

ABSTRACT

Nadine Kopp. *The Influence of the War of 1812 on Great Lakes Shipbuilding*. (Under the Direction of Dr. Bradley Rodgers) Department of History, January 2012.

The purpose of this thesis is to determine whether the War of 1812 influenced ship construction techniques on the Great Lakes. During the War of 1812, much of the fighting in the North American theater of war primarily took place along the Niagara frontier and later along the St. Lawrence River. From the outset, both the Americans and British realized that gaining the upper hand in the conflict depended upon control of the Great Lakes. Critical to achieving the advantage was the development of a significant and powerful inland navy, which led to a shipbuilding race on both shores. The primary question raised surrounding Great Lakes ship construction in the early nineteenth century is whether or not this large scale event, the War of 1812, permanently influenced the way in which ships were constructed once the war was over.

To answer this question, this study examines diagnostic attributes of archaeologically examined wrecks from the Great Lakes and Lake Champlain from before, during and after the War of 1812 to find similarities and difference in their design and construction. The three time periods have been defined as the period before the War of 1812, from the French and Indian War (1754 to 1763), when British sailing ships first appeared on the Great Lakes, up to 1811; the period of the War of 1812 itself (1812-1814); and the period after the war leading up to the opening of the Welland Canal (1829) and the widespread use of steam engines on the Great Lakes (1830s-1840s). By comparing the similarities and differences of construction traits between the three periods, it is possible to gain an understanding of the changes that took place in ship design and construction.

The second aim of this thesis is to compare these diagnostic attributes with the Navy Bay Wreck, located in Kingston, Ontario, to attempt to determine when it was constructed. Tentative

conclusions are drawn about the differences between ship construction techniques over time, that determined that the Navy Bay Wreck most likely was constructed in the period prior to the War of 1812. Historical research alongside the archaeological analysis aided in determining the *Earl of Moira* as the most likely candidate for the identity of this vessel.

While the War of 1812 had significant political and social implications, the impact on ship construction on the Great Lakes was not as substantial. The War of 1812 did not completely revolutionize or transform ship construction on the Great Lakes but did have a minor impact on ship construction techniques employed during the early 19th century.

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CHAPTER 1 : RESEARCH QUESTIONS AND DEFINITIONS OF DIAGNOSTIC SHIPBUILDING CHARACTERISTICS

The War of 1812 has often been called a forgotten conflict. Two reasons exist for the previous lack of attention paid to this significant event in North American history. First, the war that took place from 1812-1814 between the United States and Great Britain resulted in a stalemate that restored the *status quo ante bellum*. Secondly, the end of the war was considerably overshadowed by the conclusion of the Napoleonic Wars in Europe. Fortunately, since the 1980s, there has been a resurgence of scholarly research intended to expound the details of this military and naval conflict (Hickey 2001). Synchronous with the later historical research is the initiation of archaeological investigations. While much was known about the naval operations of the War of 1812, these sites have only been investigated archaeologically within the last century. In the past three decades, fifteen vessels from the War of 1812 have been recorded from Lake Champlain and the Great Lakes (Crisman 1983, 1987, 1989; Emery 1995, 2003; Washburn 1996, 1998; Sabick 2004; Moore 2006, 2008; Walker 2006; Cassavoy 2005; Gordon 2009).

During the War of 1812, the North American theater of war was determined by the geography of the region. Much of the fighting in the north primarily took place along the Niagara frontier and later along the St. Lawrence River. From the outset, both the Americans and British realized that gaining the upper hand in the conflict depended upon control of the Great Lakes (Malcomson 1998: 16). Crucial to achieving ascendancy upon the Great Lakes was the development of a significant and powerful inland navy. By necessity, this had to be built in place, as ships could not be brought in from the Atlantic due to the shallows and rapids along the St. Lawrence River. This led to a shipbuilding race on both shores in a region where supplies were not always guaranteed, since they needed to be transported from the eastern seaboard. In

addition the Royal Navy and U.S. Navy converted and upgraded for use some commercial ships from the earlier period (Malcomson 2001: 112). After the War of 1812, naval restrictions were informally set in place by the Rush-Bagot Agreement of 1817. Yet, conflicts continued throughout most of the 19th century that required both sides to use naval vessels in excess of Rush-Bagot, until after the U.S. Civil War (Stacey 1950: 3-6).

Research Questions

The aim of this research is to determine diagnostic attributes of vessels used on the Great Lakes and Lake Champlain from before the War of 1812, during the war, and after the war in an attempt to determine whether the War of 1812 influenced shipbuilding developments on the Inland Lakes. The three periods in question include the period before the War of 1812, which has been defined as the period from the French and Indian War (1754 to 1763), when British sailing ships first appeared on the Great Lakes, up to 1811; the period of the War of 1812 itself (1812-1814); and the period after the war leading up to the opening of the Welland Canal (1829) and the widespread use of steam engines on the Great Lakes (1830s-1840s). By examining archaeologically excavated wrecks from these three periods it will be possible to identify construction traits specific to each period and if or how these changed with the exigencies of war.

Archaeologically documented vessels from the pre-War of 1812 period include the 16-gun sloop *Boscawen* (Crisman 1985) built on Lake Champlain in 1759 and the *Defence* (Morris 1991), an 18th century merchant vessel lost during the Penobscot Expedition (1779). Several vessels have been studied that were built prior to the War of 1812 and subsequently used during the war. These include the schooner *Nancy*, a merchant vessel built in 1789 and pressed into British service during the War of 1812 on Georgian Bay (Sabick 2004). The Southampton

beach wreck, now identified as the *General Hunter*, was built by the Provincial Marine in 1807 at Amherstburg and used throughout the war (Cassavoy 2005). Ships pressed into the service of the U.S. Navy include *Hamilton*, built in Oswego, New York in 1809, and *Scourge*, built at Niagara, Ontario in 1811, which both remain preserved and unexcavated at a depth of 300 feet in Lake Ontario (Cain 1983; Nelson 1983).

Archaeologically documented warships from the War of 1812 period include the U.S. Brig *Eagle* (Crisman 1987), U.S.N. Row Galley *Allen* (Emery 1995 and 2003), HMS *Linnet* (Washburn 1996 and 1998) and U.S. *Ticonderoga* (Crisman 1983) on Lake Champlain, although this vessel was originally constructed as a steamer and so has different characteristics than a sailing vessel; HMS *St. Lawrence* (Moore 2006), HMS *Prince Regent* (Moore 2006), and HMS *Princess Charlotte* (Moore 2006; Walker 2006) have been identified and studied in the Kingston area of Lake Ontario; and U.S. Brig *Jefferson* on Lake Ontario (Crisman 1989). Two other War of 1812 era wrecks, located in Kingston, have not yet been identified or studied. They are known as Wreck Charlie (Moore 2006) and Guenter's Wreck (Moore 2008).

Archaeologically recorded wrecks from the post-War of 1812 era include the *Tecumseth* and *Newash* (Gordon 2009) built at the Penetanguishene Naval Yard on Lake Huron at the close of the War of 1812 prior to the Rush-Bagot Agreement and the gunboat *Radcliffe* built on Lake Ontario in 1817 and laid up in ordinary in 1820 (Amer 1986). Other archaeologically documented post-War of 1812 wrecks include the Millecoquins wreck (Whitesides 2003) discovered in the Millecoquins River, approximately 1.5 miles from Naubinway, Michigan; and the Griffon Cove Wreck (Hundley 1980) discovered in a small cove on Russel Island in Lake Huron, within the boundaries of Fathom Five National Marine Park, Canada.

The second aim of this thesis will be to compare these diagnostic attributes with the Navy Bay Wreck, located in Kingston, Ontario, to attempt to determine when it was constructed. J. Richard Steffy stated that one of the main obligations of ship reconstruction was the identification of important features and the functions of hull design. He further asserted that scholars should be able to identify shipwrecks “according to nationality and period by interpreting their construction features and hull curvatures” (Steffy 2006: 11). The identity of the Navy Bay Wreck is unknown, however due to its location in Navy Bay, the former location of the base for vessels on Lake Ontario and headquarters for the Royal Navy on the Great Lakes and Lake Champlain during the War of 1812, it is believed to relate to these former naval facilities. The wreck may relate to the pre-war period of the Provincial Marine, the War of 1812, or the post-war era. Indeed, the career of the vessel might have straddled all of these periods. Possible candidates for the identity of this ship based on its length and breadth include the snow *Duke of Kent* (launched in 1802 at Kingston), the brig *Charwell* (ex-*Earl of Moira*) (launched in 1805 at Kingston), and the schooner *Brock* (launched in 1817 at Kingston) (Moore 2008: 39; Malcomson 2001: 45, 139).

