooner barge *Aloha*, built in 1888, shares many characteristics with the *Annabell Wilson*. Also built by William Dulac at Mount Clemens, Michigan, the vessel measured 173 feet long and 32.4 feet in beam with a depth of hold of 12 feet and a gross tonnage of 522 tons. The *Aloha* similarly participated in the Great Lakes lumber and coal trades, particularly between Upper and Lower Lakes ports. On 28 October 1917, the *Aloha* was under tow of the steamer *C. W. Chamberlain* with a load of coal from Erie, Pennsylvania, bound for Kingston, Ontario. A severe storm overtook the two vessels and the *Aloha* began taking on water. Four of the barge's crew were rescued, but the captain drowned. The shipwreck rests in 55 feet of water about a mile and a half southwest of Nine Mile Point Lighthouse on Simcoe Island near Kingston, Ontario, in Lake Ontario (*Buffalo Daily Courier* 1916, *Toronto Globe* 1917, Merryman 2023, Labadie 2024c). The shipwreck has not been archaeologically documented.

A 3D model of the shipwreck was created by GLSPS (Merryman 2023; Fig. 4.14). The model clearly shows the double centerboards. Based on estimated measurements using the 3D model (which was not photographed with scales), the *Aloha*'s forward centerboard trunk is located 57.3 feet aft of the vessel's stem. The forward centerboard trunk measures 7.8 feet long and the aft centerboard trunk measures 6.4 feet long; they are separated by 8.1 feet. The centerboard trunks are located on the vessel's centerline.

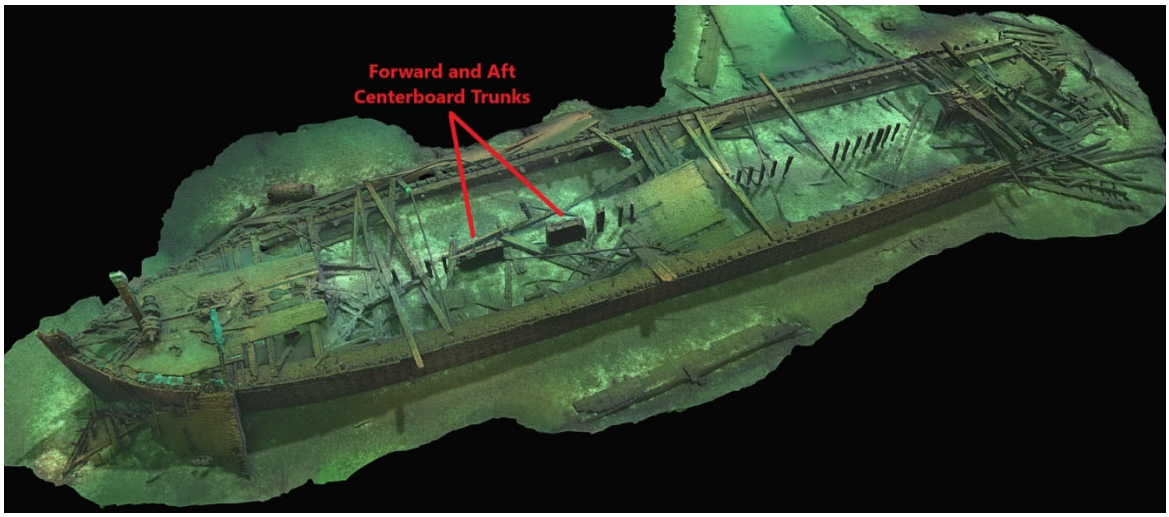

Figure 4.14. Photogrammetric 3D model, schooner barge *Aloha* (Merryman 2023).

Summary

Based on the nineteen vessels described in this chapter, double centerboards were used in sailing vessels on the Great Lakes from the early 1800s to the late 1880s and were built in Michigan, New York, Ohio, Ontario, and Wisconsin. These vessels encompass a variety of rigs and types, including eight barkentines, six schooners, three schooner barges, one bark, and one brigantine. The following discussion of Wisconsin shipwrecks with double centerboards adds to this already lengthy list.

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Chapter 5: Double Centerboard Shipwrecks in Wisconsin

As of this writing, Wisconsin has the most known shipwrecks with double centerboards of any state in the Great Lakes region. Lake Michigan has the most known shipwrecks with double centerboards of any of the five Great Lakes, including seven in Wisconsin and two in Illinois. Wisconsin's Lake Michigan double centerboard shipwrecks include the canal schooner *Montgomery* (47SB0299); the schooners *Emeline* (47DR0227), *Lumberman* (47MI0442), *Rouse Simmons* (47MN0396), and *Boaz* (47DR0193); the scow schooner *Silver Lake* (47SB0298); and an unidentified shipwreck near Horseshoe Island in Door County (hereafter referred to as the Horseshoe Island Wreck; 47DR0531). The known double centerboard wrecks in Wisconsin are described below with relevant details and measurements listed in Appendix A.

Northern Light / Montgomery (1853)

The *Montgomery* (47SB0299) was built as the three-masted canal bark *Northern Light* at the John Oades Shipyard in Clayton, New York, in 1853. At the time of the vessel's enrollment on 30 June 1853, the *Northern Light* measured 135 feet long and 25 feet 8 inches in breadth with a depth of hold of 11 feet 4 inches and a capacity of 366 15/95 tons. In 1865 and 1866, the vessel was rebuilt and lengthened by shipwright Simon G. Johnston, also in Clayton, New York. The ship was renamed and relaunched as the schooner *Montgomery* in 1866. The *Montgomery* measured 136.3 feet long and 26.1 feet in beam with an 11.5-foot depth of hold and a gross tonnage of 298.91 tons. The second centerboard may have been added during this rebuild or it may have been original to the vessel. From 1866 to 1890, the *Montgomery* transported a variety of cargo – including corn, wheat, oats, salt, coal, stone, iron ore, and lumber – between western and eastern Great Lakes ports. The vessel was rerigged as a schooner in 1881. On 5 November 1890 while sailing for Sheboygan with a cargo of coal, the vessel ran ashore during a gale eight miles north of the city near Stoney Creek. The *Montgomery* quickly began to fill with water, but the crew made it to safety despite the nearby lifesaving station failing to notice the wrecking. The vessel and cargo were salvaged not long after the sinking. WHS maritime archaeologists and volunteers investigated the shipwreck in June 2018 (Thomsen, Zant, and Kiefer 2018; Figure 5.1). The shipwreck was listed on the National Register in September 2019.

Figure 5.1. Forward centerboard trunk, looking aft, schooner *Montgomery* (Wisconsin Historical Society).

Based on archaeological investigation, the centerboard trunks are no longer present on the site except for a small portion of the bottommost board of the aft trunk (Fig. 5.2). This board extends 0.4 feet above the rider keelsons, measures 0.3 feet thick, and contains the hole for the aft centerboard's pivot pin. The small portion of the aft centerboard that remains on site contains a corresponding pivot pin hole though the pivot pin no longer remains. The forward centerboard's pivot pin is not extant either. The pocket pieces are still present along the centerline of the ship; these are the portions of the keelson structure through which the centerboards passed when they were lowered into the water. The centerboard trunks, which are located 12.8 feet apart along the centerline of the vessel, measure 18.7 feet long. The slots for the centerboards within the trunks measure 0.7 feet wide. The forward end of the *Montgomery*'s forward centerboard trunk is located 38.9 feet aft of the Samson post step and 22.4 feet aft of the foremast step. The aft end of the forward centerboard trunk is located 8.1 feet forward of the mainmast step. The forward end of the aft centerboard trunk is located 5.9 feet aft of the mainmast step. The aft end of the aft centerboard trunk is located 25.2 feet forward of the mizzenmast step (Thomsen, Zant, and Kiefer 2018).

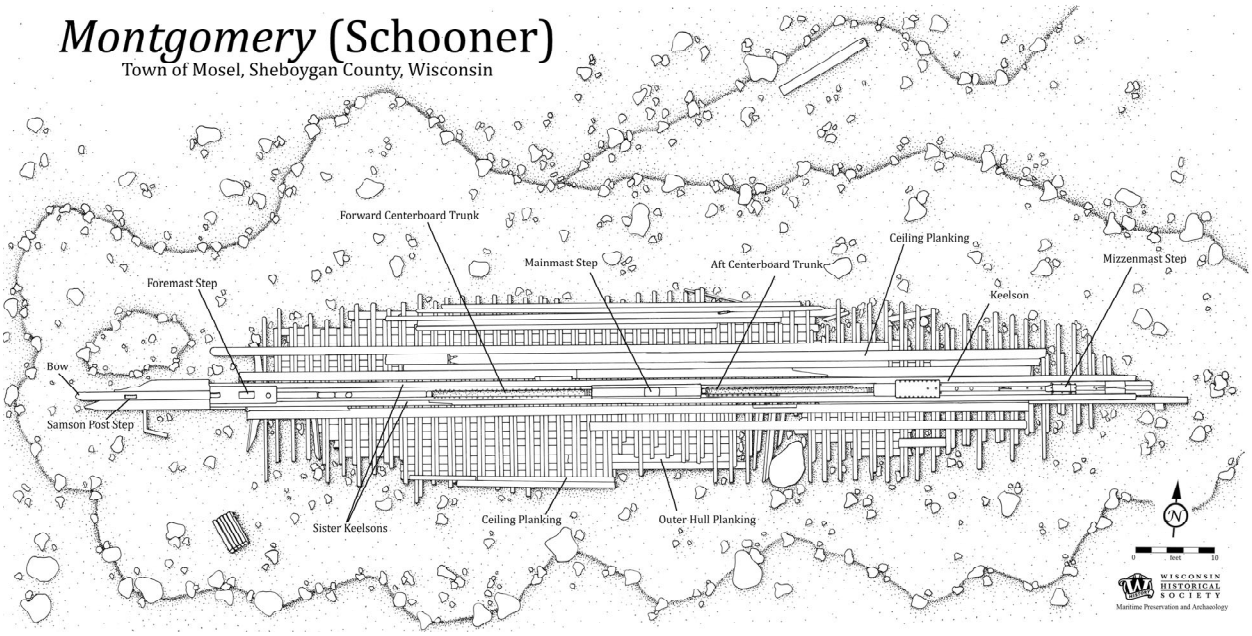

Figure 5.2. Site plan, schooner *Montgomery* (Wisconsin Historical Society).

Emeline (1862)

Myron Williams of Vicksburg, Michigan, built the schooner *Emeline* (47DR0227) in 1862. The vessel initially measured 83.0 feet long and 22.0 feet in beam with a depth of hold of 7.5 feet. Less than two years later, the *Emeline* was lengthened and a second centerboard and third mast were added. After lengthening, the *Emeline* measured 111.4 feet long and 21.7 feet in beam with a depth of hold of 6.9 feet. The vessel's tonnage increased from 121.12 tons to 127.9 tons. In August 1896, while sailing south with a cargo of tan bark from Charlevoix, Michigan, the vessel encountered a northwest squall. After being pushed over first to starboard and then to port, the *Emeline* began to fill with water. The crew escaped to Baileys Harbor in the yawl boat. Attempts were made to tow the *Emeline* the next day, but the vessel sank in 18 feet of water in the harbor near Anclam Pier. The vessel's remains quickly became a hazard to navigation so the *Emeline* was dynamited in 1903. The wreck was originally documented by WHS maritime archaeologists and volunteers in 1992 and 1996; WHS returned to the site in May 2022 to gather additional documentation (Thomsen, Zant, and Cooper 2023b; Figure 5.3). The shipwreck was listed on the National Register in July 2023.

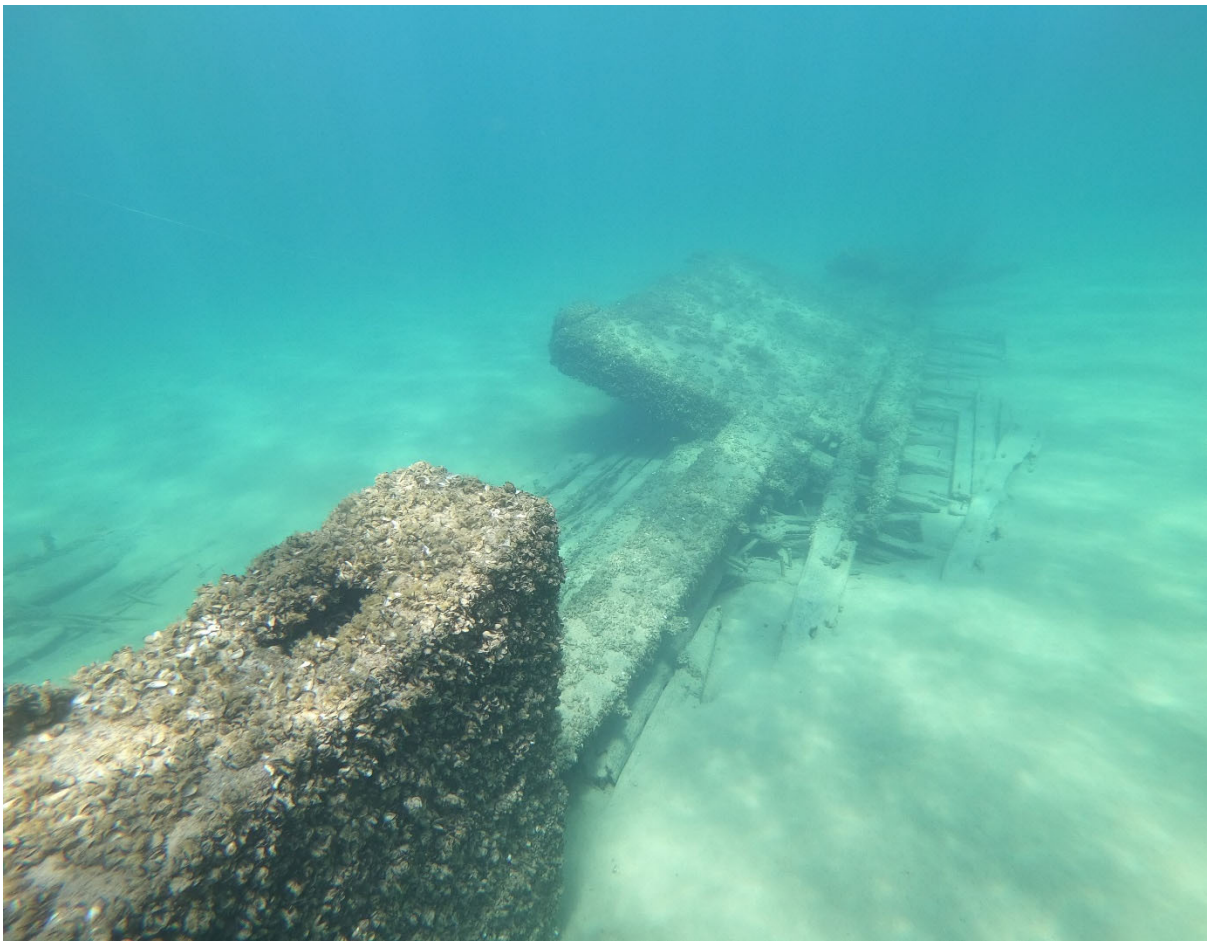

Figure 5.3. Centerboard trunks, looking aft, schooner *Emeline* (Wisconsin Historical Society).

The *Emeline*'s two centerboard trunks remain on site, are located along the vessel's centerline, and are separated by 13.3 feet (Fig. 5.4). The forward centerboard trunk is located 20.8 feet aft of the vessel's stempost, measures 23.3 feet long and 1.4 feet wide, and extends 4.8 feet above the keelson. The aft edge of the forward trunk is located about 13.2 feet forward of the mainmast step; the foremast step was not visible when the wreck was recorded so it is not known how far aft of the foremast step the forward trunk is located. The forward centerboard trunk is built of five horizontal planks that measure 0.3 feet thick and range in width from 0.65 to 1.15 feet wide. The pivot pin is located 4.65 aft of the forward edge of the forward trunk. The cap of the forward trunk measures 0.2 feet thick and extends the full length of the trunk (Thomsen, Zant, and Cooper 2023b).

The aft centerboard trunk is located 57.0 feet aft of the stempost; it measures 14.7 feet long and 1.4 feet wide. The forward edge of the aft trunk is just aft of the mainmast step and the aft edge is located 16.5 feet forward of the mizzenmast. The aft trunk lists to starboard at a 48-degree angle and is composed of five horizontal planks that measure 0.3 feet thick and range in width from 0.75 to 1.0 feet wide. The pivot pin is located 3.75 aft of the forward edge of the aft trunk. The cap of the aft trunk measures 0.2 feet thick and extends the full length of the trunk. Because the centerboard trunk caps remains in place, neither centerboard could be examined or measured. Both caps have oval openings at each end to allow for the passage of lifting gear. The openings measure 0.8 feet long and 0.55 feet wide. On the aft centerboard trunk, there are wooden blocks on top of the oval openings with their own

corresponding oval openings. Each block measures 1.8 feet long, 1.2 feet wide, and 0.5 feet thick (Thomsen, Zant, and Cooper 2023b).

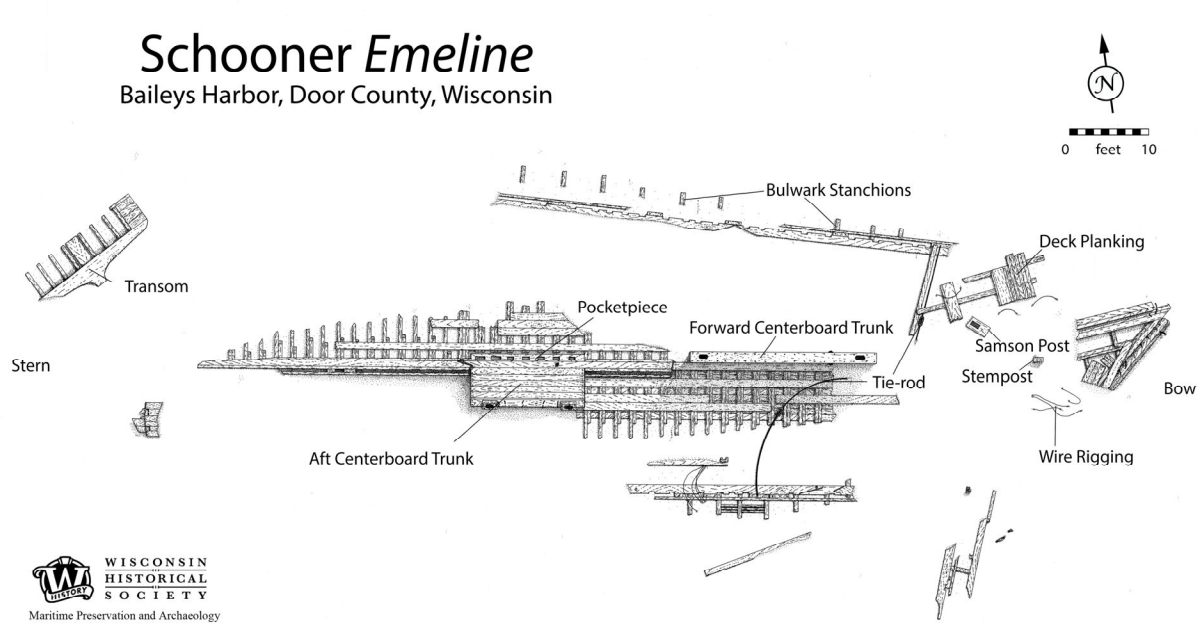

Figure 5.4. Site plan, schooner *Emeline* (Wisconsin Historical Society).

Lumberman (1862)

Also in 1862, the schooner *Lumberman* (47MI0442) was purpose built for the lumber industry by Allyne Cushing Litchfield in his frontier shipyard at Blendon's Landing, Michigan. The vessel measured 126.0 feet long and 23.5 feet in breadth with a 7.5-foot depth of hold. The *Lumberman* had three masts and two centerboards. On 6 April 1893, Captain Orin Vose and his crew left Chicago for Kewaunee, Wisconsin, to pick up a cargo of forestry products intended for the Chicago market. That afternoon, a sudden storm from the southwest slammed into the *Lumberman* and knocked the vessel over to starboard. The *Lumberman* quickly filled with water and sank upright in 55 feet of water about four miles east of Oak Creek, Wisconsin, nearly taking the captain with it. The vessel's crew clung to the protruding masts for several hours before they were rescued by the passing steamboat *Menominee*. From 2001 to 2003, WHS maritime archaeologists and volunteers, including members of the Great Lakes Shipwreck Research Foundation, documented the shipwreck (Thomsen, Meverden, and Jensen 2008; Fig. 5.5). The shipwreck was listed on the National Register in January 2009.

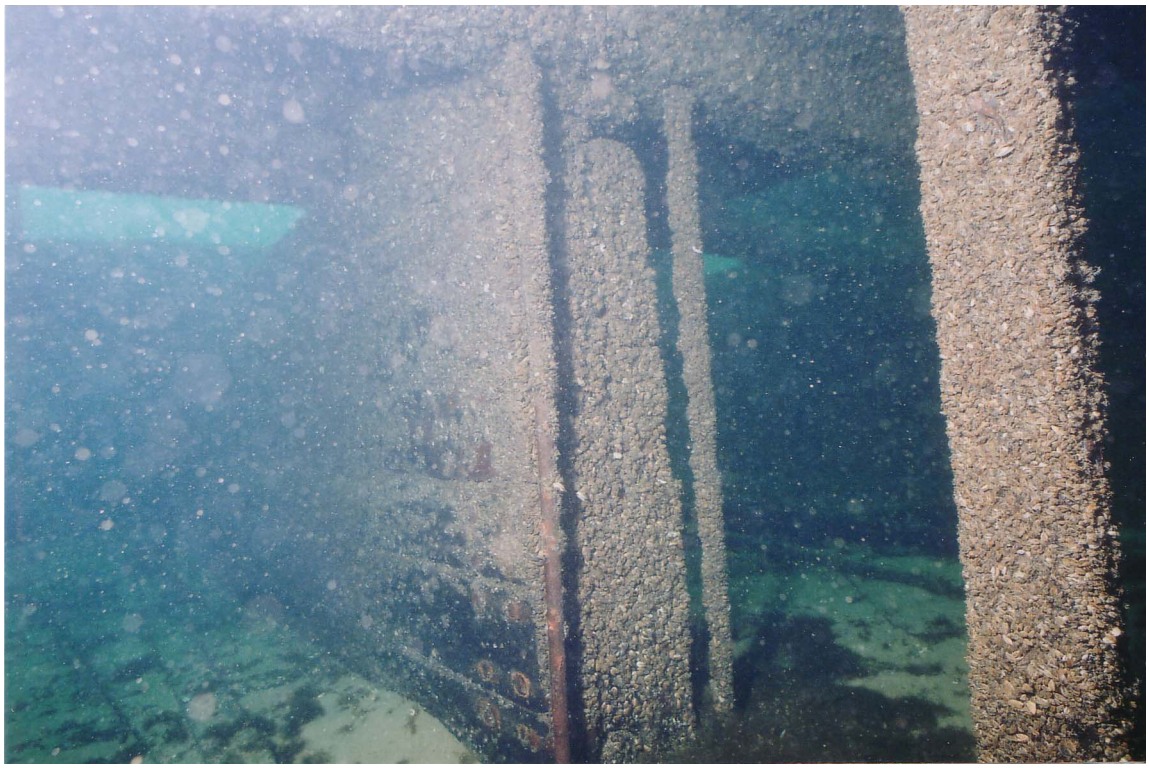

Figure 5.5. Aft centerboard trunk, looking aft, schooner *Lumberman* (Wisconsin Historical Society).

The *Lumberman's* two extant centerboard trunks are situated under the deck beams and atop the rider keelson along the vessel's centerline (Fig. 5.6). The trunks, which are separated by 32.8 feet, are reinforced by two iron tie rods that extend between the deck beams and the keelson at the aft end of each trunk. The forward end of the *Lumberman*'s forward centerboard trunk is located 23.0 feet aft of the vessel's stem and about 5.7 feet aft of the location of the unstepped foremast. The aft end of the forward trunk is located about 13 feet forward of the former location of the mainmast, which is marked by an octagonal hole in the deck. The forward trunk measures 21.8 feet long, 1.4 feet wide, and 6.4 feet tall and is constructed of seven planks on either side that range in width from 0.3 to 0.9 feet wide. The centerboard was raised and lowered by a chain and a hand winch, the latter of which was fastened to the weather deck with two sets of 0.1-inch iron bolts. While the bolts remain, the winch and chain are no longer present. The two sets of bolts are located 42.9 feet and 45.5 feet aft of the stem. The centerboard chain ran through a hole that extends through both the weather deck and the centerboard trunk; the hole measures 0.9 feet long and 0.4 feet wide (Thomsen, Meverden, and Jensen 2008).

The aft centerboard trunk measures 22.2 feet long, 1.4 feet wide, and 5.7 feet tall and is constructed of nine planks on either side that range in width from 0.3 to 0.9 feet wide. The forward end of the aft trunk is located about 15 feet aft of the former location of the mainmast. The aft end of the aft trunk is located about 1.6 feet forward of the mizzenmast. The hand winch for the aft trunk is no longer present, but the bolts that fastened it to the deck are located 99.3 feet aft of the stem (Thomsen, Meverden, and Jensen 2008).

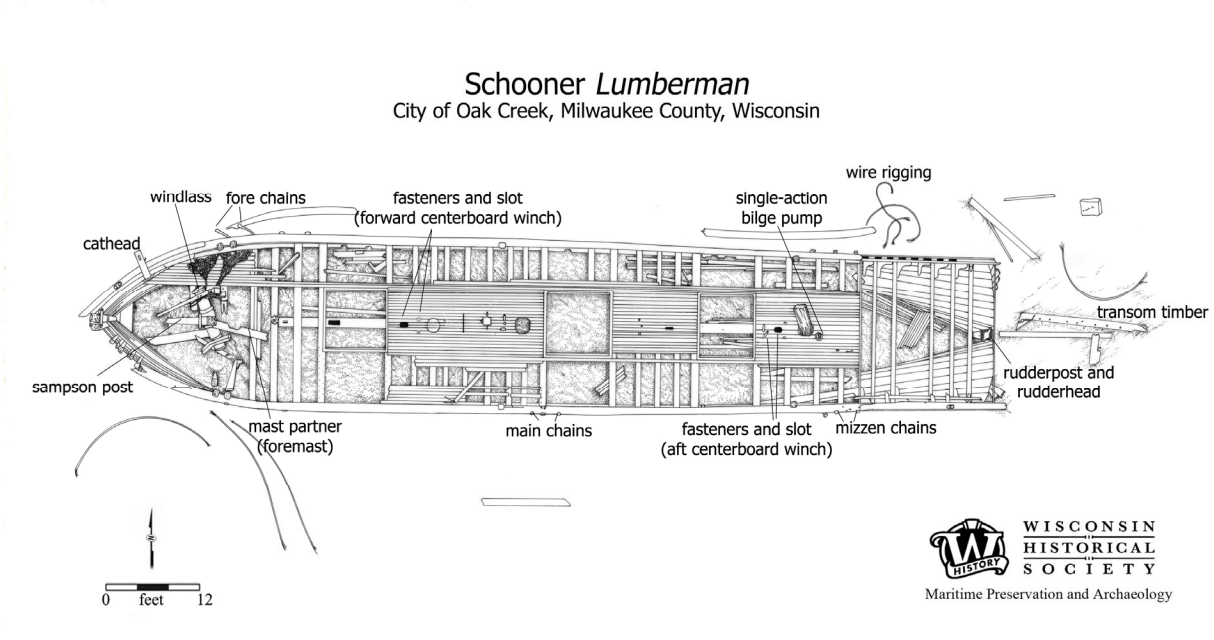

Figure 5.6. Site plan, schooner *Lumberman* (Wisconsin Historical Society).

Rouse Simmons (1868)

Built by Allan, McClelland, and Company in Milwaukee in 1868, the schooner *Rouse Simmons* (47MN0396) had a tonnage of about 220 tons and measured 127 feet long and 27.5 feet in breadth with a depth of hold of just over 8 feet. The vessel had three masts and was constructed specifically for the lumber trade like the *Lumberman*. The *Rouse Simmons* spent forty-four years sailing on the Great Lakes, finally and tragically ending its career on 23 November 1912. While bringing a load of Christmas trees from Thompson, Michigan, to Chicago, Illinois, the vessel succumbed to a severe storm – later named the Great Storm of 1912 – that sank numerous ships across Lake Michigan. The *Rouse Simmons* went down with all hands, sinking twelve miles northeast of Two Rivers, Wisconsin, in 170 feet of water. WHS maritime archaeologists and volunteers surveyed and documented the shipwreck in summer 2006 (Pennington et al. 2006, Meverden and Thomsen 2008; Fig. 5.7). The shipwreck was listed on the National Register in March 2007.

