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United States Department of Interior
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**NATIONAL REGISTER OF HISTORIC PLACES
MULTIPLE PROPERTY DOCUMENTATION FORM**

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This form is for use in documenting multiple property groups relating to one or several historic contexts. See instructions in Guidelines for Completing National Register Forms (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. For additional space use continuation sheets (Form 10-900-a) and identify the section being continued. Type all entries. Use letter quality printer in 12 pitch, using an 85 space line and 10 space left margin. Use only archival quality paper (20 pound, acid free paper with a 2% alkaline reserve).

A. Name of Multiple Property Listing

Great Lakes Shipwrecks of Wisconsin

B. Associated Historic Contexts

1. The Fur Trade, 1634-1850
2. Settlement, 1800-1930
3. The Early Industries: Fishing, Lumber, Mining, and Agriculture, 1800-1930
4. Package Freight, 1800-1930
5. Government, 1830-1940

C. Geographical Data

The territorial waters of the State of Wisconsin within Lakes Superior and Michigan, including all port areas in Wisconsin that have accommodated Great Lakes shipping in the past (Figure 1).

___ See continuation sheet

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transport began to change, reflecting trends both in technological and economic development.

After 1800, immigration to the United States increased greatly, and after the Blackhawk War of 1832 effectively ended Indian threats, there was a concomitant rise in the number of immigrants to the western Great Lakes region. For instance, immigration to the United States totalled 60,000 in 1832, whereas by 1850 it had increased to 369,000 (Labadie and Murphy 1987:22). As a result of this trend, the population center shifted to a greater equity between the east and west.

One result of this wave of immigration was the introduction of European agricultural practices to the Midwest. New resources and raw materials became available with the opening of the western territories, and the immigrants increased the demand for the manufactured goods and capital of the east (Labadie and Murphy 1987:23). With these developments, a better transportation system was needed, and that centered on water transport. Settlement often followed the rivers and other bodies of water. Water transport was used to ship grain, lumber, ore, and other resources east, and settlers, manufactured goods, and coal to the west.

Through the 19th century, industrial growth in Wisconsin increased rapidly. The early industries included grain farming, lumbering, fishing, and lead mining. The middle of the century, those years from Wisconsin statehood to after the Civil War, saw an expansion of these early industries and the introduction of new industrial enterprises. New industries included such ventures as brewing, paper production, furniture making, tanning and leather manufacturing, carriage, wagon, farm machinery and implement manufacturing, and eventually automobile manufacturing as well as the production of other light industrial products (Lusignan 1986a). In addition to Great Lakes shipping, other factors in industrial expansion was the ease of river transportation and the introduction of the railroad into Wisconsin.

The pace of industrial growth in the United States increased after the Civil War. Mirroring this trend, in 1860 60% of American workers were engaged in agriculture, while by 1910, this figure was only 30% (Labadie and Murphy 1987:23). Even with the increasing importance of the railroads, shipping continued as a major mode of transportation.

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Bulk cargoes, such as grain and ore, were increasingly shipped out of Lake Superior ports, while grain, timber and ore were important bulk cargoes in Lake Michigan. The increase in bulk shipments meant that the carriers, bulk cargo steamers and barges, grew in size. This trend also hastened the replacement of sail by steam power, and led to an increase in harbor dredging to accommodate the larger vessels (Labadie and Murphy 1987).

From the turn of the century to the Second World War, in both the United States and Wisconsin, there continued an acceleration of many of the trends that began after the Civil War. Sail was almost totally replaced as a source of power, and bulk carriers became increasingly large. Ferry service, especially on Lake Michigan, linked the railroads and motorists of Wisconsin with their counterparts in the surrounding states and Canada. Moreover, pleasure craft became a numerically superior type of vessel on the lakes (Labadie and Murphy 1987).

The remainder of this section presents an overview of Great Lakes maritime history and the principal contexts in which Great Lakes ships were used in Wisconsin. It is organized around the major industries that employed such vessels for the transportation of people and goods both to Wisconsin and from Wisconsin to the East. Within each context is a section on associated properties. That section details the major vessel types employed by a particular industry and provides examples of vessels known to be present in the Great Lakes waters of Wisconsin.

The associated property sections are not meant to constitute a comprehensive listing of the shipwreck resources of Wisconsin for several reasons. Primarily, this is due to the fact that over 600 wrecks are known to be present in the waters of Wisconsin, but it also takes into account several factors of the life-history of many Great Lakes vessels. Great Lakes vessels were often constructed as general freight carriers--that is, the ships would either carry many different types of freight during any one voyage, or, as in the case of bulk carriers, would often carry different cargoes from voyage to voyage. As well, many Great Lakes ships were rebuilt as they lost their usefulness for their original task. For instance, passenger steamers were rebuilt into steam-barges for hauling lumber, schooners were adapted to carry lumber or ore, and almost all vessels carried different return cargoes

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from the East, including coal, salt, and manufactured goods. These points illustrate the impossibility of attempting to pinpoint a single specific function for most Great Lakes vessels beyond that of the general freight or passenger trade.

Additional historical contexts and associated properties will be developed as additional research is completed. Within the Great Lakes study, new or expanded sections should be developed for the turn-of-the-century resurgence in the passenger trade (principally between the industrial cities), lifesaving and lighthouses, Great Lakes tourism and recreation, Great Lakes small craft, the development of railroad ferry links on Lake Michigan, the impact of the First and Second World Wars on shipbuilding, military training and shipping activity, and the direct linking of the Great Lakes to Atlantic and international maritime commerce with the opening of the St. Lawrence Seaway. Other topics may be included, as well. Due to its distinctive history, geography, and associated resources, inland waterway transportation and associated properties (such as Mississippi River packet steamers) will be dealt with as a separate multiple property documentation. Historical and archeological research is currently underway in this area.

Great Lakes Maritime History

Prior to 1679, Great Lakes vessels were adapted from the Native American canoes. Enlarged by the French, these canoes, up to 33 feet in length, were known as "canot de maitre" or "grand canot" (Labadie and Murphy 1987). Developed for military and trade purposes, these vessels had capacities of 4-8,000 pounds (Labadie and Murphy 1987). In 1679, motivated by fears of British competition, Rene Robert Cavalier Sieur de la Salle constructed the GRIFFON to enable French expansion and increase the volume of furs transported to the east. The GRIFFON was built of green timber and was of a design similar to a Dutch galleot, with a high poop, rounded stern, and the ability to carry heavy loads through shoal waters. She entered Lake Erie on August 6, 1679, en route to Green Bay. There she unloaded a cargo of supplies and shipwright's tools, and departed on September 18th. The GRIFFON was never seen after again, and her final resting place is unknown (Cooper 1988).

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With the passing of the GRIFFON, the development of lake shipping came to a standstill for almost fifty years. Two schooners were built on Lake Ontario in 1726 for the Frontenac-Niagara trade, and by 1741, four such vessels were recorded in service. One of the earliest upper Great Lakes vessels was a 25-ton ship built at Sault Ste. Marie on Lake Superior in 1735 by a French miner, Sieur de la Ronde. She was to be used to carry copper from the small mining concerns developing in the Superior region. Other types of watercraft began seeing use on the Great Lakes in the eighteenth century, including bateaux (large, flat-bottomed skiffs which were oared, poled, or sailed), as well as double-ended oared craft similar to contemporary whaleboats (Labadie and Murphy 1987:43; Mansfield 1899:I:390).

The experiences of the eighteenth-century indicated that the fore and aft sailing rig was the ideal rig for the Great Lakes, both for merchant and naval vessels. Sudden lake squalls discouraged the use of square sails, which could not be taken in quickly. Additionally, the fore and aft rig was easier to work to windward, and could be handled by fewer men (Cuthbertson 1931:58,128). Economy was important on the frontier, and the ability to sail in any wind was important on the lakes, with their variable airs, shoal waters, and lack of sea room.

The schooner was the favored lake rig until the decline of commercial sail on the Great Lakes. Lake vessels carried a large sail area in proportion to their hulls, as midsummer lake winds were uncertain, and often very light. Frequently, a square topsail was carried by sloops and schooners to augment the fore and aft sails while running before the wind. The gaff-rigged topsail became the classic lake rig in the nineteenth century. A yard was mounted at the hounds (below the cross-trees) of the foremast, and a large course or "runner" was set. In later times a new sail came into use, the "raffee." This was a triangular topsail footed on the yard and spread up to the mast truck (Mansfield 1899:I:233). The raffee, while not unique to the Great Lakes, saw much of its service here. It was also used in British coastal schooners in the 1860s, where it was also called a raffee (Hirthe and Hirthe 1986:115).

Another peculiarity of lake vessels was the almost universal use of the centerboard, which was found in schooners, sloops, barks, and even brigs. The invention of the centerboard has been credited to a British

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Royal Navy lieutenant named Schank, who apparently used these while constructing naval vessels in Boston in 1774 and on Lake Champlain in 1776. Built of oak planks and weighted with lead or iron, the centerboard, a cousin to the Dutch leeboard, was set on a pivot and lowered through a trunk in the bottom of the hull to resist drifting to leeward while under sail. This greatly improved the windwardliness of sailing vessels, and had the further advantage that it could be raised in shoal water. These boards were either set through the keel or offset to one side (Cuthbertson 1931:236-237; Labadie and Murphy 1987:48).

Side-wheel steamboats began appearing on Lake Michigan around 1826, mostly as pleasure excursions to the scenic waters of Green Bay, which then as now, were valued for their natural beauty. Government-chartered steamers first put in their appearance at Chicago with the Blackhawk War, and the harbor of this city received its first improvements by the federal government in 1833 (Hartshorne 1924:17; Mansfield 1899:I:184). By this time, there were eleven steamers running on Lakes Michigan, Erie, and Huron. Of the 61,485 passengers they carried to and from Buffalo, 42,956 were headed west. By 1834, forty-eight steamers were running from Buffalo to Green Bay and Chicago, and regular steamship lines between Buffalo and Chicago began in 1839. 30,945 immigrants arrived in Wisconsin in 1840, and by 1850 305,391 persons immigrated to Wisconsin, arriving almost exclusively by lake vessels (Mansfield 1899:I:184-185,188-189).

Screw steamers first came to the Great Lakes in 1842 with the launching of the VANDALIA in Oswego, New York. During this period, many sailing vessels were converted to steam vessels (Labadie and Murphy 1987). These vessels were built for the same purposes, and in fact had the same general configuration, double-decked with a passenger cabin on top, and cargo between decks and in the hold, as had side-wheel steamers. These ships carried both package and bulk freight (Labadie and Murphy 1987). One advantage of the screw steamers was that they were far less expensive to build and operate than were the side-wheelers. Their machinery was less costly and simpler, they burned less fuel, required a smaller crew, and could carry more freight because of the smaller machinery on board (Labadie and Murphy 1987:53). Screw tugboats were being built by 1850.

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The demand for larger vessels and improvements to harbors and canals brought about a steady evolution in Great Lakes vessels, both sail and steam. While brigantines and barkentines saw some early use on the lakes, the construction of larger, heavily constructed gaff-topsail schooners eclipsed the use of most alternate rigs (Cuthbertson 1931:230-231,241). From about 1850 on, full, three-masted schooners began to appear as the most popular American coastal trader, both on the Great Lakes and elsewhere. With the construction of the CHALLENGE in 1852 at Manitowoc, Wisconsin, a new type of schooner hull was seen on the lakes, the clipper-model, incorporating a schooner rig and a centerboard. The CHALLENGE was characterized by a sharp bow, full hull, flat bottom, and great speed (reportedly thirteen knots). At this time, many of the earlier two-masted schooners experienced a rig change to three masts, while brig and bark rigs were changing to schooner rigs (Chapelle 1982:260,268-269; Hirthe and Hirthe 1986:vii).

The schooner has been called the most important American sailing rig, both in greatest total tonnage built, and tonnage of cargo carried. They were used mostly for rapid, short voyages with a quick cargo turnover. They dominated the American coastal trade, and the efficiency of this rig combined with a clipper-model hull is proven by the long existence of these vessels, which were used commercially in the United States well into the twentieth century. Needing only a small crew and handy in confined waters, the schooner actually increased in use at a time when other rigs were disappearing (Chapelle 1982:158,219-220). Detailed discussion of schooner evolution and development may be found in Chapelle (1982), Greenhill (1980), Labadie and Murphy (1987), and MacGregor (1984).