To determine in which period the Navy Bay Wreck was constructed, it is necessary to use the method of multiple working hypotheses. This involves the development of several hypotheses to be tested in order to arrive at a result. The function of multiple working hypotheses is to suggest various lines of inquiry by which the facts are obtained in order to make inductive conclusions. For these hypotheses, the word ‘working’ is stressed, indicating their tentative nature, as many will prove to be false, including the possibility that none of the explanations are correct and that a new possibility may emerge. A benefit of this type of research is that an occurrence may be the result of several causes, not just one, and the method of multiple working

hypotheses makes it more likely to envision the interaction of several causes. Developing several hypotheses prior to conducting the research, avoids creating a ruling theory, whereby the facts are sought in order to support the theory (Chamberlain 1998: 147-150). The multiple working hypotheses used in this thesis include whether the War of 1812 influenced ship construction on the Great Lakes, or whether merchant vessels returned to the pre-war construction traditions. Multiple working hypotheses applied to the second part of this thesis include whether the Navy Bay Wreck was built before the war, during the war, after the war, or whether it straddled these three periods. Likewise it is possible that the Navy Bay Wreck is completely unrelated to War or 1812 and the periods before and after the war.

Definitions of Diagnostic Shipbuilding Characteristics

In order to evaluate the diagnostic attributes of Great Lakes vessels from before, during, and after the War of 1812, it is necessary to understand how a ship was constructed. Since North American shipyards and methods diverged little from those in Europe, it is natural that similarities would exist between American construction techniques and British built vessels on the Great Lakes (Bamford 2007: 132).

The first step in constructing a vessel was the cutting and shaping of the keel. The keel was typically made from oak for its sturdiness. When a single long straight grained timber was not available, the keel was fashioned from several timbers about 25 ft. in length that were joined together by a joint called a scarf. These scarfs were along the horizontal plane, and the most common types were plain, hooked, or tabled with square rectangular inserts called coaks (Longridge 1955: 7). To tighten the scarf and repel water traveling along the seams in order that it did not enter the hull, a hole was drilled across the seam and a softwood dowel, called a stopwater, was driven in. In larger vessels, if the molded dimension of the keel was not deep

enough, the keel would be made of two laminated timbers. The scarfs on these two timbers were always staggered to increase the strength of the vessel. A false keel was usually attached on the underside of the keel after the frames and keelson were in place. The false keel was tenuously attached to the keel allowing it to break off the vessel if it struck bottom and thus served to protect the keel from damage (Bamford 2007: 146-147). Along the length of the keel an angular groove, or rabbet, was notched out of the upper edge to take the lowest or garboard strake of the exterior planking (Longridge 1955: 9).

The stern post was the next piece to be put into position. It was a single timber that was vertically mortised to the keel, tapered in the athwardships direction, and raked aft. A rabbet was cut along its forward edge to accept the planking. An inner stern post was then bolted to the forward side of the sternpost, and did not extend past the upper end of the sternpost. Filler timbers, called deadwood, were laid over the keel and fastened with treenails, a wooden peg that swelled when wet to produce a tight seal, or bolted to the keel and sternpost to form one solid mass. Deadwood served as an extension of the keel upwards as the vessel curved at its extremities (Longridge 1955: 11-13).

The stem assembly was fashioned next. The stem post consisted of several timbers that were scarfed together and attached to the keel with a forward rake. The joint between the stem and the keel was referred to as the 'boxing'. Laid on top of this joint were several timbers scarfed together, known as the apron, which continued up the inside of the stem. The rabbet for the planking was cut on the stem post forward of the joint with the apron. On the after side of the apron was a third timber known as the stemson. Due to the bluff shape of the bow, there was no need for as much deadwood in the stem, but the three timbers of the stemson, apron, and stem post acted like deadwood to attach the heels of the frames. On the forward face of the stem post

were placed the gripe and knee of the head, which were fashion pieces used to give the vessel a graceful appearance rather than that of a very bluff bow (Longridge 1955: 13-14).

After the stern and stem were attached to the keel, the frames were cut, shaped, and assembled. Two framing methods were used throughout a vessel: square frames that were placed perpendicular to the keel, and cant frames that were placed at an angle to the keel. Each square frame was composed of overlapping timbers, which generally consisted of: one floor timber, two first futtocks, two second futtocks, and two top timbers. These were also known as double frames as the floor and second futtocks were next to the associated first and third futtocks. The floor was laid perpendicular across the keel, then the futtocks were scarfed or joined together by chocks. The midship frame was the first frame secured to the keel as it was the beamiest location on the vessel, and the other frames tapered inwards towards the stem and stern. Generally, frames located forward of the midship frame were constructed with the first futtocks fastened to the forward faces of the floor timbers, while frames aft of the midship frame were assembled with their first aft forward of the floors. There were approximately ten cant frames at the both ends of the vessel as it tapered towards the stem and stern posts. They were sharply angled from the keel to present a flat surface for planking. The cant frames of the stern had no floors but their heels abutted notches in the deadwood (Longridge 1955: 18-21).

The keelson was laid over the frames and served to lock them in place. Similar to the keel, several timbers were scarfed together to form the keelson if a single timber could not be located that stretched the length of the vessel. The masts were stepped into the keelson either with a simple mortise cut into the keelson, a longitudinal step atop the keelson, or an athwartships step known as a saddle type step. Saddle mast steps were a type common to 18th-century British and British colonial-built vessels. Saddle mast steps were notched over the keelson and attached to

the frames using four bolts. The outer edges of the step were angled to fit the lateral shape of the ship as well as the deadrise (Longridge 1955: 23).

Once the exterior planking was put on, it was made as watertight as possible by hammering oakum between the seams. The seams were not perfect and water would collect between each frame like a sort of gutter. In order to remove this stagnant bilge water to a central well to be pumped from the vessel, limber holes were drilled fore and aft through every floor. These holes would weaken the structure of the floors and filling pieces were often added to strengthen the assembly. When the floors, filling timbers, and keelson were bolted together, the interior or ceiling planking could be added. The first strake beside the keelson was known as the limber board, which could be lifted to clear debris from the limber passage (Longridge 1955: 23-24).

On the inner side of the frame ends were deck clamps, which served to longitudinally reinforce the hull above the waterline and support the ends of the deck beams. In large vessels the deck beams consisted of two or three lengths of timber scarfed together and were supported by stanchions that were mortised to the keelson. The end of the deck beam was secured by knees, which were timbers that naturally curved at a right angle. Such naturally curving timbers were known as compass timbers. Knees were used to strengthen the joint between two timbers on different planes, and consisted of a variety of forms including hanging knees, lodging knees, and dagger knees (Steffy 2006: 274). A hanging knee was located beneath the deck beam and supported the ends of the deck beams while a lodging knee fastened the forward side of the deck beam to the ship's side. The waterway was a timber located above the deck beam ends at the junction of the deck and bulwark. The clamp and waterway locked the deck beams in place, preventing lateral movement (Longridge 1955: 25-26). This created a rigid skeleton for the ship.

In the majority of the examples that are presented in this thesis, the hull is the only remaining portion of these vessels, since the upperworks and rigging did not survive. It is from these remains that this thesis will evaluate the diagnostic attributes of vessels used on the Great Lakes and Lake Champlain from each of these three periods to attempt to determine shipbuilding developments influenced by the War of 1812 and how these affected shipbuilding after the war.

CHAPTER 2 : INTRODUCTION AND HISTORY OF GREAT LAKES SHIPBUILDING

The Great Lakes – Ontario, Erie, Huron, Michigan, and Superior – form more than 10,500 miles (17,000 km) of coastline that spans the United States of America and Canada and flows outward towards the Atlantic Ocean via the St. Lawrence River (Figure 2.1). Often referred to as the inland seas, the Great Lakes are the largest system of fresh water on earth. Samuel de Champlain, the first European to enter the Great Lakes in 1615 at Lake Huron via the Ottawa and French Rivers, at once realized the vast potential of this commercial avenue. The early development of commerce on the Lakes required that small vessels and goods be portaged around impassable rapids since many natural barriers originally prevented a continuous voyage from the Atlantic Ocean to the western end of Lake Superior (Grady 2007: 8-9, 21). The Lachine Rapids in the St. Lawrence River prevented navigation upstream from Montreal until the opening of the Lachine Canal in 1825 (Kelton 1888: 5); Niagara Falls obstructed sail travel to the upper lakes until the opening of the first Welland Canal in 1829 (Jackson 1997: 25); and the rapids of the St. Marys River, which prevented passage from Lake Michigan to Lake Superior, were finally passable with the opening of the Sault Locks in 1855 (Desloges and Gelly 2002: 22), completing a navigable waterway from the interior of the continent to the Atlantic Ocean. The aim of this chapter is to summarize the development of Great Lakes shipbuilding, since it is essential to understand the history in order to recognize how events influenced ship construction.