Figure 5.7. Aft centerboard winch and broken mizzenmast, looking aft, schooner *Rouse Simmons* (Wisconsin Historical Society).

The *Rouse Simmons's* two centerboard trunks are located along the vessel's centerline and are separated by 29.7 feet (Fig. 5.8). The forward centerboard trunk, which lists 2 degrees aft and 5 degrees to starboard, is located 29.3 feet aft of the vessel's stem. The location of the foremast was not identified, so it is unknown how far aft of it the forward trunk is located, but the aft end of the forward trunk is located about 15 feet forward of the location of the unstepped mainmast. The forward centerboard trunk, which is capped with a plank along its full length, measures 19.0 feet long and 1.4 feet wide. The full height of the forward trunk is unknown due to the silt and cargo present in the hold, but the forward end of the forward trunk extends 3.4 feet and the aft end of the forward trunk extends 4.2 feet above the silt and cargo. The trunk is constructed of horizontal planks, of which seven are located above the silt and cargo; the planks measure 1.3 feet wide and 0.4 feet thick. The forward centerboard is visible on both ends of the trunk, indicating that it was probably not deployed when the vessel wrecked. No forward centerboard winch or chain were present (Pennington et al. 2006).

The aft centerboard trunk is located 78 feet aft of the bow and is capped with a plank along its full length. The aft trunk's forward end is located about 10 feet aft of the unstepped mainmast and the aft end is located about 7 feet forward of the mizzenmast. The trunk lists 2.5 degrees to starboard and measures 19.2 feet long and 1.4 feet wide. The full height of the aft trunk is also unknown due to the dense silt in the hold, but the trunk extends 3.2 feet above the silt. The planking on the aft trunk is so tightly joined that individual planks could not be observed and measured. The aft centerboard can be seen in the forward end of the aft trunk, but not in the aft end and several turns of chain are looped around the drum of the winch. This suggests that the centerboard may have been partially deployed when the *Rouse Simmons* wrecked. The aft centerboard winch and chain are still present on the wreck, but the winch is located 5.3 feet aft of the centerboard trunk rather than directly over it. The

centerboard chain extends over a pulley on the deck above the trunk and along the deck to the centerboard winch (Pennington et al. 2006).

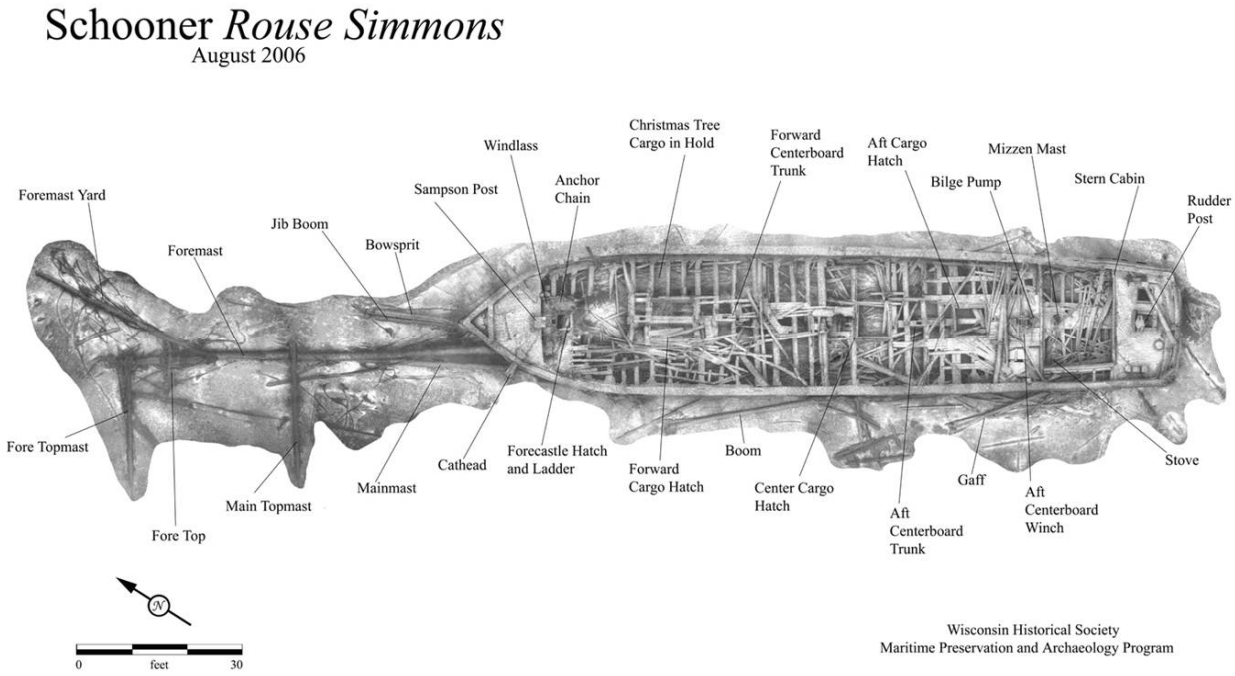

Figure 5.8. Photomosaic, schooner *Rouse Simmons* (Wisconsin Historical Society).

Boaz (1869)

The schooner *Boaz* (47DR0193) was built in 1869 in Sheboygan, Wisconsin, by Amos C. Stoakes. When registered, the vessel had one deck and three masts; it measured 82.8 feet in length and 21.2 feet in breadth with a 7.8-foot depth of hold and a gross tonnage of 96.71 tons. In 1874, the vessel was cut in half and lengthened. Its new measurements were 114.0 feet in length and 22.3 feet in breadth with a depth of hold of 7.1 feet and a gross tonnage of 127.22 tons. The second centerboard was likely added at this time. In November 1900, the *Boaz* was carrying a cargo of lumber from Pierport, Michigan, to Racine, Wisconsin, when the vessel was caught in a gale. The *Boaz*, which had begun to leak heavily, made for the relative safety of North Bay in Door County, but missed the entrance and struck Marshall's Point. After dropping anchor so the vessel wouldn't run ashore, the crew escaped in the yawl. The next day at the behest of the *Boaz*'s crew, the steamer *Two Myrtles* towed the *Boaz* into North Bay, where it grounded and was later deemed a total loss. In 1988 and 2022, WHS maritime archaeologists surveyed and recorded the vessel, which lies in eight feet of water (Thomsen, Zant, and Cooper 2023a; Fig. 5.9). The shipwreck was listed on the National Register in October 2023.

Figure 5.9. Aft centerboard, looking aft, schooner *Boaz* (Wisconsin Historical Society).

The *Boaz*'s two centerboard trunks are located 17.6 feet apart along the vessel's centerline (Fig. 5.10). The forward end of the forward centerboard trunk is located 29.2 feet aft of the vessel's stem and the aft end of the forward trunk is located 4.6 feet forward of the mainmast step. The forward centerboard trunk measures 17.7 feet long and 1.2 feet wide; the trunk rises 5.6 feet above the lakebed. The interior slot for the forward centerboard measures 0.65 feet wide, but the centerboard is not present. Some of the planks along each side of the forward centerboard trunk are missing. Six are present on the starboard side of the trunk above the lakebed, but only three are present on the port side above the lakebed. All the visible planks measure 0.9 feet wide and 0.3 feet thick. The planks are edge-joined with 0.125-diameter drift pins and are fastened to the trunk's headledge (vertical timbers) with 0.1 diameter drift pins cinched with 0.15 diameter rings. About 3.3 feet of the forward end of the forward trunk is sheathed with metal, probably to prevent excessive wear. The forward centerboard pivot hole, which has a metal collar (or bearing) that measures 0.25 feet in inner diameter and 0.5 feet in outer diameter, is located 4.15 feet aft of the forward end (Thomsen, Zant, and Cooper 2023a).

The aft centerboard trunk, which is 64.5 feet aft of the bow and 7.2 feet aft of the mainmast step, measures 15.8 feet long and 1.2 feet wide. The interior slot for the aft centerboard measures 0.65 feet wide and, like with the forward trunk, the aft centerboard is not visible. The aft trunk is substantially intact with only its cap missing and is constructed of seven planks on each side that measure 0.8 feet wide and 0.3 feet thick. The planks are edge-joined with drift pins that range from 1.0 feet to 1.15 feet apart. The aft centerboard pivot hole is located 8.0 feet aft of the forward end of the aft trunk and 5.1

feet below the top of the trunk. Like the forward centerboard pivot hole, the metal collar of the aft pivot hole measures measures 0.25 feet in inner diameter and 0.5 feet in outer diameter (Thomsen, Zant, and Cooper 2023a).

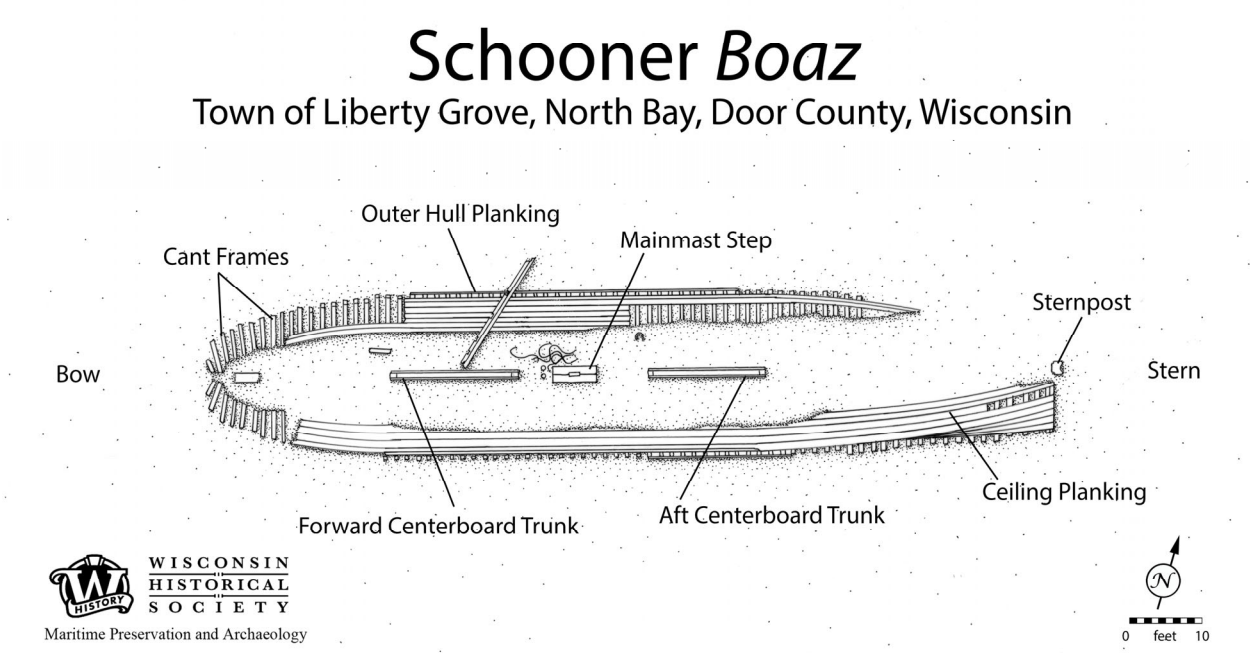

Figure 5.10. Site plan, schooner *Boaz* (Wisconsin Historical Society).

Silver Lake (1889)

Built in 1889 at the rural M. L. Johnson shipyard in Little Point Sable, Michigan, the three-masted scow schooner *Silver Lake* (47SB0298) measured 95 feet long and 20 feet in beam with a 7.6-foot depth of hold and a gross tonnage of 111.08. The scow schooner specialized in the lumber trade along Wisconsin's Lake Michigan shoreline. Tragedy struck in the early morning of 28 May 1900, while the *Silver Lake* was en route for Racine with a cargo of lumber from Ephraim, Wisconsin. Traveling through dense fog, the steel car ferry *Pere Marquette* ran straight into the *Silver Lake*, with the former's bow striking the port side of the scow schooner almost directly amidships. First Mate Harry Eastman was hurled overboard by the force of the collision; his body was never found. The rest of the crew, including the captain and two seamen, managed to climb to safety aboard the *Pere Marquette*. The *Silver Lake*, which had remained crushed and mangled on the bow of car ferry, was cut free and sank into the lake. The shipwreck of the *Silver Lake* rests upright on the lakebed seven miles northeast of Sheboygan in 200 feet of water (Thomsen and Meverden 2011). In 2008, WHS worked with Woods Hole Oceanographic Institute to create a high-resolution photo mosaic of the shipwreck. WHS maritime archaeologists and volunteers returned in July 2011 to survey and document the site (Meverden et al. 2012; Fig. 5.11). The shipwreck was listed on the National Register in April 2013.

Figure 5.11. Bow and forward cargo hatch with visible portion of forward centerboard trunk, scow schooner *Silver Lake* (Wisconsin Historical Society).

The *Silver Lake*'s centerboards are located on the vessel's centerline and are separated by 28.1 feet. The forward centerboard trunk was located 21.0 feet aft on the baseline, the zero end of which "originated at the forward peak of the monkey rail immediately aft of the jibboom" (Thomsen and Meverden 2011:7.2; Fig. 5.12). The forward centerboard trunk measures 16.4 feet long and is located abaft of the foremast. Instead of deck winches, the forward and aft centerboards were raised and lowered using tackle hung from the rigging. The forward centerboard chain runs through a wooden box that now lies on the deck but was previously fastened to the deck in a vertical position. The box measures 0.8 feet long and 0.75 feet wide and would have extended 4.5 feet above the deck. The box likely protected the centerboard chain so it would move freely and not foul on deck cargo (Thomsen and Meverden 2011). According to Loudon Wilson (1972:28), centerboards in "lumber hookers" were typically deployed via tackle hung from the mainmast crosstrees whereas ore and coal schooners utilized a centerboard winch for lowering centerboards.

The aft centerboard trunk measures 13.8 feet long and its aft end is located just forward of the mizzenmast. The aft centerboard chain extended out of the deck at 76.3 feet on the baseline and, like the forward chain, runs through a wooden box that measures 0.9 feet long, 0.55 feet wide, and 4.7 feet tall above the deck. On both centerboard trunks, the ends are reinforced with robust, vertical iron tie rods that are fastened on deck with large nuts and iron plates that cross over the centerboard trunks (Thomsen and Meverden 2011).

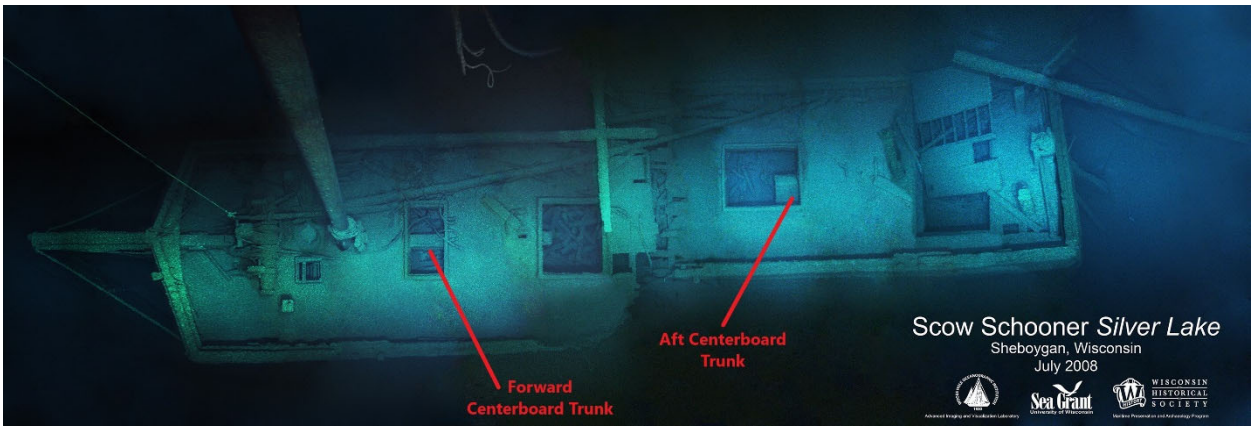

Figure 5.12. Plan view photo mosaic, scow schooner *Silver Lake* (Woods Hole Oceanographic Institution).

Horseshoe Island Wreck (?)

The final known double centerboard shipwreck in Wisconsin is the Horseshoe Island Wreck (47DR0531), located in about 25 feet of water off Horseshoe Island in Green Bay near Ephraim, Wisconsin. Unless additional wreckage is buried under the sediment, the Horseshoe Island Wreck site consists of several sections of wreckage in a small area. Major features of the wreck site are sections of keelson as well as the two centerboard trunks with centerboards that lie near each other in a manner that suggests an association consistent with their placement on an intact vessel. The identity of the vessel has not yet been determined. WHS maritime archaeologists and volunteers conducted initial documentation of the Horseshoe Island Wreck site in May 2023 (Fig. 5.13). Additional documentation needs to be completed before the site can be evaluated for its potential for listing on the National Register.

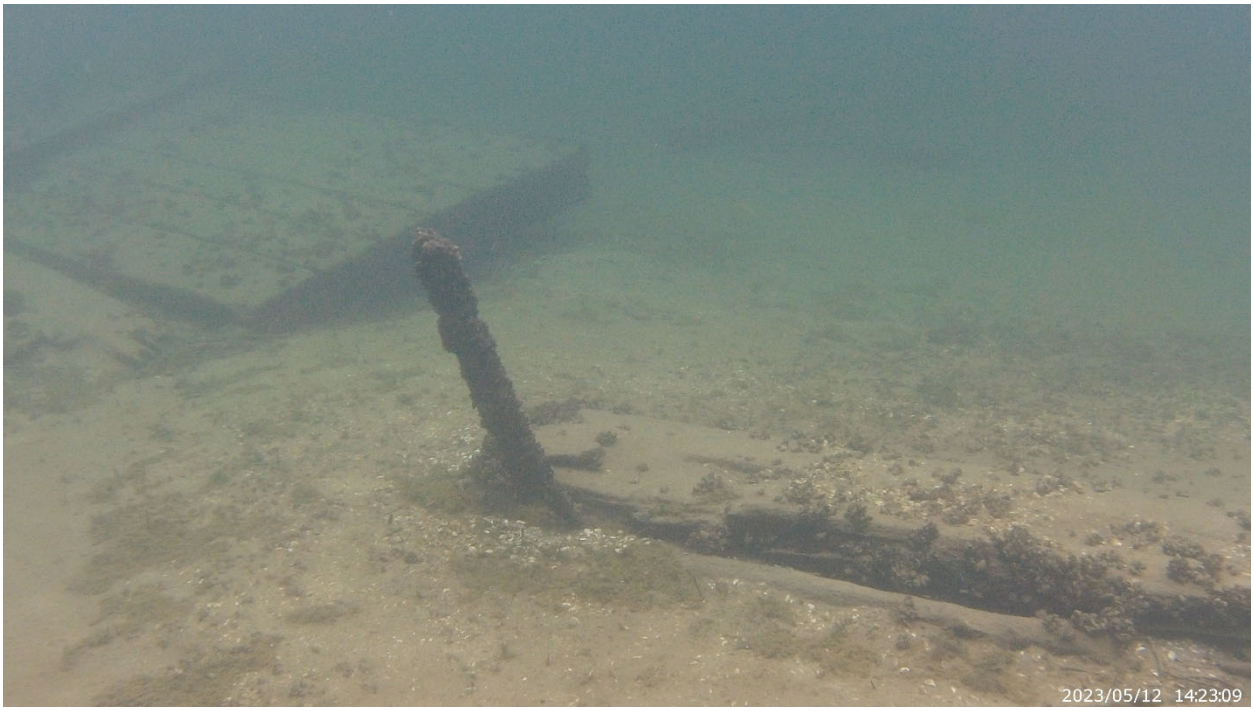

Figure 5.13. Centerboard trunks, looking west, Horseshoe Island wreck (Wisconsin Historical Society).

The Horseshoe Island wreck's forward centerboard trunk measures 15.0 feet long and the aft centerboard trunk measures 14.4 feet long; they are separated by 7.8 feet although it is not clear if the trunks retain their original positions relative to each other (Fig. 5.14). Since the shipwreck is not highly intact or is significantly buried beneath the sediment, the distances between the vessel's stem, masts, and the centerboard trunks are unknown. It is also unclear whether the centerboard trunks were located along the vessel's centerline or offset from it.

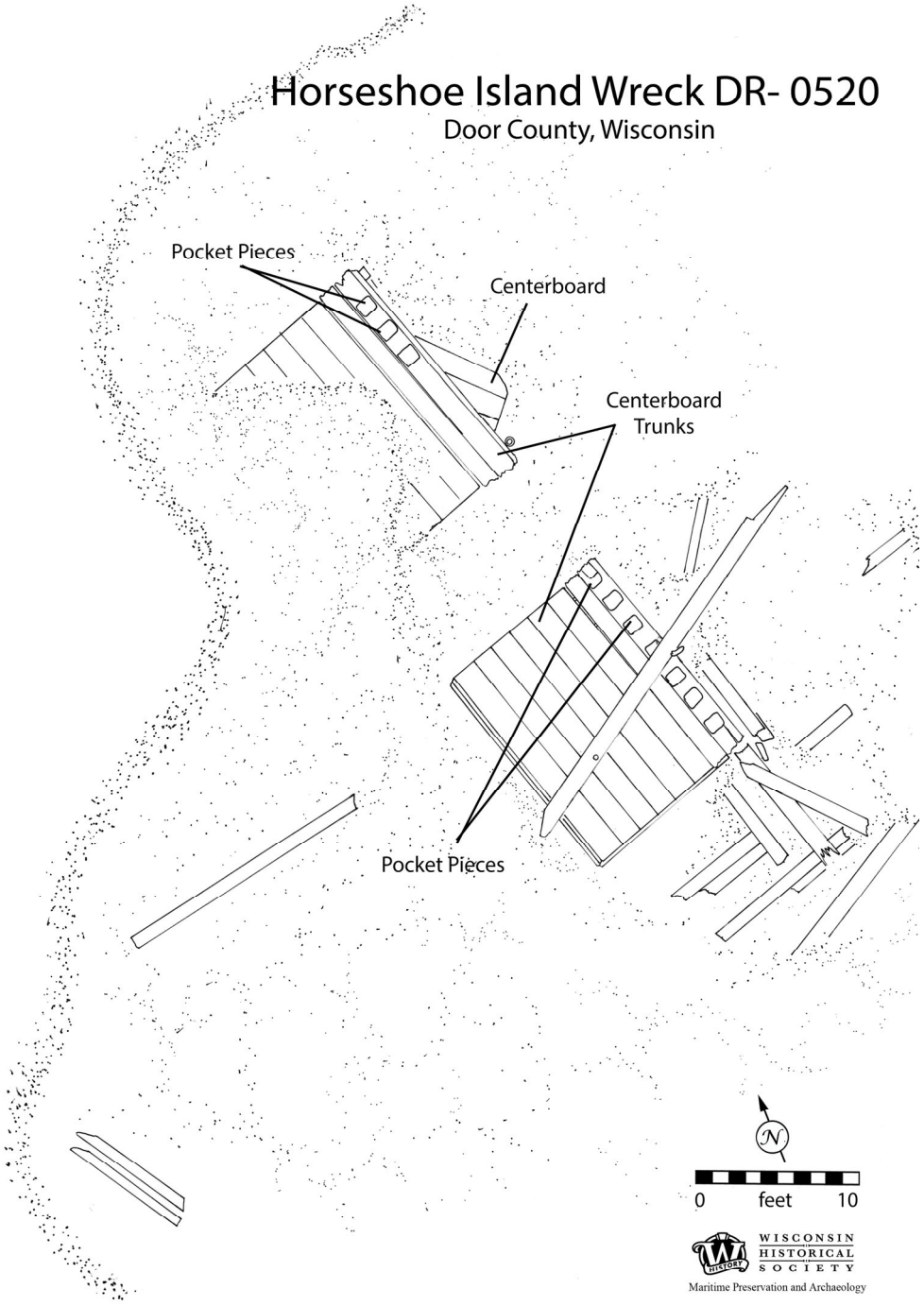

Figure 5.14. Site plan, Horseshoe Island wreck (Wisconsin Historical Society).

Summary

Based on Wisconsin's archaeologically investigated shipwrecks with double centerboards described above, significant variation existed in placement of centerboards in sailing vessels. Some forward centerboards and trunks were placed just aft of the foremast while others were located closer to the mainmast. Some aft centerboards and trunks were placed just aft of the mainmast and some were placed just forward of the mizzenmast. Amongst Wisconsin's double centerboard shipwrecks, the location of the forward centerboard and trunk varied from about 21 feet to 41 feet aft of the stem and the space between the centerboards varied from about 13 feet to 33 feet. The construction dates of double centerboard wrecks in Wisconsin are consistent with the construction dates for double centerboards identified previously; these dates range from at least 1814 to 1889. Wisconsin shipwreck vessel types and rigs consist of five schooners, one scow schooner, and one unknown type. Further investigation of double centerboard shipwrecks throughout the Great Lakes offers the potential to better understand the various ways double centerboards were incorporated into sailing vessels on the inland seas and how construction techniques changed over time.

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Chapter 6: Why Double Centerboards?

As described above, centerboards were incorporated into shallow draft sailing vessels so they could sail efficiently closer to the wind in deeper water while still retaining the ability to enter shallow areas such as harbors, canals, and rivers. Geographically, the Great Lakes offer a plethora of shallow areas into which sailing vessels needed to navigate in order to conduct commerce and other activity. Accordingly, centerboards gained a level of use in the Great Lakes that was not seen in other maritime regions. Research conducted as part of this project indicates that double centerboards also saw much more use on the Great Lakes than elsewhere. Communication with maritime archaeologists and historians outside of the Great Lakes produced very little information about double centerboard vessels and shipwrecks elsewhere in waters surrounding the United States and Canada. Certainly, there were instances of double centerboards being used outside of the Great Lakes, as demonstrated by the previously described Cumberland & Oxford canal boats and as indicated by Bates' (1904) rebuttal to his Delaware counterparts' claim of being the first to use two centerboards. But it does appear the feature was considerably uncommon outside of the inland seas. This chapter offers several possible hypotheses about why double centerboards may have been used more often on the Great Lakes than on the open ocean. The discussion also examines why the double feature was still used after the BLU's 1876 rules of construction formally sanctioned use of two centerboards for the highest rated, and therefore most lucrative, commercial sailing vessels (Dorr 1876). Future research may shed light on the merits of these theories.

According to Charnock (1801), there were a number of benefits afforded to vessels with double or triple sliding keels. These included advantages for both tacking, which involved changing direction by turning a ship's bow into the wind, and wearing or jibing, which involved changing direction by turning the stern of a vessel through the wind (Migaki 2021). In regard to tacking, Charnock (1801[3]:347-348) states, "[V]essels furnished with two or three sliding keels will tack with far greater readiness than those which are destitute of them; inasmuch as the fore and sternmost keels have each of them an effect on the vessel, very little inferior to that of the rudder itself. In working therefore to windward, or in a narrow channel where there is little room, a vessel may venture to stand much nearer to the shore than she otherwise would do, being certain of not missing stays" (Fig. 6.1). Regarding wearing or jibing, "The use of the sliding keel is equally advantageous in wearing as in tacking…. [I]f it is required that the vessel should wear round quick, it will be necessary to haul up the main keel also, and the ship will turn almost as though it were on a pivot…." (Charnock 1801[3]:348). Although Charnock wrote his three-volume opus, *History of Marine Architecture*, before the invention and adoption of pivoted centerboards, his discussion of the benefits of multiple sliding keels can be readily transferred to vessels with multiple centerboards. Maritime artist and researcher C. H. J. Snider – who in his youth had sailed on the double centerboarder *Stuart H. Dunn* – also wrote in support of multiple centerboards in sailing vessels, "Some of the three-masted schooners…had two centre-boards, the second being in line with the first but set abaft the mainmast. This was an excellent arrangement, and cured many wild steering tendencies. Difficulties of balance could be adjusted by using the proper amount of either board" (Snider 1932a). These statements from over a century apart demonstrate that vessels with multiple centerboards (or daggerboards) provided real-world benefits to masters and crews. In the narrow confines of the Great Lakes and the constricted harbors, rivers, and canals that connected them, vessels with double centerboards may have offered significant advantages.