Most of the new sailing vessels were being built specifically for bulk cargo carrying: general merchandise and passengers seem to have been a matter of serendipity. Common bulk cargoes were ore, timber, grain, and coal. Coal was shipped west from Erie and Cleveland to fuel western stoves, factories, and steamboats. Iron ore shipments came from the Marquette, Menominee, Gogebic, Vermilion, and Mesaba ranges. Most shipments went east via Lake Superior to the iron foundries of Ohio and Pennsylvania; relatively little ore was shipped on Lake Michigan, save for ore from Escanaba and shipments for Chicago (Mansfield 1899:I:547,555).

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Lake Michigan commerce consisted largely of grain and timber, contributing heavily to the rise of many lake cities. Chicago and Milwaukee were large shippers of grain and importers of lumber for building and expansion. Chicago's first grain elevator was built in 1839. This hand-operated version was replaced with a steam elevator in 1848. The mechanization of the grain trade was important for the efficient handling and shipping of this commodity. Vessels of increasingly greater capacity began to be constructed, and the average grain vessel capacity had risen from 12,000 bushels in 1848 to 70,000 bushels in 1873 (Andrews 1910; Cooper 1988:41-43; Mansfield 1899:I:526-530; Odle 1951).

Lumber was a commodity always in demand, and was a convenient and important cargo for lake schooners. Chicago first began importing lumber in 1833, and thereafter became a huge market for building materials. By 1884-1885 there were around 500 steamers, schooners, and tow barges in the Great Lakes lumber trade, hauling almost 8,000 cargoes per year (Mansfield 1899:I:514, 518, 520). Transportation had always been a major problem in the lumber industry. In 1913 it was estimated that, "transportation of forest products to mill or market represents 75% or more of the total delivered cost of raw materials exclusive of stumpage value." Costs for actual harvesting were relatively minor (Rector 1953:15,20-23,25). By 1856, Chicago was the main U.S. lumber wholesaler. Production in the lake states rose from 2½ billion board feet of pine in 1869 to 5 billion board feet in 1879 and to 7 billion board feet in 1889. By 1900, most of the accessible pineries in Wisconsin and Michigan had been logged out (Rector 1953).

Two new vessel types were an outgrowth of the need for bulk cargo transportation that increased significantly after 1860. The first was the consort system. In the consort system, a tug was used to tow several consorts, or barges, which were often converted old sailing vessels or steamers (Labadie and Murphy 1987). This system was abandoned by 1900. The second new vessel type has been called the steam-barge. These were screw steamers with schooner-type hulls, single decked, with small, compact cabins at the stern (Labadie and Murphy 1987). These vessels towed barges, but were also important carriers of lumber. Many could carry up to 350,000 feet of lumber, stacked on deck and in the hold (Labadie and Murphy 1987:56-57).

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The final major innovation in Great Lakes shipping was the construction of bulk freight carriers. The first bulk freighter, the **R. J. HACKETT** was designed by Captain Elihu Peck in 1869 for shipping ore and grain. It was double-decked, with wide, evenly spaced hatches that matched the spacing of the Marquette, Michigan ore loading chutes. It had a capacity of 1200 tons and could tow up to two barges (True 1956). The pilothouse was placed forward to improve visibility, while all the machinery was in the stern. Because of their large size, bulk freighters had heavy keelsons and iron straps reinforcing their frames (Labadie and Murphy 1987). By the time of an economic downturn in 1873, 47 bulk carriers had been built.

Construction of bulk freighters resumed in 1880. The next major change in bulk carriers occurred in the 1880s, and centered on the use of iron and steel in their construction. The first such ship was the ONOKO. Because of a high ratio of strength to weight, iron ships were larger than their wooden counterparts, and could thus haul more cargo (Labadie and Murphy 1987). The last wooden bulk freighters were built by 1902. But, throughout this period, both the wooden and metal freighters increased in size. By the turn of the century, 500-600 foot vessels were being built (Labadie and Murphy 1987:59).

The decline of the Great Lakes lumber industry and the passage of bulk grain, ore, and coal hauling first to steam vessels and then to railroads was to a great degree the passing of the age of sail on the Great Lakes. Metal-hulled steamers and the railroads competed for the existing bulk cargo and passenger trade, and the schooners became barges or headed for the boneyards. Passenger trade and package freight eventually disappeared from the lakes. At the present time, ". . . only the bulk freighters have survived in service . . . [and] . . . the only representatives of the many vessels that once plied the Great Lakes are the shipwrecks that lie beneath their surfaces (Labadie and Murphy 1987:61)."

E1.1 The Fur Trade

For two centuries after Nicolet landed in Wisconsin in 1634, the fur trade was the dominant European commercial activity in the region. Three periods have been defined within this time period based on the different external power controlling the region; the French period from

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1634-1763, the British period from 1763-1815, and the American period from 1815-1850. The major centers of European settlement in Wisconsin at this time were on Madeline Island in Lake Superior, at Prairie du Chien on the Mississippi River, and at Green Bay. The fur trade was dependent on Native American groups to provide furs. Increasingly, trade posts were constructed in Wisconsin with Europeans serving as the middlemen. Europeans traded metal cooking implements, fire steels, steel traps, firearms, blankets, clothing, and decorative items to the Native Americans for pelts. The European manufactured goods were brought west via Green Bay and the Fox-Wisconsin waterway to Prairie du Chien, or around Sault St. Marie to La Pointe on Madeline Island. From these centers, traders were then dispatched into the interior regions to trade for furs. The furs were then gathered at the trading centers and subsequently shipped east (Fay 1986).

The fur trade and the exploration of the area had a tremendous impact on the histories of both the Native Americans and Europeans. To the Native Americans it brought warfare along with population decimation through the introduction of contagious diseases, often resulting in the destruction or dispersal of the group (Wolf 1982). Some of the Native American groups were able to profit in the fur trade by acting as middlemen, others by becoming allies to one or another European power. Access to European goods also changed the nature of the social interaction of these kin-based societies. Native Americans were increasingly diverted from older economic pursuits to a dependence on European supplied goods. This dependence often took the form of advancing trade goods to Native Americans in return for future deliveries of furs. Decline in the populations of fur-bearing animals often meant Native Americans became caught in a deepening cycle of debt. For Europeans, the fur trade both helped to supply information about the New World and supplied a readily exploited pool of resources that quenched the thirst of fashion and finance (Wolf 1982). Many of the state's first wealthy individuals were engaged in some aspect of the fur trade (Fay 1986).

The French Period

The recorded history of water-borne commerce on the Great Lakes begins with the French explorers, traders, and missionaries of the 17th century. In the early decades of that century, explorers financed by

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fur trade interests penetrated the northern Great Lakes in search of trade routes to the Orient and new areas rich in fur-bearing animals. The first French trader to possibly visit Wisconsin was Etienne Brule. During 1621-1623 he conducted a voyage along the south shore of Lake Superior (Smith 1973:7). The next incursion into the state was by Jean Nicolet who landed on the southeastern shore of Green Bay in 1634 during his search for the Northwest Passage (Fay 1986). In 1659 Medard de Groseillers and Pierre-Espirit Radisson explored the southern shore of Lake Superior, landing at Chequamegon Bay, and built a cabin near present-day Ashland. There the men traded for pelts with the Ottawa. After spending the winter, both returned the next year to Canada (Fay 1986).

With the opening of the Upper Great Lakes to trade, missionaries soon followed. Jesuit priests Rene Menard and Claude Allouez each established missions at Chequamegon Bay in the 1660s (Fay 1986). Fur trade and missionary activity led to other interests such as mineral exploration. In 1671, the Sioux drove the Ottawa and Huron from their position as middlemen in the fur trade with the French. Because of this, the French were able to expand their activity to the west (Fay 1986). Beginning in 1689, competition from the British forced the French to repeatedly reestablish their claims in the Upper Great Lakes and formulate new alliances with their Indian partners. At this time, fur trading posts were established in Green Bay, along the southern shore of Lake Superior, and at Madeline Island (Fay 1986). Perrot also established a fort near Prairie du Chien. In the early 1700s, war with the Fox Indians disrupted trade in their attempt to gain middlemen status; forts, such as Fort LaBaye at Green Bay, were built to garrison troops for military expeditions into the interior in pursuit of the Fox (Fay 1986). At the conclusion of the French and Indian War of 1762, French control of the northwest gave way to the British (Fay 1986). This action was formalized in the Treaty of Paris in 1763. As a result, many of the French fur traders relocated to St. Louis or New Orleans, while others continued to work in the fur trade in the Upper Midwest, but for the English.

Associated Properties

For the first 64 years of French occupation, the canoe, adapted from the aboriginal people of the region, was the major form of water

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transportation. The French enlarged the canoe design to a length of 33 feet or more (Labadie and Murphy 1987). These craft were known as "canot de maitre" or "grand canot". They were referred to by size as being five or six fathom canoes. Developed for military and fur trade purposes, they had a capacity of 4,000 to 8,000 pounds, including crew and cargo (Labadie and Murphy 1987). Few if any innovations in shipping were made until 1678, when the fur trade attracted the colorful and enterprising Frenchman Rene Robert Cavalier Sieur de La Salle. Motivated by fears of Anglo-Dutch competition, La Salle sought to extend French occupation by establishing new posts and forts, as well as increasing the volume of trade. To enable French expansion, La Salle recognized the need for larger vessels able to carry more furs. In 1679, a new ship was constructed for La Salle, named **GRIFFON**. Built of green timber, the **GRIFFON** was launched in late spring or early summer. It seems to have been similar in design to a Dutch galleot, with a high poop, rounded stern, and the ability to carry heavy cargoes through shoal water. She was armed with five guns and measured about sixty tons. Her dimensions were probably around 70 feet in length, with a 16 foot beam, and an 8 foot depth of hold. The **GRIFFON** entered Lake Erie on August 6, 1679 and headed uplake for Green Bay, through Lakes Huron and Michigan. There she unloaded a cargo of supplies and shipwright's tools and departed on September 18th. The **GRIFFON** was never seen again and her final resting place is unknown (Cooper 1989).

With the passing of the **GRIFFON**, lake shipping came to a standstill for almost 50 years. Schooners built for the Lower Great Lakes could not pass through to the Upper Lakes because of Niagara Falls. As a result, the canoe returned to its position of prominence on the Upper Great Lakes. Some other types of small craft began to be used in the 18th century, including birchbark canoes, bateaux (large, flat-bottomed, oared, poled, or sailed skiffs), and whaleboats.

The British Period

Occupation of the Northwest passed from French to British hands at the close of the French and Indian War in 1762 (Fay 1986). Many of the French fur traders went to work for British and Scottish merchants that took up the trade. Pelts were gathered at the supply centers of Green Bay and La Pointe, now occupied by British traders, and Prairie du Chien became a major rendezvous and distribution center. From the

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hinterland the pelts were transferred to Detroit, Mackinac, and Grand Portage (Fay 1986).

British policy differed greatly from the French, and soon Indian rebellions were seen in the areas west of the Great Lakes. French fur trade rivals lured the Indian trade to St. Louis. Hoping to bend the trade to their advantage, the British closed all white settlement in the Northwest and established military garrisons in the area (Fay 1986). In 1775 the American colonies revolted from British rule, and in the Treaty of 1783, the British relinquished most of the trading posts in the Northwest and the Upper Great Lakes. The American doctrine of "Manifest Destiny" caused unrest among the Indians in the Northwest as colonists expanded into the Midwest. Even with the expansion of the newly formed United States, the fur trade remained primarily British in character in the Upper Great Lakes region with the Northwest Fur Company monopolizing the trade (Stevens 1918). Posts on Madeline Island and Lake Michigan were established between 1783 and 1800. In 1798, a rival firm, the XY Company, was formed. In 1806 these two companies merged (Fay 1986). The fur trade in the Northwest was a major cause of the War of 1812 between the British and the Americans. At the close of the war in 1815, the Northwest Territory came under United States control (Fay 1986).

Associated Properties

Water transport on the Great Lakes was improved during the British occupation of the Northwest Territory. In 1784, the British government permitted the construction and operation of commercial ships on the lakes. The 41 ton sloop **BEAVER** was launched in 1785 and saw service on Lakes Michigan, Huron, and Erie (Labadie and Murphy 1987). The 70 ton sloop **OTTER** of the Northwest Company was launched in the same year, and saw service on Lake Superior (Labadie and Murphy 1987).