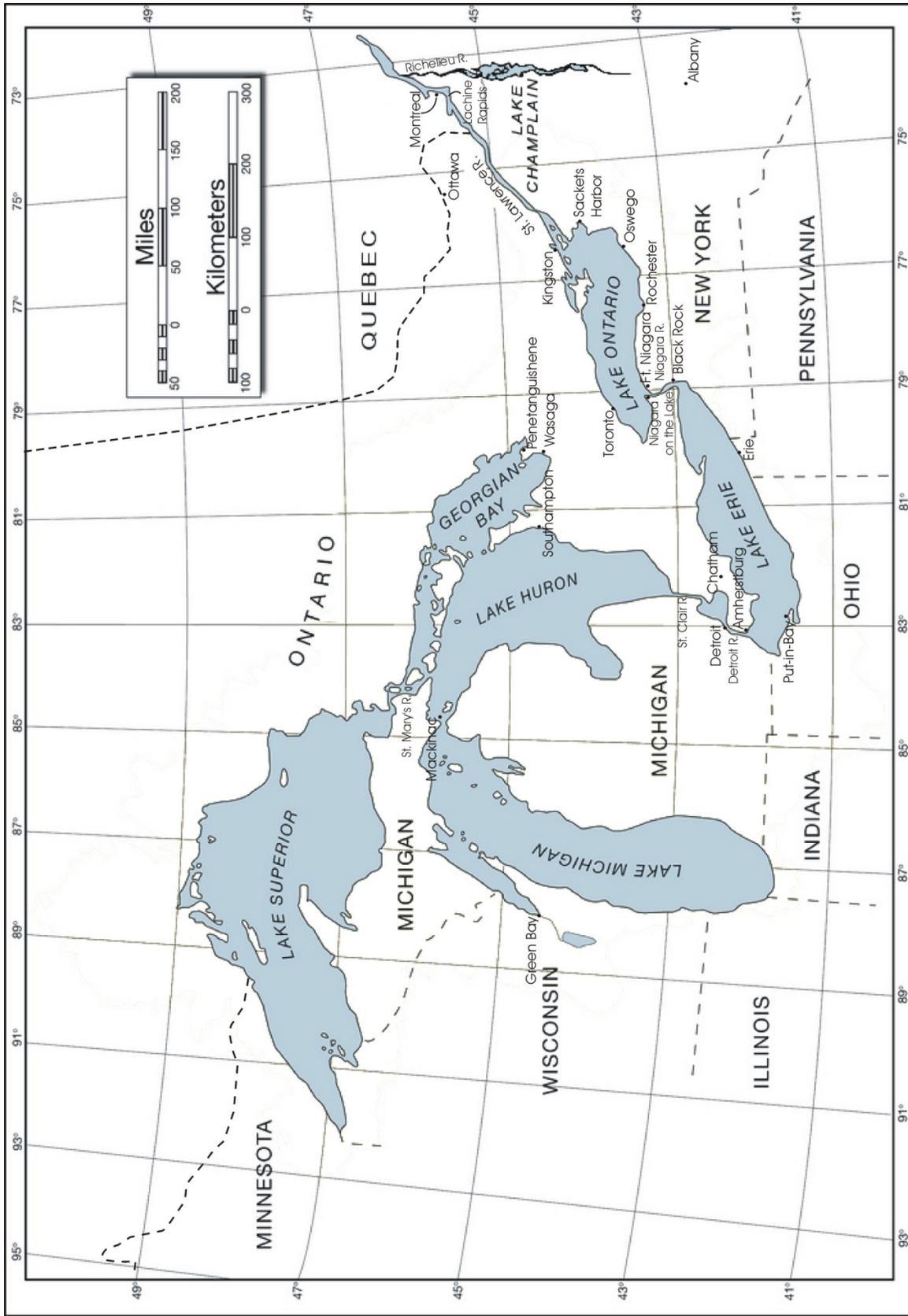


Figure 2-1: Map of important locations discussed (modified from NOAA).

The French first adopted the Native birchbark canoe as it was lightweight, making it easily portaged through the rugged wilderness yet maneuverable and stable for navigating turbulent white water in order to access the fur trade of the Northwest Territory. Two types of canoes that were larger in size than those used by Native Americans were employed by the *coureurs des bois* and *voyageurs*¹, who travelled the interior of North America transporting furs. The canoe used on the route from the St. Lawrence River to the head of Lake Superior was the *canot du maître*, or Montreal canoe, which measured approximately 12 m long and carried a payload of about four tons. Ten to twelve paddlers crewed the canoe and it could easily be portaged by four men. The smaller *canot du nord* of about 7 m long with a crew of six to eight men was used in the west. Twenty *canot du nord* were required to carry the load of twelve *canot du maître* (Wheeler 1972: 284). While canoes remained the primary means of transportation of the fur trade, eventually more substantial vessels were required for transportation of men and supplies along the lakes as New France expanded westward.

In 1675, the French under the command of Robert Cavalier, Sieur de La Salle established Fort Frontenac, the first fur trade depot on the Great Lakes. Strategically placed at Cataract (present day Kingston) the fort was located at the confluence of Lake Ontario with the Cataract and St. Lawrence Rivers. A shipyard was established and by 1677 shipwright Moïse Hillaret had constructed four *barques pontées*, or decked barques. These were the first European style vessels constructed on the Great Lakes. Two of these vessels were of 25 tons, one of 30 tons, and the largest named *Le Frontenac* was 40 tons. All four vessels were completed by August 1677, only 20 months after their keels were first laid. These vessels carried trading goods and furs to and from the Iroquois villages around the lake and as far up the St. Lawrence River as Ogdensburg

¹ By 1681, French authorities recognized the need to licence the fur trade. The *voyageurs* were those involved in the fur trade that held permits (*congés*) or were employed by a Montreal merchant who held one, while the *coureurs des bois* were unlicensed fur traders (Pilleul et al. 2008: 146).

where they met the canoe flotillas that carried goods to Montreal (Calnan 2002:196). *Le Frontenac* became the first historic Great Lakes shipwreck after it wrecked 8 January 1679, near Old Orchard Creek, 20-30 miles east of the Niagara River (Cruikshank 1926: 3). In 1679, Hillaret started construction on another barque of 60 tons, the well-known *Le Griffon*, on Lake Erie near Niagara Falls, New York. *Le Griffon* was lost somewhere on its return voyage to the Niagara River after dropping La Salle and his party at Green Bay to explore the head of Lake Michigan. The remaining barques at Fort Frontenac were burnt by the French in 1689 to prevent their use by the Iroquois when the fort was abandoned due to the escalating conflict during the French and Iroquois Wars (also called the Beaver Wars, 1642-1698) (Calnan 2002: 198-203).

British sailing ships first appeared on the Great Lakes during the French and Indian War (referred to the Seven Years' War in Canada, 1754–1763). In 1755, the British planned to attack Fort Niagara at the confluence of the Niagara River and Lake Ontario to interrupt the French supply line between the Great Lakes and the Ohio valley. To support the military, the British needed vessels on Lake Ontario, and the Admiralty requisitioned Commodore Augustus Keppel, “to cause proper Vessels to be built and fitted upon the Borders of the Lake in the most frugal manner” (Admiralty to Keppel, 1754, in Malcomson 2001: 8). Keppel transported rigging, guns, and stores from his station in Virginia to Oswego for the construction of a 60 ton vessel. In spring of 1755, Keppel was supplied with two lieutenants to supervise construction, who arrived accompanied by Major General William Shirley’s army. As the governor of Massachusetts, Shirley obtained shipwrights from Atlantic seaports for the new shipyard at Oswego. In July, the first schooner, *Oswego*, entered the lake followed by the sloop *Ontario* in August. The following year, the British squadron on Lake Ontario increased with the launch of the sloop *Mohawk*, the brigantine *London*, and the snow *Halifax* (Malcomson 2001: 9-11).

In 1759, the British finally captured Fort Niagara on Lake Ontario. With the fort, the British acquired two French vessels, which they renamed *Mississauga* and *Farquhar*. The British relocated their shipyard to this site to take advantage of the excellent harbor and large supply of oak in the surrounding forests. In the summer of 1759, Peter Jacquet, a shipwright from Pennsylvania, and a small crew arrived at the site to commence the construction program. They set to work quickly and launched the snow *Mohawk* in autumn 1759. In August 1760, Jacquet completed the second snow on the lake, *Apollo*, however, the name changed to *Onondaga* in an attempt to solidify the recently settled alliance with the local Native populations. These two vessels accompanied General Amherst's army in the attack and capture of Fort Lévis on Île Royale in the St. Lawrence River later that year (Malcomson 2001: 17-20). After this attack, Amherst's army continued on to Montreal in batteaux for the attack on Montreal and surrender of New France to the British on 9 September 1760. The French and Indian War formally ended 10 February 1763 with the signing of the Treaty of Paris (Dale 2004: 76, 80).

When the war ended in 1763 the British weakly held control of the upper lakes, while their vessels maintained complete command on Lakes Ontario and Champlain. The French and Indian War necessitated the construction of armed sloops, brigs, and snows, where previously there were only a small number of French transport vessels, bateaux, and canoes. In September 1761, the British introduced a decree that limited the rights of the Native populations to trade only with licensed agents at assigned posts. The effectiveness of this policy depended upon increasing British presence in the region, as such the garrisons at Detroit and Mackinac were manned (Malcomson 2001: 20). As communication between these areas naturally depended upon water transportation, since interior roads were poorly developed, this policy necessitated the construction of vessels to provision these frontier bases on the upper lakes (Hitsman 1999: 104-

106). Later, during the War of 1812, Lieutenant James Richardson of the Provincial Marine commented on the continued lack of overland access that “the importance of such services [Provincial Marine] in the then uninhabited state of the country, and the lack of land conveyance owing to the badness of the roads, must be obvious” (Malcomson 1997: 23).