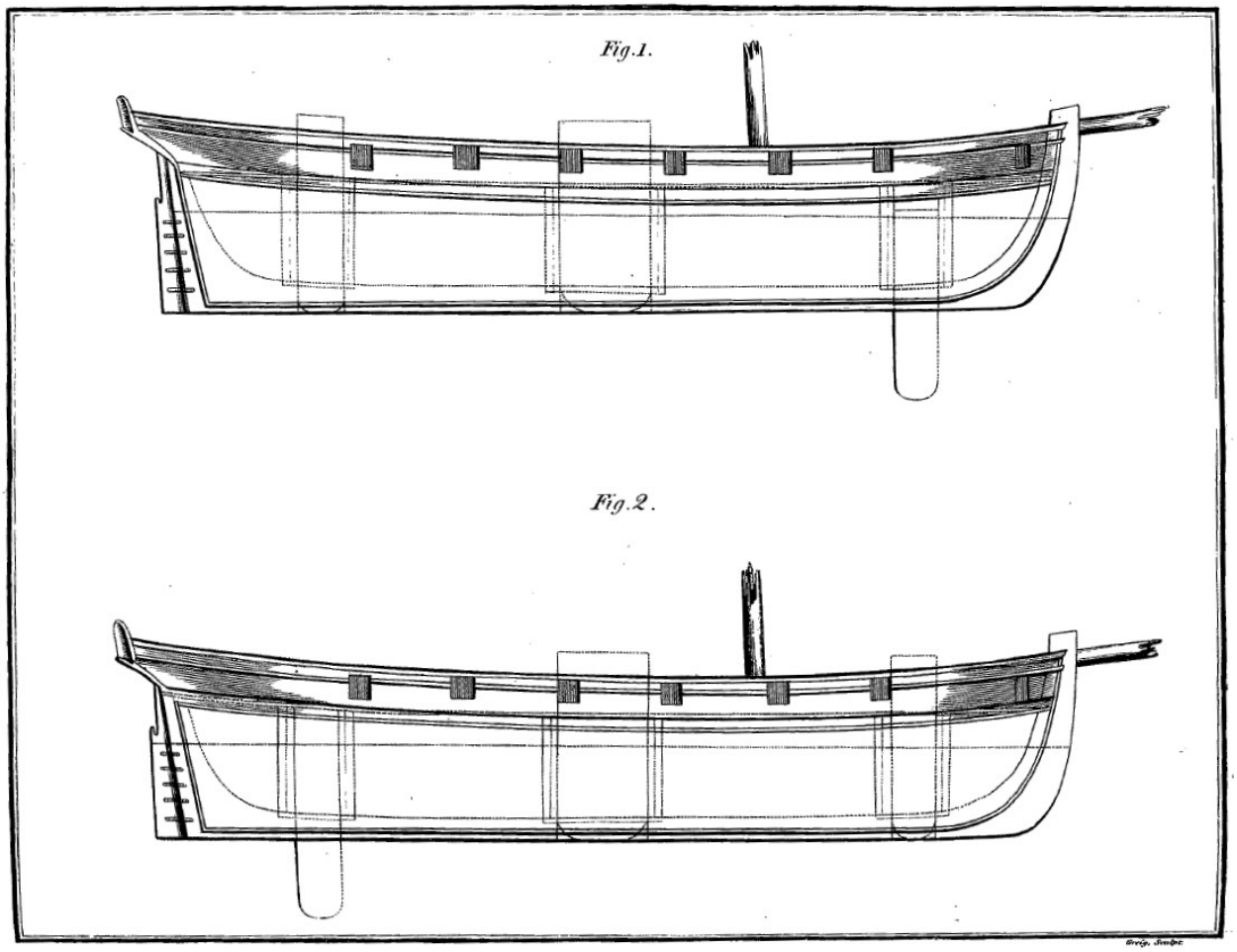

Figure 6.1. Captain John Schank's sliding keels and cutter *Trial*, different sliding keel deployments (Charnock 1801:365).

Beyond the above enumerated advantages, incorporation of two centerboards may have been necessary at times due to vessel construction requirements and costs. For example, when a vessel with a centerboard was lengthened, the addition of a second centerboard may have been necessary to provide adequate lateral resistance to the now longer vessel while working around the existing mast locations or avoiding costs to rebuild and extend an existing centerboard. It may simply have been more practical and cost efficient to add a second centerboard to the lengthened vessel. Several examples of this practice are described above, including the schooner *Montgomery* (47SB0299), built in 1853 and lengthened in 1865 to 1866; the schooner *Emeline* (47DR0227), built in 1862 and lengthened in 1864; the schooner *Boaz* (47DR0193), built in 1869 and lengthened in 1874; and the schooner *Stuart H. Dunn*, built in 1877 and lengthened in 1889. Historical records clearly indicate a second centerboard was added to the *Emeline* and *Stuart H. Dunn* when they were lengthened. No specific details exist regarding changes to the *Montgomery* and *Boaz* when they were lengthened, but it is possible that their second centerboards were added when the vessels were rebuilt. The practical need to add a second centerboard when a vessel was lengthened in order to maintain its maneuverability and ability to sail close to the wind may have trumped any concerns about vessel construction needs or additional manpower required to operate a second centerboard.

For vessels constructed after 1876 when the multiple centerboard sanction was included in the BLU's updated rules of construction, the reasons above may have factored into the choice to construct a vessel with double centerboards regardless of prohibitions against their use (Dorr 1876). In addition, on very large vessels – like the five-masted barkentine *David Dows* and the four-masted schooner barge *Magnetic* – a single, adequately large centerboard could have been unwieldly and difficult to control. Such a large board also might not have fit in-between the vessel's masts. The 1876 rules provide a formula for determining the appropriate length of a centerboard, "The length of the centre-board shall not be greater than that determined by the following rule: add the draft of water to the length on load line; multiply the sum by four; the square root of the product shall be taken as the proportionate length" (Dorr 1876). An example in the accompanying table indicates that a vessel with a load line length of 240 feet and a 15-foot draft of water would be adequately proportioned, per the BLU's calculations, with a centerboard measuring almost 32 feet long and 8 feet thick. Interestingly, the *David Dows* – which measured 265.4 feet in overall length, 37.6 feet in beam, and 18.1 feet in depth of hold – had two centerboards, with one measuring 25 feet long and the other measuring 27 feet long. Using the *David Dows*'s overall length and full depth of hold, rather than the unknown and shorter length of load line and draft of water, the BLU's calculations indicate the *David Dows* would have needed one centerboard measuring 33.67 feet long ([265.4 + 18.1] x 4 = 1,134; $\sqrt{1{,}134}$ = 33.67). This result suggests the *David Dows*'s combined centerboard length of 52 feet was far more than required by the BLU's calculations. The Bailey Brothers, builders of the *David Dows*, may have been more interested in constructing the vessel with two shorter, more manageable centerboards instead of one lengthy, ponderous centerboard. Further, if the vessel's owners were unconcerned about insurance premiums or if they self-insured the vessel, the BLU's sanction on double centerboards may have been of no importance to them.

Since the BLU's 1876 sanction meant that vessels with two centerboards could not obtain the highest rating of A1, owners of vessels with two centerboards risked paying more in insurance premiums. Shipments of grain tended to be the costliest to insure because of the cargo's susceptibility to water damage. Cargoes of coarse freight, like lumber and stone, were less costly to insure. Consequently, lower rated vessels were typically used in the coarse freight trades. Two of the post-1876 double centerboard vessels described in this report – the schooner barges *Annabell Wilson* and *Aloha*, built in 1887 and 1888, respectively – were involved in the lumber and coal trades, not in the grain trade. So the owners of the *Annabell Wilson* and *Aloha* did not have to concern themselves with attaining an A1 rating on their vessels (Fig. 6.2). Owners of vessels involved in shipping lumber, coal, and stone around the Great Lakes may have considered higher insurance premiums for their vessels a reasonable tradeoff for the improved efficiency and maneuverability afforded by two centerboards.

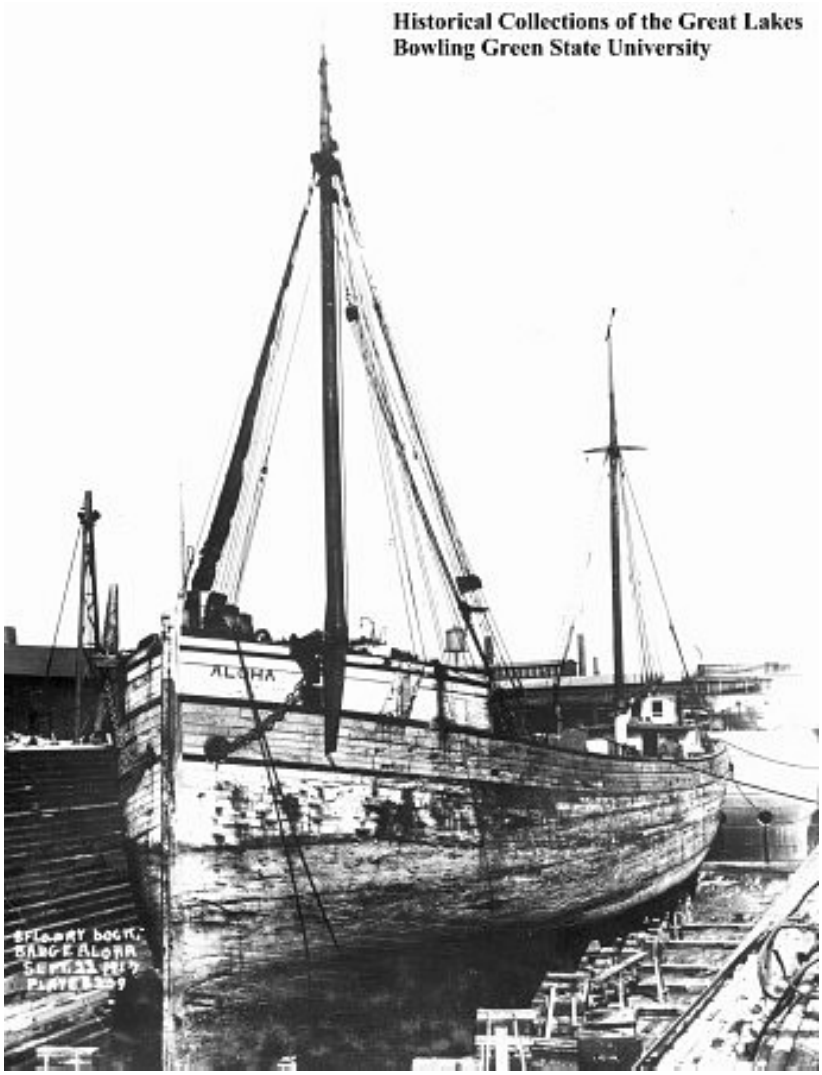

Figure 6.2. Schooner barge *Aloha* (BGSU 2024d).

Chapter 7: Conclusions and Recommendations

Centerboards (and daggerboards) in historic sailing vessels offered significant advantages for their owners. Vessels constructed with shallow drafts and centerboards could retain the sailing advantages of vessels with much deeper drafts while maintaining an ability to enter shallow harbors, rivers, canals, and other waterbodies in order to better load and unload cargo and passengers. As discussed above, double centerboards offered these same advantages with the addition of increased maneuverability on narrow and constricted bodies of water. In essence, the double centerboard vessel was particularly well suited to the geographic realities of the Great Lakes.

WHS maritime archaeologists identified 26 double board vessels (including two double daggerboard vessels and 24 double centerboard vessels) that were constructed on the Great Lakes between approximately 1814 and 1889. Of the total, nine are known only from archival records, ten are known shipwrecks in the Great Lakes outside of Wisconsin – including six in Lake Erie, two in Lake Ontario, and two in Lake Michigan – and seven are known shipwrecks in Lake Michigan in Wisconsin. The 26 vessels comprise eleven schooners, eight barkentines, three schooner barges, one brigantine, one bark, one scow schooner, and one unknown. Double centerboards were clearly used on a variety of vessels on the Great Lakes, likely because of the numerous advantages they conferred.

During the course of this research project, WHS maritime archaeologists discussed double centerboards with various parties, both avocational and professional. CLUE co-founder and avocational archaeologist Kevin Magee shared, based on his diving experience, that he felt the majority of barkentines in the Great Lakes were built with double centerboards (Kevin Magee 2024, elec. comm.). The research conducted for this project does indicate that numerous barkentines on the Great Lakes were constructed with double centerboards. But at least three other identified barks or barkentines in Wisconsin – the *Cherubusco* (47DR0194) built in 1848, the *Major Anderson* (47MN0485) built in 1861, and the *Mojave* (47SB0474) built in 1863 – featured single centerboards (Wisconsin Sea Grant 2024a, 2024b, 2024c). Further study of barks and barkentines in the Great Lakes has the potential to reveal whether double centerboards were a frequent, almost defining characteristic of barkentines or just one possible feature among many options. In addition, although the data gathered for this project could be interpreted to mean that double centerboards became more common on schooners, as opposed to barkentines, on the Great Lakes as the nineteenth century progressed, this change can instead be attributed to an increasing preference for schooners after about 1850. Per Cooper and Kriesa (1991:E6), "[T]he schooner actually increased in use at a time when other rigs were disappearing" because schooners required a smaller crew and performed better in confined waters. If there was a correlation between barkentines and double centerboards, then as schooners became more common on the Great Lakes, double centerboards may have decreased in popularity as well.

Dedicated investigation of known double centerboard shipwrecks in the Great Lakes, including the 17 discussed above and any others identified subsequently (including those only revealed by archival sources), and examination of the placement of the centerboards in each vessel may reveal typological (barkentines vs. schooners, lumber hookers vs. coal and ore carriers, etc.), regional (Upper Lakes, Lower Lakes, etc.), and/or chronological variations and trends that could enhance our knowledge of maritime innovation in the midcontinent. For example, Loudon Wilson indicates that centerboards were lowered via tackle hung from the rigging in lumber hookers, but centerboard winches were more common in vessels transporting coal and ore (Wilson 1972:28). Another potential avenue for future inquiry is examination of the use of double centerboards outside of the Great Lakes in places where their benefits

would have been particularly valuable, such as for sailing canal vessels, like the Cumberland & Oxford Canal boats and St. Lawrence sailing batteaux, and vessels on other large bodies of water like Lake Champlain, on which no shipwrecks with double centerboards have yet been located (Chris Sabick 2024, elec. comm.).

Most significantly, this research has demonstrated how increased archaeological investigation of shipwrecks on the Great Lakes, particularly through state maritime archaeology programs and funding for the same, offers stunning potential to provide a cross-comparative archaeological collection and body of historical knowledge that would enable archaeologists, historians, and the general public of Wisconsin, other Great Lakes states, and Canada to better understand the development of marine architecture, transportation and commerce, insurance regulations, and much more on North America's storied and vital inland seas.

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Appendix A: Diagnostic Measurements of Double Centerboard Sailing Ships in the Great Lakes

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Name	Build Year	Builder	Vessel Type	Build Location	Known Wreck Location, Lake	State or Province	Length	Width	Depth of Hold	Gross Tonnage	Forward CB Trunk (length, ft.)	Aft CB Trunk (length, ft.)	Distance Btw CB Trunks	Stem to Fwd CB Trunk	CB Trunk Location to Keelson
Aloha	1888	William Dulac	Schooner barge	Mt. Clemens, MI	Lake Ontario	Ont.	173	32.4	12	522	7.8	6.4	8.1	57.3	Centered
Annabell Wilson	1887	William Dulac	Schooner barge	Mt. Clemens, MI	Lake Erie	NY	174	32.2	12	490.63	7.5	7.4	8.1	58.2	Centered
Boaz	1869	Amos C. Stokes	Schooner	Sheboygan, WI	Lake Michigan	WI	114	22.3	7.1	127.22	17.7	15.8	17.6	29.2	Centered
Cortland	1867	Albert G. Huntley	Barkentine	Sheboygan, WI	Lake Erie	OH	173.6	34.4	13.8	676.13	24	22			Centered
Danube	1853	James A. Baker	Barkentine	Oswego, NY			134	25.5	11.5	369					
David Dows	1881	Bailey Brothers	Barkentine	Toledo, OH	Lake Michigan	IL	265.4	37.6	18.1	1418.63	27	23 or 25			
Double Dagger Board wreck			Schooner		Lake Ontario	NY	55	15			4.5	4.5			Centered
Emeline	1862	Myron Williams	Schooner	Vicksburg (St. Clair, MI)	Lake Michigan	WI	111.4	21.7	6.9	127.9	23.3	14.7	13.3	20.8	Centered
Horseshoe Island wreck					Lake Michigan	WI					15	14.4	7.8		
Indiana	1852	George S. Weeks	Bark	Oswego, NY	Lake Erie	PA	141.5	25	10	354.53	19.5	13.8	4.6	42.9	Centered
Lafayette Cook / Herbert Dudley	1851	Louis Shickluna	Brigantine	St. Catharines, Ont.			113.5	71.6	11.3	220					
Lumberman	1862	Allyne Litchfield	Schooner	Blendons Landing, MI	Lake Michigan	WI	126	23.5	7.5	159.89	21.9	22.2	32.8	23	Centered
Magnetic	1882	Presley & Co.	Schooner barge	Cleveland, OH			264	38.4	19.9	1602	26	26			
Mary Stockton	1853	Bates and Son	Barkentine	Manitowoc, WI			135	29.1	9.6	350					
Melitta	1881	Jasper Hanson and Hans M. Scove	Schooner	Manitowoc, WI			70.6	20.2	6.3	57.65	13	9.8	14.7		Centered
Monarch	1863	John Simpson or Duncan C. Chisholm	Schooner	Oakville, Ontario			135	24	10.8	378					
Northern Light / Montgomery	1853	John Oades	Schooner (canal)	Clayton, NY	Lake Michigan	WI	136.3	26.1	11.5	298.91	18.7	18.7	12.8	41	Centered
Republic	1854	John Oades	Barkentine	Clayton, NY	Lake Erie	OH	140	26.1	11.5	392.57					
Rouse Simmons	1868	Allen, McClelland & Co.	Schooner	Milwaukee, WI	Lake Michigan	WI	127	27.5	8.4	220	19	19.2	29.7	29.3	Centered
Silver Lake	1889	M. L. Johnson	Scow schooner	Little Point Sauble, MI	Lake Michigan	WI	95	20	7.6	111.08	16.4	13.8	28.1	21	Centered

Name	Build Year	Builder	Vessel Type	Build Location	Known Wreck Location, Lake	State or Province	Length	Width	Depth of Hold	Gross Tonnage	Forward CB Trunk (length, ft.)	Aft CB Trunk (length, ft.)	Distance Btw CB Trunks	Stem to Fwd CB Trunk	CB Trunk Location to Keelson
Sonora	1854	P. Ellenwood	Barkentine	Sackets Harbor, NY			136	25.7	11.5	371.72					
Trade Wind	1853	Peter Lamoree	Barkentine	Stony Creek, NY	Lake Erie	Ont.	136.5	25.5	11.5						
Tuscola	1851	Frederick Nelson Jones	Schooner	Buffalo, NY	Lake Michigan	IL	128	23	8	221.22	16.6	15.7	48.3	18.4	Centered
Two Fannies	1862	George O. Spear	Barkentine	Peshtigo, WI	Lake Erie	OH	152	33	12	492					
Union	1814	Robert Martin	Schooner	Put-In-Bay and Grand River, OH			68	22.7	7.5	97.37					
Wilfred R. Taylor / Stuart H. Dunn	1877	George Dixon (or Dickson)	Schooner	Marysburgh, Ontario			164.8	26.8	12.7	458					

Appendix B: *Boaz* Shipwreck (Schooner) National Register Nomination by Tamara Thomsen, Caitlin Zant, and David J. Cooper

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form.* If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions.

1. Name of Property

Historic name: *Boaz* Shipwreck (Schooner)
Other names/site number: DR-0193
Name of related multiple property listing: Great Lakes Shipwrecks of Wisconsin

2. Location

Street & number: 0.5 miles southeast of the entrance of North Bay, Door County in Lake Michigan
City or town: Town of Liberty Grove State: WI County: Door
Not For Publication: ☐ Vicinity: ☒

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended,

I hereby certify that this ☒ nomination ☐ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60.

In my opinion, the property ☒ meets ☐ does not meet the National Register Criteria. I recommend that this property be considered significant at the following

level(s) of significance: ☐**National** ☒**Statewide** ☐**Local**

Applicable National Register Criteria ☐**A** ☐**B** ☐**C** ☒**D**

Daina Penkiunas 8/24/2023	
Signature of certifying official/Title:	**Date**
Daina Penkiunas, Wisconsin State Historic Preservation Officer	
State or Federal agency/bureau or Tribal Government	
In my opinion, the property ☐meets ☐ does not meet the National Register criteria.	
Signature of commenting official:	**Date**
Title:	**State or Federal agency/bureau or Tribal Government**

4. National Park Service Certification

I hereby certify that this property is:

☐ Entered in the National Register

☐ Determined eligible for the National Register

☐ Determined not eligible for the National Register

☐ Removed from the National Register

☐ Other (explain:) _____

_____

Signature of the Keeper Date of Action

5. Classification

Ownership of Property

Private:	☐
Public – Local	☐
Public – State	☒
Public – Federal	☐

Category of Property

Building(s)	☐
District	☐
Site	☒
Structure	☐
Object	☐

Number of Resources within Property

Contributing	Noncontributing	
		Buildings
1		Sites
		Structures
		Objects
1	0	Total

Number of contributing resources previously listed in the National Register 0

6. Function or Use

Historic Functions	Current Functions
TRANSPORTATION/Water-Related	LANDSCAPE/Underwater

7. Description

Architectural Classification

Other- Schooner

Materials:

Principal exterior materials of the property: N/A

Summary

Located 0.5 miles southeast of the entrance to North Bay, Door County, Wisconsin, lie the remains of the wooden schooner *Boaz* (47DR-0193) in 8 feet of water in North Bay, Lake Michigan on a bottom of sand. Built in 1869 by Amos C. Stoakes in Sheboygan, Wisconsin, *Boaz* was one of a unique class of Great Lakes vessels: the double centerboard schooner. In November 1900, *Boaz* was caught in a gale while sailing for Racine, Wisconsin, from Pierpont, Michigan, with a cargo of lumber. The 31-year old vessel quickly began to leak heavily and sought shelter in nearby North Bay. While attempting to enter, the vessel struck Marshalls Point, and missed the entrance to the bay. The crew dropped anchor to prevent the vessel from running ashore, but fearing the vessel would capsize in the waves, the crew abandoned the vessel in the yawl. The following day the crew requested assistance from a nearby vessel, *Two Myrtles*. The steamer towed *Boaz* into the bay, where the vessel was grounded. Attempts were later made to pull the ship off, but to no avail. The cost of recovering the old, damaged schooner was deemed too high, and it was listed as a total loss.

Today, *Boaz* provides a rare glimpse into a little documented Great Lakes vessel type: the double centerboard schooners. With only five other known double centerboard schooners in Wisconsin waters, the *Boaz* site provides historians and archaeologists a unique opportunity to study late nineteenth-century wooden ship construction techniques and shipboard life of Great Lakes merchant vessels. *Boaz* meets the National Register requirements for Criterion D at the state level as a good example of a schooner sailing vessel type as described in the Multiple Property Documentation Great Lakes Shipwrecks of Wisconsin (Cooper and Kriesa 1992). The *Boaz* site was originally documented and recorded by Wisconsin Historical Society (WHS) archaeologists in 1988. In May 2022, WHS maritime archaeologists returned to the site to gather additional information on the vessel's double centerboards and update the site plan. Shifting sands and weeds cover large portions of the lower hull and associated debris field, protecting many

associated artifacts. The *Boaz* site has already produced a wealth of archaeological knowledge about early schooner construction and use, and it will continue to yield important archaeological data in future years.

Vessel Description

Boaz is representative of a rare subclass of sailing vessels, double centerboard schooners, which transported bulk cargo and general merchandise within its hull. As an integral part of the intralake transportation network, many features of this vessel type were common to all schooners on the Great Lakes. As mentioned in the Multiple Property Documentation *Great Lakes Shipwrecks of Wisconsin* (Cooper and Kriesa 1992), schooners are described as fore-and-aft rigged, with two or more masts. Lake schooners usually carried square-rigged topsails on their foremasts, as well a variety of jib sails and headsails on their foremast, main staysails, and gaff-topsails. Schooners were built for speed, maneuverability, and their ability to sail close to the wind, and usually had a single deck.

Flat-bottomed schooners were known to be poor sailors and tended to drift sideways in the wind. Centerboards came to be incorporated into the designs of all hull types to improve windwardliness and control leeward drift (Cooper and Kriesa 1992). Although little historic documentation exists regarding the advantages of two centerboards, it was likely thought to improve a vessel's windwardliness even further.

As a Great Lakes schooner, *Boaz* is typical of this description. At the time of its registration, it was described as a wooden schooner with one deck and three masts; it measured at 82.8 feet long with a 21.2-foot beam, and 7.8 feet depth of hold (Bureau of Navigation 1869). In 1874, the vessel was cut in half and lengthened by 31.2 feet. *Boaz* was calculated with a gross tonnage of 127 gross tons and a net tonnage of 120 tons and the vessel was measured at a length of 114.0 feet, had a beam of 22.3 feet, and depth of hold, measuring 7.1 feet (Bureau of Navigation 1874). Despite its lengthening, and addition of a second centerboard trunk, the vessel maintained its ship lines and general construction features throughout its sailing career.

Site Description

The double centerboard schooner *Boaz* (47DR-0193) lies on an even keel, in 8 feet of water, 0.5 miles southeast of the entrance to North Bay, Door County, Wisconsin. The vessel sits on a heading of 247-degrees at the southwest end of Marshall Point, near a privately-owned L-shaped pier. The wreck lies on a bottom of shifting sand and weeds, which obscure portions of the site for much of the summer. The remains of the vessel rest upright and intact, with only a broken stern, broken bow, and a large portion of the bilge covered by weeds and sand. Overall, the site exhibits excellent preservation with major hull sections intact, including the two centerboards and centerboard trunks, and hull nearly up to the deck beams. None of the deck structure remains extant, and the majority of the vessel's floor remains covered by sand. The wreck rises a maximum of 5.6 feet above the lakebed, and the two standing centerboard trunks can easily be

seen from the water's surface. Many quagga mussels cover the exposed surfaces of the wreck. The vessel's integrity offers a wealth of information for archaeologists and researchers.

The site was originally documented by the WHS in 1988. A Phase II archaeological survey of *Boaz* was completed by WHS maritime archaeologists and volunteers at that time using a baseline extending down the centerline of the wreckage. All of the measurements were taken from this baseline. WHS maritime archaeologists returned to the site in 2022 to document changes and gather additional information on the double centerboards, for a grant funded by the University of Wisconsin Sea Grant Institute. A single temporary baseline was established along the centerline of the ship, from near the vessel's fallen stempost to the vessel's sternpost. All of the measurements and documentation for the survey were taken from this baseline.

The *Boaz* wreck site measures 119.9 feet in overall length, and 23.2 feet in overall width, measured from the edge of the port side hull to the edge of the starboard side of the vessel, between the vessel's two centerboard trunks. All construction components of the vessel remain intact and only broken near the extreme forward and aft ends of the wreckage. The vessel's upper deck works are no longer intact, likely damaged during the salvage of the cargo and deck machinery after the sinking. The hull of the vessel remains intact and upright, as do the vessel's two centerboards. The lowest portion of the vessel's hull, keelson structure, and ceiling planking are buried beneath an estimated 1.5 feet of sand.

The entire length of the vessel sits on an even keel. The vessel's stempost was not identified during either the 1988 survey or the 2022 site visit, and likely remains nearby, buried in the sand. The vessel's sternpost remains upright, extending 2.4 feet above the sand, just aft of the collapsed portion of the vessel's starboard buttock. The stern post measures 1.3 feet sided (wide) and 1.6 feet molded (thick), and its aft facing side is rounded inward for the rudderpost to move freely.