The experience of the 18th century indicated that the fore and aft rig was the ideal Great Lakes rig, both for merchant and naval vessels. Sudden lake squalls discouraged the use of square sails, which could not be taken in quickly. Additionally, the fore and aft rig was easier to work to windward, and could be handled by fewer men (Labadie and Murphy 1987). Economy was important on the lakes, with their frequent shoal waters and lack of sea room. The British Deputy-Surveyor

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reported in 1788:

Gales of wind or squalls rise suddenly upon the lakes, and from the confined state of the waters, or want of sea room (as it is called), vessels may in some degree be considered as upon a lee shore, and this seems to point out the necessity for their being built of such a construction as will best enable them to work windward. Schooners should perhaps have the preference as being safer than sloops (Cuthbertson 1931).

In addition, the British used the large birchbark canoes and wooden bateaux, and small sailing craft known as mackinaw boats.

The American Period

While the first significant American involvement in the fur trade actually began in 1808 with the organization of the American Fur Company by John Jacob Astor, it really did not achieve prominence until after 1815, following the settlement of the War of 1812. In 1816, the United States Congress enacted a law that prevented foreigners from trading with Native Americans within territories of the United States, and authorized the establishment of government operated "factories" in an effort to better control the trade. Factories, often associated with military forts, were government trading houses that traded goods to Native Americans for furs. Factories were established at Green Bay and Prairie du Chien (Fay 1986).

Astor's American Fur Company established major centers at Prairie du Chien and La Pointe, drawing on the manpower and experience of non-Americans. The American Fur Company came to monopolize trade in the Upper Mississippi and Upper Great Lakes region to such an extent that the United States government terminated the factory system in the area in 1822 (Peake 1954). Throughout this period, much of the fur trade traffic had been directed south down the Mississippi River. In 1823, this was enhanced by the use of the **VIRGINIA**, a steamboat, that began to carry supplies north and furs south (Peterson 1932).

In 1834, the American Fur Company moved its headquarters to La Pointe and began to diversify its activities as the fur trade began to wane. New concerns of the company included shipbuilding and fishing on Lake

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Superior (Nute 1925). An improved wharf for sailing vessels was constructed at La Pointe on Madeline Island at this time. By 1850, the fur trade diminished in economic importance, and was replaced by lead mining, farming, fishing, and other forms of commerce in the state (Fay 1986).

Associated Properties

The American fur trading companies used many of the same types of vessels as the British had used. Smaller craft such as canoes and bateaux continued in use. Schooners and brigs were also employed, examples of which are the **Madeline** and the **Ramsey Crooks**, respectively.

E1.2 Settlement

The influx of settlers into Wisconsin is perhaps one of the most important events in the history of the state. While settlers came to Wisconsin prior to 1832, it was with the end of the Blackhawk War that immigrants gained confidence in the stability of the new territory (Wallar 1986). With the region quieted after the war, many of the Native American tribes ceded land to the United States government, and a few were even resettled west of the Mississippi River, opening up large tracts of land for new settlers (Wallar 1986). The economic potential of lumber, mining, and agriculture in Wisconsin attracted many settlers, which in turn spurred the growth of those and other ventures.

In 1836, the population of the Wisconsin Territory was 11,500, mostly concentrated in the southwestern lead mining region. By 1850, the population of the state was over 300,000, with at least a third being foreign-born (Wallar 1986). The initial influx of settlers was in the southern part of the state, eventually spreading northward (Wallar 1986). Immigration to Wisconsin was encouraged during this early period in the state's history. In 1852, a Commission of Emigration was created to encourage the settlement of Wisconsin (Wallar 1986). The Commission went so far as to publish a pamphlet on Wisconsin in a number of different languages, which was distributed in various European countries. The Commission was disbanded in 1855 due to the rise of anti-foreign sentiments. The most numerically important immigrant groups were the Germans, Poles, Norwegians, Swedes, Czechs,

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Austrians, and Russians. Often these, and less numerically important nationalities, would settle as a group in certain parts of the state (Wallar 1986).

Settlers usually tried to arrive in the spring for several reasons; the ability to locate land, plant a crop, and make preparations for winter (Current 1976). Most of the people journeyed directly to the state, and this was increasingly the case as transportation systems improved (Current 1976). One important improvement was the opening of the Erie Canal, which enabled the lake steamships to transport passengers directly from the east to Wisconsin without the need for overland transfers. From 1840-1860, there was a boom in Great Lakes passenger service to Wisconsin. Side-wheel passenger steamers were used, and their number and size increased throughout the period. The number of passengers was 250,000 in 1845. This demand for service enabled steamship lines to run on set routes and increasingly on set schedules. Demand for first class accommodations also increased. Throughout, most passenger vessels carried package freight as well. By the late 1850s, the railroad began to replace water transport as a means of moving settlers to Wisconsin, although passenger service in general resumed its importance between 1870-1890 with the introduction of iron and steel ships driven by propellers (Mansfield 1899).

Associated Properties

Great Lakes vessels played an important role in both populating Wisconsin but also in helping the State maintain links to the population centers of the East. Prior to 1850, over half of the immigrants to the western Great Lakes arrived by lake transport, and this figure may have been greater for Wisconsin (Mansfield 1899). There was a general transition from schooners to side-wheel steamers to steam screws in passenger service. A number of side-wheel steamers have gone down in Wisconsin Great Lakes waters. Two examples from the Apostle Islands are the **City of Ashland** and the **Emerald**. Steam screw wrecks include the **Phoenix** lost off of Sheboygan in 1847 and the **Toledo** lost at Port Washington in 1856. Another early example is the steam-screw **Niagra**, lost off of Port Washington in 1856. Other vessels carried passengers and freight. For instance the tug **May Corgan** carried passengers and doubled as a fishing tug, while the **Northshore**, a gas screw, carried passengers, but was hauling 10,000 baskets of

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grapes when it sank off of Racine.

E1.3 The Early Industries: Fishing, Lumber, Mining, and Agriculture

With the decline of the fur trade and the end of the Blackhawk War, there was a substantial increase in the volume of settlers immigrating into what was to become the State of Wisconsin. The earliest endeavors that these individuals were engaged in took advantage of the natural resources of the state--fishing in the Great Lakes around the Apostle Islands and at many points along Lake Michigan, lumbering in the northern and western parts of the state, mining and quarrying in the southwest corner, along Lake Michigan, and in the northwest, and agriculture, first primarily wheat, in the southern two-thirds of the state. Great Lakes shipping was critical, enabling these early industries to transport raw materials back to consumers in the East.

Fishing

The early Wisconsin fishing industry was concentrated on the rich spawning areas of lakes Michigan and Superior, centered in Bayfield, Manitowoc, Two Rivers, Milwaukee, and Door County (Lusignan 1986b). Fishing rose to prominence in these areas due to their protected shorelines or harbors, nearby rich aquatic environments, and a lack of heavy industries. After the fur trade, it was one of the first commercial enterprises to attain success. Fishing on the inland waterways was less well developed.

At the start, the fishing industry in Wisconsin was characterized by individuals fishing in specific areas and mainly supplying local markets. During the 1830s, the fur companies began to establish networks of these local fishermen to provide raw fish for export. The fur companies collected the fish, salted and **packed** them in barrels, and shipped the fish to the east. One of the **earliest** fish suppliers was the American Fur Company, which set up a **fishing-warehouse** center at La Pointe on Madeline Island (Holzhueter 1974). As this system was set in place, fishermen increasingly spent the season in small island or lakeshore camps.

Similar early fisheries were established in Door County and Two Rivers in the 1830s. The first settlers were drawn to Door County because of

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its potential as a fishery, and located themselves in 1836 on Rock and Washington islands (Lusignan 1986b). Through time, Door County was advantageously positioned with respect to markets such as Green Bay and other Lake Michigan shoreline communities, and the lumber and mining camps of northern Wisconsin and the Upper Peninsula. In Two Rivers, Captain J.V. Edwards started a fishery in 1837 (Lusignan 1986b). Drawn to that site by a well-protected harbor and using an experienced workforce composed of French and French-Canadians, the Two Rivers fishery packed 2,000 barrels of fish by 1838 (Krejcarek 1969).

In 1836, 1000 barrels were shipped from La Pointe, this figure increased to 7500 barrels by 1839. Several local companies eclipsed the American Fur Company in Lake Superior during the 1840s, which moved its fishing operation from La Pointe to Bayfield during that time (Lusignan 1986b).

The fishing industry experienced little growth during the period from roughly ca. 1850-1880. Growth resumed around 1880, with the expansion of the railroad system that enhanced the fisheries ability to ship their catch to urban markets. For instance, over 1.7 million pounds were caught in Bayfield in 1888, which increased to over 8 million pounds in 1896, when fishing employed about 160 men (Lusignan 1986b). Increasingly important in this boom were the Green Bay fisheries. In statistics compiled by the Wisconsin Commissioner of Fisheries, it is shown that from 1888 to 1896, after which statistics were no longer compiled, the Green Bay fisheries produced 50-67% of the Great Lakes fish caught in Wisconsin (Wisconsin Commissioners of Fisheries 1891, 1897). By 1894, Wisconsin was ranked 14th in the nation in fish catch (Wisconsin Commissioners of Fisheries 1895).

Unfortunately, this boom in prosperity was not to continue. Starting around the turn of the century, overfishing, pollution, and depressed markets caused periodic downturns in the fishing industry (Lusignan 1986b). Gains were made after World War I, with the incorporation of new technology such as improved boat designs, refrigeration, and truck transport. But fishing was increasingly displaced by other industries from its waterfront locales, environmental pollution increased, areas were overfished, and a final major setback encountered was the invasion of the predatory sea lamprey via the St. Lawrence Seaway in the 1950s.

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Associated Properties

The earliest vessels engaging in fishing were sailing vessels, such as schooners, barkentines, and brigs. Schooners were some of the larger vessels used in the fishing trade. After the Civil War, tugs were incorporated into the fisheries fleets. More common are the fishing tugs, such as **Leila C.** and the **L. P. Hill**, both lost in Lake Michigan waters early in the 20th century. Throughout this time, most of the fishing was done by netting. Also present is the **Vernon**, a steamer lost off Two Rivers in 1887. This ship would routinely transport the fisherman's catch to metropolitan areas such as Chicago. A vessel type less commonly associated with the fishing industry is the scow. One, the **Red River**, was sunk in 1852 in Green Bay while carrying a cargo of fish.

Lumber

The lumbering industry in Wisconsin helped reshape the state's environment and landscape, and provided a livelihood for a great number of people in many parts of the state. By the late 19th century, Wisconsin was one of the leading lumber producing states, and from 1890-1910, it was the state's leading industry by a wide margin (Lusignan 1986c). Initially, the lumber industry was spurred on by the building needs of settlers on the treeless prairies and plains of the Midwest (Fries 1951). Water transportation, through rivers or the Great Lakes, connected the Wisconsin forests with the east, south, and west. The history of lumbering in the state has been roughly divided between an early period of 1840-1880, and a later, post-1880 period.

Prior to the 1840s, lumbering was small scale and mostly for local consumption (Lusignan 1986c). By the 1840s, it surpassed the fur and lead mining industries to become Wisconsin's leading industry. This, and subsequent growth, was due to immigration of people into the Midwest, the growth of industry, and of the railroads (Lusignan 1986c). The lumber industry's success was due in part to the availability of skilled laborers--Irish, Scandinavian, German, and French-Canadian immigrants (Fries 1951).

The Wisconsin River area was the first to be exploited on a large scale in the state (Fries 1951). But demand had already outdistanced the

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Wisconsin River region's output during the 1840s, and several other regions became important lumbering areas. Included were the areas surrounding Green Bay, the Wolf River, the Black River, the St. Croix area, and the Chippewa River Valley (Lusignan 1986c). For many of these regions, the greatest growth occurred from ca. 1860-1880. For instance, in 1866 the Wolf River region produced 52 million board feet, while during the 1870s, the region yielded 180 million board feet per year (Lusignan 1986c). The Green Bay and St. Croix districts were producing about 300 million board feet per year in the 1870s, and in the Chippewa River Valley, there was an increase from 5.5 million board feet per year in the 1840s to 436 million board feet in 1870 (Fries 1951).