In March 1761, General Amherst planned to construct a shipyard above Niagara Falls. Lieutenant Charles Robertson arrived with John Dies on Lake Erie and selected Navy Island located above the falls on the Niagara River as the new location for the dockyard. Later that year Dies completed the schooner *Huron*, the first sailing vessel on the upper lakes since *Le Griffon*. The next year the sloop *Michigan* set sail on the lake. The British attempted to establish a regular sail up the St. Clair River to Lake Huron in 1763 to provision the frontier posts, but encountered problems caused by the uprising of Native populations led by Pontiac (Malcomson 2001: 20-21).

The American Revolutionary War (1775-1783) forced the British to improve their vessels to protect their Canadian Colonies, since their forces had been greatly reduced during peaceful times. Few British government vessels sailed the lakes during the period between 1763-1775. In 1767 the British repaired and maintained only four vessels in the northern theater controlled by John Blackburn, an army contractor. These were the *Musquelongy* on Lake Champlain, the *Brunswick* on Lake Ontario, the *Charlotte* on Lake Erie, and the *Gladwin* on Lake Huron. The rest of the vessels constructed for combat during the French and Indian War rotted at their moorings. In the early 1770s, the British constructed a handful of vessels in the dockyards at Fort Niagara, Oswegatchie, on the St. Lawrence River, and Detroit, which the British preferred to Navy Island for its proximity to Lakes Erie and Huron (Malcomson 2001: 23-24). These vessels served principally as transports along the Great Lakes and were not equipped for war. In 1773, the commander of the *General Gage* on Lake Erie bemoaned that vessel’s “defenceless state

having on board only eight useless Muskets without Pistol, Sword or pike and only about two pounds of Powder, for the carriage guns” (Andrews to Basset, 17 June 1773 in Malcomson 2001: 24).

The state of the British forces on the Great Lakes changed in late August 1776, when Major General Sir Guy Carleton took control of operations. He banned the use of private decked vessels on the lakes. To avoid restricting commerce, he instructed his commanders to transport private shipping in government vessels. This limited the movement of goods to military depots as these were the destinations of the naval vessels. Merchants were then required to ship any goods intended for purely civilian destinations by bateaux or Durham boat. These accommodations resulted in complaints from captains since they were “having extraordinary trouble in carrying Merchandise, and [were] almost always crowded with Passengers, of Merchants, traders, Clerks, and others not employed in His Majesty’s Services” (Memo by Carleton, 21 October 1777 in Malcomson 2001: 26). Carleton also hired private craft, which then became the King’s ships, to transport supplies to the British garrisons on the frontier (Malcomson 2001: 25). Carleton’s improvements were intended to prepare the British force on the Great Lakes for war, although no consequential events took place in that arena (Douglas 1979: 4). Consequently, little shipbuilding took place (Malcomson 2001: 37).

In order to prepare the frontier for a spillover of hostilities from the American Revolution, Carleton appointed Lieutenant John Schank² in 1778 to manage the various naval bases of the lakes. He received the title Commissioner of all His Majesty’s Naval Yards or Docks upon the Lakes. As Schank believed that the naval force on the lakes should be an autonomous unit, Carleton had him transferred from the Royal Navy and posted under his

² John Schank, introduced the sliding or drop keel to the Admiralty in 1791. It was a centreboard that could be raised in shallow water under oars, or when sailing before the wind. In deeper water it could be dropped to make the vessel weatherly when sailing to windward (Woodman 2002: 128).

command at Quebec. This creation of an independent naval authority represented the birth of the Provincial Marine. Schank was only in command for a few months before Carleton resigned in and Sir Frederick Haldimand replaced him June 1778. Haldimand promoted the restructuring of the naval force on the lakes and created three separate divisions: Lake Champlain, commanded by Lieutenant William Chambers; Lake Ontario under Master and Commander James Andrews; and, Lake Erie and the upper lakes commanded by Lieutenant Alexander Grant. Each division reported to the senior military officer of the region, with final control retained by Schank at the Quartermaster General's Department at Quebec (Malcomson 2001: 36).

Schank modeled his reforms of the lakes' naval department upon the Royal Navy (Douglas 1979: 5). One of the largest changes was the relocation of the shipyard at Oswegatchie closer to the opening of Lake Ontario. Haldimand selected the location of Cataraqui, where Lake Ontario meets the St. Lawrence River. In 1778, Haldimand sent Schank with a small force to prepare the site. On their way to Cataraqui, the detachment visited Buck Island, located ten miles southeast of Cataraqui in the middle of the St. Lawrence River (Malcomson 2001: 37). Upon touring the island it was determined that this was not the island that the French called Isle aux Chevreuilles (Buck Island) and, to avoid confusion, the British changed the name to Carleton Island (Lt William Twiss, R.E. to Haldimand, 17 August 1778, in Preston 1959: 6). Schank determined that this island presented a much better location for the construction of a dockyard. Among the advantages were deep well sheltered harbors and plenty of good timber unlike Cataraqui Bay which could not accommodate large vessels and timber needed to be transported to the site from other locations (Preston 1959: 7-8). The construction of a large garrison on the island acted as an impediment for American plans to build a base at Oswego and attack the British (Malcomson 2001: 37).

During this period, the Provincial Marine consisted chiefly of British personnel. Most of the shipwrights and laborers employed at the bases spread across the inland waterways arrived from British dockyards, and by 1783 there were over 300 seamen from Royal Navy vessels serving on the lakes. Although the crews were well qualified, none of the officers under Schank's command were professional naval seamen (Douglas 1979: 5-6). Naval records from 1779 indicate a total of 171 officers and men employed on Lake Ontario and 118 men at Detroit (Library and Archives Canada [LAC] 1779: RG 8, 722a: 32, 34). Along with the Royal Navy seamen employed were many French Canadians. In 1777, the snow *Seneca* had an entirely French Canadian crew under Captain Jean-Baptiste Bouchette (Malcomson 2001: 37).

In 1782, preliminary peace terms with the newly formed United States prompted the reduction of the naval force in anticipation of the war's end. Slightly more than half, 266 of 468, of the officers and men stationed on the lakes were discharged. Three vessels remained in service on both Lake Ontario and the upper lakes. The 1783 Treaty of Paris determined the boundary between the United States and British North America which extended through the middle of Lakes Huron, Erie, and Ontario and partially along the St. Lawrence River (Malcomson 2001: 39). Haldimand feared that Carleton Island would fall into American territory and had the site of Cataraqui resurveyed for consideration as the future location of the Provincial Marine on Lake Ontario. Major John Ross of the 34th Regiment of Foot conducted this survey and notified Haldimand that he had "surveyed the Harbour in Haldimand Bay, where there is Water sufficient: Point Frederick being subjected to an Advantageous Canonade from the West Side of Cataraqui Harbour, may I then take the liberty to say (altho [*sic*] no Town can be placed here secure from Bombardment) that the Land or East Side of Haldimand Cove is preferable for a Town" (Ross to Haldimand, 3 September 1783, in Preston 1959: 34). After this, the garrisons at

Oswego and Oswegatchie, now in American territory, moved to Cataraqui, while the Provincial Marine headquarters remained at Carleton Island. During the summer of 1783, some of the first United Empire Loyalists settled on the west bank of the Cataraqui River. Schank left his command in North America in 1784, and the entire command of the Provincial Marine fell to the Quartermaster General's Office in Quebec. At this time the Provincial Marine consisted of fewer than 100 individuals and its sole function was that of transporting provisions along the lakes. More vessels remained on the lake than during the reductions witnessed after the French and Indian War only because of the increase in population caused by the flood of United Empire Loyalists leaving the new American republic (Malcomson 2001: 38-39).

The end of the American Revolution in 1781 brought economic depression, and many merchants in the growing settlements along the lakes went bankrupt. Those who remained in business requested the government to lift the ban of 1777 that restricted private vessels upon the lakes. While the limitation of private vessels along the lake was beneficial during the war (as it checked contraband trade and limited espionage), during times of peace it was devastating, requiring the King's ships to carry merchandise for private individuals. The lack of merchant vessels resulted in a pile up of goods in Kingston warehouses that had been transshipped from Montreal and food rotted on Cartwright's quay since the King's ships, with their strict schedules and policy of safety first, were unable to handle the traffic (Roy 1952: 41). In response to this and the uproar raised by merchants, the Inland Navigation Act was established in 1788. This act lessened the transport duties of the Provincial Marine, as more private vessels now plied the lakes. As private individuals and companies were now allowed to build their own vessels, although with some restrictions, the problem of the bottleneck at the warehouses was effectively solved. This act required the creation of supervision districts, the establishment of ports of entry

and Customs houses, vessel registration, clearance papers and dues. The main ports of Upper Canada were the garrison towns of Kingston and Niagara and the provincial capital York (present day Toronto) (Cain 1983: 24).