The vessel is double framed, with each futtock measuring 0.4 feet sided and 0.6 feet molded. The frame sets measure 0.9 feet in overall sided dimension, and they are spaced 1.2 feet apart. The cant frames at the bow of the vessel can be seen sticking out of the sand, and extend 2.0 to 4.0 feet in length. These cant frames measure 0.3 feet sided and 0.55 feet molded. The vessel's ceiling planking measures 0.3 feet thick and varies in width in different sections of the ship. Amidships, the ceiling planking measures 0.7 feet wide and measures 0.9 feet near the stern.

The ceiling is fastened with clinch-ringed, wrought-iron drift pins, measuring 0.1 feet in diameter. The ceiling planking is intact on the starboard side of the vessel beginning at 16.1 feet along the baseline where it extends from the sand, to the aft extent of the starboard hull piece, near the fallen section of *Boaz*'s buttocks at 119.5 feet aft of the baseline. *Boaz*'s port side ceiling planking is intact extending from 31.2 feet to 61.9 feet along the baseline. Forward of this, two boards near the turn of the bilge extend forward to 14.4 feet along the baseline. Additionally, two ceiling planks located near the upper extent of the frame sets extend aft, to 101.6 feet along the baseline, where the port side extends beneath the sand.

The vessel's outer hull planking measures 0.55 feet wide and 0.2 feet thick. Many sections of the vessel's outer hull planking are obscured by sand. Outer hull planking can be seen intact from 64.4 feet to 83.8 feet along the vessel's starboard side, while it extends from 32.1 feet to 76.9 feet along the vessel's port side. Both the port and starboard sides of the vessel's hull rise approximately 2.5 feet above the sand.

Due to the large amount of sand covering the inside of *Boaz*'s hull, the vessel's keelson assembly remains largely covered. However, near the vessel's bow, from 3.1 to 6.2 feet along the baseline, the keelson can be seen above the sand. It measures 1.1 feet in width, and 1.0 feet in thickness. No rider keelson or sister keelsons were identified in this area. A single mast step is extant above the sand along the centerline of the vessel, at 51.6 feet along the baseline, just aft of the forward centerboard trunk. This location, between the two centerboard trunks, helps identify this as the mainmast step. When constructed, *Boaz* was listed as a 3-masted schooner, and the placement of this mainmast step is consistent with other 3-masted vessels built in the same era. The mainmast step is made up of two rectangular pieces of wood fastened side by side, forming a step assembly 6.0 feet long, 1.75 feet wide, and 0.4 feet thick. The step itself is a rectangular mortise 1.4 feet long and 0.6 feet wide, placed at the middle of the juncture of the two halves of the step assembly.

The vessel's two centerboard trunks are aligned along the centerline of the ship, directly in line with the exposed portion of the keelson near the bow. This configuration indicates that *Boaz* has a through-the-keelson centerboard design. With this, *Boaz* would have two sister keelsons running alongside the centerboard trunks, which would be notched for the floors; however, due to the accumulation of sand within the hull, these were not visible during the 1988 survey or the 2022 site visit. The centerboard trunks are aligned fore and aft, 17.6 feet apart, with the rectangular mainmast step and twin pump shafts located between the two trunks.

The centerboard trunks rise approximately 5.6 feet above the sand. The forward centerboard trunk is located 29.9 feet aft of the bow, and extends to 46.9 feet along the baseline, measuring 17.7 feet in overall length. The interior slot measures 0.65 feet wide and the overall width of the centerboard is 1.2 feet. Although intact along its length, several of the planks that make up the centerboard trunk are missing.

Six boards were identified on the starboard side of the trunk, while only three were observed above the sand on the port side. Each of these planks measure 0.9 feet wide and 0.3 feet thick. The side planks are edge joined with 0.125 diameter drift pins, are fastened horizontally to the trunk headledges (vertical timbers) with 0.1 diameter drifts cinched with 0.15 diameter rings. The forward edge of the trunk is sheathed with sheet metal to approximately 3.3 feet aft of the leading edge, presumably to protect the end from wear. The centerboard pivot hole is located 4.15 feet aft of the forward edge, and has a metal bearing, or collar, measuring 0.25 feet in inner diameter and 0.5 feet in outer diameter. At the time of the 1988 survey, and again during the 2022 site visit, the forward centerboard was not identified. It is possible that the centerboard was removed during salvage or was damaged and dragged away by ice action.

The aft centerboard trunk, located 64.5 feet aft of the bow, is almost entirely intact with only its covering board missing. The aft trunk is slightly shorter than the forward trunk, measuring 15.8 feet in overall length, extending to 80.3 feet along the baseline. Like the forward centerboard trunk, the aft trunk measures 1.2 feet in overall width, and has an inner slot measurement of 0.65 feet wide. Approximately seven boards make up the centerboard trunk, each measuring 0.8 feet in width, and 0.3 feet thick. These boards are edge-joined with drift pins spaced 1.0 to 1.15 feet apart. The pivot hole is located 8.0 feet aft of the forward edge of the trunk, and is located 5.1 feet from the upper extent of the trunk. The metal pivot bearing, or collar, has a 0.25-foot diameter inner diameter and a 0.5-foot outer diameter. Like with the forward centerboard, the aft centerboard was not located during the 1988 survey or the 2022 site visit.

The two pump shafts located just forward of the aft centerboard trunk, located 50.3 feet along the baseline, are of an undetermined metal (likely iron) measuring 0.1 feet thick, have a diameter of 0.3 feet, and extend 1.3 feet above the sand. The shafts sit parallel to one another, located 1.0 feet apart, measured on center. These shafts would have been connected to the vessel's bilge pump. The two shafts indicate *Boaz* was equipped with a double action bilge pump.

Some miscellaneous planking was located inshore of the site during the original 1988 survey. It is likely that much of the upper hull is located beneath the surrounding overburden of sand, rocks, and weeds. Additional timbers and boards were located during the 2022 site visit, including a small board near the vessel's bow, on the port side. The board measures 3.4 feet long and 0.7 feet wide. It is likely that this is a small section of ceiling planking.

Furthermore, two timbers fastened together were identified extending from the forward centerboard to the portside outer hull and beyond, at 22.5 feet along the baseline. These timbers appear to be loose, and they were not identified during the original 1988 survey. It is likely that wave or ice action detached this piece from elsewhere on the site and deposited it in this position. The larger timber measures 17.6 feet long, 0.4 feet wide, and 0.3 feet thick. The smaller timber measures 16.8 feet long, 0.5 feet wide, and 0.3 feet thick. Large notches, measuring 0.9 feet long, are cut into this timber, spaced 1.2 feet, 3.1 feet, and 4.5 feet apart. The length of these notches closely corresponds to the sided measurements of *Boaz*'s frame sets; however, the spacing of the notches is not equal and does not correspond to the spacing measurements of the frame sets. The timbers are likely part of the vessel's deck shelf, and the notches match the measurements of the vessel's deck beams. No deck beams remain on the site for comparison; however, many other vessels of a similar age and type have similar notches cut into the deck shelves.

Lengths of hawser-laid wire cable, measuring 0.05 and 0.1 feet in diameter, were found in the vicinity of the pump shafts and mast step, protruding from the sand. These are likely associated with the centerboard winches, which would have been located on the vessel's deck. It is also possible that this cable is associated with the attempted removal of some of the hull structure in the 1960s to improve navigation in the lagoon. Reportedly, cables were stretched across the lagoon to shore, and an attempt was made to break apart and remove sections of the hull with come-alongs or winches. The effort proved unsuccessful.

A moderate amount of other salvage was also reportedly conducted on the site by sport divers, including the removal of the vessel's anchors, a wheel, and the rudder. During part of the salvage, the rudder was lost during the attempt to tow it across North Bay. The rudder was not recovered at the time, and it may remain buried beneath the sand further out in the bay. A single U-shaped metal bar was located protruding from the sand at 62.2 feet aft of the bow on the vessel's port side. This is likely another disarticulated component from the deck machinery or upper deck structure.

8. Statement of Significance

Applicable National Register Criteria

☐ A. Property is associated with events that have made a significant contribution to the broad patterns of our history.

☐ B. Property is associated with the lives of persons significant in our past.

☐ C. Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

☒ D. Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations

☐ A. Owned by a religious institution or used for religious purposes

☐ B. Removed from its original location

☐ C. A birthplace or grave

☐ D. A cemetery

☐ E. A reconstructed building, object, or structure

☐ F. A commemorative property

☐ G. Less than 50 years old or achieving significance within the past 50 years

Areas of Significance

ARCHAEOLOGY/ HISTORICAL-NON-ABORIGINAL
MARITIME HISTORY
COMMERCE

Period of Significance
1869 - 1900

Significant Dates
1869

Significant Person
N/A

Cultural Affiliation
Euro-American

Architect/Builder
Stoakes, Amos C.

Summary
Located 0.5 miles southeast of the entrance to North Bay, Door County, Wisconsin, lie the remains of the wooden scow schooner *Boaz* (47DR-0193) in 8 feet of water in North Bay, Lake Michigan on a bottom of sand. Built in 1869 by Amos C. Stoakes in Sheboygan, Wisconsin, *Boaz* was one of a unique class of Great Lakes vessels: the double centerboard schooner. Much of our understanding of this vessel type, and the lakeshoring trade in which they operated, has come from archaeological data recovered from wreck sites. Little historical documentation exists on double centerboard schooner construction and operation.

The vessel spent most of its 31-year career carrying lumber from various ports throughout the Great Lakes region. In November 1900, *Boaz* was caught in a gale while sailing for Racine, Wisconsin, from Pierpont, Michigan, with a cargo of lumber. The vessel quickly began to leak heavily and sought shelter in nearby North Bay. While attempting to enter, the vessel struck Marshalls Point, and missed the entrance to the bay. The crew dropped anchor to prevent the vessel from running ashore, but fearing the vessel would capsize in the waves, the crew abandoned the vessel in the yawl. The following day the crew requested assistance from the nearby vessel, *Two Myrtles*. The steamer towed *Boaz* into the bay, where it was grounded. Attempts were later made to pull the vessel off, but to no avail. The cost of recovering the old, damaged schooner was deemed too high, and it was listed as a total loss. Today, the vessel sits upright, with many of its hull components intact and many more extant beneath the sand. As a double centerboard schooner, *Boaz* provides historians and archaeologists the rare chance to study double centerboard schooner construction and the Great Lakes lumber trades. *Boaz* meets the National Register requirements for Criterion D at the state level as a good example of a schooner sailing vessel type as described in the Multiple Property Documentation *Great Lakes Shipwrecks of Wisconsin* (Cooper and Kriesa 1992) and in the area of Commerce for its role in the Great Lakes lumber trades.

Period of Significance

The period of significance (1869 - 1900) begins with *Boaz*'s date of construction and ends with the date of its sinking and its enrollment documents surrendered.

Operational History

The schooner *Boaz* was built in 1869 by Amos C. Stoakes (oftentimes misspelled as Stokes) in Sheboygan, Wisconsin. *Boaz* was likely the last vessel he completed. Stoakes was born on 22 October 1825 in New York and worked as ship carpenter in Portland (Sandusky), Ohio, before immigrating to Sheboygan with his wife Hannah Maria Metcalf Stoakes in 1854. He was the senior, Master Shipbuilder at the Stoakes & Locklin shipyard, a company started with partner Benjamin Locklin in 1856 and the leading shipbuilding firm in Sheboygan (*Chicago Tribune* 1870a; *Sheboygan County Herald* 1869; U.S. Census Bureau 1850, 1860).

Boaz was first registered at the port of Milwaukee on 25 May 1869. The enrollment document indicated that Stoakes was sole owner, Captain James Wilson was Master, and Sheboygan was its homeport. The ship was described as having one deck, two masts, a square stern, and a plain head. It measured 82.8 feet long with 21.2 feet beam, and 7.8 feet depth of hold. Tonnage was calculated at 96.71 tons of which 89.42 tons capacity was under tonnage deck and 7.29 tons accounted for the capacity of enclosures on its upper deck (Bureau of Navigation 1869; *Kewaunee Enterprise* 1869).

The ship completed two trips from Muskegon, Michigan, to Chicago in June 1869 with arrivals recorded on 22 June and 29 June with scantlings, joists, and planks for lumber dealer Brewster, Meglade & Co. (*Chicago Evening Post* 1869a, 1869b). On 4 July 1869, Amos Stoakes died suddenly and unexpectedly at 43-years-old from heart disease, leaving Hannah Stoakes widowed with five children, and the schooner as well as his other business assets to dispose (*Sheboygan County Herald* 1869). No other trips for the vessel were recorded that year.

In early February, Hannah Stoakes announced the sale arrangement for the vessel. She sold 2/3 interest in the ship to Charles B. Packard for $4000 and 1/3 interest to Gustav Guilner for $1,868. The twenty-six-year-old Packard had been sailing the Great Lakes since his early teenage years. At the time of the sale, he was engaged to Anna E. Stoakes, Hannah Stoakes' oldest daughter. The couple married on 9 April 1870. A new enrollment was entered at the port on Milwaukee on 17 April 1870 for the change in owners. As both men were from Sheboygan, Sheboygan remained the vessel's homeport. Packard took his first command with *Boaz* and became its new Master (*Buffalo Courier* 1870; Bureau of Navigation 1870; *Chicago Tribune* 1870b; *Daily Milwaukee News* 1870). The ship made thirteen trips from Muskegon to Chicago bringing lumber, strips, lath, and common boards throughout the season, which ran from mid-April through mid-October. One trip was made from Centerville, Michigan, with cordwood (*Chicago Tribune* 1870c, 1870d, 1870e, 1870f, 1870g, 1870h, 1870i, 1870j, 1870k, 1870l, 1870m, 1870n, 1870o, 1870p).

On 16 June 1871, a new enrollment was entered at the port of Milwaukee for change in owners. Hannah Stoakes acquired ½ of Captain Packard's share, and the new arrangement was for the three owners, Packard, Hannah Stoakes, and Guilner to hold 1/3 equal shares each. The reason for this change is not known. In April 1871, *Boaz* lost a portion of its sails in a storm on Lake Michigan (Hall 1871). Otherwise, the season was uneventful delivering lumber from Muskegon to Chicago for lumber dealer R.K. Bickford & Co. (*Chicago Tribune* 1871a, 1871b, 1871c).

From early April through August 1872, *Boaz* brought lumber products to the Chicago Lumber Market from Sheboygan, White Lake, Michigan; Muskegon, and Ludington, Michigan. The shipments were sold by Blanchard, Borland & Co., and R.K. Bickford & Co. (*Chicago Tribune* 1872a, 1872b, 1872c, 1872d, 1872e; *Chicago Evening Post* 1872a, 1872b, 1872c). Only one incident occurred during the season; in August, *Boaz* lost its deck load of lumber on Lake Michigan during a gale (*Detroit Free Press* 1872).

On 15 August 1872, the schooner was sold, and a new enrollment was entered at the port of Milwaukee. Charles T. Burnham and John Q. Burnham became *Boaz*'s new owners. Captain Edward J. Cole took over the helm. As the owners resided in Milwaukee, it became the schooner's homeport (Bureau of Navigation 1872). The brothers, Charles T. and John Q. Burnham, were the sons of George Burnham, manufacturer of Milwaukee Cream City bricks. In 1870, George Burnham took his sons into his brickmaking firm and the business continued under the name of George Burnham & Sons. The Burnhams invested in real estate, timber lands, coal mines, and railroads, as well as owning several lake vessels (Flower 1881; Gregory 1931; Usher 1913).

In early November 1873, *Boaz* was caught in a squall that drove the vessel over Whaleback Shoal in Green Bay. The crew was forced to cut the masts down. After the storm abated, the vessel was found drifting near Menominee, Michigan. *Boaz* was taken in tow of the propeller *G.J. Truesdell* and brought to Milwaukee for repairs. Instead of repairing only the damages caused in the storm, the owners had the ship hauled out, cut in half, and lengthened by 32 feet (Bureau of Navigation 1874; *Door County Advocate* 1873; *Chicago Evening Post* 1873; *Daily Palladium* 1873).

After it was rebuilt over the winter, on 6 May 1874 a new enrollment was entered at the port of Milwaukee. George Burnham joined his sons in ownership of *Boaz* with Charles T., John Q., and George Burnham each owning an equal 1/3 interest. Captain Cole continued as Master and Milwaukee remained its homeport. The vessel was now described as having one deck, three masts, a plain head, and square stern. A surveyor at the port recorded the new measurements as 114.0 feet long with a 22.3 feet breadth and 7.1 feet depth of hold. Capacity under the tonnage deck was calculated at 122.32 tons with capacity above the tonnage deck of 4.90 tons for a total tonnage of 127.22 tons. It is plausible that during this major repair that the second centerboard trunk was added. It was likely necessary for stability of the lengthened vessel, as the breadth remained the same (Bureau of Navigation 1874). The ship was valued at $9,000 and given an A2 insurance rating (BLU 1874). In October 1874, *Boaz* went ashore near Port Washington. Cost to

its owners for removal and repairs totaled $500 (*Inter Ocean* 1974). No records for the ship were found for 1875 – 1877.

On 12 September 1878, *Boaz* departed Traverse Bay laden with wood and bound for Milwaukee. By 20 September the vessel still had not arrived, and a search of regional ports was conducted to determine the whereabouts of the ship. The vessel had been delayed, when on the night of 15 September 1878, the cook, George Gunderson fell overboard near South Manitou Island and drowned. The man had been only 20 years old and from Milwaukee (*Chicago Tribune* 1878a, 1878b).

Boaz wintered over 1878-79 in the Milwaukee River at Burnham's Slip along with the scow *Milton*. On 16 May 1879 the temporary railroad bridge placed across Burnham's Slip by the Chicago, Milwaukee & St. Paul Railway, while a new iron double-track bridge was under construction, was removed to release *Boaz* and *Milton* from their winter quarters. At the opening of the season, the vessel was given a B1 insurance rating and valued at $3000 (BLU 1879; *Chicago Tribune* 1879). Perhaps because of their wealth, the Burnhams carried no insurance on their vessels (Polk 1884). For the seasons 1879 through 1882, the ship recorded deliveries of lumber products at Milwaukee and Chicago from Ludington, Pierpont, Foscoro, Arcadia, and Manistee, Michigan (*Ahnapee Record* 1881; *Chicago Tribune* 1879a, 1878b, 1880, 1882a; *Cleveland Herald 1881; Daily Milwaukee News* 1880; *Detroit Free Press* 1881).

Two incidents occurred in 1881. On 14 November 1881, the ship lost its jibboom during a collision with a schooner near Manitowoc. The name of the other schooner went unreported. *Boaz* sailed to Milwaukee where the spar was replaced (*Detroit Free Press* 1881). Then on 20 November while sailing from Milwaukee for Burnham's Pier, just a few miles north of Arcadia, Michigan, with a $2,000 cargo of back freight, consisting of flour, oats, hay, bricks, and other sundries, the ship was attempting to seek shelter in Manistee when it missed the harbor entrance and went ashore south of the piers. After the gale subsided the vessel was stripped of her outfit, and the brick on deck was recovered (*Cleveland Herald* 1881). There was some discussion of whether the ship would be abandoned or recovered, and no records of the vessel's recovery were located. *Boaz*, however, continued sailing the next season.

Early-season storms plagued the ship in 1882. When Captain Cole arrived at Milwaukee on 11 May from Burnham's Pier, he asserted of the storm and the ship crossed the lake in on 10 May. He stated, "never in my service on the lakes have I experienced so heavy an easterly gale as that along the east shore" (*Wisconsin State Journal* 1882). On 3 June, the ship departed Burnham's Pier into another furious storm and arrived at Chicago missing a large portion of its deck load of wood and part of its canvas (*Chicago Tribune* 1882b; *Detroit Free Press* 1882).

During a gale on the night of 21 August 1883, George Burnham & Sons incurred damage to all their vessels; the steambarge *George Burnham*, schooner *Boaz*, and scow *I.M. Hill*. The schooner ran up on the beach at Pierpont. The ship was recovered with only minor damage to its hull but lost two masts (*Inter Ocean* 1883a, 1883b). Another big storm struck Milwaukee on 16 September 1883. As the storm began to abate in the early evening, *Boaz* left the harbor but the

vessel was forced back on the afternoon of 17 September. The ship sheltered again at Sheboygan on 5 October (*Chicago Tribune* 1883a, 1883b). The most fearful storm of the season began 11 November 1883 and lasted nearly two weeks. *Boaz* sheltered in the harbor at Frankfort and did not get away until 19 November (*Detroit Free Press* 1883a, 1883b, 1883c; Mansfield 1899).

From 1881- 1887, lumber deliveries were made at Sheboygan, Milwaukee, and Chicago from Burnham's Pier. *Boaz* was forced to shelter on two occasions in 1884, at Racine on the night of 8 June and at Frankfort, Michigan, on 16 June. In a gale from west and southwest on 7 May 1885, the ship was forced to wait at Sheboygan (*Chicago Tribune* 1884a, 1884b, 1885a, 1885b, 1885c; *Journal Times* 1884).

During an overnight sail on 24 April 1886 from Burnham's Pier to Milwaukee, *Boaz* sprung a bad leak mid-lake. The crew was forced to jettison a large part of the cargo and operate the pumps. The ship arrived at Milwaukee on the morning of 25 April and immediately put into the dry dock (*Chicago Tribune* 1886). Extensive repair and caulking were conducted on the vessel's hull (Polk 1888). On 2 May 1887, John Patzki, an unmarried 20-year-old Polish laborer was at work unloading the *Boaz* when he fell into the water and drowned in Burnham's Slip in Milwaukee (*Weekly Herald* 1887; *Superior Times* 1887).

In 1888, *Boaz* began collecting lumber from Door County ports. When the ship passed through Sturgeon Bay on 3 August 1888, it was flying a Cleveland and Thurman banner in support of Democratic nominees for U.S. President Grover Cleveland and Vice President Allen G. Thurman. The ship called at Sister Bay twice in August and once in September 1888 to collect cargos of "brick yard wood" taken to Milwaukee (*Independent* 1888; *Door County Advocate* 1888a, 1888b). As the ship was loading ties for Milwaukee at North Bay on 21 May 1890, *The Independent* (1890) reported Captain John Williams, formerly of the *Arctic,* as *Boaz's* Master. This change in Master went unrecorded in the ship's papers (*Independent* 1890).

Little is known of the details of *Boaz's* service between 1894-1898. In 1894, the ship's insurance rating dropped to B1½; however, the Burnham's continued to self-insure, and *Boaz* wintered each year at the Burnham Slip in Milwaukee (*Door County Advocate* 1898; *Marine Record* 1894, 1896, 1897, 1898; Polk 1884;). On 8 May 1895, a new enrollment was entered for *Boaz* at the port of Milwaukee for a change in its ownership arrangement.

The 79-year-old George Burnham discontinued his part in the vessel, and there was a new distribution of shares. Charles T. Burnham and John Q. Burnham held 5/12 shares each. 1/12 share went to Phoebe A. Hamilton (Phoebe A. Burnham Hamilton was the daughter of George Burnham, sister to Charles T. and John Q., and wife of Milwaukee manufacturer and capitalist, A.K. Hamilton). The remaining 1/12 share went to Captain Nils Larson, *Boaz's* new Master. Larson was born in Fredrikshald, Norway and immigrated with his family in 1878 when he was 10 years old. He began sailing on the Great Lakes in his early teens and was promoted to the rank of captain in 1893. As all parties resided in Milwaukee, Milwaukee remained the schooner's homeport. Tonnage was recalculated at 122.32 tons capacity under tonnage deck and 4.90 tons capacity of enclosures on the upper deck for a gross tonnage of 127.22 tons. Deductions were

given of 6.36 tons under Section 4153 of the revised statutes of the Congressional Act of 2 March 1895 for a net tonnage of 120.86 tons (Bureau of Navigation 1895; Gjerset 1979; Gregory 1931). Surveyors indicated it had enough canvas and centerboard to operate independently, meaning that unlike many other work-a-day lumber schooners operating around the turn of the twentieth century, *Boaz* had not yet been cut down into a barge (Great Lakes Shipping Register 1900).

Beginning in September 1898, *Boaz* began calling at Jacksonport, Wisconsin, to collect wood cargoes (*Advocate* 1898; 1899a, 1899b; *Door County Democrat* 1899). While in route, on 4 September 1899, *Boaz* required the services of the tug *Leathem Smith* to bring it into Sturgeon Bay to shelter from an easterly blow (*Advocate* 1899a).

On 7 November 1900, while sailing from Pierpont to Racine with a cargo of elm lumber, *Boaz* was caught out in a storm and strained so severely that it started to leak. The crew took to the pumps but had trouble keeping the ship free of water. Captain Larson decided to run into the nearest harbor. In attempting to enter North Bay, *Boaz* struck Marshalls Point. The crew was able to free the vessel but missed the harbor. Both anchors were then dropped to keep the ship off the beach. At this point, *Boaz* was completely waterlogged and sank to its deck.

Fearing the schooner might roll over, the crew prepared the yawl. The small boat was fastened to *Boaz's* stern and in this exposed position the four men spent the night in the rain and snow. At daybreak *Boaz's* crew spotted the steambarge *Two Myrtles* tucked up in the harbor and went to the ship for assistance. The shipwreck victims were given clothes and fed a warm breakfast. The steamer then towed *Boaz* into the bay and ran the schooner on the beach. In the following days, the deck load of lumber was removed from the vessel. Tugs were sent from Sheboygan to release the schooner, but the ship proved a total loss. The estimated value of the vessel and the cargo that remained in its hold was a $1500 total loss to its owners (*Advocate* 1900a, 1900b, 1901; *Buffalo Courier* 1900a, 1900b; *Door County Democrat* 1900; *Marine Record* 1900). On 27 November 1900, Deputy United States Marshal E.H. Glantz, filed a claim against the vessel on behalf of the sailors for wages in aggregate of $200 (*Advocate* 1900c).

Boaz's final enrollment document was surrendered on 25 May 1901 at the port of Milwaukee indicating "Total loss. Wrecked at North Bay" (Bureau of Navigation 1895). At the beginning of September 1903, local salver Captain Thomas Isabell went to North Bay and removed the spars from the wreckage (*Door County Advocate* 1903).

Archaeological Significance

Although broken, most of *Boaz*'s hull components are represented within the wreck site, largely covered by moving sand. The site retains its archaeological integrity, and sites such as *Boaz* present a rare opportunity to study and learn about historic wooden vessels, specifically double centerboard schooner construction and the history of Wisconsin's small, lakeshore communities. Given that a large portion of this wreck is covered by sand, there is the potential that more artifacts may be uncovered; these artifacts may shed light on day-to-day shipboard life. *Boaz*

represents a rare vessel type found in Wisconsin waters and offers the opportunity for further study. In fact, *Boaz* is one of the few double centerboard schooners found in Wisconsin waters; others are the schooners *Rouse Simmons*, *Lumberman*, *Emeline* (Anclam Pier Wreck), the sailing canaller *Montgomery*, and the scow schooner *Silver Lake*. Although the cargo was salvaged and parts of the hull broken up following its sinking, the name and location of the wreck site was not lost to local memory, and it became a popular local dive spot. Recent study of the site and additional historical analysis have confirmed that this site is the wreckage of *Boaz*. Due to its shallow location, the vessel remains a popular dive and kayak destination.

Boaz meets the registration requirements for Criterion D at the state level as a good example of a double centerboard schooner sailing vessel type as described in the Multiple Property Documentation *Great Lakes Shipwrecks of Wisconsin* (Cooper and Kriesa 1992) and in the area of Commerce for its role in the Great Lakes lumber trade. *Boaz* is an example of a vessel type that was vital to Wisconsin's economy and the economy of the Midwest through maritime bulk cargo transportation; a part of the transportation infrastructure prior to the development of road and rail networks.

Concluding Significance Statement

Many opportunities remain for future archaeological research on the *Boaz* site as sands shift and the site becomes more visible; additional information from the site may significantly add to our understanding of Great Lakes sailing vessels. Nineteenth-century wooden vessels were rarely built to drawn plans. Today, little documentation exists that illustrates how these unique vessels were constructed, the nuances of differing hull lines, construction techniques, including why double centerboards were used, and adaptations to bulk cargo needs. Double centerboard schooners were rare on the Great Lakes, and little historic documentation exists regarding the advantages of two centerboards. As one of only six documented double centerboard schooners in Wisconsin waters, data gathered on *Boaz* has significantly increased our understanding of the variations of double centerboard schooner use and construction.