One reason for such hefty increases in the lumber trade during this period was the availability of excellent water transportation opportunities. Rafts of lumber were floated on inland streams and Lake Michigan by 1850, and by 1865 some rafts on the Mississippi River contained over one million board feet per raft. After the mid-1860s, steamships were increasingly used to tow the rafts. At its peak, more than 100 ships were engaged in the towing operations (Lusignan 1986c).

On lakes Michigan and Superior, sailing ships and steamers were used to transport milled lumber, often between 250,000 to 1.5 million board feet (Fries 1951). Through time, steamers and bulk carriers replaced the sailing ships, with many of the sailing ships stripped of their sails and towed by tugs as barges (Labadie and Murphy 1987). The most important lumber shipping ports were Superior, Ashland, Marinette, Green Bay, and Sturgeon Bay (Fries 1951).

During the time between 1880-1900 the lumber industry increased despite periods of depression. In 1892, 4 billion board feet were cut (Lusignan 1986c). But, through the years, the wasteful practices of the lumber industry depleted most of the white pine in the state. In 1897, forestry experts predicted that with current use patterns and practices, the woods could handle only 10 more years of logging (Lusignan 1986c). These predictions caused a major decline and changes in the lumbering industry. A lower grade of trees were used, and the cutting of hardwoods, mainly maple and oak, increased. This decline can be seen in the number of sawmills in operation. In 1900, Wisconsin was first in the nation with over 1000 sawmills, but by 1925 there were

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only 250 mills in operation (Fries 1951). As a result, lumber slipped from its place as the leading industry in the state.

Associated Properties

A wide range and great number of vessels were engaged in transporting lumber and lumber products on the Great Lakes waters of Wisconsin, and consequently, quite a few have ended as shipwrecks. These include schooners, brigantines, and scow-schooners, steamers including steam-barges, and barges. Lumber was first shipped in Lake Michigan by the 1830s, generally by schooners (Mansfield 1899). The number of lumber carriers on the Great Lakes increased from 50 in 1840 to over 500, carrying 8,000 cargos a year, by 1885. Much of the increase was due to the expansion of metropolitan areas such as Chicago and Milwaukee (Mansfield 1899). For instance, Milwaukee received 30,000 million board feet in lumber in 1860. This had increased five-fold by 1897, and compared with only 40,000 million board feet in lumber delivered to Milwaukee by rail (Mansfield 1899). Indeed, shipboard transportation continued to be relied upon into the late 19th century.

Many of the early carriers are barks and brigs. Barks in Wisconsin waters include the **Emily A. Roelofson**, which was sunk in 1863 in the Milwaukee harbor area, and had been carrying a load of cedar posts, and the **Cleveland**, lost in 1875 off Door County with a cargo of lumber. An example of a brig is the **Cumberland**, lost in 1859 near Milwaukee with a load of lumber. The brigantine **Sam Hale** was also lost off the tip of the Door Peninsula with a cargo of lumber in 1867. Schooners soon took up the lumber trade. Examples of schooners include the **Ardent** (tan bark), and **Blazing Star** (lumber), both lost off the tip of the Door Peninsula in Lake Michigan. By 1860, schooners were increasingly refitted as barges and were towed by tugs (Mansfield 1899). By 1870, scow-schooners became important ships in the lumber trade. Scow-schooners such as the **Laurel** and **Maria**, both lost off the Door Peninsula, were lost while carrying cargos of wood. The steam-barge **A.L. Hopkins**, lost in the Apostle Islands in 1911, and the **Noquebay** lost in 1905, are examples of a type of craft that was predominantly a lumber carrier. An example of a barge is the **Ontario**, lost off the Apostle Islands carrying 1100 tons of pulp. Tugs, such as the **Kate Williams** lost off of Rock Island in 1907, were used to tow rafts of logs. These constitute a few examples of the vessels that participated

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in the lumber industry.

A number of other lumber products were transported by ship. This includes bark, railroad ties, posts, telegraph poles, cordwood, and Christmas trees. One Christmas tree ship, the **Rouse Simmons**, went down in 1912 in Lake Michigan approximately nine miles northeast of Two Rivers. The ship was owned by the Schuenemann family of Chicago, who shipped trees annually from Michigan to Chicago. Another Christmas tree ship is the **Mystic**, lost off of the Door Peninsula, which was also part of the Schuenemann fleet.

Mining and Quarrying

The two most important mining operations in Wisconsin, lead and iron mining, both depended on water transport for their success. The lead mining district was situated in southwestern Wisconsin, while the most productive iron mines were located in the northern part of the state. Lead mining, which occurred earlier than iron mining, was in a large part responsible for the initial settlement of Wisconsin by Euro-Americans. Both lead and iron mining contributed greatly to the growth of Wisconsin's fledgling economy. To a lesser extent, quarried stone was also shipped on the Great Lakes.

Lead Mining

A significant portion of American lead came from southwestern Wisconsin and adjacent states between 1820 and 1920, making the area an early economic and population center of Wisconsin (Lusignan 1986d). The presence of lead in the region was known to Europeans as early as the 17th century when fur traders were told of the deposits by Native Americans. It was first profitably mined after 1760 when Dubuque obtained permission from the Sauk and Fox to mine on the west side of the Mississippi River (Schafer 1932). By 1810, the United States Secretary of War estimated that a half million pounds of lead were being mined, with most of this amount being obtained by the British (Schafer 1932; Palmer n.d.).

Few Americans were engaged in lead mining prior to ca. 1825, but the increasing reports of lead strikes pressured the government to allow increased settlement in the region. The Federal government set up a

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system in which it controlled the land and the production of lead in the region. Permits were issued for mining and smelting, with a 10% royalty required (Nesbit 1973). Most profitable were "float mineral" of near surface deposits. At the time, lead was used for making pewter, printer's type, pipes, weights, shot, and paint.

An influx of miners began in the 1820s. In 1825, only 200 Euro-Americans lived in Wisconsin. By 1829, this figure increased to 10,000. Among this group, the Cornish helped make mining a major success (Fatzinger 1971). In 1829 there were over 4000 miners and 52 licensed smelters producing 13 million pounds of refined lead (Nesbit 1973; Schafer 1932). By that time, Wisconsin had surpassed Missouri as the most productive lead district in America. High levels of production continued into the 1840s. In 1840, the Wisconsin Territory supplied half of the lead used in the United States (Schafer 1932). But production declined after 1845. Shallow and surface deposits were exhausted, while deeper deposits were worked down to the water table. After 1850, lead mining became a source of supplemental income for farmers during the winter months. The Civil War proved to be the sole increase in lead production after 1845 (Nesbit 1973).

A typical lead mining operation consisted of two or three men who would sink a vertical shaft. Lateral horizontal tunnels would then be dug out from this main tunnel to follow the mainly east-west oriented veins of lead. Tubs of lead ore would be lifted up by means of a crankshaft, which was then transported to a smelter. The average claim yielded 150 pounds per day (Fatzinger 1971).

Early on, most lead was shipped on riverboats from Potosi or Galena. The vessels would travel down the Mississippi to New Orleans or up the Ohio to the east. But, by the 1830s, an overland route was established to the newly opened lake ports of Milwaukee and Racine, and the lead was then shipped over the Great Lakes to the east. By 1856, over half of the lead from southwestern Wisconsin was shipped via the Great Lakes, aided by railroad connections to the southeastern Wisconsin ports (Lusignan 1986d).

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Iron Mining

The first iron mining regions were located in southern Wisconsin--the Mayville and Baraboo districts. These areas supplied relatively low grade ores and were dependent on railroads for transportation (Lusignan 1986e). More important to the history of waterways transportation is the effect that the discovery of high grade ores in the Gogebic-Menominee ranges had in the 1880s. The exploitation of ore in this area eventually pushed the southern Wisconsin districts out of production, as many single northern mines had greater annual production than did the entire southern districts (Lusignan 1986e).

The iron ore mines of the northern districts were deep mine shaft operations, needing new mining techniques and adequate transportation for them to be economically feasible (Lusignan 1986e). Railroads were constructed to harbors on Lake Superior and Menominee/Escaanaba on Lake Michigan, at which the ore was loaded onto bulk carriers and shipped to Milwaukee, Chicago, and points east (Mansfield 1899). Most of the mines were owned by eastern corporations.

The Menominee range began large scale production by 1880, shipping most of the ore through Menominee/Escaanaba. Seven million tons were produced in the Wisconsin part of the range by the time it closed in the 1930s (Lusignan 1986e). The Gogebic range, centered in Wisconsin around the Hurley and Montreal mines, also began production in the 1880s. Most of the ore was shipped from Ashland (Lusignan 1986e). The mines were closed in the 1930s due to the effects of the Great Depression, but resumed production during World War II. Production continued after the war, with an average of 1.5 million tons of ore mined per year (Lusignan 1986e). Due to increased competition with other areas and the high costs of operating deep shaft mines, production was discontinued in the 1960s.

Iron mining benefitted the lakeshore economies of northern Wisconsin by producing an increased demand for transportation facilities to ship the ore to markets. Not only were railroads established, but harbors were expanded and shipbuilding activities increased. Wisconsin ports proved to be central locales for shipment, ideally placed between the Minnesota, Wisconsin, and Michigan iron ore ranges (Mansfield 1899). Ashland, for instance, built a dock that ran 1/2 mile into Lake

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Superior for loading ores onto ships. Ashland became the second leading ore shipper after Escanaba in 1889 (11th Census of the United States, 1890: Mineral Industries). Superior, between 1902-1928, built the worlds largest transshipment facility, consisting of four interconnected docks (Lusignan 1986e).

Lake transport of ore was expedited by the use of bulk freighters (Labadie and Murphy 1987). One of the more innovative creations associated with the iron ore mining industry was the "whaleback" carrier, created by Capt. Alexander McDougal of Superior. The whalebacks, of which 41 were constructed in Superior between 1889-1899, were steel hulled cigar-shaped vessels designed to carry bulk cargos such as ore, coal, or oil. Cargo was stored below the waterline, while the wheeldeck and crews quarters were above (Labadie and Murphy 1987). The S.S. **Meteor**, docked in Superior and used as a maritime museum, is the last whaleback in existence (Lusignan 1986e).

Quarried Stone

Two quarry areas in the State of Wisconsin used water transport extensively to market their materials; the limestone quarries of Door County and the brownstone quarries of the Apostle Islands (Lusignan 1986f). While quarrying was a major industry in Wisconsin during the last half of the 19th century, it often depended less on water transport than land transport. Stone quarrying declined in Wisconsin, as it did in the rest of the nation, after the depression of 1893. In Wisconsin, this was due to the increased use of imported limestone and concrete (Lusignan 1986f).

Door County is part of a limestone district that extends from the tip of Door County to the state boundary with Illinois, extending up to 40 miles inland from Lake Michigan (Lusignan 1986f). Most of the deposits in this area were best suited for the production of lime, although many firms quarried stone for building and roadbed use as well. In Door County, one of the first limestone quarries was established by the federal government near Sturgeon Bay during improvements to the harbor there in the 1830s. Quite a few quarries were in operation by the 1880s, including those near Sturgeon Bay, Ellison Bay, Mud Bay, Ephraim, and on Washington Island. Only the quarries near Sturgeon Bay lasted for any length of time in production (Lusignan 1986f).

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In the mid to late 19th century, population increase in the Midwest spurred a greater demand for construction materials, especially durable materials for large public buildings. When in 1868 Milwaukee was to build a new courthouse, brownstone quarries at the south end of Basswood Island in Lake Superior were chosen to supply the material. This dark sandstone was heavy and hard, resistant to crushing, and in plentiful supply in the Apostle Islands. Quarrying commenced at Basswood in 1868 by the firm of Strong, French, and Company. The quarry on Basswood Island had a boardinghouse for its workers, and received supply shipments from the mainland, including barrelled crackers and tinned oysters. Other quarries were later established at Houghton Point north of Washburn in 1888, on Stockton Island in 1889, and Hermit Island in 1891. Eventually there were ten brownstone quarries in the area (Ross 1960).