In 1788, there was only one registered merchant vessel of 15 tons on Lake Ontario, the *Good Intent* (Cruikshank 1926: 6). The following year, *Lady Dorchester*, of approximately 90 tons, was launched at Kingston (Roy 1952: 41). Amongst the first merchant vessels constructed on Lake Ontario was *York*, a 66 ton schooner built in 1794 at the mouth of the Niagara River for merchant Francis Crooks. Around the same time, two smaller vessels were built at Niagara, *Genesee* and *Polly*. Shipbuilding on Lake Ontario quickly expanded, and the eastern end of the lake near Kingston was the forerunner in maritime development, where larger vessels such as the *Governor Simcoe* of 137 tons were constructed (Cain 1983: 26). Artist George Heriot observed that “the rapid advancement of the country in population and improvements of every description have proportionately extended the commerce; the number of vessels in the employ of merchants is considerable.” He further stated that “the timber used for their construction is red cedar or oak” (Heriot 1807: 132).

Navigation was primarily pilotage, as Deputy Surveyor-General John Collins noted in a letter to Lord Dorchester in 1788 that “vessels sailing on these waters being seldom for any length of time out of sight of land, the navigation must be considered chiefly as pilotage to which the use of good natural charts is essential, and therefore much wanted” (Ross to Lord Dorchester, 1788, in Robertson 1896: 821). As such, Collins recommended the best rig as fore-and-aft, and this schooner rig became common on the lake for the next century and a half. Great Lakes vessels were also characterized by the great amount of sail carried since the lakes are typically a light air region during the navigable season. However, carrying a lot of sail could be dangerous

as the Lakes are also subject to sudden, fierce storms (Cain 1983: 24-25). This was not improved by the fact that sailors on the lakes were usually inexperienced. In 1792, Elizabeth Simcoe, wife of John Graves Simcoe, the lieutenant governor of Upper Canada, noted that “the men who navigate the Ships on this Lake have little nautical knowledge and never keep a logbook. This afternoon we were near aground” (Innis 1965: 74).

The trading activities on the northern shore of Lake Ontario after the American Revolution remained unchanged from previous times in that furs and supplies for the British Army were the primary goods shipped. As populations increased along the shore, however still small and widely dispersed, settlers’ produce, such as potash, salt, salt-meat, and wheat, were traded with more frequency. The population of York in 1801, the year it was designated a Customs port, was 336. By 1809, the population had grown to 577. Kingston was the most important community along the eastern end of the lake, which acted as a transshipment point between Lake Ontario and Montreal. In 1792, there were approximately fifty houses in Kingston, three years later, there were about 130 houses (Cain 1983: 28).

John Graves Simcoe noted that the construction of these merchant vessels was excellent. At the same time, he was shocked when he visited the government yards by their clumsy and top heavy construction and the use of green wood, which caused them to only last a few years before their need of replacement (Roy 1952: 41). In the late 1780s and early 1790s, the Provincial Marine constructed new vessels upon the lakes, many of which replaced the older vessels built before or during the American Revolution. By 1793, nine Provincial Marine vessels sailed the lakes: the *Maria* and *Royal Edward* on Lake Champlain; the *Onondaga*, *Mississauga*³ and *Caldwell* on Lake Ontario; and the *Ottawa*, *Dunmore*, *Chippewa*, and *Felicity* on Lakes Erie and Huron (LAC 1793: MG 11, CO 42/97: 170).

³ The *Onondaga* and *Mississauga* were both the second vessels to sail Lake Ontario with those names.

In 1789, the Provincial Marine offices and dockyard on Lake Ontario moved from Carleton Island, now located in disputed British and American territory, to Point Frederick, across the bay from the town of Kingston (Malcomson 2001: 42). Cataraqui became Kingstown in 1788, but the name Kingston was already in use later that year. The earliest court records referring to Kingston date from March and April 1789 (Preston 1959: lviii). Upon arrival in Kingston, the Provincial Marine immediately constructed a wharf and storehouses upon the peninsula of Point Frederick and anchored ships east of the town in Haldimand Cove, later Navy Bay. Between the establishment of the dockyard and 1807, seven vessels were launched at Kingston: the cutter *Mohawk*, the gunboats *Catherine* and *Sophia*, the schooners *Swift* and *Speedy*, the snow *Duke of Kent*, and the ship *Earl of Moira* (Malcomson 2001: 42, 45).

In the 1790s, the boundary between the United States and the British Territories was finally imposed. With Jay's Treaty of 1795, the British withdrew from the posts they occupied in the Northwest Territory of the United States. This caused the dockyard on Lake Erie to move from Detroit to the future site of Amherstburg at the mouth of the Detroit River in 1796. Before this move took place, the British had already considered relocating the dockyard at Detroit. In 1794, Simcoe proposed the location of Chatham on the Thames River, which drained into Lake St. Clair. The assistant Master Builder at Detroit, William Baker, traveled to the proposed site to begin construction. The dockyard at Chatham, however, soon fell to disuse as the British determined a dockyard at the mouth of the Detroit River would be more beneficial (Garcia accessed 2000).

In 1796, the British moved downstream to Amherstburg. The need to supply the vessels on the upper lakes designated the construction of the marine facilities of prime importance. In 1799, shipwright William Bell arrived at Amherstburg (Garcia accessed 2000). In 1803, the

vessels that had been constructed at Detroit were condemned. These were the snows *Ottawa* and *Chippewa*, the sloop *Francis*, and the schooner *Maria*. By 1807, Bell had produced three vessels: the snow *Earl of Camden*, the schooner *General Hope*, and the schooner *General Hunter* that was later rigged as a brig (Malcomson 2001: 45).

The year of 1807 marked a significant development in Great Lakes ship construction with the introduction of the centerboard schooner (Van Gemert 1972: 290). A centerboard is a moveable plank assembly that is contained within a watertight case near the centerline of the vessel that can be raised or lowered to allow for more lateral resistance to the water. The advantage of the centerboard was better control tacking in open water when lowered, but the ability to raise it permitted a shallow draft for entering port. By 1807, private merchant fleets dominated traffic on the Great Lakes. Approximately a dozen vessels operated on Lake Ontario and a few more on Lake Erie and the upper lakes. While the innovation of the centerboard would in time improve trade along the lakes, early century commerce became impeded by international events. In response to the British and French sanctions restricting American trade during the Napoleonic War, President Thomas Jefferson introduced the Embargo Act in 1807, prohibiting trade with these foreign powers. Instead of hurting British trade as this act intended, it created an economic collapse in the United States and encouraged the smuggling of exports to the British North American Territories (Cooper 1809: 32). By 1810, there were approximately 11 vessels under 90 tons involved in trade on Lake Ontario (Cain 1985: 5). This illegal trade created hostilities between the United States and Britain, almost erupting in war several times. These tensions caused both sides to launch warships upon the Great Lakes in anticipation of a conflict (Malcomson 2001: 54-55).

By 1808, war seemed an immediate threat as American military detachments arrived in Oswego and on Lake Champlain. Concerning the amassing of troops along the border, Richard Cartwright, a Kingston merchant, noted that “the ostensible object of all this, is more effectually to enforce the Embargo; but the vessel building at Oswegatchie is to carry eighteen guns besides a twenty-four Pounder in the Bow is much less adapted to this service than Armed Boats would be” (Cartwright to Gore, 5 November 1808 in Preston 1959: 261). To oppose the Americans’ naval threat, the British had a weak force: *Earl of Moira*, *Duke of Gloucester*, and *Duke of Kent* sailed on Lake Ontario. The latter was badly decayed. On Lake Erie, *General Hunter* and *Earl of Camden* lacked armament, however, when guns were eventually found for these vessels, *Earl of Camden* could not bear the weight of the heavy cannon due to its bad state of disrepair. Sir James Craig, governor-in-chief of British North America at the time, ordered the construction of one more vessel on Lakes Ontario and Erie (Malcomson 2001: 57). These were to be designed strictly as warships, and Craig suggested that a railing should continue “the whole length and breadth and fitted up strong for the reception of Guns when needfull [*sic*]” (Douglas 1979: 10). The assistant to the Quartermaster, General Captain William Robe, recommended that the ships should be fitted out with carronades instead of long guns, since these weighed much less and it was believed that long range guns were unlikely to be used on the Great Lakes (Douglas 1979: 10).

At Kingston, shipwright John Dennis directed a crew of forty-three laborers in the construction of the new vessel. On 21 February 1809, construction began on the ship-corvette *Royal George*. This vessel marked a change in British ship design on the Great Lakes as it had a sharper hull than other ships operating on the lake at the time, ports for twenty 18 or 24 pounder carronades, and confined spaces for the officers to berth. This vessel was did not sail the lake

upon its launch, since Jefferson's 1807 embargo was revoked in spring 1809 reducing tensions along the border. At this time, the Provincial Marine had in service the *Earl of Moira* and *Duke of Gloucester* on Lake Ontario, while the new ship-corvette remained in ordinary (Malcomson 2001: 57-58).