Land Acknowledgement

American Indian populations have utilized the Great Lakes as travel and trade routes and fishing grounds since the dawn of the post-Glacial period, as attested by finds of caches of Late Paleo-Indian (ca. 10,000 BP) trihedral adzes connected to manufacture of dugout canoes. American Indians continued to build dugout canoes even as skin boats and eventually birch bark canoes came into widespread use in the Great Lakes. American Indians adopted and adapted other vessel designs as time passed and ways of traveling, making a living and utilizing the water changed. Netting, fish hooks, harpoons, and fish remains have been found at coastal sites inhabited throughout the span of human occupation of the region, confirming American Indian use of the lake as a productive fishery. Trade in tool stone, finished goods, and other products is likely to have moved along water routes as well, since such routes were firmly established by the 1500s when they were documented by French colonists. In the post-Contact period, refugees fleeing eastern wars, traders, and warriors of many Nations—Ho-Chunk, Menominee,

Potawatomi, Ojibwe, Meskwaki, Sauk, Mascouten, Kickapoo, Odawa, and Wendat--utilized Lake Michigan as a major travel route. Most recently, members of the Menominee, Potawatomi, Ojibwe, and Odawa have used the section of the coast nearest the wreck for hunting, fishing, gathering, and recreation.

9. Major Bibliographical References

Previous documentation on file (NPS):

_____ preliminary determination of individual listing (36 CFR 67) has been requested
_____ previously listed in the National Register
_____ previously determined eligible by the National Register
_____ designated a National Historic Landmark
_____ recorded by Historic American Buildings Survey #
_____ recorded by Historic American Engineering Record #
_____ recorded by Historic American Landscape Survey #

Primary location of additional data:

x State Historic Preservation Office
_____ Other State agency
_____ Federal agency
_____ Local government
_____ University
_____ Other
Name of repository: _____

Wisconsin Architecture and History Inventory #
and/or Archaeological Site Inventory #: _____

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1872c *Chicago Evening Post*. 13 July.
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1870b *Chicago Tribune*. 4 April
1870c *Chicago Tribune*. 16 April
1870d *Chicago Tribune*. 5 May
1870e *Chicago Tribune*. 11 May
1870f *Chicago Tribune*. 24 May
1870g *Chicago Tribune*. 4 June
1870h *Chicago Tribune*. 13 June
1870i *Chicago Tribune*. 18 June
1870j *Chicago Tribune*. 4 July
1870k *Chicago Tribune*. 13 July
1870l *Chicago Tribune*. 27 July
1870m *Chicago Tribune*. 19 September.
1870n *Chicago Tribune*. 23 September.
1870o *Chicago Tribune*. 6 October.
1870p *Chicago Tribune*. 15 October.
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1872b *Chicago Tribune*. 24 April.
1872c *Chicago Tribune*. 1 May.
1872d *Chicago Tribune*. 21 May.
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1878b *Chicago Tribune*. 22 September.
1879a *Chicago Tribune*. 16 March.
1879b *Chicago Tribune*. 26 September.
1880 *Chicago Tribune*. 4 December.
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1882b *Chicago Tribune*. 4 June.
1883a *Chicago Tribune*. 17 September.
1883b *Chicago Tribune*. 6 October.
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10. Geographical Data

Acreage of Property: 1.4 acres

Provide either the UTM system or latitude/longitude coordinates
UTM References
Datum (indicated on USGS map):

☐ NAD 1927 or ☐ NAD 1983

1.	Zone:	16T	Easting:	0495947	Northing:	4998398
2.	Zone::		Easting:		Northing:	
3.	Zone::		Easting:		Northing:	
4.	Zone:		Easting:		Northing:	

Verbal Boundary Description (Describe the boundaries of the property.)
The boundary for the *Boaz* site is marked by a circle with a radius of 150 feet, centered on the UTM coordinates 0495947 Easting, 4998398 Northing, Zone 16T.

Boundary Justification (Explain why the boundaries were selected.)
This site boundary was chosen to encompass the wreck site and associated debris field

11. Form Prepared By

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Additional Documentation

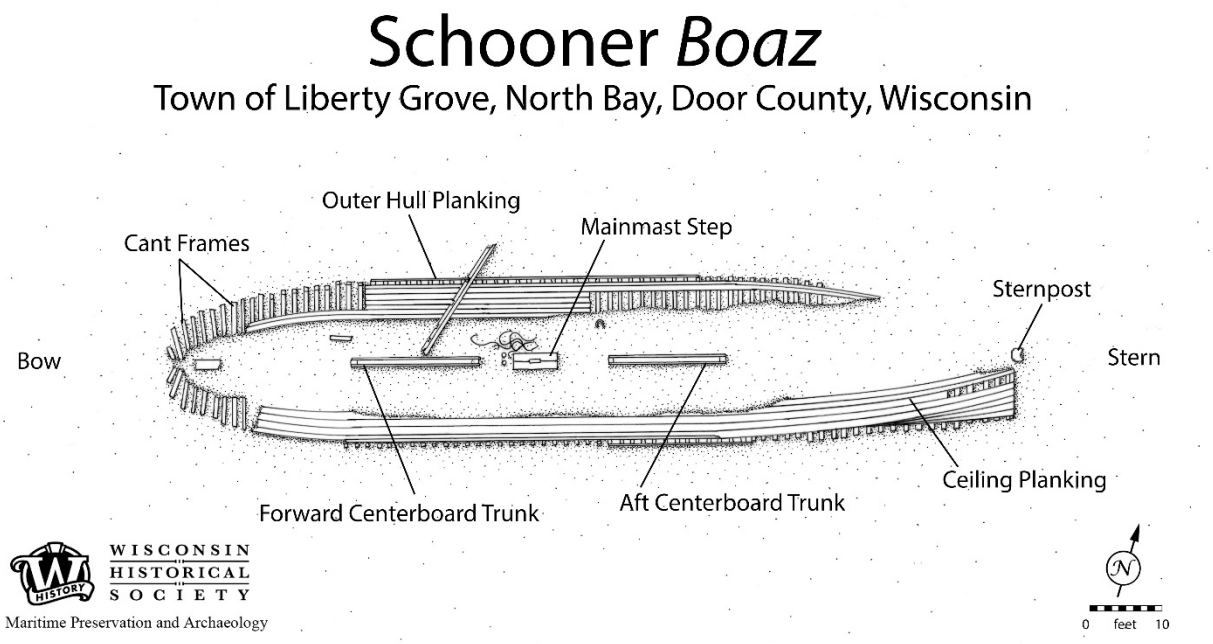
Figure Log:

Figure #1 of 2
Boaz Shipwreck (Schooner), Door County, Wisconsin, Location of *Boaz,* May 2022

Figure #2 of 2
Boaz Shipwreck (Schooner), Door County, Wisconsin, Site Plan of *Boaz,* May 2022

Figure #1 of 2
Boaz Shipwreck (Schooner)
Door County, Wisconsin
Location of *Boaz*
May 2022

Figure #2 of 2
Boaz Shipwreck (Schooner)
Door County, Wisconsin
Site Plan of *Boaz*
May 2022



Photographs

Submit clear and descriptive photographs. The size of each image must be 1600x1200 pixels (minimum), 3000x2000 preferred, at 300 ppi (pixels per inch) or larger. Key all photographs to the sketch map. For simplicity, the name of the photographer, photo date, etc. may be listed once in the photograph log. The photograph order must correspond with the photograph log.

Photo Log

Name of Property: *Boaz* Shipwreck (Schooner)
City or Vicinity: Vicinity of Town of North Bay in Lake Michigan
County: Door State: Wisconsin
Photographer: Caitlin Zant
Date photographed: June 2021

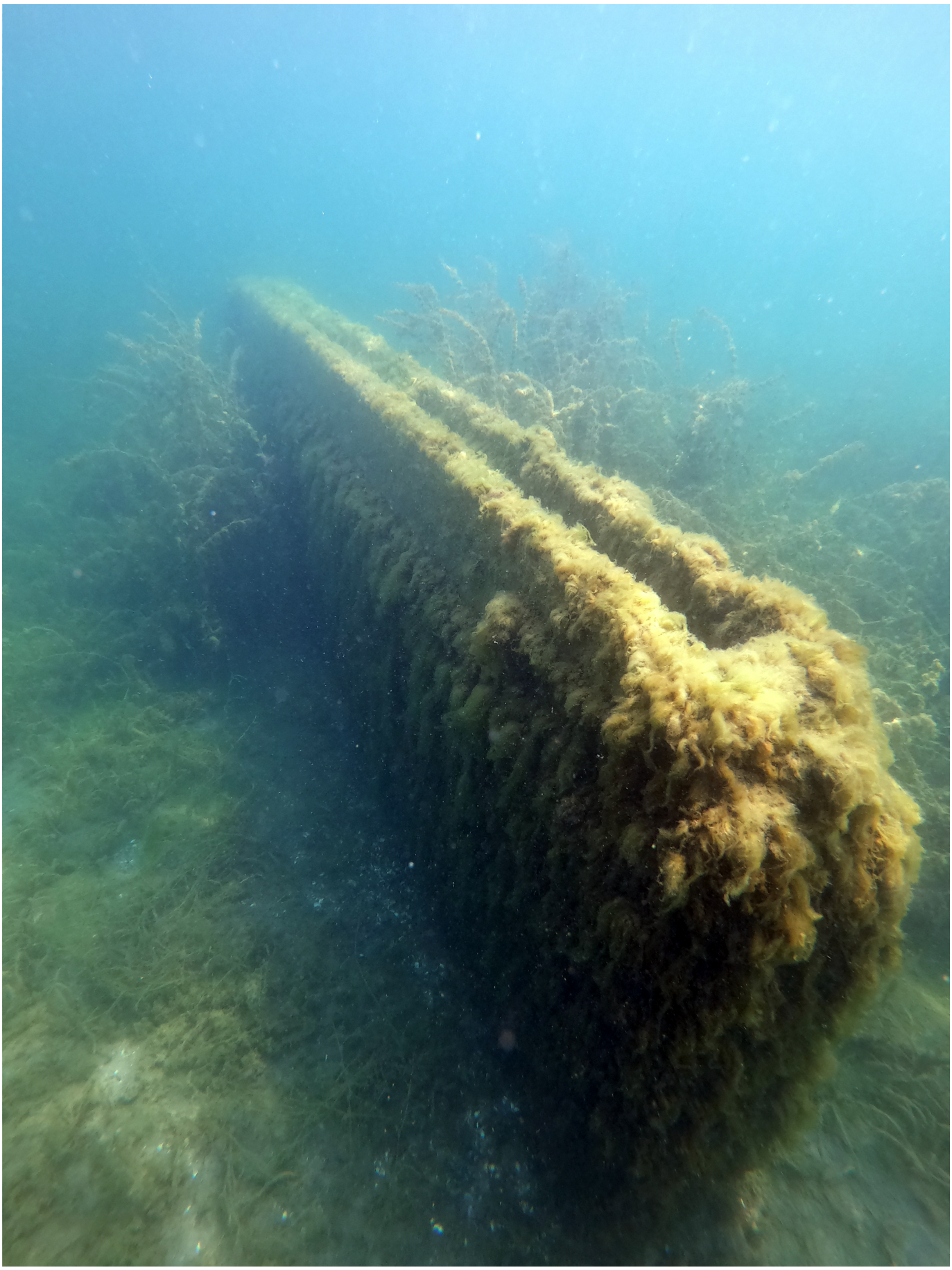
1 of 5
Image of *Boaz*'s aft centerboard

2 of 5
Image of *Boaz*'s forward centerboard, looking aft

3 of 5
Image of *Boaz's* forward centerboard, looking forward

4 of 5
Image of *Boaz's* aft centerboard, looking aft

5 of 5
Image of an archaeologist swimming over *Boaz's* port site hull, looking forward



Appendix C: *Emeline* Shipwreck (Schooner) National Register Nomination by Tamara Thomsen, Caitlin Zant, and David Cooper

NPS Form 10-900
(Expires 5/31/2012)
Wisconsin Word Processing Format (Approved 1/92)

OMB No. 10024-0018

United States Department of Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900A). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name *Emeline* Shipwreck (Schooner)
other names/site number DR-0227

2. Location

street & number	0.5 miles southeast of the entrance of the Baileys Harbor marina, Baileys Harbor, Lake Michigan					NA	**not for publication**
city or town	Town of Baileys Harbor					X	**vicinity**
state Wisconsin	**code** WI	**county** Door	**code** 029	**zip code** 54202			

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this X nomination request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property X meets _ does not meet the National Register criteria. I recommend that this property be considered significant _ nationally X statewide _ locally. (_ See continuation sheet for additional comments.)

Signature of certifying official/Title — Date: 6/20/2023

State Historic Preservation Officer - Wisconsin
State or Federal agency and bureau

In my opinion, the property _ meets _ does not meet the National Register criteria.
(_ See continuation sheet for additional comments.)

Signature of commenting official/Title — Date

State or Federal agency and bureau

Emeline Shipwreck (Schooner)	Door	Wisconsin
Name of Property	County and State	

4. National Park Service Certification

I hereby certify that the property is:

__ entered in the National Register.
___ See continuation sheet.
__ determined eligible for the National Register.
___ See continuation sheet.
__ determined not eligible for the National Register.
___ See continuation sheet.
__ removed from the National Register.
__ other, (explain:)

	Signature of the Keeper	Date of Action

5. Classification

Ownership of Property
(check as many boxes as as apply)

	private
	public-local
X	public-State
	public-Federal

Category of Property
(Check only one box)

	building(s)
	district
	structure
X	Site
	object

Number of Resources within Property
(Do not include previously listed resources in the count)

contributing	noncontributing	
		buildings
1		sites
		structures
		objects
1	0	total

Name of related multiple property listing:
(Enter "N/A" if property not part of a multiple property listing.)

Great Lakes Shipwrecks of Wisconsin

Number of contributing resources previously listed in the National Register

0

6. Function or Use

Historic Functions
(Enter categories from instructions)

TRANSPORTATION/Water-Related

Current Functions
(Enter categories from instructions)

LANDSCAPE/Underwater

7. Description

Architectural Classification
(Enter categories from instructions)

Other-Scow Schooner

Materials
(Enter categories from instructions)

foundation N/A
walls N/A
roof N/A
other N/A

Narrative Description

(Describe the historic and current condition of the property on one or more continuation sheets.)

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for the National Register listing.)

_ A Property is associated with events that have made a significant contribution to the broad patterns of our history.

_ B Property is associated with the lives of persons significant in our past.

_ C Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

X D Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" in all the boxes that apply.)

Property is:

_ A owned by a religious institution or used for religious purposes.

_ B removed from its original location.

_ C a birthplace or grave.

_ D a cemetery.

_ E a reconstructed building, object, or structure.

_ F a commemorative property.

_ G less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance
(Enter categories from instructions)

ARCHAEOLOGY/ HISTORICAL-NON-ABORIGINAL
MARITIME HISTORY
COMMERCE

Period of Significance

1862 - 1896

Significant Dates

1862, 1896

Significant Person
(Complete if Criterion B is marked)

N/A

Cultural Affiliation

Euro-American

Architect/Builder

Williams, Myron

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographic References

(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous Documentation on File (National Park Service):
- _ preliminary determination of individual listing (36 CFR 67) has been requested
- _ previously listed in the National Register
- _ previously determined eligible by the National Register
- _ designated a National Historic landmark
- _ recorded by Historic American Buildings Survey #
- _ recorded by Historic American Engineering Record #

Primary location of additional data:
- X State Historic Preservation Office
- _ Other State Agency
- _ Federal Agency
- _ Local government
- _ University
- Other

Name of repository:

10. Geographical Data

Acreage of Property 1.4 acres

UTM References (Place additional UTM references on a continuation sheet.)

	Zone	Easting	Northing
1	16T	0490845	4989537
2			
3			
4			

☐ See Continuation Sheet

Verbal Boundary Description (Describe the boundaries of the property on a continuation sheet)

Boundary Justification (Explain why the boundaries were selected on a continuation sheet)

11. Form Prepared By

name/title	Tamara Thomsen, Caitlin Zant, and David Cooper				
organization	Wisconsin Historical Society			**date**	12/2/2022
street & number	816 State Street			**telephone**	608-221-5909
city or town	Madison	**state**	WI	**zip code**	53706

Summary

Located 0.5 miles southeast of the entrance to the Baileys Harbor marina, Baileys Harbor, Door County, Wisconsin, and under 18 feet of water lie the remains of the wooden double centerboard schooner *Emeline* (47DR-0227). Built in 1862 by Myron Williams in Vicksburg, Michigan, *Emeline* was one of a unique class of Great Lakes vessels: the double centerboard schooner. In August 1896, *Emeline* was sailing south from Charlevoix, Michigan, with a cargo of tan bark when the vessel was caught in a northwest squall. The vessel was blown over to its starboard side and was able to right itself. It did not gain stability and was pushed over on its port side by shifting cargo and began to fill with water. The crew were able to reach Baileys Harbor in the yawl, and the following day, the vessel was taken under tow, still slightly afloat. After several attempts, the vessel was righted, only to heel over and sink in 18 feet of water near Anclam Pier. Over the next few months, the vessel was broken up by wind and wave action and declared a hazard to navigation. In 1903, the vessel was dynamited to flatten the hazard (*Door County Advocate* 1903).

Today, *Emeline* provides a rare glimpse into a nominally documented Great Lakes vessel type: double centerboard schooners. With only six other double centerboard schooners known in Wisconsin waters and seven in all of the Great Lakes, the *Emeline* site provides historians and archaeologists a unique opportunity to study nineteenth-century wooden ship construction techniques and shipboard life on late nineteenth-century Great Lakes merchant vessels. *Emeline* meets the National Register of Historic Places (NRHP) registration requirements for Criterion D at the state level as a good example of a schooner sailing vessel type as described in the Multiple Property Documentation *Great Lakes Shipwrecks of Wisconsin* (Cooper and Kriesa 1992).

The *Emeline* site was originally documented and recorded by Wisconsin Historical Society (WHS) archaeologists and volunteers in the summers of 1992 and 1996. In May 2022, WHS maritime archaeologists returned to the site to gather additional information on the vessel's double centerboards and update the site plan. Shifting sands cover large portions of the lower hull and associated debris field, protecting many associated artifacts. The *Emeline* site has already produced a wealth of archaeological information about double centerboard schooner construction and use, and it will continue to yield important archaeological data.

Vessel Description

Emeline is representative of a subclass of sailing vessels, double centerboard schooners, which transported bulk cargo and general merchandise within their hulls. As an integral part of the intralake transportation network, many features of this vessel type were common to all schooners on the Great Lakes. As mentioned in the Multiple Property Documentation *Great Lakes Shipwrecks of Wisconsin* (Cooper and Kriesa 1992), schooners are described as fore-and-aft rigged, with two or more masts. Lake schooners usually carried square-rigged topsails on their foremasts, as well a variety of jib sails

and headsails on their foremast, main staysails, and gaff-topsails. Schooners were built for speed, maneuverability, and their ability to sail close to the wind, and usually had a single deck. Flat-bottomed schooners were known to be poor sailors and tended to drift sideways in the wind. Centerboards were incorporated into the designs of all hull types to improve windwardliness and control leeward drift (Cooper and Kriesa 1992). Although little historic documentation exists regarding the advantages of two centerboards, it was thought to improve a vessel's windwardliness even further.

As a Great Lakes schooner, *Emeline* is typical of this description. At the time of its initial registration, *Emeline* was described as a wooden schooner with one deck, two masts, and a round stern. It had a tonnage of 121.12, measured 83.0 feet long with a 22.0-foot beam, and a depth of hold measuring 7 feet 6 inches. After only a year and a half of operation, the vessel was lengthened, a second centerboard was added to the hull, and a third mast was added. Following the lengthening, the vessel was described as a wooden schooner with one deck, three masts, and a square stern. It had a gross tonnage of 127.9 tons, a net tonnage of 121.51 tons, length of 111.4 feet, breadth of 21.7 feet, and depth of 6.9 feet. Beyond these additions in its early career, the vessel maintained its hull lines throughout its sailing career.

Site Description

The double centerboard schooner *Emeline* (47DR-0227) lies on an even keel, in 18 feet of water on a heading of 190-degrees, 0.5 miles southeast of the entrance to the Baileys Harbor marina, in Door County, Wisconsin. The wreck lies on a bottom of shifting sand. The remains of the vessel rest upright, but broken at the turn of the bilge and show signs of twisting near midships. Reports of the wrecking event describe a section of the hull detaching and drifting closer to shore. Sections of the forward and aft hull are not extant on the wreck site. Overall, the site exhibits excellent preservation with major sections of the hull intact, including the two centerboards, centerboard trunks, and lower hull. Artifacts from the vessel's rigging also remain on site. None of the deck structure remains extant, and the majority of the vessel's floor is covered by sand. The wreck rises approximately 5.0 feet above the lakebed. Quagga mussels cover the exposed surfaces of the wreck.

The site was originally documented by the WHS in the summers of 1992 and 1996. A Phase II archaeological survey of *Emeline* was completed by WHS maritime archaeologists and volunteers at that time using a baseline extending down the centerline of the wreckage. All measurements were taken from this baseline. Maritime archaeologists from WHS returned to the site in 2022 to document changes and gather additional information on the double centerboards, with a grant funded by the University of Wisconsin Sea Grant Institute. A single temporary baseline was established along the centerline of the ship, from near the vessel's fallen stempost to the vessel's sternpost. All measurements and documentation for the survey were taken from this baseline.

The *Emeline* wreck site measures 106.0 feet in overall length, and the site extends over 54.0 feet in width, measured from the edge of the port side hull to extent of wreckage on the starboard side of the vessel. The site consists of the lower hull, preserved to about the turn of the bilge, bow components, starboard and portside railing sections, and disarticulated transom. The flattened and scattered condition of the wreckage stands in mute testimony to the destructive forces of the dynamiting in 1903 and subsequent ice and storm surge damage.

The keel measures 0.95 feet sided and 0.5 feet molded. Over most of its length, the vessel is double framed. Each futtock of the frame set measures 0.4 feet sided (wide), with the overall frame set measuring 0.9 feet. Each futtock measures 0.8 to 0.9 feet molded (thick) where it meets with the floors. They measure slightly smaller at the turn of the bilge, with a measurement of 0.6. The spacing between frame sets is 1.2 feet. Three sets of triple frames were recorded just aft of the aft centerboard trunk. These frame sets have an overall width of 0.9 feet and tare spaced 1.25 feet apart. Sided and molded dimensions are identical to the double frames. Limber holes measuring 0.4 inches wide and 0.15 inches high are cut into the bottom of the floors, a few inches outboard from the keel.

The keelson measures 0.7 feet wide and 1.1 feet thick. Atop the keelson sits a rider keelson, which measures 0.7 feet wide and 0.8 feet thick. Along both sides of the rider keelson are stringers, measuring 0.3 feet wide and 1.1 feet thick. The vessel's mast steps are formed by these stringers and gaps cut into the rider keelson. The mizzenmast step measures 0.6 feet wide and 1.1 feet long, and is located 16.5 feet aft of the aft centerboard trunk. The mainmast step is located just forward of the aft centerboard trunk. Here, two sister keelsons run along the vessel's keel. The starboard sister keelson measures 1.0 feet wide and 0.8 feet thick, while the port sister keelson measures 0.8 feet wide and 0.5 feet thick.

The vessel's outer hull planking measures 0.75 to 0.9 feet wide and 0.2 feet thick. The ceiling planking measures 0.3 feet thick and between 0.5 to 1.0 feet wide. A small section of the vessel's deck planking, measuring 15.9 feet in length, remains extant on the site, located at 1.1 feet along the baseline on the starboard side of the wreckage. It measures 5.8 feet in overall length before extending beneath the sand. The deck planks themselves measure 0.55 feet wide and 0.2 feet thick, and they remain fastened to two deck beams. These deck beams measure 0.65 feet wide and 0.5 feet thick, and are spaced 1.7 feet apart. There are two deck planks also attached to the deck planks, which are wider than the other deck planks. These planks measure 1.8 feet wide and 0.35 feet thick. In cross-section, these planks have 0.3-foot-wide chamfered (a right-angled edge or corner cut away to make a symmetrical sloping edge) upper edges.

Emeline has two centerboard trunks that are aligned along the vessel's centerline. The forward centerboard trunk is located 20.8 feet aft of the stempost and measures 23.3 feet in length, and 1.4 feet in overall width. The trunk's headledges measure 0.6 inches wide, but with the centerboard cap still in

place, the length was unable to be determined during the survey. The cap itself measures 0.2 feet thick and extends the entire length of the trunk. The centerboard trunk rises 4.8 feet above the keelson. It is constructed of five longitudinal planks, measuring 0.3 feet thick and varying in width from 0.65 to 1.15 feet wide. No data could be collected on the centerboard itself. The pivot pin is located 4.65 feet aft of the centerboard trunk's forward edge.

The aft centerboard trunk is located 57.0 feet aft of the stempost and measures 14.7 feet in overall length, 1.4 feet in width, and sits 13.3 feet aft of the forward centerboard trunk. The aft centerboard trunk is heeled over at a 48-degree angle to starboard. The headledges measure 0.55 feet wide. Like the forward centerboard trunk, the centerboard trunk cap remains in place, obscuring the length measurement for the headledges. The cap extends the entire length of the trunk and measures 0.2 feet thick. This trunk is composed of five longitudinal planks, measuring 0.3 feet thick and between 0.75 to 1.0 feet wide. The pivot pin is located 3.75 feet aft of the trunk's forward face. The caps of both trunks were outfitted with openings for the passage of lifting gear at each end. These oval openings measured 0.8 feet long and 0.55 feet wide. On the aft centerboard trunk, these openings were topped with a two-piece wooden block with the same size oval opening. Each block measures 1.8 feet long, 1.2 feet wide and 0.5 feet thick.

A section of the upper port side hull structure survives, measuring 57.8 feet in overall length, extending from 11.1 to 68.9 feet along the baseline. This section includes a part of the vessel's deck shelf, a single deck beam, covering board/waterway, and bulwark stanchions. The deck shelf is 1.6 feet wide and 0.25 feet thick. It is fastened to the frames with 0.075 feet diameter drift bolts peened over 0.2-foot diameter roves. It is notched to receive the deck beams. The notches measure 0.95 inches long and 0.25 feet thick, which match the approximate measurements of the deck beams. Fastened atop the deck shelf is the covering board/waterway. This plank measures 1.0 feet wide and 0.25 feet thick. Its upper surface has square holes cut into it to receive the 0.4-foot square bulwark stanchions. The stanchions are spaced 3.1 feet apart and are all broken. No evidence of the rail cap exists on this section. A single tie-rod extends from the port hull piece, near its forward extent. The tie-rod measures 0.1 feet in diameter and has a 1.5-foot long turnbuckle, located 9.3 feet along its length. Overall, the tie-rod extends 12.5 feet in length before disappearing beneath the sand.

Two smaller sections of the upper starboard hull structure are exposed on site as well. The longer of the two pieces extend from 22.4 to 51.6 feet along the baseline, and it is located approximately 14.5 feet outbound from the forward centerboard trunk. It measures 27.9 feet in length and consists of the deck shelf, covering board/waterway, bulwark stanchions, and a small section of bulwarks. The deck shelf is interesting in that it appears to be made up of three planks, each measuring 0.35 feet thick. This differs from the port side and may be the result of repair work. The shelf is notched to receive the deck beams. The notches vary in width, between 0.6 to 0.8 feet wide, and measure 0.25 feet thick. The outermost plank making up the deck shelf has a 3.0-foot long scarf in its forward end. Spacers 0.35

feet thick and 1.0 to 2.4 feet in length separate the shelf from the covering board. Extending through one of these is an athwartship tie-rod. The tie-rod measures 0.1 feet in diameter and has a 1.5-foot long turnbuckle, located 11.3 feet along its length. Overall, the tie-rod extends 22.6 feet in length before disappearing beneath the sand.