The Basswood brownstone was important in the late nineteenth century as a building material. Brownstone was used in many buildings in Chicago after the Great Fire of 1871. Transported by ships and rail, it found its way to Milwaukee, Detroit, Toledo, Cincinnati, St. Paul, Kansas City, Omaha, and other cities. Records suggest it was used in 40 cities and 10 states. But, by the turn of the century, lighter building materials were more frequently used, decreasing the demand for brownstone. By 1910, the quarries were largely out of business (Ross 1960).

Associated Properties

Many of the mining related vessels in the Great Lakes waters of Wisconsin are associated with iron mining. In fact, by 1900, iron ore shipping counted for a third of all the Great Lakes traffic. Part of the ease of shipping ore by water was due to the locks at Sault St. Marie, allowing the Lake Superior region ore to be transported to the refineries of the East. Most of the ore was transported to a number of different Lake Erie ports, while Chicago mills used the second highest amount (Mansfield 1899). By the 1890s, Ashland shipped the fourth and Superior the sixth largest amounts of ore on the Great Lakes. During this period the Lake Superior ore districts contributed almost 70% of the nation's ore supply (Mansfield 1899). As discussed above, ore mining precipitated the construction of new vessel types such as bulk carriers and the whalebacks. Similarly, mechanized bulk loaders were

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developed and improved in an attempt to load and unload the ore more economically.

The earliest ships to transport ore were sailing vessels, although through time steamships and later bulk carriers were increasingly used. Examples of each type of ore carrier are the **R.J. Hackett**, a bulk freighter, the **Moonlight**, a schooner-barge, and the **Lucerne**, a schooner. The **Sevona**, the sole metal second generation bulk carrier in Wisconsin waters, was lost in 1905 at Sand Island Reef. While the Wisconsin Cultural Resource Management Plan denotes that lead was shipped over the Great Lakes from Milwaukee and Racine, to date no shipwrecks have been associated with this context.

A number of vessels are associated with other aspects of the mining theme. One, the **Pup**, a tow barge, sank while it was carrying cement. A number of vessel types were engaged in hauling limestone as well. The schooner **Adriatic**, carrying limestone, was sunk off Sturgeon Bay. Schooner-barges were also used, examples of which are the **Ida Corning**, abandoned in 1931 at Sturgeon Bay, and the **Halstead**, also abandoned off Sturgeon Bay. Scow-schooners such as the **Ella Doak** were sunk while carrying a load of stone. The **Mueller**, lost in 1935 off of Sturgeon Bay, is a converted steam-screw that carried limestone. The **Joseph L. Hurd**, a steam-barge converted from a passenger steamer, was also abandoned in Sturgeon Bay. Finally, barges such as the **Empire State**, also a converted passenger steamer abandoned near Sturgeon Bay, were also used to carry limestone.

Agriculture

Agriculture and associated industries such as grain milling were the basis of Wisconsin's economy during much of the 19th century. During that period, farming changed from an emphasis on a single crop, wheat, to a more diversified system. Naturally, the emergence of grain milling coincided with the production of wheat in Wisconsin, and declined as wheat production moved westward.

The earliest cash crop grown in the state was wheat (Lusignan 1986). Wheat farming required little capital investment, was easy to grow, and needed little tending until harvest. Wheat also produced a high rate of financial return. In contrast, wheat tended to be hard on the soil

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and yields varied due to weather conditions, insects, and disease (Lusignan 1986g). During the 1850s, wheat farmers in Iowa and Minnesota began to compete with those in Wisconsin, and wheat prices fell. Between 1860-1880, wheat production in Wisconsin sharply declined.

Due to falling prices and soil exhaustion, many farmers began to diversify their operations during this time. The new crops included vegetables, cranberries, hops, fruits, and tobacco. Others took up raising livestock and dairying, along with growing feed crops for the animals. The feed crops were predominantly corn, oats, hay, and clover. By the mid-1850s, dairying was a viable alternative to wheat cultivation (Lusignan 1986h). In general, feed crop and livestock-dairying was better adapted to the soils and climate of Wisconsin than was wheat farming. The change to dairying and livestock increased, so that by 1899 cows were present on over 90% of the farms in the state (Lusignan 1986h). In the subsequent years, these new ventures provided a stable agricultural base for the state of Wisconsin.

Milling grains into flour and meal, was an industry closely associated with agriculture. In Wisconsin, the fortunes of the milling industry closely paralleled those of the wheat farmers. The milling of grain became one of the first industries to gain importance in the territory (Lusignan 1986h). The first mills were located along waterways as a convenient source of power, and generally serviced the needs of the immediate areas. Subsequently the milling industry was transformed, with mills located in major shipping centers in an effort to supply eastern and foreign markets.

The first mills were located in Green Bay and Prairie du Chien around 1810 (Lusignan 1986i). With the influx of settlers into the territory after 1830, Wisconsin became an important wheat producing state. By 1849, there were 117 mills in the state, and between 1845-1875, flour milling was the leading industry in the new state (Lusignan 1986i). In 1860, it accounted for 40% of the total dollar amount of the state's manufactures, or about \$11.5 million dollars in production. By 1880, the year of peak production, it accounted for only 20% of the total dollar amount of the state's manufactures, but over \$27.5 million dollars in production (Alexander 1929). During this period, Wisconsin was ranked 7th or 8th in flour production in the Union (Nord 1978).

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After 1900, the number of mills in Wisconsin declined steadily.

In the period between 1860-1880, wheat was increasingly milled for shipment to eastern and foreign markets (Lusignan 1986i). Cities like Milwaukee, Neenah-Menasha, La Crosse, and Superior, with their rail links to rural areas and excellent harbors, became major milling and shipping centers (Lusignan 1986i). Superior first became a major flour milling and shipment center in the 1880s, due to its proximity to the western wheat producing areas, rail connections, and harbor facilities (Lusignan 1986i). But, like all grain milling centers in Wisconsin, it too declined after 1900.

Associated Properties

Submerged vessels associated with agriculture are present in both Lake Michigan and Lake Superior. The first shipments were made from various Lake Michigan ports in the late 1830s to Buffalo, and were carried mainly on brigs, steamers, and schooners. Initially, these ships were loaded by hand with buckets. Elevators were constructed by the 1840s, loading the vessels first by buckets and later by horse-driven belts (Mansfield 1899). Quite early, Milwaukee became a major shipping port. In 1860 almost 8 million barrels of wheat, oats, and other grains were shipped from that port. The trade peaked in Milwaukee in 1875 when over 20 million barrels were shipped, while by 1890 this amount fell to 3 million barrels. By that point, though, Lake Superior ports were important traffickers in grains. By 1900 there were nine elevators in Superior, Wis., which accounted for half of the grain handling capacity in the United States portion of Lake Superior (Mansfield 1899).

As mentioned above, grain was initially shipped on sailing vessels. The schooners **Daniel Slauson** and **Trident** transported wheat, the **Nellie, Seaman,** and **Pride** had cargoes of potatoes when they sank, while the **Newsboy** was transporting corn. Examples of brigs include the **Greyhound,** lost off Sheboygan in 1859 while carrying wheat, and the **Belle,** lost in 1860 off of Door County with a load of corn. A bark, the **Buckeye State,** was carrying apples and cider, in addition to railroad iron, when it was lost off of Milwaukee in 1852. Internal combustion engine vessels increasingly came to dominate what was left of the declining grain trade. The gas screw **Starlight** was hauling hay and grain when it sank off Marinette in 1915. Barges, such as the

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Thomas A. Scott, were also used in agricultural transportation. The **Thomas A. Scott**, being towed by the **Conemaugh**, was carrying 44,000 bushels of corn when it foundered off Milwaukee.

E1.4 Package Freight

The term package freight is used to differentiate general merchandise from bulk cargos. The early history of package freight carriers is associated with ships providing passenger service, with moving passengers often being more important. Some of the early freight carriers shuttled manufactured goods to isolated towns and camps, and in return picked up raw materials to be shipped back to the urban centers of the east. Typically, supplies would be loaded in Detroit and Cleveland, including coffee, pork, tobacco, stoves, net lines, crockery, sundries, leather, cider, twine, salt, beans, potatoes, sugar, flour, hay, oats, whiskey, beer, lard, butter, empty barrels, fishing gear, boats, and soap. In return, the carriers would pick up fish or other raw materials (Cooper 1987). One early example is the schooner **Gazelle**. It delivered salt, empty barrels, fishing lines, lumber, and a boat to a fishing camp on the Door Peninsula. It picked up from this camp two passengers, 40 barrels of freight (fish?), and two boats (Cooper 1987).

Over time, package freight became increasingly important, supplanting passenger service (Murphy and Lenihan 1987). The primary trend in goods was from the east to the west, supplying the growing population of Wisconsin with manufactured goods from the East. Going to the East were agricultural products, including flour, from the Midwest. Package freight was also a frequent return cargo for schooners and cargo steamers. Murphy and Lenihan (1987) indicate that Buffalo, Cleveland, and Detroit were the primary eastern ports, with Chicago, Milwaukee, and Duluth-Superior being the western termini.

It was also increasingly common for railroad companies to own and operate package freight lines. By the early part of the twentieth century, all major lines were owned by railroad concerns. In fact, by 1916 the Interstate Commerce Commission forced a reorganization of the package freight lines, requiring that the railroads divest their holdings of Great Lakes vessels. As a result a new company, controlling 85% of the passenger and package freight service on the

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Great Lakes, the Great Lakes Transit Corporation, was formed (Fletcher 1960). By the Depression, though, the freight lines began to run at a deficit, and the start of World War II saw the end of the package freight service on the Great Lakes (Fletcher 1960). A descendant of the passenger and package freight service is the Great Lakes ferry lines.

Associated Properties

As mentioned in the settlement context, side-wheel steamers often carried both passengers and package freight, and a number of these vessels are present in the Great Lakes waters of Wisconsin. In addition, a number of other vessels types carried package freight. Examples are the brig **Ramsey Crooks** that was carrying "back freight" and whiskey, the schooners **Maria Hilliard**, **Dolphin**, and **Geo. C. Smalley** that were carrying sundries and household goods, the schooner **Windsor** that was carrying supplies for mills, and the freight-fishing tug **T.H. Camp** that was carrying supplies for a lumber camp. Sidewheel steamers, such as the **Sebastopol**, was lost carrying merchandise off of Milwaukee Bay. Others include the steam-screws **Vernon** that sank in 1887 off of Two Rivers Point and was carrying general cargo including apples, pig iron, potatoes, fish, and general stores, and the **Bon Ami** that carried passengers and freight between Green Bay ports and sank in 1930. Package freight was carried on the brigs **John Irwin**, lost in 1855 in Two Rivers harbor while transporting iron, nails, glass, apples, cider, and cheese, and the **Shakespear**, lost off of Door County in 1858-59, carrying a cargo of sundries. Scow-schooners such as the **A. Howes**, lost in 1871 near Kewaunee, also carried miscellaneous supplies.

Several ferries, all steam-screws, have sunk in Wisconsin Great Lakes waters. The **Pere Marquette 18** and the **Milwaukee** were both carrying railroad cars when they sank in Lake Michigan. The **Pere Marquette 18** was also carrying general merchandise and coal. The **Lakeland** carried a cargo of Nash and Kissel automobiles in 1924 in Lake Michigan, east of Sturgeon Bay, while the **Senator** was lost in 1929 in Lake Michigan with 200 automobiles bound for Detroit.

Other, bulkier cargos were also shipped to and from Wisconsin via the Great Lakes. Most important among these items was coal, brought from Eastern mines to help fuel Midwestern industrial expansion. The amount

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of coal imported into Wisconsin was quite low before 1850. For instance, only 2177 tons were shipped into Milwaukee in 1851 (Mansfield 1899). By 1861 this figure rose to 31,000 tons, and by 1897 it totalled 1.5 million tons (Mansfield 1899). An equally impressive 1.8 million tons were unloaded at the Duluth/Superior ports in 1897 (Mansfield 1899). Coal was transported mainly by ship prior to 1874, after which rail became increasingly important. The distribution of coal was highly centralized. Ships would deliver large loads to a nodal port, from which it was transshipped to smaller communities (Mansfield 1899).