While Dennis completed *Royal George* in Kingston, Bell began construction of the vessel ordered by Craig at Amherstburg. Construction of the ship *Queen Charlotte* was delayed due to the shortage of supplies and shipwrights at the Lake Erie dockyard. Bell ordered supplies and materials to construct "a large stout Corvette Brig to carry sixteen guns upon one Deck with good quarters for the men...built exclusively for fighting and sailing and the navigation of Lake Erie, having at the same time as much accommodation as possible for the conveyance of Troops" (Kempt 1809). With the easing of hostilities across the border in 1809, Craig nevertheless ordered construction on the vessel to continue and it was completed in late 1810 (Malcomson 2001: 58). This vessel also represented a change in Great Lakes shipbuilding, as it was a three masted, square rigged ship with full bulwarks able to carry sixteen cannon. This was a warship that could still act as a transport vessel (Garcia accessed 2000). With the launch of the *Queen Charlotte*, the badly deteriorated *Earl of Camden* was withdrawn from active duty. This meant that the *General Hunter* was now the only vessel with a shallow enough draft to sail up the St. Clair River to the upper lakes (Malcomson 2001: 58). *Queen Charlotte* was the largest vessel on Lake Erie until the launch of the *Detroit* at Amherstburg in 1813 (Garcia accessed 2000). The Provincial Marine for the first time had two vessels whose primary purpose was naval: the *Queen Charlotte* on Lake Erie and the *Royal George* on Lake Ontario.

In 1811, relations between the United States and Britain worsened. Fears concerning the ensuing war led Colonel Alleyne Hampden Pye, Deputy Quartermaster General, to make several

suggestions as to the improvement of the Provincial Marine. His report on the state of the Provincial Marine listed a combined force of seven vessels on both lakes. Four vessels were in commission on Lake Ontario: the snow *Duke of Kent*, which was “incapable of repair” and used as a barrack during the winter; the ships *Earl of Moira* and *Royal George*; and the schooner *Duke of Gloucester*. The last vessel was in the best state of repair and most useful (Pye, Report on the Provincial Marine of the Canadas in Wood 1920: 242). Three vessels were in service on Lake Erie: the schooner *General Hunter* and the ships *Camden* and *Queen Charlotte*. Only the first was truly serviceable, while the *Queen Charlotte* was new but limited to the lake proper on account of its great draft, and *Camden* was so rotten that it could not even be used as winter lodgings. Pye recommended the construction of “schooners from 120 to 160 Tons burthen built on the corvette plan and calculated when armed to carry 10 to 14 guns and not exceed nine and a half feet of water,” believing that “vessels of that class would answer both the purposes of Transport or War” (Wood 1920: 241). Although the British now began to outfit a freshwater naval fleet, the mentality of the Provincial Marine remained that of a transport service first. The decades of mismanagement and languid transport duty it served on the lakes hindered British attempts for the timely creation of a naval force in preparation for war.

Relations between the United States and Britain finally culminated in the outbreak of war on 18 June 1812. From the outset of the war, both the Americans and British realized that the upper hand in the conflict depended upon control of the Great Lakes. In January 1812, John Armstrong, former American ambassador to France, advised William Eustis in his preparations of the United States Army that, “resting, as the line of Canadian defence does, in its whole extent on navigable lakes and rivers, no time should be lost in getting a naval ascendancy on both for...the belligerent who is the first to obtain this advantage will (miracles excepted) win the

game” (Armstrong to Eustis, 2 January 1812, in Malcomson 1998: 16). Although the Provincial Marine was not equipped as a naval service prior to the war, its superior numbers allowed the British to command the lakes at the start of the 1812 sailing season. The original strategy outlined by Governor-in-Chief Sir George Prevost was of non-aggressive defense, in the hopes of not inciting anti-British feelings in case peace could still be negotiated. For this reason, the Provincial Marine did not initially exploit its command of the Great Lakes to organize attacks on the United States, but remained a transport service (Malcomson 2001: 61-63).

When the United States entered the war, its navy consisted of seventeen vessels, only one of which operated on the Great Lakes, the brig *Oneida* (Hamilton to the Navy Department, 3 December 1811, in Dudley 1985: 56). The United States Army controlled the sole armed vessel on Lake Erie, *Adams*. Similar to vessels in the Provincial Marine, this brig was primarily employed in transporting cargo to frontier ports and was crewed by the 2nd U.S. Infantry Regiment rather than skilled sailors. After the Secretary of the Navy Paul Hamilton received exaggerated news about the strength of the British fleet, he initiated procedures to improve the American position. In a letter to Lieutenant Melancthon Woolsey, the navy official in command of the Great Lakes, Hamilton ordered improvements to the base at Sackets Harbor in autumn 1811. Woolsey opened an enlistment office and built new barracks to house the recruits. By the end of the year, *Oneida* was only short twenty-one crew members. In November 1811, President James Madison addressed to Congress the need to improve the navy and military in preparation for war, however, unwilling to raise taxes, the only finances allotted to the navy went towards fitting out three existing frigates on the Atlantic and nothing was done to improve the defenses on the Great Lakes (Malcomson 2001: 54-60).

Although the American government was unenthusiastic to support the preparations for the war effort along the northern frontier, Woolsey slightly improved his force in June of 1812. On 5 June, sailing the *Oneida* from Sackets Harbor, Woolsey captured the British merchant vessel *Lord Nelson* on the suspicion of smuggling goods from the United States to Upper Canada. In late June, the Americans confiscated the schooner *Julia* for similar reasons. After the declaration of war, Woolsey fitted the two captured schooners with cannon for service on Lake Ontario (Malcomson 2001: 62). Although Woolsey attempted to enhance his squadron in preparation for the ensuing conflict, the American navy entered the war with the disadvantage of a much smaller fleet, thereby relinquishing all hopes of gaining command on the lakes.

Only after the first invasion of Upper Canada and the capture of Sandwich (present day Windsor, Ontario) on 12 July 1812 was the Provincial Marine employed as a naval power. Shortly after the American retreat caused by their supply line being cut by the British, Major-General Sir Isaac Brock arrived at Fort Malden, Amherstburg, on 13 August, with reinforcements of 50 regulars and 250 militia. Through American dispatches that were captured by the native force that had attacked the supply train, Brock learned that American Brigadier General William Hull's position at Detroit was vulnerable without reinforcements from Kentucky and Ohio. Consequently, Brock immediately planned for an attack on Detroit, abandoning the previous defensive strategy set out by Prevost. On 16 August, Brock's force crossed the river under the cover of guns from *Queen Charlotte* and *General Hunter*. This was the first naval action that the Provincial Marine completed during the War of 1812. Hull surrendered his position when the shore battery at Sandwich found the correct range, firing an 18-pound shell into the officers' mess, killing four people. The Ohio militia were paroled to their homes, but Hull and 582 regulars marched to imprisonment at Quebec City. The only American

brig on Lake Erie, *Adams*, was also surrendered to the British, who fittingly renamed it *Detroit* (Hitsman 1999: 78-82).

Awakened by this event, the American government realized changes were required to overcome the British forces in North America. President Madison received the news of the defeat on 28 August. The next day he organized a meeting with his cabinet officials. This meeting determined two things: an army would be dispatched to retake Detroit and a naval squadron would be created to gain control on the Great Lakes. Isaac Chauncey, commandant of the navy yard at New York, received the command of building the force on the Great Lakes (Malcomson 1998: 38). Chauncey's official orders from Secretary of the Navy Hamilton stated that he was "at liberty to purchase, hire or build" (emphasis original) whatever necessary to obtain supremacy on the lakes (Hamilton to Commodore Isaac Chauncey, 31 August 1812, in Dudley 1985: 297).

Chauncey readily accepted the staggering assignment of fashioning a fleet from the negligible force that already existed on the lakes. Upon receiving his post, Chauncey communicated three objectives to Lieutenant Woolsey: to acquire any available merchant vessels for conversion into gunboats; to select a construction site for a 300-ton vessel at Sackets Harbor; and to build barracks for 400 men (Malcomson 2001: 65). On 5 September, Chauncey ordered forty shipwrights to that location for the purpose of converting merchant vessels into warships and to build new vessels (Chauncey to Hamilton, 26 September 1812, in Dudley 1985: 316). Shortly after, another party of one hundred shipwrights arrived under the direction of Henry Eckford, a shipwright and friend of Chauncey from New York. In addition to the 300-ton vessel *Madison* constructed on Lake Ontario were plans for three gunboats. A naval base on Lake Erie

was also organized at Black Rock commanded by Lieutenant Jesse Elliot, where there were plans for two 300-ton vessels and three gunboats (Malcomson 1998: 43, 47).