The covering board/waterway is 0.3 feet thick. Its upper surface has square holes cut into it to receive the 0.4-foot square bulwark stanchions. Fastened to the outside face of three of the stanchions are three 0.25-foot wide planks, spaced 0.08 feet apart. The first one is located 0.55 feet above the covering board/waterway. Four strands of wire rope rigging are attached to this section. The smaller starboard side hull section is located 16.5 feet forward of the longer hull section, measures 18.2 feet in length, and is situated perpendicular to the aft piece of starboard hull planking. It has the same construction as the longer starboard side hull section, except for the addition of a small piece of the rail. This rail piece measures 0.75 feet wide, and it is topped with a rail cap that measures 0.35 feet thick.

The stump of the stempost protrudes 0.6 feet above the sand, marking the end of the articulated hull. It is badly degraded, so no specific dimensional information could be gathered. Approximately 4.0 feet forward of the stempost lie the articulated bow components. This section is intact from the apron and lower stem, to the rail cap, with the lower section buried in the sand. The stempost remains extant, measuring 12.0 feet before disappearing beneath the sand. It measures 1.1 feet thick (molded) and 0.8 feet wide (sided) near its upper end. Just to the port of the stempost is a knighthead, measuring 0.4 feet wide and 0.55 feet thick. Attached to this knighthead is a hawsepiece, measuring 0.8 feet wide and 0.45 feet thick. The apron is pulled away from the stempost.

Attached perpendicularly into the hawsepiece is a 7.0-foot long section of covering board. A mortise is cut through this timber, through which a bulwark stanchion, or possibly a cathead stanchion, passes. The stanchion measures 0.45 feet square, and it appears to be stepped at a point near the junction of the lower stem and apron. Attached to the inside face of this stanchion are two bulwark planks. The lower of these planks measures 0.7 feet wide and 0.2 feet thick, while the upper plank measures 0.85 feet wide and 0.25 feet thick. A section of the vessel's rail cap measures 0.5 feet wide and 0.65 feet thick. Three ceiling planks also extend from the sand near this bow section. These planks measure 0.65 feet wide, 0.3 feet thick, and extend 2.4 feet before disappearing into the sand.

Just aft of the stub of the stempost, 6.3 feet aft along the baseline on the port side of the vessel, are the remains of *Emeline*'s Samson post. Only the upper extent of the Samson post can be seen above the sand, laying on its aft facing side. The extant portion of the Samson post measures 2.2 feet long and 1.2 feet wide. A mortise measuring 0.9 feet long and 0.4 feet wide is cut into the Samson post. A corresponding tenon on the end of the vessel's bowsprit would have fit into this mortise, and kept the bowsprit and jibboom secure and in place.

The vessel's transom is located approximately 15.0 feet northeast of the aft end of the articulated wreckage. One end is partially buried in sand. Overall, the transom measures 18.6 feet wide, and measures 3.15 feet from its bottom edge to the top of the counter (top edge of the transom). It is supported by ten 0.35-foot square stanchions and a vertical plank rising at the center of the transom. This vertical plank measures 1.0 feet wide and 0.3 feet thick. Four 0.9-foot wide horizontal planks are attached to the outside face of the last two stanchions on the port side of the transom. A single knee remains attached to the transom, measuring 0.4 feet thick and 3.6 feet long.

Several rigging components also remain on site, including a deadeye with three lanyard holes, which measures 0.7 feet in diameter. This deadeye is located just aft of the forward centerboard trunk, next to the keelson, partially buried in sand on the port side of the wreckage. Additionally, sections of 0.1-foot diameter wire rigging protrude from beneath the sand near the vessel's bow. Due to the shifting sands in the area, many more artifacts likely remain protected beneath the sand.

Integrity

The *Emeline* site (47 DR-0227) retains archaeological integrity with most of the vessel's original construction features intact. Sites such as *Emeline* present a unique opportunity to study and learn about this rare Great Lakes vessel type, the double centerboard schooner, their construction, and their use. Dynamiting shipwrecks whose final deposition impedes navigation is a common practice when a vessel comes to rest within a shipping lane. This activity does not destroy the integrity of the site. It is done to flatten the sunken vessel so that it clears the channel of the obstruction to navigation. All components of the *Emeline* shipwreck remain extant but are splayed out and flattened to the lakebed.

Summary

Located 0.5 miles southeast of the entrance to the Baileys Harbor marina in Door County, Wisconsin, lie the remains of in 18 feet of water on a bottom of sand. Built in 1862 by Myron Williams in Vicksburg, Michigan, *Emeline* was one of a unique class of Great Lakes vessels: the double centerboard schooner. Much of our understanding of this vessel type, and the lakeshoring trade in which they operated, has come from archaeological data recovered from wreck sites. Little historical documentation exists on double centerboard schooner construction and operation.

The vessel spent most of its career carrying lumber throughout the Great Lakes region. In August 1896, *Emeline* was sailing south from Charlevoix, Michigan, with a cargo of tan bark when the vessel was caught in a northwest squall. The vessel was blown over to its starboard side, and was able to right itself, but did not gain stability. It was pushed over on its port side by shifting cargo, and began to fill with water. The crew were able to reach Baileys Harbor in the yawl, and the following day, the vessel was taken under tow, still slightly afloat. After several attempts, the vessel was righted, only to heel over and sink in 18 feet of water near Anclam Pier. Over the next few months, the vessel was broken up by wind and wave action and declared a hazard to navigation. In 1903, the vessel was dynamited to flatten the hazard (Door County Advocate 1903).

Today, the vessel sits upright, with many of its hull components intact and many more extant beneath the sand. As a double centerboard schooner, *Emeline* provides historians and archaeologists the rare chance to study double centerboard schooner construction and the Great Lakes lumber trades. *Emeline* meets the registration requirements for Criterion D at the state level as a good example of a schooner sailing vessel type as described in the Multiple Property Documentation *Great Lakes Shipwrecks of Wisconsin* (Cooper and Kriesa 1992) and in the area of Commerce for its role in the Great Lakes lumber trades. The period of significance (1862 - 1896) begins with *Emeline*'s date of construction and ends with the date of surrender of its sinking and enrollment documents.

Operational History

The schooner *Emeline* was built in 1862 above Detroit on the St. Clair River at Marysville, Michigan at the yard of master shipbuilder Myron Williams (Bureau of Navigation 1862). The Williams' yard operated between 1853 and 1883. Most vessels were built to serve in the lumber trade between Detroit and ports on Lake Erie. Marysville was first known as Vickery's Landing, but as it grew, it became known as Vicksburg. When a post office was approved for the location, it was discovered that another Vicksburg already existed elsewhere in Michigan, so another name change came in 1859, and the place was called Marysville.

Emeline's initial enrollment document was entered at the port of Detroit, Michigan on 6 October 1862. Myron Williams is listed as sole owner of the schooner and Marysville is indicated as Williams' home.

Vicksburg, however (the name apparently still in use by some residents) is listed as *Emeline*'s homeport. Described as a schooner with one deck, two masts, a rounded stern and no figurehead, *Emeline* measured 83 feet long, with 22 feet beam and 7 feet 6 inches depth of hold. Its tonnage was calculated at 121.12 tons. Captain G.M. Young was the ship's first Master (Bureau of Navigation 1862). The vessel ran primarily between Detroit, Toledo, Ohio, and Buffalo, New York, in its first season (*Buffalo Commercial Advertiser* 1862; *Buffalo Morning Express and Illustrated Buffalo Express* 1862).

Williams had difficulty finding a buyer for the ship and transferred ownership to Edward Kanter of Detroit. Kanter, born in Breslau, Silesia, in 1824, was a former clerk with the American Fur Company on Mackinac Island. At the age of twenty-three and with capital of $200, he became proprietor of a grocery and ship chandlery business. In 1852, he sold the business, moved to Detroit, and opened a chandlery at the foot of Woodward Street. Along with the supply business, Kanter traded vessels: buying, selling, and accruing wealth so that in 1868 he established a private banking house (Bureau of Navigation 1863; Wendell; Leake).

A new enrollment was entered at the port of Detroit on 16 April 1863 for the temporary change in owner to Kanter. Captain N.W. Kirtland was listed as the ship's new Master and Detroit its new homeport (Bureau of Navigation 1863). Through the middle of June 1863, *Emeline* made several trips from Buffalo to Detroit with lumber products. On 15 June, the ship was recorded arriving at Detroit with 33,000-barrel staves, and on its next trip out it, departed for Chicago (*Buffalo Commercial Advertiser* 1863a; *Buffalo Courier* 1863; *Buffalo Morning Express and Illustrated Buffalo Express* 1863; *Milwaukee Daily Sentinel* 1863a). In August, *Emeline* made a trip from Milwaukee, Wisconsin, to Beaver Island with 50,000 bricks, and 30,000 feet of lumber and shingles. The ship delivered 3,500 post and 28 cords of wood to Chicago from Green Bay, Wisconsin in September. It returned to Lake Erie running between Buffalo and Detroit until the later part of October when it came back to Detroit for winter lay up (*Buffalo Commercial Advertiser* 1863b; *Chicago Tribune* 1863; *Milwaukee Daily Sentinel* 1863b).

That winter the ship was lengthened at the McDonald shipyard at Detroit and at 3p.m. on 28 March 1864, *Emeline* was relaunched. It is likely that this is when the second centerboard trunk was added to the vessel's hold (*Buffalo Commercial Advertiser* 1864a; *Cleveland Daily Herald* 1864). A new enrollment was entered at the port of Detroit on 15 April 1864 that described the improvements. After it was elongated, the ship measured 115 feet long and 21 feet 10 inches in beam, with a depth of hold measuring 7 feet 3 inches. Its new tonnage was calculated at 169.76 tons, and it was rigged as a three-masted barque with one deck, a square stern, and no figurehead. Captain Charles Calmin took over as Master (Bureau of Navigation 1864a).

Emeline was chartered to carry lumber from Saginaw City, Michigan, to Cleveland, Ohio, at $4.50 per 1,000 board feet; the trip was the last week of April (*Buffalo Commercial Advertiser* 1864b). By the start of May, Edward Kantor sold *Emeline* to Reverend William M. Ferry and his son, Thomas W. Ferry of Grand Haven, Michigan, for $10,000. The new enrollment showed father and son as equal owners. Grand Haven became its new homeport and Captain Richard Williams took over the helm (Bureau of Navigation 1864b; Buffalo Commercial Advertiser 1864c).

William Montague Ferry, a Presbyterian minister from Granby, Massachusetts, had come west as a missionary to the Indians of Mackinaw Island in the early 1820s. The pious and well-educated reverend also brought a keen business sense and quickly invested in lake vessels and in land. In the early 1830s, he moved his growing family to a lush spot where the Grand River pours into Lake Michigan. There he founded a small settlement now known as Grand Haven. One of the earliest European settlers in the region, William Ferry recognized the commercial value of Western Michigan's untapped forests and went into the lumber business. By 1850, he was reported owning real estate with a value of $10,000. The next ten years saw his real estate fortunes grow to $75,000 (Biographical Publishing 1893; Thomsen et al 2008; United States Census Bureau 1850; 1860).

William Ferry had four sons who also showed a propensity for success. The oldest, William, Jr., born in 1824 invented an improved type of steam sawmill. As a manufacturer of lumber milling equipment, in 1860 he had accumulated assets worth $60,000. His second son, Thomas W. (co-owner of *Emeline*) was a successful Michigan politician. At thirty-six years old, he had served two terms in the Michigan Legislature and had been a vice president of the 1860 Republican National Convention in Chicago—an event remembered for its nomination of Abraham Lincoln. In 1864, he was elected to the U.S. House of Representatives (Biographical Publishing 1893; Thomsen et al 2008). In 1860, Ferry's third son, Noah H., a 30-year-old bachelor lumberman, built sawmills on White Lake, and Black Creek near Muskegon, Michigan, and reported assets that exceeded $30,000. His fourth son, Edward P., age 25, remained under his father's roof, but along with his brother Noah, commissioned his own double centerboard schooner, *Lumberman*, in 1862. Noah enlisted in the Union Army in 1863 and died on the battlefield at Gettysburg. After Noah's death ownership of *Lumberman* passed solely to Edward P. Ferry, was then transferred briefly to his father, and then jointly owned by Edward P. and Thomas W. until 1884. *Emeline* was added to the Ferry family's growing lumber fleet to move freshly harvested and milled lumber to the hungry Chicago market (Thomsen et al 2008; United States Census Bureau 1860).

All things ran smoothly for *Emeline* throughout the 1864 season until on 14 November, while running light (without cargo) the ship ran aground on a bar in Lake Michigan. No other information is known of the incident, so it is likely the ship was floated off without damage (*Detroit Free Press* 1864; *Daily British Whig* 1864).

Before the start of the 1865 season, *Emeline* was remeasured at Detroit in compliance with the Congressional Act of 6 May 1864. The ship's new measurements were 111.04 feet x 21.72 feet x 6.94 feet. Its tonnage was calculated at 121.74 tons beneath the deck and 6.16 tons on the upper deck for a total cargo capacity of 127.90 tons. In this new document, the ship was described as three-masted and schooner-rigged. The document also listed Captain Peter D. Burns as *Emeline*'s new Master (Bureau of Navigation 1865). *Emeline* delivered lumber, shingles, and lath to Chicago from the Ferry family's Michigan mills at Black Creek and Grand Haven throughout the season (*Chicago Tribune* 1865; *Daily Inter Ocean* 1865a, 1865b).

Emeline again called on Black Creek and Grand Haven in 1866. Arrivals at Chicago were recorded with up to 130,000 board feet of lumber and clearings were light. For the last trip of the season, the ship brought 3,500 bushels of oats and corn from Chicago to Grand Haven on 27 November (*Chicago Tribune* 1866; *Daily Inter Ocean* 1866a, 1866b).

On 5 April 1867, a new enrollment was entered at the port of Grand Haven for a change in districts, owner arrangement, and Master. By 1867, the port of Grand Haven had acquired its own Customs House, and the ship was entered in this new district. William M. Ferry was noted as owning 2/3 interest and Thomas W. Ferry owned 1/3 of the schooner. Captain William Mulhall took over the helm (Bureau of Navigation 1867).

Emeline cleared Chicago on 11 April 1867 for its first trip of the season with sundries bound for Grand Haven. Although the ship's document indicated Captain Mulhall in command, well into the summer Captain Burns remained at its helm as was recorded as the ship entered Chicago. Through November, the ship ran from Black Creek, Grand Haven, and Grand River to Chicago, bringing upwards of 125,000 board feet of lumber per load to the later city. The vessel also brought cargos of lath, shingles, cordwood, and railroad ties from the Ferry mills (*Chicago Tribune* 1867a, 1867b; *Daily Inter Ocean* May 23, 1867a, 1867b, 1867c, 1867d, 1867e, 1867f, 1867g, 1867h, 1867i, 1867j, 1867k, 1867l, 1867m; *Daily Milwaukee News* 1867).

On 30 November 1867, *Emeline* was sailing in a heavy sea when it came ashore 20 miles south of Chicago. The tugs *O.B. Greene* and *Union* were sent to aid the schooner. They were initially unable to pull it off the beach, but a steam pump was transferred to the ship to keep the water down until the sea subsided. On 9 December, the tugs were able to float the ship, but it sank again in 6 feet of water about a half mile down the shore. By 20 December, the *Detroit Free Press* reported the vessel recovered in a synopsis of marine accidents of 1867, but no other details were provided. It is assumed that the vessel was uninjured or only required minor repairs that were not reported in the press (*Chicago Tribune* 1867c, 1867d, 1867e, 1867f; *Detroit Free Press* 1867; *Erie Daily Dispatch* 1867; *Milwaukee Daily Sentinel* 1867).

Emeline's first entry at Chicago for the 1868 season was recorded on 29 April 1868 bringing 120,000 board feet of lumber and 100,000 pieces lath from Black Creek (*Daily Inter Ocean* 1868a). The ship delivered lumber products from Black Creek, Grand Haven, Holland, and Muskegon throughout the season with the largest load being 130,000 board feet of dimensional lumber (*Chicago Tribune* 1868a, 1868b, 1868c; *Daily Inter Ocean* 1868b, 1868c, 1868d, 1868e, 1868f, 1868g, 1868h, 1868i, 1868j, 1868k). After delivery, the ship departed Chicago light for the trip across the lake. On 18 November 1868 *Emeline* cleared Chicago with 300 bushels of corn, 610 bushels of oats, 15 barrels of pork, 20 barrels of beef, and 55 barrels of flour to sustain Black Creek into the winter (*Daily Inter Ocean* 1868k). William H. Ferry passed away on 30 December 1868. A new enrollment should have been taken out for change in owner, but this was not done (Thomsen et al 2008).

The first record for the 1869 season was a clearing noted on 14 April as the vessel left light for Grand Haven (*Daily Inter Ocean* 1869a). On the afternoon of 10 May 1869, *Emeline* was under tow on the Chicago River by the tug *Babcock* near the Lake Street Bridge when both ships were struck by the propeller *Passaic*. The schooner lost its jibboom and a portion of its gunnel. The tug was so heavily damaged that it immediately steamed for the dry dock of repairs (*Buffalo Commercial Advertiser* 1869; *Daily Inter Ocean* 1869b; Hall 1869). *Emeline* made one additional trip to Chicago from Black Creek with lumber in May before heading to the shipyard in June (*Chicago Tribune* 1869a; *Milwaukee Daily Sentinel* 1869a). The vessel was placed back in service in July and it carried lumber products to Chicago from Black Creek and Muskegon through the middle of September (*Chicago Tribune* 1869b; *Milwaukee Daily Sentinel* 1869b, 1869c, 1869d).

On 18 April 1870, a new enrollment was entered at the port of Chicago for a change in owner and districts. Thomas W. Ferry sold the schooner to the partnership of James Gannett (2/3) and John Henry Gale (1/6) of Chicago, and Homer Edgar Prindle of Cleveland, Ohio (1/6). The ship's homeport was changed to Chicago and Captain William Follett was appointed Master (Bureau of Navigation 1870). The ship called on Black Lake, Pere Marquette, Manistee, Michigan, and Muskegon throughout the season to bring dimensional lumber and lumber products to Chicago (*Chicago Tribune* 1870a, 1870b, 1870c, 1870d, 1870e, 1870f, 1870g, 1870h, 1870j; *Daily Inter Ocean* 1870; *Detroit Free Press* 1870).

On 25 July 1870, Captain Follett was replaced by Captain James Hennberg (alternatively spelled Heneberg). Captain Follett returned to *Emeline*'s helm on 8 August 1870 and exchanged with Captain Hennberg again on 22 August 1870 (Bureau of Navigation 1870). On 24 October, *Emeline* loaded with winter supplies and sailed 30 barrels of pork and sundries to Manistee. Then on 3 November, the ship was chartered for a late season run from Chicago to Buffalo with wheat at 9 cents per bushel (*Chicago Tribune* 1870i; *Buffalo Morning Express and Illustrated Buffalo Express* 1870).

At the opening of the 1871 season a new enrollment was entered at the port of Chicago for a change in the ownership arrangement. John Henry Gale and Captain Sven Christenson, both of Chicago, bought out the shares previously owned by James Gannett. The new division of shares was Gale 1/3 share, Christenson ½ share, and Homer Prindle retained his 1/6 share. Captain Christenson became *Emeline*'s new Master. The ship's official number was assigned at this time, and #7492 was handwritten on documents (Bureau of Navigation 1871). Only four arrivals were recorded at Chicago, one each in May, June, August, and September as the ship carried lumber to the city from White Lake, Wisconsin, Kewaunee, Manistee, and Muskegon (*Chicago Tribune* 1871a, 1871b, 1871c, 1871d).

Emeline was lying at the Van Buren Street Bridge in Chicago on the night of 9 October 1871 when fire swept through the city. At midnight, the Mate ran to request the aid of the tug *L.H. Boole* at its dock near Market Street to tow the schooner out of danger. The tug took *Emeline* in a hip tow and navigated past several blocks of burning buildings to a point above Twelfth Street. The ship was saved because of this action. The crew of the tug claimed that the Mate offered the sum of $300 for the tug's services when a standard tow would be $30. The owners of *Emeline* suggested that the fee was equivalent to extortion and refused to pay. The dispute was forced into the courts for settlement (*Daily Inter Ocean* 1875a).

From 4 May through 23 August 1872 the ship brought near weekly shipments of lumber, strips, or lath from Muskegon to Chicago all sold by lumber merchant A.B. Watson (*Chicago Post* 1872; *Chicago Tribune* May 6, 1872a, 1872b, 1872c, 1872d, 1872e, 1872f, 1872g, 1872h, 1872i, 1872j). Its next trip out, the propeller *Colorado* collided with the *Emeline,* damaging *Emeline*'s hull and outfit (*Detroit Free Press* 1872). The vessel was repaired and returned to service by mid-September where it was employed carrying three shipments of lumber from Muskegon before putting up for the winter in early November (*Chicago Tribune* 1872k, 1872l, 1872m).

Emeline departed Chicago light on 16 April 1873 for its first run of the season. The schooner was bound to Muskegon. The ship was active through the middle of October and delivered seventeen loads of lumber to Chicago from that port with most of the cargos sold by lumber merchants, Blanchard, Borland & Co. (*Chicago Post* 1873; *Chicago Tribune* 1873a, 1873b, 1873c, 1873d, 1873e, 1873f, 1873g, 1873h, 1873i, 1873j, 1873k, 1873l, 1873m, 1873n 1873o, 1873p, *Daily Inter Ocean* 1873).

At the start of the 1874 season, the Board of Lake Underwriters valued *Emeline* at $5,500 and gave the vessel a B1 insurance rating (BLU 1874). Cargos were scarce during the first half of the season with only a handful of delivery recorded for the ship at Chicago from Ludington, Michigan, and Grand Haven (*Chicago Tribune* 1874a; *Daily Inter Ocean* 1874a, 1874b, 1874c). Without movement in June or July, there was a general concern for the lumber trade for the rest of the season and the *Chicago Tribune* reported that a large number of vessels had laid up until freight rates improved -- *Emeline* was

one of them (*Chicago Tribune* 1874b). Business picked up again in mid-August and through the end of the season, *Emeline* brought in lumber from White River, Whitehall, Ludington, and White Lake sold by Chicago lumber merchant W.B. Prettyman (*Chicago Tribune* 1874c, 1874d, 1874e; *Daily Inter Ocean* 1874d, 1874e, 1874f, 1874g, 1874h). The ship laid up in winter quarters in Chicago (*Daily Inter Ocean* 1874i).

On 23 February 1875, the dispute over the 9 October 1871 towing bill was finally heard in front of Judge Henry Blodgett of the U.S. District Court for the Northern District of Illinois. The owners of the *Emeline* were libeled for failure to pay for services rendered by the tug *L.H. Boole* for moving the schooner on the night of the Great Chicago Fire at the rate of $300 (*Daily Inter Ocean* 1875a).

Emeline was active from 6 May through 2 November 1875, bringing lumber to Chicago from Muskegon and Grand Haven throughout the season (*Chicago Tribune* 1875a, 1875b, 1875c, 1875d, 1875e; *Daily Inter Ocean* 1875b, 1875d, 1875f, 1875g, 1875h). On 26 June 1875, *Emeline* collided with the schooner *Rouse Simmons* while sailing in a fog. *Emeline* was cut down almost to its waterline. Its fore rigging was torn away, foresail ruined, bulwarks stove in, several stanchions broken and a large section of its railing missing. *Rouse Simmons* lost its bowsprit and jibboom. *Emeline* made it into Chicago on 28 June and went straight to the shipyard. The vessel was out of service for several weeks for the repairs (*Daily Inter Ocean* 1875e).

Emeline called at White Lake, Grand Haven, Manistee, White River, and Potter's Pier, Michigan, to collect lumber cargos during 1876. All shipments were taken to Chicago *(Chicago Tribune* 1876a, 1876b, 1876c, 1876d, 1876e, 1876f, 1876g; *Daily Inter Ocean* 1876a, 1876b, 1876c, 1876d, 1876e). During a heavy storm on the lake on 8 September 1876, *Emeline* lost its deck load of lumber and suffered slight damage to its outfit (*Daily Inter Ocean* 1876f). On 2 December 1876, the Chicago Crib-keeper reported *Emeline* ashore north of the Chicago Water Works. *Emeline* had been anchored in this vicinity and her anchor dragged for a distance, but fortunately, it did not go up on the beach (*Chicago Tribune* 1876h*).* As soon as the vessel could get inside the harbor, it was put up for the winter in the North Branch of the Chicago River (*Daily Inter Ocean* 1876g).

The vessel's 1877 arrivals at the port of Chicago were with lumber exclusively from Manistee and the vessel cleared the port light on each departure (*Chicago Tribune* 1877a, 1877b, 1877c*; Daily Inter Ocean* 1877a, 1877b, 1877c, 1877d)*.* On 15 June 1877, while off Point au Sable, Captain Sven Christenson was badly injured when the crank for the centerboard winch slipped from his hand while he was lowering the centerboard. The handle spun around freely and struck him on the side of his head, knocking him unconscious. He was carried to his cabin and attended to by the crew, but his injuries were severe. He was taken to the marine hospital when he arrived at Chicago on 19 June. Captain Charles A. Christenson took over the helm (*Chicago Tribune* 1877a*).* The schooner was put in winter

quarters during the first week of December in the North Branch of the Chicago River (*Daily Inter Ocean* 1877e).

The schooner was recorded entering the port of Chicago on three occasions in May 1878. The first arrival was on 3 May with sundries from White Lake and the next two arrivals were with lumber from Ludington and Manistee on 9 and 20 May (*Chicago Tribune* 1878a, 1878b; *Daily Inter Ocean* 1878a). On 1 June upon entering the port of Milwaukee, it was discovered that the ship's license had expired, so a temporary registration was issued. Captain Charles A. Christenson, who was not previously indicated on the vessel's paperwork, was listed as Master (Bureau of Navigation 1878a). This enrollment was replaced with a new, updated and permanent document once the ship arrived home at Chicago on 6 June 1878 (Bureau of Navigation 1878b). Through the end of the season, *Emeline* carried lumber to Chicago from White Lake, Cheboygan, Muskegon, Manistee and Grand Haven (*Chicago Tribune* 1878c, 1878d, 1878e, 1878f, 1878g; *Daily Inter Ocean* 1878b, 1878c, 1878d, 1878g; *Detroit Free Press* 1878). While in the Chicago harbor on the night of 23 October 1878, *Emeline* ran over the tug *Satisfaction* knocking off its smokestack. *Emeline* was slightly damaged and lost one of its catheads (*Daily Inter Ocean* 1878e, 1878d).

Following repairs to the schooner in the wake of the tangle with *Satisfaction*, the Board of Lake Underwriters reduced the value of the schooner to $2,500 at a B1 insurance rating (BLU 1879). The ship came out of winter quarters in mid-April and delivered its first cargo of lumber for the season from Muskegon on 24 April 1879 (*Daily Inter Ocean* 1879a). On its next trip, it was chartered to bring a load of stone to Grand Haven for harbor improvement projects (*Chicago Tribune* 1879a). Outside of one cargo of railroad ties delivered to Manitowoc for the Manitowoc Rail Road Company in July, all shipments were delivered to Chicago for the remainder of the season. Lumber was collected from Muskegon, Manistee, and Grand Haven (*Chicago Tribune* 1879b, 1879c, 1879d, 1879e, 1879g; *Daily Inter Ocean* 1879b, 1879c, 1879d, 1879e; *Manitowoc Pilot* 1879).

Before daylight on the morning of 18 October 1879, the tug *G.W. Gardner* was steaming in the vicinity of the Chicago harbor entrance in search of a tow. The tug's captain saw a green light ahead and in attempting to steer clear of it by changing his course, he ran across the bow of the schooner *Emeline*. *Emeline* lost a portion of its headgear, cutwater and dislocated its bowsprit. The tug only lost a piece of its monkey railing. *Emeline* was taken in leaking condition to the shipyard for repairs (*Daily Inter Ocean* 1879g; *Detroit Free Press* 1879). The schooner made one more delivery of lumber to Chicago for the season on 1 November before going into winter quarters (*Chicago Tribune* 1879h, 1879i; *Detroit Post and Tribune* 1879).