The shipwrecks of Wisconsin mirror these trends in coal use. For instance, the bark **Flora**, lost in 1853 off Kewaunee, carried only 435 tons of coal. Forty years later, in 1892, when the **Joseph G. Masten**, a bark converted into a barge, sank off Two Rivers, it was carrying 2000 tons of coal. Lost in 1919, the steam-screw **Frank O'Conner** was loaded with 3000 tons of coal when it sank off Cana Island. The **Frank O'Conner**, which also typically carried grain, provides a good example of the versatility of freight carriers.

Records of lost ships carrying other cargoes include the **Chicago**, a bark lost in 1851 off Door County that was carrying salt from Quebec headed for Milwaukee, and the **Nebraska** and **St. Ignace**, both carrying loads of bricks.

E1.5 Government

While the Government impact on Great Lakes shipping was substantial, few local, state, or federal craft operated on the waters until the formation of the Coast Guard. Prior to that, most government activity centered on the improvement of harbors, the construction and manning of lighthouses, harbor lights, and lightships, and a lifesaving rescue service.

One activity that the federal government did commission vessels for was that of lightships. Lightships were sent to northern Lake Michigan as early as 1832, although most operated between 1875-1950. In the early years, the lightships were plagued by serious problems with vessels, personnel, and equipment (Watts 1989). In 1851, Congress investigated the situation, and in 1852 formed the Lighthouse Board within the

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Treasury Department, in an effort to upgrade technology and improve conditions. The Board was disbanded in 1910, when the Bureau of Lighthouses within the Commerce Department was formed, once again in an effort to improve and modernize the lighthouses and lightships. The Coast Guard then took over responsibility for lighthouses and lightships in 1939, and they were eventually replaced (Watts 1989).

A second federal agency involved in Great Lakes shipping was the Revenue Cutter Service. The Revenue Cutter Service was created by an act of Congress in 1789 to collect duties placed on ships and their goods being imported into the United States, and it authorized vessels to secure the collection of these revenues (Capron 1965:10). A 1790 bill authorized the construction of the first Revenue Cutters (Capron 1965). The first revenue cutters appeared on the western Great Lakes prior to the Civil War, perhaps as early as the 1840s, in an effort to regulate trade with Canada and the eastern United States ports. The Revenue Cutter Service was merged with the Lifesaving Service in 1915 (Capron 1965), and is now part of the United States Coast Guard.

Associated Properties

One example of a government vessel in Wisconsin Great Lakes waters is the **Lightship 57** located off Milwaukee in Lake Michigan. This vessel was used as a lightship in Lake Michigan during the late 19th and early 20th centuries. Another example is the United States Revenue Cutter, **John B. Floyd**. This vessel was built in 1858 and subsequently rebuilt in 1877 as the **Alice Craig**. A final example of government vessels is the car ferry **Wisconsin**, which had been a convalescent hospital ship of the United States Shipping Board during World War I. Then named **General Robert M. O'Reilly**, she was stationed in New York harbor.

F. Associated Property Types

I. Name of Property Type: Sailing Vessels

II. Description: Sailing vessels include such types as barks and barkentines, brigs and brigantines, schooners, schooner-barges, and scow-schooners. Of these, barks, barkentines, brigs, and brigantines are numerically the least common of the Great Lakes sailing vessels. All of these vessels are commercial ships of forty or more feet in length and are propelled by sail, with varying types of rigging. Most of the sailing vessels described here were general purpose cargo carriers, with few specialized carriers constructed.

Labadie and Murphy (1987:45) make the point that there were few barks or brigs on the Great Lakes, although these terms were often used for the more common barkentines and brigantines. True brigs were two-masted and square-rigged on both masts (Figure 2); the mainmast also carried a spanker sail. Barks carried three or more masts, were square-rigged on both fore and mainmasts, and the mizzen (or the aftermost mast in barks with more than three masts) was fore-and-aft rigged (usually with a gaff-rigged spanker and gaff-topsail). Brigantines and barkentines were characterized by having a combination of square and fore-and-aft sails. The brigantine carried a single square-rigged foremast and a fore-and-aft rigged mainmast. Barkentines had three or more masts with square sails on the foremast and fore-and-aft (usually gaff-rigged) sails on the other masts. Barks, brigantines, et. al. usually carried a variety of jibs and headsails on their foremast, main staysails, and gaff-topsails.

After 1830, schooners quickly became the most favored rig on the Great Lakes. 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 poor sailors, as they tended to drift sideways. Centerboards came to be incorporated into the designs of all hull types to improve windwardliness and control leeward drift (Labadie 1989:19-20).

Schooners are fore-and-aft rigged, and have two or more masts (Figures 3 and 4). Three-masters became the norm on the Great Lakes around the Civil War, a few four-masters appeared thereafter, and at least one five-master was constructed (Chapelle 1982:259-260, 270; Hirthe and Hirthe 1986:vii). Lake schooners usually carried square-rigged topsails on their foremasts, and by the time of the Civil War, augmented these with an additional triangular sail (called a raffee) footed on the foretopsail yard and spread up to the mast truck (Cuthbertson 1931:128-129; Hirthe and Hirthe 1986:vii). Lake schooners usually carried a variety of jibs and headsails on their foremast, main staysails, and gaff-topsails.

X see continuation sheet

X see continuation sheet for additional property types

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Scow-schooners were schooner rigged, but were characterized by flat bottomed, boxy hulls, and flat bows (though some variants of this design had an ordinary schooner bow). They were usually rigged with two to three masts. They were generally crudely built, and used for low-paying, local freight such as hay, lumber, cordwood, tanbark, and sand (Labadie 1990:F:4).

Canaller schooners were designed to fit through the Welland and St. Lawrence locks, allowing passage into and out of Lake Ontario from Lake Erie and the St. Lawrence River, respectively. Restricted by lock dimensions, canallers were characterized by straight stems, narrow beams, flat sides, flat bottoms and sterns, and short, highly canted bowsprits and jibbooms (Cuthbertson 1931:234-235; Labadie 1989:21). As a class, their dimensions changed along with the developing lock systems.

Schooner-barges developed out of a need to transport large quantities of bulk material economically after the Civil War (Carrell 1985:14-16). This resulted in a "consort system" in which heavily laden barges were towed by tugs or steam barges. Schooner-barges included schooners renovated into barges, or specially constructed schooner-barges. The main difference between schooner-barges and schooners is the reduction in the sail and rigging area in the former. The masts were shorter (sometimes deliberately cut down), and usually totalled two to three in number. Deckhousing was usually removed from converted schooners, and hatches were added. A pilothouse was sometimes added to provide the pilot with a clear view, and a small steam-engine was often used to hoist anchors, work pumps, and load and unload cargo. Schooner-barges needed fewer crew members for their operation than did fully-rigged schooners, thus reducing costs.

III. Significance:

Sunken sailing vessels can be nominated under Criteria A, C, and D in the areas of settlement, transportation, commerce, engineering, and historical archeology. While it is possible to nominate a wreck under Criterion B, it is less likely. Many of the sunken sailing vessels will have significance in more than one area.

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Under Criterion A, sailing vessels can be significant for their association with the settling of the area that was to become Wisconsin, and for providing access to Eastern goods to Wisconsin residents and markets for Wisconsin products. Early settlers to the Midwest were often transported on sailing vessels. In addition, many of the immigrants depended on sailing vessels for their livelihood. Many were engaged in fishing, both on Lake Superior and Lake Michigan. Others depended on schooners and other sailing vessels to transport their produce (grains and other agricultural products, ores, fish, and lumber, and later, manufactured goods), to the markets of the East. Those vessels eligible under Criterion A will have a well documented association with at least one of the contexts discussed above.

When eligible under Criterion C, the shipwrecks must retain enough integrity, at least within selected portions of the vessel, to provide visible examples of engineering design or construction techniques that were important to sailing vessels. They can be illustrative of innovative engineering or construction techniques or representative of standard techniques. Great Lakes sailing vessels were not mass produced, but instead reflect individual or ethnically inspired building traditions, local innovation, and matters of expediency. Ships (then as now) reflected some of the most advanced technology of the day in terms of engineering and architecture, and provide invaluable insights into undocumented or poorly understood technologies. At present, there are no surviving floating or working examples of Great Lakes sailing craft (as defined within this property type) in Wisconsin, and in addition, the technology to build and maintain these vessels has all but disappeared.

Under Criterion D, historic archeological resources are significant for their information on the development and uses of sailing vessels on the Great Lakes. For many of the sailing ships, written documentation is both sparse and limited in scope. Nominated sites can both confirm and supplement the documentary record, in the end yielding a better understanding of the nature and use of Great Lakes sailing vessels, both in a general sense and in specific instances.

As archeological sites, shipwrecks are also sources of data of cultural ecological systems at work on the Great Lakes, formed by a complex interplay of economic, environmental, and ethnic factors. Ship

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architecture may reflect developments and changes in man's exploitation of the lake's natural environment (increasing scarcity of timber, fish, increasing availability and viability of iron and steel production), in man's adaptation to the Great Lakes environment (changes in hull and rig designs to accommodate the idiosyncracies of Great Lakes weather, navigation, and cargo types), and ethnic factors influencing vessel design and use.

Lastly is the value of shipwrecks as cultural "time capsules"; loci of synchronically deposited and datable artifacts (cargo, ship's equipment, and personal effects). Material culture associated with Great Lakes sailing vessels may be especially revealing of such factors as shipboard life, vessel maintenance, subsistence, hierarchy, shipboard spatial arrangement, activity areas, personal apparel, personal histories of the crew and passengers, relative value and origins of manufactured goods shipped or used aboard, and trading routes, might all be gleaned from elements of shipboard material culture, and contribute to a vessel's significance under Criteria D.

Cargo lists for the sailing vessels, especially during the earlier years, are often either not available or are incomplete. Archeological investigations of these shipwrecks could lead to a more detailed understanding of the freight being hauled on the Great Lakes, its changes through time, its difference when compared with land transport, and what cargos were being shipped to specific areas. With the locational and temporal data from shipwrecks, sailing routes can also be reconstructed. A better understanding of post-depositional processes in the Great Lakes can also be obtained, for such items as wood, fabrics, and metal from shipwreck sites.

The ships themselves can reveal information on the shipbuilding and hardware manufacturing technology of the time. As stated above, sailing ships were very much a vernacular engineering work, and that much of the knowledge of their construction and maintenance has been lost. Analysis of the ship's hardware, both construction and task-related hardware, can provide valuable information concerning these areas. It is possible to determine whether the hardware was mass-produced or individually made, while the evolution from individually made to mass-produced hardware can also be traced. Analysis of the vessel itself can contribute to the understanding of

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early shipbuilding techniques of Great Lakes vessels. Differences in these techniques can be studied to determine if they reflect ethnic, expedient, temporal, or environmental variables.

The lifeways of sailing vessel crews and immigrant passengers can also be studied through the archeological analysis of shipwrecks. Often, the possessions of these individuals will be present at the wreck site, whether the shipwreck resulted in any casualties or not. Information such as on the ethnic and economic identity of the crews can be obtained. Additionally, questions about their life aboard ship can be answered, including concerns such as living conditions, food, clothing, and the nature of shipboard work. The ethnic and economic identity, and types of possessions transported by immigrants, can also be obtained from certain shipwreck sites. Material culture may even provide data on shipboard hierarchies, health, human behavior, and other questions related to maritime cultural anthropology.

F. Associated Property Types

I. Name of Property Type: Steam Vessels

II. Description: The vessels included in this property type are all propelled by steam power. The major steam vessels include side-wheel steamers, steam-barges, steam-screws, and steam-scows, of which the last is a somewhat numerically unusual type. These vessels were used to transport package freight, passengers, and bulk freight.

Side and stern paddle-wheel steamers usually had two or more decks, with cargo space below the decks in holds, and passenger accommodations in cabins on the deck. Of the two paddle-wheel steamers, side-wheel steamships were most common on the Great Lakes, with stern-wheelers being quite rare. Side-wheelers functioned as general cargo carriers and had non-specialized cargo space. These vessels became particularly well-suited for passengers, culminating in the "palace" side-wheelers of the mid-nineteenth century. Paddle-wheel steamers that did not specialize in the transport of passengers were known as package freighters and had two decks with side loading gangways (Labadie and Murphy 1987:52-54).

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A few "steam-schooner" vessels mark somewhat of an transitional design between schooners and steam-screws. Steam-schooners were converted schooners that had steam engines and screw propellers replacing sails as their primary means of locomotion. These vessels were used to carry passengers and freight (Labadie and Murphy 1987:51).