Within the following weeks, the naval base at Sackets Harbor began to take shape as men and supplies arrived. Everything that arrived at this site was to be divided equally between Lakes Ontario and Erie (Malcomson 1998: 47). Dispatched to the Great Lakes were 600 naval officers and seamen along with 100 U.S. Marines (Malcomson 2001: 65). Over 100 pieces of ordnance ranging in size from 32-pounder long guns to 12-pounder carronades arrived at Sackets Harbor along with the equipment, shot, and powder necessary for firing the guns. All the supplies required to build and outfit a fleet of ships also needed to be shipped to the Great Lakes, including sails, rigging, blocks, cables and anchors. Only food supplies did not need to be transported, as Woolsey made arrangements to obtain enough provisions for all the troops. All supplies were transported north along the Hudson River to Albany, and then carted to Schenectady, where the cargo was transported west by riverboat along the Mohawk River to Rome. At Rome a canal allowed transport to Lake Oneida and up the Oswego River. From Oswego supplies were shipped along the shore of Lake Ontario to Sackets Harbor. Low water levels in the canal often delayed the transportation of supplies, requiring them to be carted overland from Rome (Malcomson 1998: 45-46).

On 6 October, Chauncey arrived at Sackets Harbor. In addition to *Lord Nelson* and *Julia*, Woolsey had acquired the schooners *Genessee-Packet*, *Collector*, and *Experiment*, which were being prepared for service. The U.S. Navy was unable to procure merchant vessels on Lake Erie, limiting the force on that lake to the two planned brigs. Although meeting the enemy on Lake Ontario that season remained a possibility, this was not the case on Lake Erie. Since supplies could not be transported to Black Rock overland at that time of the year, Chauncey directly

stated to Hamilton that “we could not arm our vessels upon lake Erie, before winter, even if they were ready” (Chauncey to Hamilton, 8 October 1812, in Dudley 1985: 337).

Although the early British victories of the war depended upon the aid of the Provincial Marine, by November 1812, the general public believed that this force was “worse than nothing” (John Strachan to McGill, November 1812, in Spragge 1946: 28). British citizens expected that with the outbreak of war, the Provincial Marine would suddenly perform like the Royal Navy rather than the transport service that it was. Opinions of the inefficiency of the Provincial Marine were fostered by the fact that the industrious Americans constructed an entire fleet to capture the command of Lake Ontario by the end of the 1812 sailing season. American command of the lake was solidified on 10 November, when *Oneida* and six converted merchant vessels chased the Provincial Marine flagship *Royal George* into Kingston harbor, nearly capturing the vessel. Subsequently, the commercial vessel *Governor Simcoe* eluded Commodore Chauncey on its way to Kingston on 11 November. The following day, the Provincial Marine ship *Earl of Moira* also slipped into Kingston harbor (Malcomson 2001: 68). Chauncey maintained a blockade of Kingston, effectively cutting off supply lines to York and other western positions. Chauncey noted that “we have now the command of The Lake and that we can transport Troops and Stores to any part of it without any risk of an attack from the Enemy” (Chauncey to Hamilton, 13 November 1812, in Dudley 1985: 346). Chauncey’s control of the lake was guaranteed for the 1813 season with the launch of *Madison* on 26 November 1812. This corvette was bigger and stronger than the British *Royal George* (Malcomson 1998: 56). On the north shore of the lake, there was great concern over Chauncey’s efficient reform of the U.S. Navy; consequently, the British began devising their own improvements for 1813.

The assessments of Captain Andrew Gray of the Provincial Marine in December 1812 led to recommendations for several improvements to Prevost (Malcomson 1998: 59). Gray was appalled by the deficiency he uncovered within the Provincial Marine and found the officers “destitute of all energy and spirit and are sunk into contempt in the eyes of all who know them.” Furthermore, he stated that “the want of seamen is so great that the *Royal George* has only seventeen men on board who are capable of doing their duty and the *Moira* ten” (Gray to Prevost, 3 and 11 December 1812, in Cruikshank 1916: 167). Gray suggested that attempts be made to match the building program at Sackets Harbor. He proposed construction of a ship of thirty 32pd. carronades at York, and one vessels of the class of the *Royal George* built at each Kingston and Amherstburg (Cruikshank 1916: 169). Prevost accepted Gray’s proposition and began assigning shipwrights to all three locations, unfortunately not realizing the difficulties that would arise by not focusing on maintaining only one shipyard on each lake. Moreover, Prevost thought to introduce new ship building ideas to the Great Lakes, hiring builders from Lower Canada rather than using John Dennis, the Provincial Marine shipwright for the past decade, who was acutely familiar with local materials and personnel. Thomas Plucknett from Quebec City was assigned to York, but designed the vessels at both locations, and James Morrison from Montreal was to supervise in Kingston (Malcomson 2001: 70).

Problems arose at both shipyards on Lake Ontario, hindering the development of the fleet. In Kingston, Morrison was soon fired, due to incompetence, and Daniel Allen, the foreman of the yard was promoted to the master shipwright. After encouraging the shipwrights to strike one month into his new role Allan was replaced by George Record. Nevertheless, by March, the vessel was nearly complete, *Earl of Moira* was repaired and overhauled from a ship to a brig, and *Governor Simcoe* refitted from a merchant vessel to a warship (Malcomson 2001: 70). At

York, construction of the new vessel progressed at a much slower rate, as Plucknett refused to build at the site Gray had selected. After consultation with Major-General Roger Hale Sheaffe, who took command after Brock's death at the Battle of Queenston Heights, Plucknett was able to continue at a site of his own choosing. The vessel at York, *Sir Isaac Brock*, named to honor the deceased general, had only eleven planks on one side by April, and Gray admitted that "as matters now stand it is very doubtful when [*Brock*] will be ready" (Gray 1813 in Malcomson 2001: 73).

Although improvements were made to the British forces on the Great Lakes during the winter, the fleet still lacked in ships, crew, and proper organization. The harsh criticisms that the Provincial Marine received led Prevost to denounce this force to his superior in Britain, Henry Bathurst, the secretary for war and the colonies, stating that the "officers are deficient in experience and particularly in the energetic spirit which distinguishes British seamen." He requested replacements of "tried officers of the rank of lieutenants and trusty men from the Royal Navy" (Prevost 1812 LAC MG 11, CO42/147: 215). Bathurst responded by detaching 200 seamen and officers from the Royal Navy (Malcomson 1998: 62). Commander Robert Barclay and the rest of the reinforcements arrived in May of 1813 to take command of the lake. The arrival of the Royal Navy to command on the Great Lakes displaced the officers of the Provincial Marine. Prevost had guaranteed that the officers would "be suitably provided for without dimunition [*sic*] of their salaries" (Baynes 1813 LAC RG8, I, 1170: 177). Nevertheless, all but three officers quit the service, as Barclay commented that they appeared "to feel the loss of their commands more sensibly than was expected" (Barclay 1813 LAC RG8, I, 729: 83).

Barclay was to assess the situation before the arrival of Sir James Lucas Yeo, who would take over complete control of the lakes squadron, while Barclay was reassigned to command on

Lake Erie (Malcomson 1998: 112). Barclay was not distressed by the situation that he encountered on Lake Ontario, reporting to Captain Noah Freer that “the Ships are I think as fine vessels of their kind as I have ever seen. The *Moirra* is small, it is true, but she is by no means so despicable as was represented” (Barclay 1813 LAC RG8, I, 729: 183). Prior to Barclay’s arrival, the small squadron was enhanced with the launch of the *Sir George Prevost* on 28 April 1813, which was larger than the *Royal George*. It was shortly renamed *Wolfe* by request of the modest governor-in-chief (Malcomson 2001: 76). Not all the Royal Navy officers agreed with Barclay’s optimistic view of the Provincial Marine. Midshipman David Wingfield believed that the vessels on the lakes were “in such a wretched state with regard to discipline and furniture, that they would have reflected disgrace upon a maritime power of the third grade.” He further stated that the squadron was “officered and manned by provincials, men of no experience whatever in naval tactics” (Wingfield 1813 in Malcomson 2001: 77).

Barclay’s inspection identified the lack of many supplies that were needed to maintain a fleet, including cables; various sizes of rope; compasses; more than 5,500 yards of canvas; white, black and yellow paint; and pitch and tar. He recommended the construction of between six and ten gunboats and also believed that there was enough wood stored at Kingston to build a ship to replace the one burned at York after the American attack on 27 April 1813 (Malcomson 1998: 114).

Commodore Sir James Lucas Yeo arrived in Kingston on 15 May to take control of the Lake Ontario fleet from Barclay. With him arrived 465 Royal Navy officers, far too many to take command of the few vessels on the Great Lakes (Malcomson 2001: 77). Prevost, however, was confident that “this most seasonable reinforcement will I hope enable us to regain an ascendancy on Lake Ontario” (Prevost 1813 LAC RG8, I, 678: 216). With Yeo’s arrival, Barclay relocated to

Lake Erie on 20 May to organize the Provincial Marine squadron along with three lieutenants, a surgeon, a purser, a master's mate, and nineteen seamen (Malcomson 1998: 122). Building upon the reorganization begun by Barclay, Yeo continued to prepare the fleet at Kingston for an encounter with the Americans.