Emeline landed twenty-seven cargos of lumber from Muskegon and Manistee at Chicago in 1880 (*Chicago Tribune* 1880a, 1880b, 1880c, 1880d, 1880e, 1880f, 1880g, 1880h, 1880i, 1880j, 1880k,

1880l, 1880m, 1880n 1880o, 1880p, 1880q, 1880r, 1880s, 1880t, 1880u, 1880v, 1880w, 1880x; *Daily Inter Ocean* 1880a, 1880b, 1880c, 1880d, 1880e, 1880f, 1880g). The ship received a thorough recaulking at the Miller Brothers' dry dock on 29 July 1880 **(***Chicago Tribune* 1880j). On the afternoon of 13 September while *Emeline* was in port delivering lumber from Muskegon and tied up in the Chicago River near the Polk Street Bridge, the pilothouse of the passing tug *McClellan* caught the jibboom guy-wire of the schooner and broke off its jibboom near the cap. It was argued that since there was no damage to the pilothouse that the jibboom was in an advanced stage of decay, but the tug captain was at fault and forced to pay for a new spar. The Chicago Dry Dock company made the part and handled the replacement. Two days later the schooner cleared for Manistee (*Chicago Tribune* 1880p, 1880q; *Daily Inter Ocean* 1880d). While sailing for Chicago on 18 October, the *Emeline* encountered a heavy blow and lost a considerable portion of its deck load of lumber (*Chicago Tribune* 1880w).

Emeline logged seventeen arrivals at Chicago with lumber during the 1881- season. The ship called at Manistee, Muskegon, Bluffton, and Ludington for cargoes (*Chicago Tribune* 1881a, 1881b, 1881c, 1881d, 1881e, 1881f, 1881g; *Daily Inter Ocean* 1881a, 1881b, 1881c, 1881d, 1881e, 1881f, 1881g, 1881h, 1881i, 1881j, 1881k, 1881l, 1881m, 1881n, 1881o, 1881p). While unloading lumber at the Chicago Lumber Market on 10 October, *Emeline* lost its spritsail yard and the vessel was forced to seek out a replacement at the shipyards (*Chicago Tribune* 1881e).

In 1882, *Emeline* made lumber and shingles deliveries to Chicago from mid-April through October from Manistee, Ludington, Muskegon, and Grand Haven. The ship would drop off its cargo and clear light typically on the same day (*Chicago Tribune* 1882a, 1882b, 1882c, 1882d, 1882e, 1882f, 1882g, 1882h, 1882i, 1882j, 1882k, 1882l, 1882m; *Daily Inter Ocean* 1882a, 1882b, 1882c, 1882d, 1882e, 1882f, 1882g). On 1 May, the ship arrived with a single shipment of railroad ties from Ahnapee, Wisconsin (*Daily Inter Ocean* 1882b). On 17 August 1882, *Emeline* finished dropping off a lumber cargo but the vessel became detained overnight above the Kinzie Street Bridge the bridge was being repaired (*Daily Inter Ocean* 1882f).

Lumber shipments were down in 1883. Only six arrivals for the schooner were recorded for the season at the port of Chicago with lumber from Manistee, Muskegon, and White Lake (*Chicago Tribune* 1883a, 1883b; *Daily Inter Ocean* 1883a, 1883c, 1883d, 1883e, 1883f). On 1 July Captain Christenson discovered thieves had boarded and stolen the vessel's compass. The captain located the men, summoned the police, and the thieves were taken to jail (*Daily Inter Ocean* 1883b). *Emeline* was caught out in a squall on the lake on 16 September and lost its jibboom in the blow (*Marine Record* 1883). By 1 December, the ship was reported tied up on the North Branch of the Chicago River for the winter (*Chicago Tribune* 1883c).

Due to repairs on the vessel, *Emeline* was able to retain its B1 insurance rating for the 1884 season (Polk 1884). The ship called at Muskegon, Manistee, and Marinette to collect lumber for the Chicago market (*Chicago Tribune* 1884a, 1884b, 1884c, 1884d, 1884e, 1884f, 1884g, 1884h, 1884i, 1884j, 1884k, 1884l; *Daily Inter Ocean* 1884a, 1884b, 1884c). On 26 August, *Emeline* came into Chicago in a leaking condition and was taken to the Miller Brothers' dry dock where it received several new planks and caulking (*Chicago Tribune* 1884i; *Marine Record* 1884).

By the end of October 1884, available lumber cargos were set at less than 3 cents per board foot but vessel owners were not financially able to take less than 4 cents. With shippers unwilling to concede to the higher prices, *Emeline*'s owners (as well as many other vessel owners) notified the underwriters of their intention to cancel the insurance policy on the vessel (*Chicago Tribune* 1884m).

Emeline began its 1885 season in May with two trips to Manistee for lumber (*Chicago Tribune* 1885a; *Daily Inter Ocean* 1885a). On 3 June, *Emeline* departed Chicago light bound for Manistee, when sailing in a dense fog about thirty miles northeast of Chicago; it was struck by the schooner *Truman Moss*. *Truman Moss* was lumber-laden and bound for Chicago from Manistee when it hit the *Emeline* with a glancing blow on the port bow that carried away *Emeline*'s foretopmast, jibboom, bowsprit, two jibs and her headgear, thirty feet of railing, and eight stanchions. *Emeline*'s foresail was also split as it was pierced by *Truman Moss*' jibboom. *Truman Moss* had its jibboom and headgear carried away. *Emeline* limped back to Chicago on 4 June leaking and went to the Miller Brothers' shipyard for repairs (*Chicago Tribune* 1885b; *Marine Record* 1885; *Milwaukee Daily Sentinel* 1885; *Oshkosh Daily Northwestern* 1885). *Emeline* returned to service and cleared Chicago on 25 June for Muskegon. Lumber cargos were steady through July but tapered off to one delivery each month in August, September, and October (Chicago Tribune 1885c, 1885d, 1885e, 1885f, 1885g, 1885h; *Daily Inter Ocean* 1885b, 1885c).

On 19 April 1886, a new enrollment document was entered at the Port of Chicago for a change in *Emeline*'s owner arrangement. John Henry Gale was listed as managing owner owning ½ interest in the vessel. Along with him Sven and Charles A. Christenson, who each owned ¼ share. The ship's homeport remained Chicago and Captain Charles Christenson remained at its helm. On this document, an additional deduction of 16.39 ton was given under section 4153 revised statues as amended by Congressional Act of 5 August 1882 resulting in a net tonnage of 121.51 tons (Bureau of Navigation 1886). The ship brought lumber to Chicago from Pentwater, Muskegon, and Manistee throughout the season (*Chicago Tribune* 1886a, 1886b, 1886c, 1886d, 1886e, 1886f, 1886g, 1886h, 1886i, 1886j; *Daily Inter Ocean* 1886a, 1886b, 1886c, 1886d, 1886e).

On the morning on 27 September 1886, *Emeline* was bound upriver in tow of a tug. Just as the vessel was starting to enter the draw of the Main Street Bridge, the steambarge *Nellie Torrent*, also up bound,

attempted to pass the schooner but smashed into the schooner's stern quarter. Both vessels became wedged in the narrow channel for more than seven hours. The bridge remained open but because of shoaling under the other draw, only light vessels could navigate up or down river past the obstruction. In trying to remove the two ships, tug *Alpha* pulled her bitts out and the steambarge *Inter Ocean* broke her timber heads. *Emeline* was taken to the shipyard where it received $150 in repairs (*Chicago Tribune* 1886g). *Emeline* was placed back in service clearing Chicago for Muskegon on 14 October and sailed through November before going into winter quarters at Chicago (*Chicago Tribune* 1886h, 1886i).

Emeline was recorded entering the port of Chicago with lumber cargos twenty-eight times throughout the 1887 season. The ship was active mid-May through the beginning of November and delivered lumber from Manistee, White Lake, Menominee, and Muskegon (*Chicago Tribune* 1887a, 1887b, 1887c, 1887d, 1887e, 1887f, 1887g, 1887h, 1887i, 1887j, 1887k, 1887l, 1887m, 1887n, 1887o, 1887p, 1887q, 1887r, 1887s, 1887t, 1887u, 1887v; *Daily Inter Ocean* 1887a, 1887b, 1887c, 1887d, 1887e, 1887f, 1887g, 1887h). By 1 December, *Emeline* was listed among the winter fleet at Chicago (*Chicago Tribune* 1887w).

Due to damages and repairs to the vessel, *Emeline*'s insurance rating was lowered to B1 1/2 for the 1888 season (Polk 1888). The ship was active from early May through late October, making at least four landings per month at Chicago and collecting lumber from Manistee, Muskegon, Minorville, and Marinette (*Chicago Tribune* 1888a, 1888b, 1888c, 1888d, 1888e, 1888f, 1888g, 1888h, 1888i, 1888j, 1888k, 1888l, 1888m; *Daily Inter Ocean* 1888a, 1888b, 1888c, 1888d, 1888e, 1888f, 1888g, 1888h, 1888i, 1888j, 1888k, 1888l, 1888m, 1888n, 1888o). In October, *Emeline* experienced two separate delays due to weather. On 20 October, the ship was wind bound at Manistee, and on 31 October, *Emeline* ran into Milwaukee to shelter from a heavy sea (*Chicago Tribune* 1888n, 1888o).

During the first week of April 1889, *Emeline* came into the dry dock at Miller Brothers' shipyard to receive a new centerboard trunk (*Marine Record* 1889). After the improvement, the vessel's insurance rating was increased to B1 (*Daily Inter Ocean* 1889r). Its first arrival at Chicago was recorded on 19 April from Manistee. Twenty-seven entries at Chicago were documented for the vessel, mostly from Manistee. Singular lumber deliveries were also made from Muskegon, Menominee, and Washington Island, Wisconsin (Chicago Tribune 1889a, 1889b, 1889c, 1889d, 1889e, 1889f, 1889g, 1889h, 1889i, 1889j, 1889k, 1889l, 1889m; *Daily Inter Ocean* 1889a, 1889b, 1889c, 1889d, 1889e, 1889f, 1889g, 1889h, 1889i, 1889j, 1889k, 1889l, 1889m, 1889n, 1889o, 1889p, 1889q; *Door County Advocate* 1889). By 13 November, the ship was stripped for the winter and tied at its winter berth along the Chicago River (*Daily Inter Ocean* 1889r).

Emeline was out of winter quarters in mid-April and active in Chicago's lumber trade through the end of November 1890. The ship fetched cargos from Minorville, Manistee, Menominee, and Marinette throughout the season (*Chicago Tribune* 1890a, 1890b, 1890c, 1890d, 1890e, 1890f, 1890g, 1890h; *Daily Inter Ocean* 1890a, 1890b, 1890c, 1890d, 1890e, 1890f, 1890g, 1890h, 1890i, 1890j, 1890k, 1890l). Only one delay was reported from weather when on 2 November the ship was windbound at Sheboygan (*Daily Inter Ocean* 1890j). By the first week of December, the schooner had laid up for the winter at the Burlington slip in Chicago (*Chicago Tribune* 1890i).

In 1891, the ship called on Manistee, Menominee, and Peshtigo to collect cargoes for the Chicago lumber market. Freights were down and only two trips were made in April, two in June, two in July, one in August, two in September and one in October. By 20 October, the ship was stripped and put up for the winter (*Chicago Tribune* 1891a, 1891b, 1891c, 1891d, 1891e; *Daily Inter Ocean* 1891a, 1891b, 1891c, 1891d, 1891e, 1891f, 1891g).

The schooner made fifteen lumber deliveries at Chicago in 1892, brought to the city from Manistee, Sturgeon Bay, and St. Joseph. For the first time in several of years, no accidents were reported during the season. The ship remained active from late April through the middle of October (*Chicago Tribune* 1892a, 1892b, 1892c, 1892d, 1892e, 1892f, 1892g, 1892h, 1892i, 1892j, 1892k; *Detroit Free Press* 1892; *Daily Inter Ocean* 1892a, 1892b, 1892c, 1892d).

Cargoes were light and the schooner made only eleven lumber deliveries at Chicago in 1893, brought to the city from Manistee, Manitowoc, Beauspier, Rowley's Harbor, and Mud Lake. The ship was active from late April through the end of July. No trips were made in August or September. A remark in the Inland Lloyd's Register suggests the ship was rebuilt in 1893, and these idle months are likely when that service was carried out (Inland Lloyds 1894). Business picked up in October and the ship remained in service through the middle of December (*Chicago Tribune* 1893a, 1893b, 1893c, 1893d, 1893e, 1893f, 1893g, 1893h, 1893i, 1893j, 1893k, 1893l, 1893m; *Daily Inter Ocean 1893*).

At the start of the 1894 season, the Board of Lake Underwriters valued *Emeline* at $1,500 and gave the vessel a B1+ insurance rating (Inland Lloyds 1894). Lumber was collected for the Chicago market from Manistee, Ludington, Little Sturgeon, Menominee, Little Harbor, Thompson's Pier, and Muskegon (*Chicago Tribune* 1894a, 1894b, 1894c, 1894d, 1894e, 1894f, 1894g, 1894h, 1894i, 1894j, 1894k, 1894l, 1894m, 1894n, 1894o, 1894p, 1894q, 1894r; *Daily Inter Ocean* 1894a, 1894b). This indicates the growing scarcity of the resource and the necessity to sail further and to a greater diversity of places to meet the demand. The ship was active May through November delivering nineteen cargos at Chicago, and one at South Chicago throughout the season.

On 15 October 1894, *Emeline*, lumber-laden and bound for Chicago, spotted the schooner *A.J. Mowry* displaying distress signals while 20 miles off Port Washington. *A.J. Mowry* broke its foremast in a gale and its crew was forced to cut away a portion of the vessel's rigging. Two steamers came upon *A.J. Mowry* but neither offered aid. *Emeline* came up to the disabled schooner, and *Emeline*'s master, Captain Hellesy (not recorded in the vessel's papers) asked if the crew wanted to be taken off. *A.J. Mowry*'s crew decided to stay aboard, but *Emeline* stood by until they were taken in tow by the tug *Arthur Jones* and taken to Milwaukee (*Chicago Tribune* 1894p; *Marine Record* 1894).

Emeline loaded lumber at Manistee, White Lake, Traverse City, and Whitehall during the 1895 season, making sixteen deliveries to Chicago (*Chicago Tribune* 1895a, 1895b, 1895c, 1895d, 1895e, 1895f, 1895g, 1895h, 1895i, 1895j, 1895k, 1895l, 1895m, 1895n, 1895o; *Daily Inter Ocean* 1895a, 1895b, 1895c). At 10a.m. on 24 September 1895, the schooner was being towed out of the Chicago River by a tug and the crew partially raised its foresail while in the river. In rounding the north pier and coming into the wind on the lake, the vessel's sail jibed over and in an instant, it was torn from the bolt ropes. The tug steamed over to help, but since it was not requested, the schooner kept on her way (*Chicago Tribune* 1895k; *Daily Inter Ocean* 1895d). On the afternoon of 8 November while lying at the Chicago lumber market docks, *Emeline* was run into by the passing steamer *Progress*. The schooner's railing was broken, and part of its headgear carried away. *Progress* was spun around in the river but otherwise the vessel went uninjured (*Chicago Tribune* 1895p).

On 23 March 1896, a new enrollment was entered at the Port of Chicago for change in owners. Captain Adam E. Abrahamson became sole owner and Master. Captain Abrahamson purchased the vessel from John Henry Gale and his partners for $1,500 (Bureau of Navigation 1896). Abrahamson was a Norwegian immigrant. Upon arrival in America, he took to the lakes as a means of livelihood and sailed for many years as a common sailor. Through frugal living, he saved enough money finally to buy a schooner for himself in which to make his fortune (Door County Advocate 1896b).

At the start of the 1896 season, the insurance underwriters reduced *Emeline*'s value from $1,500 to $1,200 (Inland Lloyd's Register 1896; *Marine Review* 1896a). The ship called at Frankfort, Charlevoix and Marinette in May and June. At Marinette, *Emeline* picked up a cargo of sawdust bound to South Chicago. It was said that it would be used in the manufacture of fireproof material (*Chicago Tribune* 1896a, 1896b; *Milwaukee Daily Sentinel* 1896a).

The vessel cleared Charlevoix on 6 August 1896 bound with lumber for Kenosha. At 10a.m., twenty miles southeast of Baileys Harbor, Wisconsin the schooner was struck down by a heavy squall from the west, which caused the ship to careen, and eventually capsize. Most of the crew was on deck at the time of the incident. Only one of the sailors was below in the fo'c's'le and was thrown out of his bunk as the vessel lay on its beam. He crawled out of the companion hatch and on deck as rushed in. The

captain and crew took to the yawl around 11a.m. and rowed to Baileys Harbor, making it there by 5p.m. The life-saving crew took the shipwreck victims in and provided them with food, clothing, and shelter. Captain Abrahamson telephoned to Sturgeon Bay for a tug to come to Baileys Harbor and the *Sydney Smith* arrived at 8p.m. Along with Captain Peter Olsen and the crew of the Baileys Harbor Life-Saving Station in tow in their surfboat, they set out about 3a.m. on 9 August to find *Emeline*. After more than half a day searching, they found the schooner twenty miles southeast of Baileys Harbor.

Emeline was taken into Baileys Harbor at 9p.m. Several unavailing efforts were made to right the ship. First, a line was fastened to the mainmast, but this resulted in breaking the mast. Next, the schooner *Nancy Dell* was taken alongside, and the capsized vessel was successfully righted, but during the night rolled over again. On 12 August, Captain Abrahamson and his crew boarded the steamer *City of Ludington* for Chicago. Captain Abrahamson spent most his money acquiring the *Emeline*, what remained he spent in the recovery attempts. He had no money to pay his crew. As he carried no insurance the loss was complete, and the outfit was stranded. The schooner was left lying off Anclam Pier with her side and spars just visible above the surface (*Chicago Tribune* 1896c, 1897; *Daily Inter Ocean* 1896; *Door County Advocate* 1896a, 1896b, 1896c, 1896d, 1897a; *Marine Record* 1896; *Milwaukee Journal* 1896; *Port Huron Daily Times* 1896a, 1896b).

A copy of the vessel's enrollment was surrendered at the port of Chicago on 18 August 1896 stating vessel was lost, having capsized 20 miles southeast of Baileys Harbor, Michigan (the state erroneously reported) (Bureau of Navigation 1896). In the following weeks, newspapers reported that Captain Abrahamson sold the wreck to the Brann Brothers of Baileys Harbor for $15, although the vessel's title did not change hands (*Door County Advocate* 1896c; *Milwaukee Daily Sentinel* 1896b).

As the wreck lay only 400 feet west of the line of the range lights, calls for the vessel's removal as a hazard to navigation began by mid-September 1896. J.A.B. Thompkins of the U.S. Engineer Office in Milwaukee came up in late October to assess the boat's condition and position relative to the navigation channels in the harbor (*Door County Advocate* 1896d, 1896e; *Marine Review* 1896b).

By January 1897, ice and waves caused the ship to break in two (*Door County Advocate* 1897b, 1897c, 1897d, 1897e, 1897f). On 8 October 1898, a black spar buoy was placed on the north side of the wreck to warn off approaching vessels. In September 1903, wreckers removed the anchors from *Emeline* and dynamited the wreck to flatten it partially (*Door County Advocate* 1903).

Archaeological Significance
Although broken, most of *Emeline*'s hull components are represented within the wreck site, largely covered by moving sand. The site retains its archaeological integrity, and sites such as *Emeline* present

a rare opportunity to study and learn about historic wooden vessels, specifically double centerboard schooner construction and the history of Wisconsin's small, lakeshore communities. In fact, *Emeline* is one of the few double centerboard schooners found in the Great Lakes; others in Wisconsin are the schooners *Rouse Simmons*, *Lumberman*, *Boaz*, the sailing canaller *Montgomery*, and the scow schooner *Silver Lake*. The preservation of this site offers the opportunity for further study. *Emeline* represents a unique vessel type found in Wisconsin waters and offers the opportunity for further study. Given that a large portion of this wreck is covered by sand, there is the potential that more artifacts may be uncovered; these artifacts may shed light on day-to-day shipboard life. Although the cargo was salvaged and the hull broken up with dynamite following its sinking, the name of the wreck site was lost to local memory, and it eventually became known only as the Anclam Pier Wreck. Recent work on the site and additional historical analysis have indicated that this site is the wreckage of *Emeline*. Due to its shallow location, the vessel remains a popular dive site.

Emeline meets the registration requirements for Criterion D at the state level as a good example of a double centerboard schooner sailing vessel type as described in the Multiple Property Documentation *Great Lakes Shipwrecks of Wisconsin* (Cooper and Kriesa 1992) and in the area of Commerce for its role in the Great Lakes lumber trade. *Emeline* is an example of a vessel type that was vital to Wisconsin's economy and the economy of the Midwest through maritime bulk cargo transportation; a part of the transportation infrastructure prior to the development of road and rail networks.

Many opportunities remain for future archaeological research on the *Emeline* site as sands shift, and the site becomes more visible; additional information from the site may significantly add to our understanding of Great Lakes sailing vessels. Nineteenth-century wooden vessels were rarely built to drawn plans. Today, scant documentation exists that illustrates how these unique vessels were constructed, the nuances of differing hull lines, construction techniques, including why double centerboards were used, and adaptations to bulk cargo needs. Double centerboard schooners were rare on the Great Lakes, and little historic documentation exists regarding the advantages of two centerboards. As one of only six documented double centerboard schooners in Wisconsin waters, data gathered on *Emeline* has significantly increased our understanding of the variations of double centerboard schooner use and construction.

Land Acknowledgement
American Indian populations have utilized the Great Lakes as travel and trade routes and fishing grounds since the dawn of the post-Glacial period, as attested by finds of caches of Late Paleo-Indian (ca. 10,000 BP) trihedral adzes connected to manufacture of dugout canoes. American Indians continued to build dugout canoes even as skin boats and eventually birch bark canoes came into widespread use in the Great Lakes. American Indians adopted and adapted other vessel designs as time passed and ways of traveling, making a living and utilizing the water changed. Netting, fish hooks,

harpoons, and fish remains have been found at coastal sites inhabited throughout the span of human occupation of the region, confirming American Indian use of the lake as a productive fishery. Trade in tool stone, finished goods, and other products is likely to have moved along water routes as well, since such routes were firmly established by the 1500s when they were documented by French colonists. In the post-Contact period, refugees fleeing eastern wars, traders, and warriors of many Nations—Ho-Chunk, Menominee, Potawatomi, Ojibwe, Meskwaki, Sauk, Mascouten, Kickapoo, Odawa, and Wendat--utilized Lake Michigan as a major travel route. Most recently members of the Menominee, Potawatomi, Ojibwe, and Odawa have used the section of the coast nearest the wreck of the *Emeline* for hunting, fishing, gathering, and recreation. No American Indian sites have been identified in the vicinity of this shipwreck, but the area has not been systematically investigated for the presence of such sites.

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1874g *Daily Inter Ocean*. 23 September.
1874h *Daily Inter Ocean*. 21 September.
1874i *Daily Inter Ocean*. 24 December.
1875a *Daily Inter Ocean*. 23 February.
1875b *Daily Inter Ocean*. 8 June.
1875c *Daily Inter Ocean*. 15 June.
1875d *Daily Inter Ocean*. 28 June.
1875e *Daily Inter Ocean*. 29 June.
1875f *Daily Inter Ocean*. 6 July.
1875g *Daily Inter Ocean*. 2 August.

1875h *Daily Inter Ocean*. 10 August.
1876a *Daily Inter Ocean*. 31 May.
1876b *Daily Inter Ocean*. 1 June.
1876c *Daily Inter Ocean*. 3 July.
1876d *Daily Inter Ocean*. 15 July.
1876e *Daily Inter Ocean*. 16 August.
1876f *Daily Inter Ocean*. 8 September.
1876g *Daily Inter Ocean*. 18 December.
1877a *Daily Inter Ocean*. 6 June.
1877b *Daily Inter Ocean*. 28 July.
1877c *Daily Inter Ocean*. 10 September.
1877d *Daily Inter Ocean*. 29 October.
1877e *Daily Inter Ocean*. 5 December.
1878a *Daily Inter Ocean*. 20 May.
1878b *Daily Inter Ocean*.1 July.
1878c *Daily Inter Ocean*. 26 Aug.
1878d *Daily Inter Ocean*. 4 Sept.
1878e *Daily Inter Ocean*. 25 Oct.
1878f *Daily Inter Ocean*. 28 Oct.
1878g *Daily Inter Ocean*. 4 Nov.
1879a *Daily Inter Ocean*. 25 April.
1879b *Daily Inter Ocean*. 1 July.
1879c *Daily Inter Ocean*. 4 August.
1879d *Daily Inter Ocean*. 3 September.
1879e *Daily Inter Ocean*. 9 September.
1879f *Daily Inter Ocean*. 20 September.
1879g *Daily Inter Ocean*. 20 October.
1880a *Daily Inter Ocean*. 4 May.
1880b *Daily Inter Ocean*. 19 July.
1880c *Daily Inter Ocean*. 22 July.
1880d *Daily Inter Ocean*. 15 September.
1880e *Daily Inter Ocean*. 5 October.
1880f *Daily Inter Ocean*. 11 November.
1880g *Daily Inter Ocean*. 13 November.
1881a *Daily Inter Ocean*. 13 May.
1881b *Daily Inter Ocean*. 19 May.
1881c *Daily Inter Ocean*. 21 May.
1881d *Daily Inter Ocean*. 26 May.

1881e *Daily Inter Ocean*. 1 June.
1881f *Daily Inter Ocean*. 13 June.
1881g *Daily Inter Ocean*. 14 June.
1881h *Daily Inter Ocean*. 30 June.
1881i *Daily Inter Ocean*. 12 July.
1881j *Daily Inter Ocean*. 27 July.
1881k *Daily Inter Ocean*. 6 August.
1881l *Daily Inter Ocean*. 9 September.
1881m *Daily Inter Ocean*. 15 September.
1881n *Daily Inter Ocean*. 30 September.
1881o *Daily Inter Ocean*. 25 October.
1881p *Daily Inter Ocean*. 7 November.
1882a *Daily Inter Ocean*. 22 April.
1882b *Daily Inter Ocean*. 1 May.
1882c *Daily Inter Ocean*. 24 May.
1882d *Daily Inter Ocean*. 30 May.
1882e *Daily Inter Ocean*. 6 July.
1882f *Daily Inter Ocean*. 18 Aug.
1882g *Daily Inter Ocean*. 12 Oct.
1883a *Daily Inter Ocean*. 6 June.
1883b *Daily Inter Ocean*. 1 July.
1883c *Daily Inter Ocean*. 9 July.
1883d *Daily Inter Ocean*. 1 August.
1883e *Daily Inter Ocean*. 21 August.
1883f *Daily Inter Ocean*. 22 August.
1884a *Daily Inter Ocean*. 17 June.
1884b *Daily Inter Ocean*. 24 August.
1884c *Daily Inter Ocean*. 2 October.
1885a *Daily Inter Ocean*. 30 May.
1885b *Daily Inter Ocean*. 25 July.
1885c *Daily Inter Ocean*. 17 Sept.
1886a *Daily Inter Ocean*. 25 May.
1886b *Daily Inter Ocean*. 8 June.
1886c *Daily Inter Ocean*. 9 July.
1886d *Daily Inter Ocean*. 11 August.
1886e *Daily Inter Ocean*. 26 October.
1887a *Daily Inter Ocean*. 4 August.
1887b *Daily Inter Ocean*. 27 August.

1887c *Daily Inter Ocean*. 1 October.
1887d *Daily Inter Ocean*. 12 October.
1887e *Daily Inter Ocean*. 21 October.
1887f *Daily Inter Ocean*. 22 October.
1887g *Daily Inter Ocean*. 1 November.
1887h *Daily Inter Ocean*. 1 December.
1888a *Daily Inter Ocean*. 8 May.
1888b *Daily Inter Ocean*. 14 May.
1888c *Daily Inter Ocean*. 8 June.
1888d *Daily Inter Ocean*. 27 July.
1888e *Daily Inter Ocean*. 28 July.
1888f *Daily Inter Ocean.* 4 August.
1888g *Daily Inter Ocean*. 5 August.
1888h *Daily Inter Ocean*. 28 August.
1888i *Daily Inter Ocean*. 29 August.
1888j *Daily Inter Ocean*. 31 August.
1888k *Daily Inter Ocean*. 1 September.
1888l *Daily Inter Ocean.* 4 September.
1888m *Daily Inter Ocean*. 20 September.
1888n *Daily Inter Ocean*. 24 September.
1888o *Daily Inter Ocean*. 2 October.
1889a *Daily Inter Ocean*. 21 April.
1889b *Daily Inter Ocean*. 24 April.
1889c *Daily Inter Ocean*. 22 June.
1889d *Daily Inter Ocean*. 26 June.
1889e *Daily Inter Ocean*. 29 June.
1889f *Daily Inter Ocean*. 19 July.
1889g *Daily Inter Ocean*. 20 July.
1889h *Daily Inter Ocean*. 27 July.
1889i *Daily Inter Ocean*. 31 July.
1889j *Daily Inter Ocean*. 6 August.
1889k *Daily Inter Ocean*. 9 August.
1889l *Daily Inter Ocean*. 12 August.
1889m *Daily Inter Ocean*. 23 August.
1889n *Daily Inter Ocean*. 31 August.
1889o *Daily Inter Ocean*. 15 October.
1889p *Daily Inter Ocean*. 18 October.
1889q *Daily Inter Ocean*. 25 October.