Steam-screws (called "propellers" by contemporaries) were general cargo and passenger carriers (Figures 5 and 6). These vessels were double-decked with main and spar decks and a passenger cabin on top. Cargo was carried between decks and in the hold beneath the main deck. Package freight (cargo usually in barrels, crates, boxes, bags, and bales) was loaded between decks through a series of gangways (freight openings in the sides of the vessel), and could also be stowed in the hold. Bulk cargo, such as grain and coal, was loaded into the hold by buckets. Steam-screws had compact machinery, enabling them to carry more cargo, providing an advantage over side-wheelers (Labadie and Murphy 1987:53).

Steam-screws grew in size through time, and, as their length exceeded 150 feet, hulls needed to be reinforced to prevent longitudinal sagging or "hogging". Complex reinforcing systems of wood, and later, iron and steel began to emerge, including longitudinal hogging trusses (called crown or Bishop's arches), use of an arched bilge ceiling, and iron sheer straps (Labadie and Murphy 1987:55). Though wooden steam-screws were built up to 1902, after 1880 they were being slowly replaced by iron and steel-hulled ships (Labadie and Murphy 1987:59). Gas and oil-powered screw propulsion systems made their appearance around the turn of the century.

After about 1860, steam-screws were built without enclosed freight decks, and were single-decked with small cabins located at the stern. These modified steam-screws were forerunners of a new vessel type, steam-barges (Figures 7 and 8). Steam-barges were screw propelled steamers with schooner-type hulls. These vessels had single open freight decks unlike the earlier steam-screws, and compact aftercabins. Steam-barges were designed to tow barges and to carry bulk cargoes, mainly lumber. Small storage capacity below deck along with inadequate hatch sizes thwarted their use as bulk carriers. The earliest of these vessels had after pilothouses, while after 1880 most carried a raised forecastle with a well deck between the bow and stern. Most steam-

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barges had a tall mast near the bow, while larger vessels had up to three masts. Most had centerboards. Large steam-barges, like their steam-screw counterparts, needed reinforced hulls. Steam barges ended operation on the Great Lakes by the 1930s (Labadie and Murphy 1987:56-57, 60). Steam-scows are smaller than steam-barges, with boxy scow hulls and steam-screw propulsion, usually involved in general-purpose heavy marine work such as dredging, logging, wrecking and salvage, and construction.

Specially designed bulk freighters, used to carry ore and grain, began to be built shortly after the Civil War. The first was the bulk freighter **R. J. Hackett** (Figure 9). These freighters were double-decked and had space below the decks for dry bulk cargo, wide hatches that were evenly spaced to accommodate bulk loading devices, and were equipped with powerful engines to enable them to tow barges (Figure 10). Pilothouses were placed forward to improve visibility, and the machinery was placed in the stern. Originally, these vessels had three to four masts to steady them and act as auxiliary propulsion, but this was abandoned by around 1890 due to improvements in steam engines. The vessels had long, narrow shoal-draft hulls and were characterized by close, heavy floor framing, large multiple floor keelsons set parallel to the centerline keelson, and (in many cases) the use of diagonal iron or steel cross bracing and reinforcing straps in the hull. Due to improvements in marine architecture, propulsion systems, and the enlarging of canals and locks, bulk carriers increased in size through time, and, after the turn of the century, were being built almost exclusively of steel (Figures 11 through 13) (Labadie and Murphy 1987:57-59).

III. Significance:

Sunken steam vessels can be nominated under Criteria A, C, and D in the areas of transportation, settlement, commerce, engineering, and historical archeology. While it is possible to nominate a wreck under Criterion B, it is less likely. Many of the sunken steam vessels will have significance in more than one area.

Under Criterion A, steam vessels can be significant for their association with the settling of the area that was to become Wisconsin and for providing access to Eastern goods for Wisconsin settlers and

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markets for Wisconsin products. Settlers to the Midwest were often transported on side-wheel steamers and propellers. In addition, many of the immigrants depended on steam vessels for their livelihood. Many were engaged in fishing, both on Lake Superior and Lake Michigan. Others depended on side-wheel steamers, steam-screws, and other steam vessels to transport their produce (grains and other agricultural products, ores, fish, and lumber, and later manufactured goods), to the markets of the East. Those vessels eligible under Criterion A will have a well documented association with at least one of the contexts discussed above.

When eligible under Criterion C, the shipwrecks must retain enough integrity, at least within those portions of the vessel that provide visible examples of engineering design or construction techniques important to steam vessels. They can be illustrative of innovative engineering or construction techniques or representative of standard techniques. Great Lakes steam vessels were not generally mass produced, but often reflect individual or ethnically inspired building traditions, local innovation, and matters of expediency (especially for the period of wooden ship construction). Ships (then as now) reflected some of the most advanced technology of the day in terms of engineering and architecture, and provide invaluable insights into undocumented or poorly understood technologies. Many of the early steam vessels may represent unique engineering details no longer present in floating vessels. It is estimated that plans are available for fewer than ten percent of the steam vessels dating to the nineteenth century, and those that are present are often general in detail. Few if any of these vessels are afloat on the Great Lakes today.

Under Criterion D, the historic archeological resources are significant for their information on the development and uses of steam vessels on the Great Lakes. For many of the steam ships, written documentation is both sparse and limited in scope. Nominated sites can both confirm and supplement the documentary record, in the end yielding a better understanding of the nature and use of Great Lakes steam vessels, both in a general sense and in specific instances.

The beginning of steamship construction saw a change from vernacular to more standardized construction techniques, although most vessels still have vernacular elements of construction. During the first years of

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the use of steam power, sailing ships were often fitted with a steam engine. These ships are truly vernacular, and represent the evolution of one form of transportation mode to another. Archeological investigations can provide information on this transition.

Also located within the Wisconsin Great Lakes waters are several of the first generation bulk carriers. Analysis of the engineering details of these vessels could provide an understanding of the evolution of this important vessel type.

As archeological sites, shipwrecks are also sources of data of cultural ecological systems at work on the Great Lakes, formed by a complex interplay of economic, environmental, and ethnic factors. Ship architecture may reflect developments and changes in man's exploitation of the lake's natural environment (increasing scarcity of timber, fish, increasing availability and viability of iron and steel production), in man's adaptation to the Great Lakes environment (changes in hull and machinery designs to accommodate the idiosyncracies of Great Lakes weather, navigation, and cargo types), and ethnic factors influencing vessel design and use.

Lastly is the value of shipwrecks as cultural "time capsules"; loci of synchronically deposited and datable artifacts (cargo, ship's equipment, and personal effects). Material culture associated with Great Lakes sailing vessels may be especially revealing of such factors as shipboard life, vessel maintenance, subsistence, hierarchy, shipboard spatial arrangement, activity areas, personal apparel, personal histories of the crew and passengers, relative value and origins of manufactured goods shipped or used aboard, and trading routes might all be gleaned from elements of shipboard material culture, and contribute to a vessel's significance under Criteria D.

The lifeways of crew and passengers can be better understood through the analysis of the material culture and shipboard conditions. Comparisons may be made with crews of sailing vessels in an attempt to obtain a better understanding of changes in the living and work conditions of Great Lakes crews. For instance, does the transportation of bulk cargos and the increased speed change the nature of work for the crews on steamships? Details as to changes in the ethnic identity

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or place of recruitment of crews could also be obtained. Other questions on the nature of cargoes transported by steam vessels and the routes taken by ships can also be addressed archeologically. Steam vessel wrecks can also be used to gain an understanding of post-depositional processes in the Great Lakes.

F. Associated Property Types

I. Name of Property Type: Miscellaneous Vessels

II. Description: There are a variety of vessel types subsumed under this heading. Included are government lightships and revenue cutters, barges, scows, and fish and towing tugs. This property type is centered more around vessel function than propulsion, as in the previously defined property types.

The single known lightship in Wisconsin waters, **Light Vessel #57**, built in 1891, was about 100 ft long, 20 ft in beam, and 14 ft deep. The ship was built of oak, and was propelled by a steam engine with a maximum speed of eight knots. It was fitted with two masts designed to carry oil burning lanterns 45 ft above the lake. These lights were visible in clear weather from 10-15 miles (Watts 1989:7-8). It is now located along South Shore Park in Milwaukee. The other potential government-operated ship type, revenue cutters, denote more of a function than a vessel type. Revenue cutters had steam, gas, or oil engines, and were generally built for increased speeds.

Scows and barges (Figure 14) are used for hauling bulk cargoes, wrecking and salvage, construction, dredging, logging, and other heavy marine uses. Both types are unpowered, and must be towed by other craft. Many Great Lakes barges were simply cut down, unrigged old schooners and steamers, utilizing the original vessel's hull shape and reinforcement scheme, perhaps with some ad hoc reinforcing additions such as tie rods and turnbuckles. Converted barges carrying massive bulk cargoes such as stone may have even had their decks removed, serving simply as huge floating wheelbarrows. Scows were generally smaller, specially built workcraft, having boxy hulls, cross-planked bottoms, and squared ends. Neither barges nor scows carried masts (other than derricks for salvage or logging work, differentiating them from scow-schooners and schooner-barges), and had minimal

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superstructure, other than that required for housing crews, machinery, and equipment. Barges and scows frequently carried specialized equipment for the current task at hand, including wrecking, logging, construction, or dredging equipment. In various forms, barges are still in use today. Most are general-purpose, steel hulled vessels, though a variety of special-purpose types are utilized for bulk cargo transport on large inland rivers. Many are former military work vessels (such as construction and dredging barges), as well as landing craft.

Tugs are generally small powered vessels, less than 100 ft in length, used for various types of fishing and towing operations. Tugs apparently have their origin in small, multi-purpose steam powered craft, both screw and paddle-propelled, that came into use around the 1840s and 1850s (Labadie 1989:25). These vessels were used to perform many tasks, both commercial and governmental, including service as fish tugs, towing log rafts, harbor tugs, fireboats, hydrographic survey vessels, and even gunboats. As small steamers, tugs were used locally from time to time for passenger and packet transportation, and occasional use for shipwreck rescues, pleasure excursions, salvage, and wrecking.

Great Lakes tugs were used both in harbors and on the open lake. Harbor tugs became increasingly common after the Civil War, especially as vessels became larger and less maneuverable, and as developing harbors became more congested. Harbor tugs were used for towing sailing vessels into and out of harbors, nudging sailing and steam ships into and out of loading docks, and towing sailing vessels through canal areas, such as the Sturgeon Bay Ship Canal (Figure 15). These tugs were generally around 40 to 70 ft in length, were screw-propelled, with a single powerful steam engine. Resembling modern tugs in many ways, these harbor tugs usually had a small pilot house forward, crews quarters, machinery, and galley amidships, and an open afterdeck with towing bitts.

Lake tugs were generally larger, and were used for towing lumber rafts and strings of barges, scows, or schooner-barges. Powerful towing tugs such as the **Boscobel** (later renamed **Ottawa**) were built for towing large rafts of lumber on lakes Michigan and Huron during the 1870s. These large tow tugs were also used as wrecking tugs, and specialized in the

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salvage and recovery of other vessels. These large tow tugs resembled their smaller harbor sisters, but had much larger engines, varied from 90 to over 150 ft in length, and had a higher freeboard for navigating on the open lakes.

Tugs also saw use in the fisheries, including setting gill nets, pound nets, set lines, trawling, and shipping processed fish to distribution points (Figures 16 and 17). Frequently one of only a handful of powered vessels available locally, fish tugs also ended up performing many miscellaneous local tasks, including towing, rescues, excursions, and carrying package freight. In the twentieth century, more specialized fishing tugs emerged. Twentieth century fish tugs were first built of wood, later of riveted steel and then welded steel, and were propelled by steam screws until about the time of the Great Depression. Smaller launches propelled by steam and naphtha were also used during this period for fishing and transportation. After the 1920s and 1930s, gasoline engines, including the popular Kahlenberg engines built at Two Rivers, came into greater use. During and after the Second World War, diesel engines, also manufactured by Kahlenberg, came to replace gasoline engines.