1889r *Daily Inter Ocean*. 13 November.
1890a *Daily Inter Ocean*. 29 April.
1890b *Daily Inter Ocean*. 23 May.
1890c *Daily Inter Ocean*. 28 June.
1890d *Daily Inter Ocean.*6 July.
I1890e *Daily Inter Ocean*. 17 August.
1890f *Daily Inter Ocean*. 26 August.
1890g *Daily Inter Ocean*. 30 August.
1890h *Daily Inter Ocean*. 21 September.
1890i *Daily Inter Ocean*. 10 October.
1890j *Daily Inter Ocean*. 3 November.
1890k *Daily Inter Ocean*. 7 November.
1890l *Daily Inter Ocean*. 9 November.
1891a *Daily Inter Ocean.* 19 April.
1891b *Daily Inter Ocean.* 26 April.
1891c *Daily Inter Ocean.* 2 June.
1891d *Daily Inter Ocean.* 5 June.
1891e *Daily Inter Ocean.* 18 July.
1891f *Daily Inter Ocean.* 27 July.
1891g *Daily Inter Ocean.* 22 October.
1892a *Daily Inter Ocean*. 23 May.
1892b *Daily Inter Ocean*. 17 August.
1892c *Daily Inter Ocean*. 22 August.
1892d *Daily Inter Ocean*. 11 September.
1893 *Daily Inter Ocean*. 11 December.
1894a *Daily Inter Ocean*. 4 May.
1894b *Daily Inter Ocean*. 11November.
1895a *Daily Inter Ocean*. 25 September.
1895b *Daily Inter Ocean*. 4 October.
1895c *Daily Inter Ocean*. 10 October.
1895d *Daily Inter Ocean*. 11 October.
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1867 *Daily Milwaukee News*. 17 October.

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1864 *Detroit Free Press*. 14 November.

1867 *Detroit Free Press*. 20 December.
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1872 *Detroit Free Press*. 14 December.
1878 *Detroit Free Press*. 16 June.
1879 *Detroit Free Press*. 21 October.
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1889 *Door County Advocate*. 21 September.
1896a *Door County Advocate*. 15 August.
1896b *Door County Advocate*. 22 August.
1896c *Door County Advocate*. 5 September.
1896d *Door County Advocate*. 10 October.
1896e *Door County Advocate*. 31 October.
1897a *Door County Advocate*. 2 January.
1897b *Door County Advocate*. 9 January.
1897c *Door County Advocate*. 16 January.
1897d *Door County Advocate*. 23 January.
1897e *Door County Advocate*. 6 February.
1897f *Door County Advocate*. 20 February.
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1885 *Marine Record*. 11 June.
1889 *Marine Record*. 4 April.
1894 *Marine Record*. 18 October.
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1869c *Milwaukee Daily Sentinel*. 1 September.
1869d *Milwaukee Daily Sentinel*. 14 September.
1885 *Milwaukee Daily Sentinel.* 6 June.
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United States Department of the Interior
National Park Service

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Continuation Sheet

Verbal Boundary Description:
The boundary for the *Emeline* site is marked by a circle with a radius of 150 feet, centered on the UTM coordinates 0490845 Easting, 4989537 Northing, Zone 16T.

Boundary Justification:
This site boundary was chosen to encompass the wreck site and associated debris field.

United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

Photo #1 of 6
Emeline Shipwreck (Schooner)
Door County, Wisconsin
Photographer Tamara Thomsen
July 2022
Image of *Emeline*'s two centerboards, looking aft

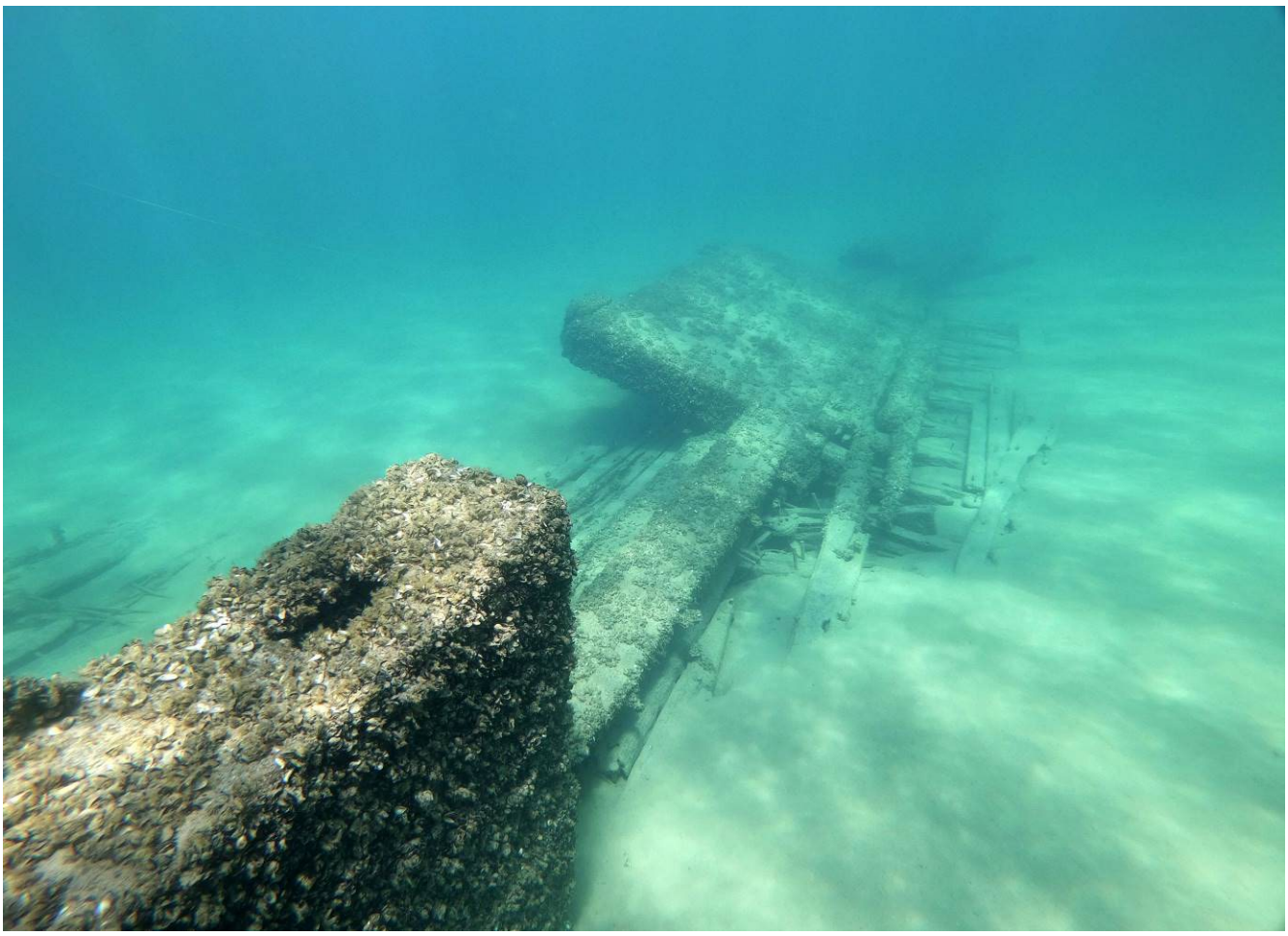


Photo #2 of 6
Emeline Shipwreck (Schooner)
Door County, Wisconsin
Photographer Tamara Thomsen
May 2022
Archaeologists record *Emeline*'s aft centerboard

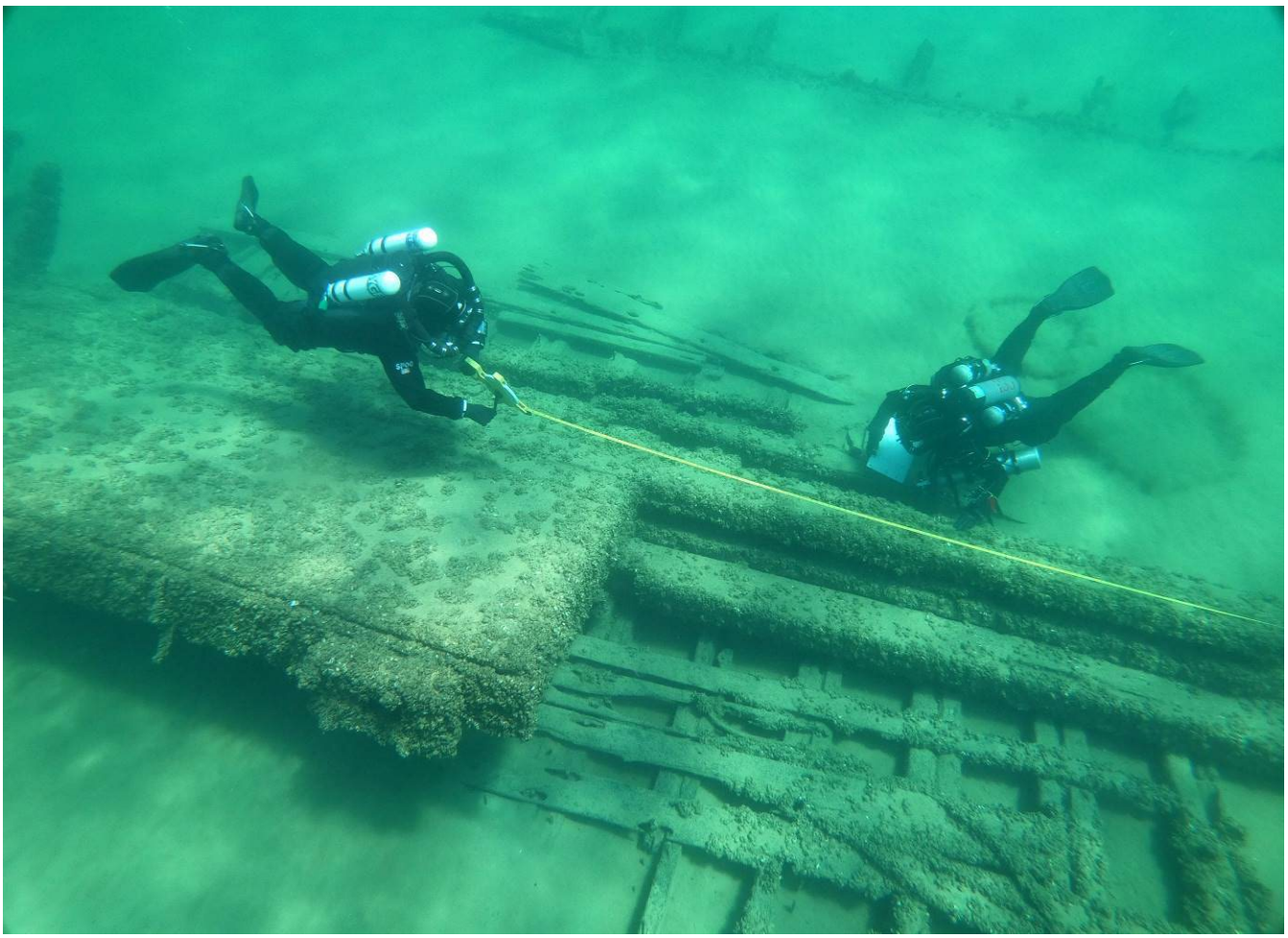
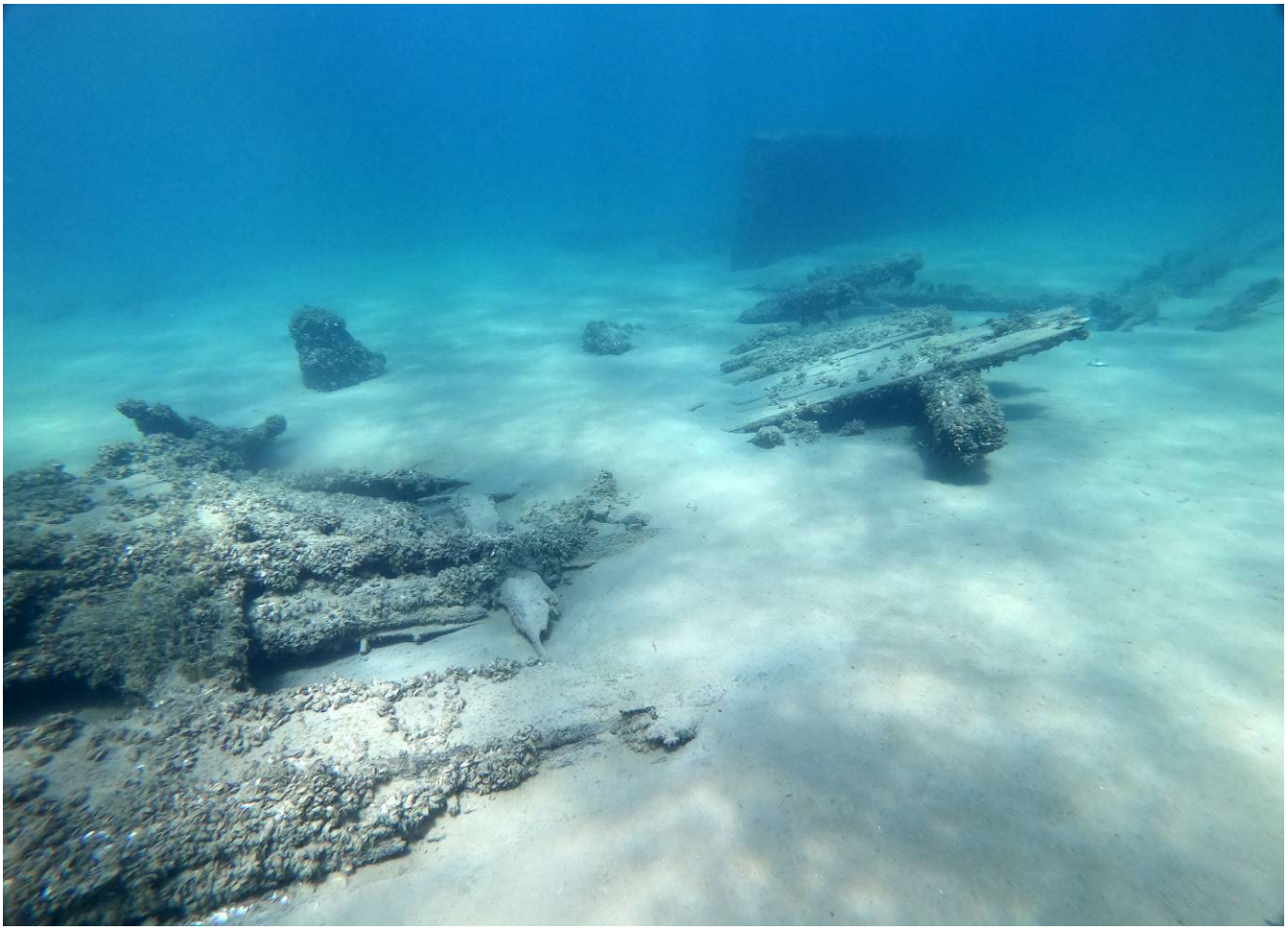


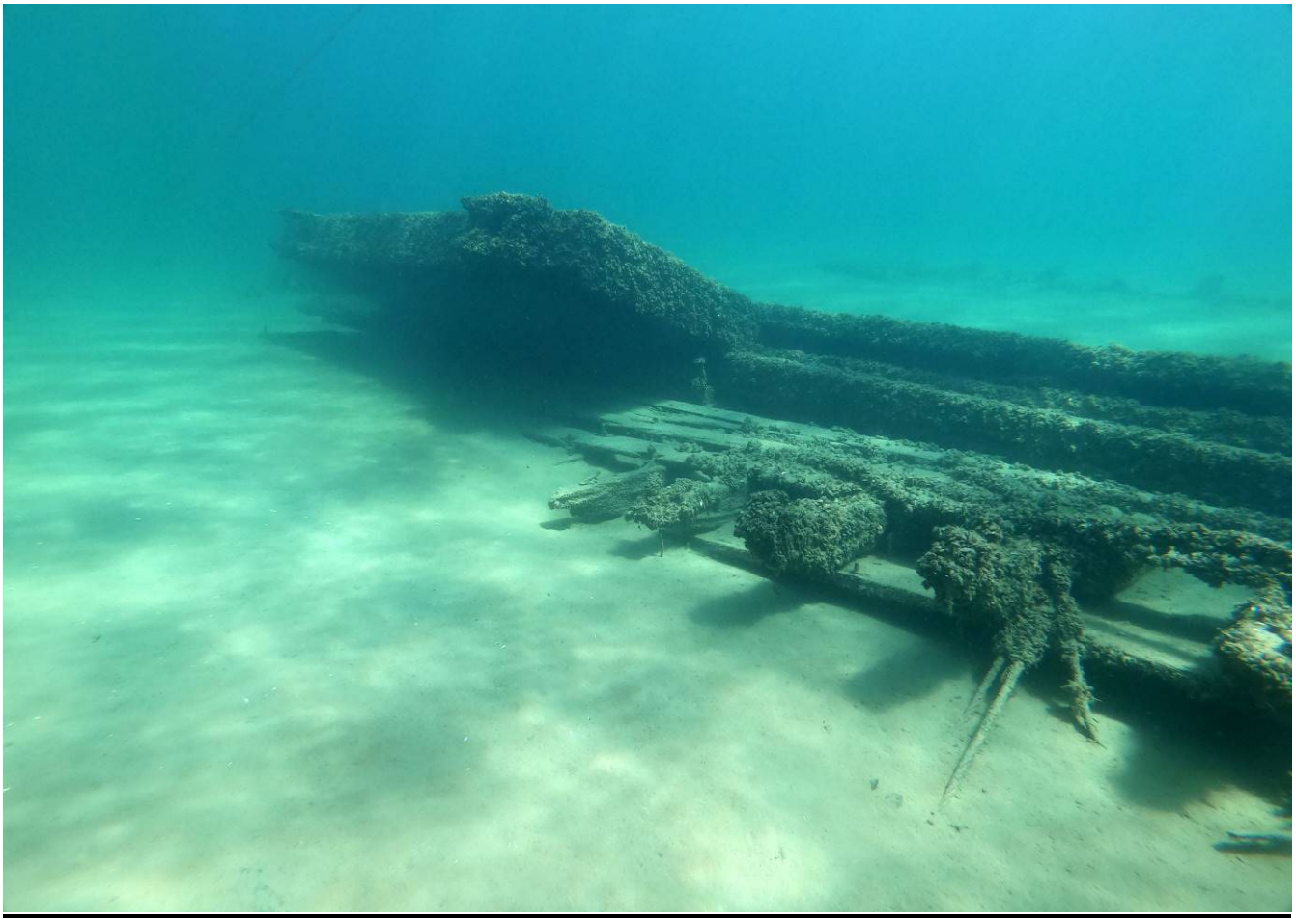
Photo #3 of 6
Emeline Shipwreck (Schooner)
Door County, Wisconsin
Photographer Tamara Thomsen
May 2022
Emeline's bow section and forward portside hull, looking aft



United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

Photo #4 of 6
Emeline Shipwreck (Schooner)
Door County, Wisconsin
Photographer Tamara Thomsen
May 2022
Image of *Emeline*'s starboard keelson structure, looking aft



United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

Photo #5 of 6
Emeline Shipwreck (Schooner)
Door County, Wisconsin
Photographer Tamara Thomsen
May 2022
A diver descends over *Emeline*'s forward centerboard, looking forward

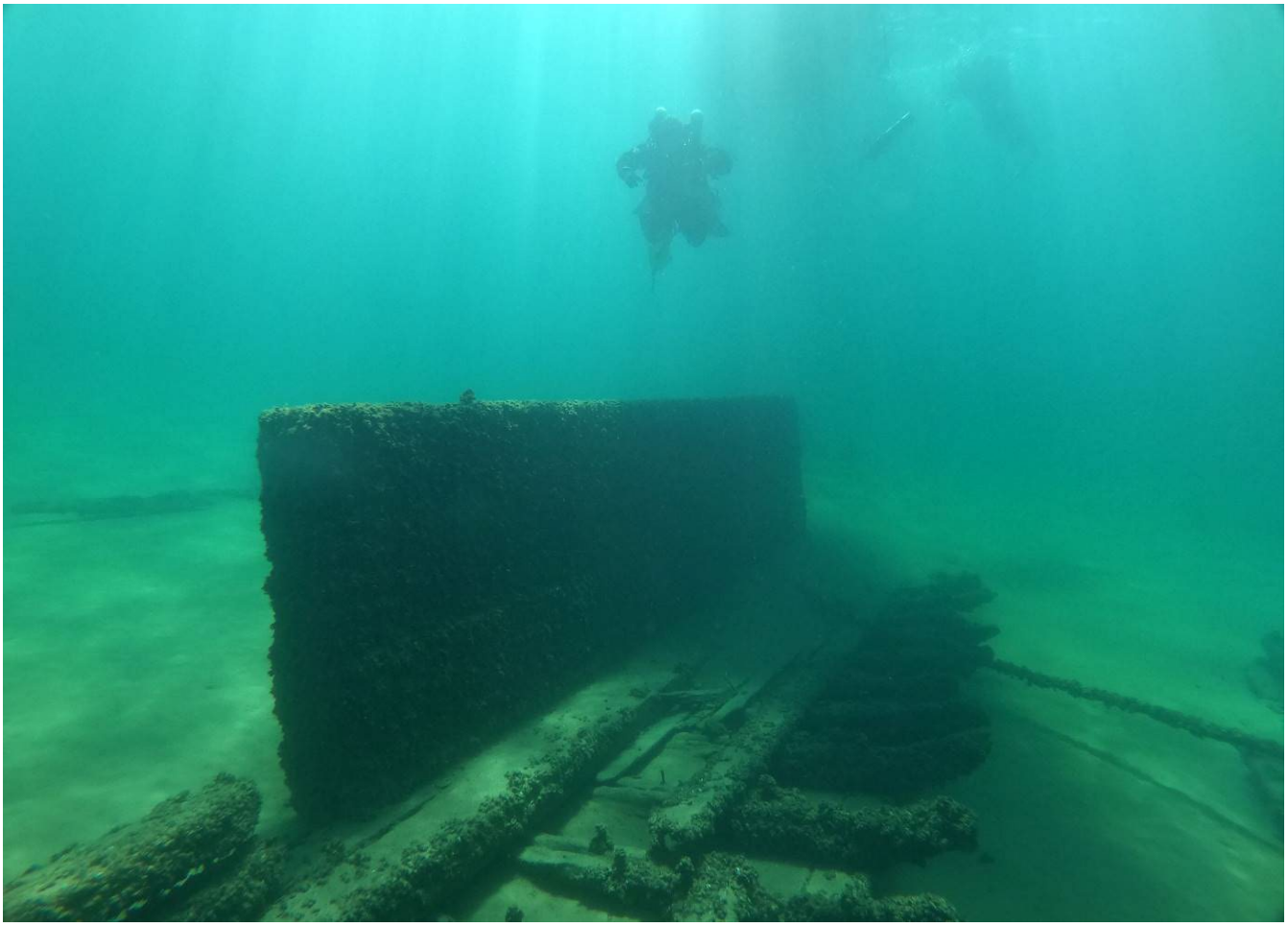
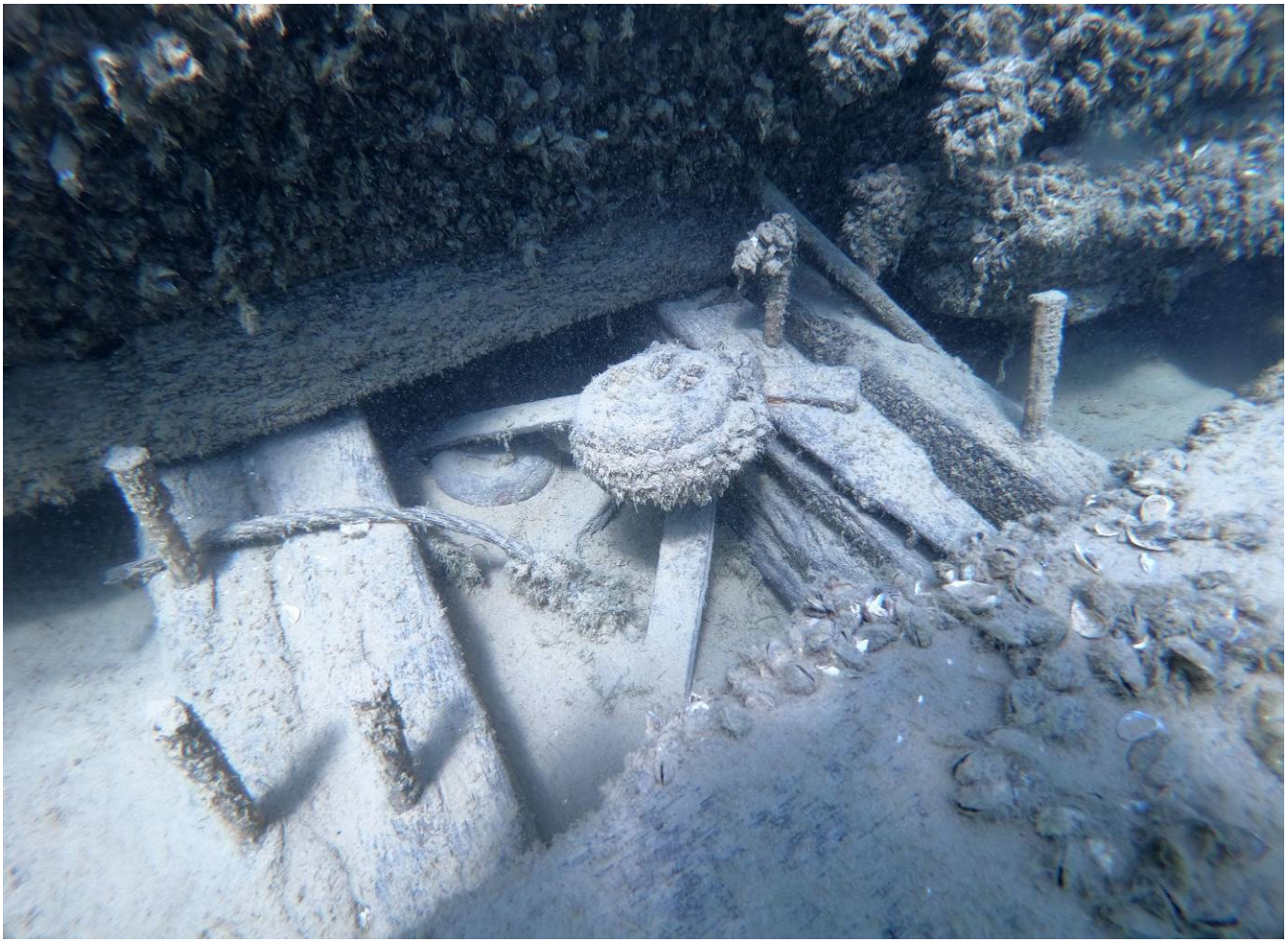


Photo #5 of 6
Emeline Shipwreck (Schooner)
Door County, Wisconsin
Photographer Tamara Thomsen
May 2022
A single deadeye located near *Emeline*'s aft centerboard



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National Park Service

National Register of Historic Places
Continuation Sheet

Figure #1 of 2
Emeline Shipwreck (Schooner)
Door County, Wisconsin
Location of *Emeline*
May 2022

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National Park Service

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Continuation Sheet

Figure #2 of 2
Emeline Shipwreck (Schooner)
Door County, Wisconsin
Site Plan of *Emeline*
May 2022