The Great Lakes fishing tug in its final form was a product of local innovation as well as adaptation to the harsh Great Lakes environment. It seems to have developed from the designs of the small packet steamers and tugs of the late-nineteenth century. The classic gill net tug is frequently likened to a "wooden shoe" in appearance. These sturdy gill net boats invariably have an enclosed hull but exhibit a great amount of variation in the placement of the pilot house and net doors. Generally, the pilot house is placed aft, though many examples of forward pilot houses exist, especially in earlier boats, with the machinery amidships. The pilot house usually consists of a steering station slightly elevated above the top of the boat, fitted with square windows or round portholes. The enclosed upper structure permits fishing even in winter, allowing the tugs to wallow through heavy winter seas which may break clear over the vessel. Winter heating was provided by wood or coal stoves, now replaced by oil stoves in more modern tugs. Modern fish tug hulls are normally of steel (though some older boats are wooden with steel-sheathing) with a sharp bow for ice-breaking. Gill net boats generally have net doors placed on either side of the hull forward for lifting nets, and a large after door for

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setting nets. Traditional vessel colors were a black lower hull and a white upper hull, with trim of the same color as the lower hull, and occasionally a bottom painted with a red anti-fouling paint (Weborg, personal communication 5/9/1991).

Another fishing boat type is the pound net boat. Pound (pronounced "pond") nets came into use by around 1885 in the Apostle Islands and by 1917 in Door County (U.S. N.P.S. 1988:15, 24-25; Weborg, personal communication 5/9/1991). Placement and lifting of these nets requires an open boat design, the boat having to actually enter into the net impoundment under the net cables to harvest fish from the pound nets. Therefore, pound net boats are characterized by a pilot house placed far forward, with a long open afterdeck and a very low bulwark. Early pound net boats were basically large wooden skiff designs with propulsion by oar, sail, or later, by small internal combustion engines. Modern pound net boats are gasoline or diesel screw-propelled, and have steel hulls and superstructures.

III. Significance:

Sunken lightships, revenue cutters, barges and scows, hauling tugs, and fishing tugs can be nominated under Criteria A, C, and D in the areas of transportation, commerce, engineering, and historical archeology. While it is possible to nominate a wreck under Criterion B, it is less likely. Many of the sunken vessels will have significance in more than one area.

When nominated under Criterion A, the vessels should have a well documented and significant association with the contexts discussed above for each individual vessel type. For example, fishing tugs must have a well documented and significant association with the Wisconsin Great Lakes fishing industry.

When eligible under Criterion C, the shipwrecks must retain enough integrity, at least within selected portions of the vessel, to provide visible examples of engineering design or construction techniques that were important to the vessels described above. They can be illustrative of innovative engineering or construction techniques or representative of standard techniques. Nineteenth century Great Lakes vessels were not generally mass produced, but often reflect individual

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or ethnically inspired building traditions, local innovation, and matters of expediency (especially for the period of wooden ship construction). Ships (then as now) reflected some of the most advanced technology of the day in terms of engineering and architecture, and provide invaluable insights into undocumented or poorly understood technologies. Many of the early steam vessels may represent unique engineering details no longer present in floating vessels. It is estimated that plans are available for fewer than ten percent of the steam vessels dating to the nineteenth century, and those that are present are often general in detail. Few if any of these vessels are afloat on the Great Lakes today.

Under Criterion D, the historic archeological resources are significant for their information on the development and uses, of the various vessels described above, on the Great Lakes. For many of the these ships, written documentation is both sparse and limited in scope. Nominated sites can both confirm and supplement the documentary record, in the end yielding a better understanding of the nature and use of Great Lakes steam vessels, both in a general sense and in specific instances. This is true of the engineering and construction details of these ships, as much of this type of information is poorly documented, and many of the vessels incorporated vernacular elements into their construction.

As archeological sites, shipwrecks are also sources of data of cultural ecological systems at work on the Great Lakes, formed by a complex interplay of economic, environmental, and ethnic factors. Ship architecture may reflect developments and changes in man's exploitation of the lake's natural environment (increasing scarcity of timber, fish, increasing availability and viability of iron and steel production), in man's adaptation to the Great Lakes environment (changes in hull and machinery designs to accommodate the idiosyncracies of Great Lakes weather, navigation, and cargo types), and ethnic factors influencing vessel design and use.

Lastly is the value of shipwrecks as cultural "time capsules"; loci of synchronically deposited and datable artifacts (cargo, ship's equipment, and personal effects). Material culture associated with Great Lakes sailing vessels may be especially revealing of such factors as shipboard life, vessel maintenance, subsistence, hierarchy,

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shipboard spatial arrangement, activity areas, personal apparel, personal histories of the crew and passengers, relative value and origins of manufactured goods shipped or used aboard, and trading routes might all be gleaned from elements of shipboard material culture, and contribute to a vessel's significance under Criteria D.

The lifeways of crew and passengers can be better understood through the analysis of the material culture and shipboard conditions. Comparisons may be made with crews of sailing vessels in an attempt to obtain a better understanding of changes in the living and work conditions of Great Lakes crews. For instance, does the transportation of bulk cargos and the increased speed change the nature of work for the crews on steamships? Details as to changes in the ethnic identity or place of recruitment of crews could also be obtained. Other questions on the nature of cargos transported by steam vessels and the routes taken by ships can also be addressed archeologically. Steam vessel wrecks can also be used to gain an understanding of post-depositional processes in the Great Lakes.

IV. Registration Requirements:

Any of the property types defined above can be significant under Criteria A, C, or D, and although it is possible that a wrecked vessel could qualify under Criterion B, having an association with an important individual, it is less likely. It is anticipated that many wrecks will be eligible under two or more criteria. To be eligible, all wrecks must have integrity of location, in other words, they cannot have been raised or moved except by the action of natural forces or through contemporary salvage efforts. They must also have integrity of setting, in that they cannot have been covered over with fill materials other than by natural processes. An exception to this is in cases when filling has been used as a mitigative technique in Section 106 compliance cases, in which case the wreck should be nominated under Criterion D. Other requirements are more criterion specific, and are detailed below.

To qualify under Criterion A, the ship must contribute to broad patterns of history, for instance settlement, fishing, mining, transportation, or agriculture in Wisconsin. While helpful, it is not necessary for the identity of the ship to be securely known. At

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minimum, the wreck must be identifiable as being used in the historic context cited. In other words, an ore carrier should still have enough structural integrity for it to be identified as an ore carrier. Integrity can be lost either prior to the wreck, through conversion of the ship from one task to another, or it can be lost during and after the shipwreck event. The remaining physical elements, either structural or artifactual, must be indicative of the historic function.

To qualify under Criteria C, the wreck must be substantially intact or have sections large enough to illustrate distinctive characteristics of construction, engineering, or the work of a master shipbuilder, for which the wreck is being nominated. This can include evidence of the craftsmanship of shipbuilding, including methods of construction, local shipbuilding traditions, or individual, local, regional, or national applications of technological practices. This would necessitate the existence of a substantial amount of the original materials of the ship and an overall integrity illustrating the historical function, shipbuilding technology, or nautical technology of the wreck.

Wrecks can qualify under Criteria D if the ship is in ruins but yet able to yield information important to history. This could include the history of shipping on lakes Superior or Michigan, shipbuilding, nautical archeology, maritime anthropology, or broad patterns of history. Artifacts or other deposits associated with the wreck have to be shown to exist. Looted wrecks can be nominated under other appropriate criteria, or subsurface deposits will have to be shown to be present at the wreck site. The materials at the wreck site should be able to yield information on nautical technology, shipboard life, the nature of items being shipped, or the use of the ship. Materials can also provide information on the construction or manufacture of items used on the ship or goods being transported by the ship.

While possible, it is less likely that wrecks associated with important individuals (Criterion B), will be identified in the Great Lakes of Wisconsin. If present, research must document an association between the individual and vessel. As such, the wreck must be intact enough for it to be identified with certainty. The wreck's association should be compared with other properties associated with the individual and should be representative of that individual's historic contributions.

G. Summary of Identification and Evaluation Methods

Discuss the methods used in developing the multiple property listing.

Under the auspices of the Underwater Archeology Program, State Historical Society of Wisconsin, archival research and underwater fieldwork has been initiated in an attempt to obtain greater information on submerged vessels within the Great Lakes waters of the State of Wisconsin. The archival research has concentrated on the larger vessel types, with less information sought on smaller vessels such as mackinaw boats, yachts, canoes, dinghies, and others. The archival data collected includes vessel name, type, casualty type and date, location, construction and engineering specifications, details of the casualty event, and references to the vessel, including documentary sources and a discussion of fieldwork conducted at the wreck site (Figure 18). At present, varying amounts of information are available on over 700 wrecks in the Great Lakes waters of Wisconsin. Field investigations have been conducted at over thirty vessels, aside from those investigated during Section 106 compliance investigations. The fieldwork has taken place in Lake Michigan at Death's Door (between the

 X See continuation sheet

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 X See continuation sheet

Primary location of additional documentation:

<u> X </u> State historic preservation office	<u> </u> Local government
<u> </u> Other State agency	<u> </u> University
<u> </u> Federal agency	<u> </u> Other

Specify repository: _____

I. Form Prepared By

name/title	Paul Kreisa\David Cooper, Asst. State Archeologist				
organization	State Hist. Soc. of Wisconsin	date	06/30/91		
street & number	816 State Street	telephone	608/262-9893		
city or town	Madison	state	WI	zip code	53706

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Door County peninsula and Washington Island), in northern Green Bay and Lake Michigan, and in the Apostle Islands areas of Lake Superior. Typically, the investigations include locating the vessel through a verbal description, placement on a topographic map, use of the LORAN system, or use of a theodolite (tied into a USGS datum) to determine a site's UTM coordinates. Additional information on wrecks has been obtained by the state underwater archeology program with the cooperation of amateur divers who occasionally report wreck findings, and from various Section 106 compliance investigations.

Survey priorities for field research are chosen on the basis of estimated potential for significant archeological remains. Field survey consists of actual physical inspection, evaluation, and interpretation of the archeological site, involving survey and documentation of the remains, and identification of management problems (such as archeological importance and sensitivity, site environment, human and natural threats, visitor access, and safety). Survey work is conducted along those guidelines established by the National Park Service for submerged cultural resource survey and evaluation in determining eligibility of sites for the National Register of Historic Places.

The survey research design is directed towards formulating descriptions and archeological assessments for each site. Sites are approached with a package of management questions, some specific to the site itself (location, environment, parameters, integrity, extant features, artifacts) and some general questions which placed the site in its broader context as a resource (historical significance, archeological potential, recreational potential, management requirements). Research objectives had the following intents:

Phase I Archeological Survey.

1. Determine site location, environment, and parameters through visual survey of extant elements, features, and artifacts.
2. Document and map exposed remains using trilaterated survey points and an onsite (submerged) datum or using an offsite (surface) datum, transit and electronic distance meter.

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Phase II Archeological Evaluation.

1. Document using still photos, underwater video, and measured sketches those architectural and archeological elements which are diagnostic of (a) vessel type (b) vessel age (c) vessel construction style and method (d) vessel propulsion (e) vessel use (f) vessel identification (through comparison with inventory records of historically-known vessel losses) (g) vessel cargo (h) shipboard human activity broadly indicative of occupation, status, ethnicity, subsistence or other questions allied with the study of maritime anthropology and Great Lakes social and economic history.
2. Provide an assessment of a site's environmental and cultural context for determining its historical significance and archeological potential (according to National Register of Historic Places criteria) as well as recreational potential, and management requirements.

Site evaluation and documentation is conducted using SCUBA and simple manual mapping techniques, coupled with still and/or video photography. Documentation includes measured sketches, construction schematics, and site plans for National Register-level documentation. Analysis is conducted using comparative archeological evidence obtained from archeological surveys of similar sites, and is augmented by historical documentation relating to individual site histories and general Great Lakes maritime history. Where artifacts are encountered, material culture is interpreted in the context of its relevance to shipboard activities, shipboard hierarchy, shipboard activity/use areas, and other aspects of maritime anthropology.

The submerged cultural resource survey report is produced to serve as a source for site description, analysis, interpretation, and management recommendations for use in cultural resource management planning, recreational development, and public education. It is also to serve as the source document for determination of eligibility and nomination for listing on the National Register of Historic Places. Preservation of the sites will insure their availability as an important and non-renewable source of scientific data relating to Great Lakes underwater archeology, maritime history, marine architecture, and maritime anthropology.

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