On the Niagara Peninsula, the presence of the British and American military forces remained in a standoff. Both Yeo and Chauncey were requested by their respective superiors to seek a battle to resolve the question of command on Lake Ontario (Malcomson 2001: 81). At 4:30 a.m. on 7 August 1813, the British force sailed into view of the Americans anchored at Four Mile Creek, east of the Niagara River. The American fleet consisted of the *General Pike*, *Madison*, *Oneida*, *Governor Tompkins*, *Conquest*, *Ontario*, *Fair American*, *Asp*, *Pert*, *Hamilton*, *Scourge*, *Julia*, and *Growler*. The British squadron consisted of the *Wolfe*, *Royal George*, *Earl of Moira*, *Lord Melville*, *Lord Beresford*, and *Sir Sidney Smith* (Malcomson 1998: 168-169). Not only did the Americans have the advantage of more vessels, they were able to commence battle at a further distance with their long guns, as the British preferred the short carronades. This forced Yeo to maneuver close to Chauncey's squadron in order to balance the contest (Malcomson 2001: 82). Midshipman Wingfield commented that "the object of Sir James [Yeo] was to engage them at close quarters and board, which would, in all human probability, have insured success" (Wingfield 1813-1816 LAC MG 24, F18: 16). Chauncey, however, attempted to maintain his advantage by keeping the distance.

Another significant difference that existed between the two fleets related to their sailing abilities. Noted by both parties was the superiority of the British vessels. Arthur Sinclair of the U.S. Navy commented that Yeo was "a judicious cautious and skillful commander," and that the British fleet consisted of "six regular built vessels of war, all sailing alike and able to support

each other in any weather – capable of keeping the sea and acting efficiently when our Gunboats dare not cast their guns loose” (Sinclair to John Cocke, 25 August 1813, in Malcomson 1997: 48). Yeo deemed the American navy unfit; of the *General Pike*, he stated that it was “a very fine large ship, but appears to be very unwieldy and unmanageable” and inferred from the way it was sailed that the vessel did not carry a complete crew (Yeo 1813 in Malcomson 2001: 83). Even Chauncey agreed with these statements, bemoaning his “dull Sailing Schooners” that, along with the *Oneida*, he was required to tow to keep up with his force (Chauncey to Jones, 19 August 1813, in Dudley 1985: 541).

During the night, both fleets anchored near Twelve Mile Creek on the British side of the Niagara River. Myers reported that the British fleet was “so near, indeed, that we could almost count their ports...Our object was to get together lest the enemy should cut off some of our small vessels during the night” (Cooper 1843: 78). It was not the British, however, that caused the loss of two of the American schooners that night, but a severe and sudden squall. Myers recalled that “a flash of lightening almost blinded me. The thunder came the next instant, and with it a rushing of winds that fairly smothered the clap” (Cooper 1843: 81). The *Hamilton* and *Scourge* both foundered in this unexpected squall. Only sixteen crewmembers from these ships survived. This was unfortunate for Chauncey, who related that “this fatal accident, deprived me at once of the Services of two valuable officers and two of my best Schooners, mounting together 19 guns – this accident giving to the Enemy decidedly the Superiority” (Chauncey to Jones, 13 August 1813, in Dudley 1985: 538).

The British understood the greater strategic importance of Lake Ontario compared to that of Lake Erie. The loss of control of Lake Erie would not obligate the capture of Upper Canada, however; Lake Ontario was essential to controlling the British territory. Accordingly, the British

allocated the majority of their resources to Lake Ontario, essentially forfeiting Barclay's Lake Erie fleet for the larger objective. Nevertheless, the shipbuilding race on Lake Ontario prevented both Yeo and Chauncey from providing essential support to Lake Erie. Furthermore, the American capture of Fort George interrupted the transport of supplies from the Niagara Peninsula to Amherstburg. These events also allowed the vessels constructed at Black Rock to enter Lake Erie unmolested by the British formerly stationed on the Niagara Peninsula (Skaggs and Altoff 1997: 53). While historians, such as Theodore Roosevelt and Alfred Thayer Mahan, censure Chauncey's program on Lake Ontario during the 1813 season, it is evident that these actions allowed the American naval forces on Lake Erie a substantial advantage (Roosevelt 1887: 221-237; Mahan 1905: ch. 10; Skaggs and Altoff 1997: 53).

Although Barclay tried to avoid the American fleet by staying at Amherstburg, lack of supplies caused by the American control of Fort George on the Niagara River, eventually led him to set sail. Barclay hoped to meet and defeat Perry's fleet. With control of the lake, Barclay could then re-provision with supplies awaiting him at the other end (Dale 1990: 53). Although the gamble was great, Barclay planned "to sail and risk every thing" since "in the present state of this place, without provisions, without stores – and without Indian Goods (which last is a matter of the highest importance,) it is necessary" (Barclay to Yeo, 6 September 1813, in Hitsman 1999: 170). On 9 September, *Detroit*, *Queen Charlotte*, *Lady Prevost* and three armed schooners left Amherstburg. Since the guns intended for *Detroit* were lost at York, Barclay armed his newly completed flagship with the long guns from Fort Malden (Hitsman 1999:171).

The two fleets met near Put-in-Bay, Ohio on 10 September 1813. The battle began around noon when Barclay opened fire with his long guns. Perry had the advantage of the wind and was able to easily close the gap between the two fleets. Although Perry's fleet was much

larger, consisting of nine vessels compared to Barclay's six, his flagship, *Lawrence*, was not properly supported by the rest of the line, especially *Niagara*. After two hours of firing, both flagships were badly damaged with many casualties aboard, including Barclay, who was seriously injured and carried below decks (Hitsman 1999: 171). At this point, the *Lawrence* was severely damaged, since *Niagara* had failed to come up in time to assist and it, therefore, received the concentrated barrage from the *Detroit* and *Queen Charlotte*. Since *Lawrence* was no longer serviceable, Perry was rowed through the heavy gunfire to take control of the *Niagara* from Commandant Jesse Elliott. When asked at his court martial why the British did not take possession of the damaged *Lawrence*, Barclay replied: "We had only one boat, and that was cut to pieces; and the *Niagara*, another large brig, being to-windward, came down too quickly upon us" (Extracts from the court martial on Captain Barclay, in James 2004: 324). The nearly undamaged *Niagara*, along with the gunboats, forced the British surrender (Malcomson 2001: 95-96).

The Americans gained command of all the British vessels on Lake Erie. The vessels were anchored and repaired when Perry composed his now famous letter to William Henry Harrison, commander of the Army of the Northwest, stating: "We have met the enemy and they are ours. Two ships, two brigs, one schooner and one sloop" (Perry to Harrison, in Dudley 1992: 553). Within the next few weeks, Perry prepared the least damaged of the prizes for service in his squadron. Perry now commanded Lake Erie, however, the issue of who controlled the upper lakes was undecided and, on account of the advanced season and Perry's request to leave Lake Erie, it would not be resolved until 1814 (Malcomson 2001: 96).

The dockyards on both shores of Lake Erie were dormant during the winter of 1813-1814 as neither the British nor the Americans constructed new vessels for the remainder of the war.

The British considered arming a fleet at Long Point on Georgian Bay, off Lake Huron, but this was never realized. Rumors of a shipyard at Penetanguishene on Georgian Bay and the persisting American zeal to recapture Mackinac led to the development of a campaign on the upper lakes for spring. The instructions for this campaign assigned to Captain Arthur Sinclair stated that

the enemy, it is understood, is making efforts to create a force on Lake Huron, and the moment is at hand when our Squadron on Lake Erie must be actively employed, not only in keeping secure possession of that Lake, but a part of the Squadron must immediately proceed into Lake Huron, in order to rout the enemy, retake Michilimackinac, take St. Joseph, and thus secure the entire command of the Upper Lakes (Navy Department to Sinclair, 15 April 1813, in Gough 2002: 84).

Sinclair failed in his task to gain control of the upper lakes. Although he burned two merchant vessels, the attack on Mackinac did not succeed. Furthermore, Lieutenant Miller Worsely, on a supply mission to Mackinac, captured the American *Scorpion* and *Tigress*. These schooners were respectively renamed *Surprise* and *Confiance* and employed as supply vessels to Mackinac for the rest of the season. After this, Sinclair returned to Erie, ending the naval campaigns on the upper lakes (Gough 2002: 82-102).

The events on Lake Erie in 1813 helped to stimulate Yeo and Chauncey to attempt to find some sort of resolution to the conflict on Lake Ontario in 1814. Consequently, both commanders directed large shipbuilding programs, producing increasingly larger ships. Over the winter of 1813-1814, three new vessels were ordered to be constructed at Kingston. Likewise three vessels were constructed at Sackets Harbor and launched in the spring. Yeo believed that the launch of the frigates *Princess Charlotte* and *Prince Regent* in April 1814 would be pivotal in the outcome of the war on Lake Ontario and if the vessels that Chauncey had produced during the winter (*Jefferson*, *Jones*, and *Superior*) outmanned the British fleet, Yeo would wait until the launch of the third vessel *St. Lawrence* to take to the lake (Moore 2006: 11; Malcomson 2001: 102-107).

With the launch of *St Lawrence* on 10 September 1814 Yeo did indeed command the lake, although late in the war (Malcomson 2001: 115-116). This first rate ship was the largest on the lake, and has been compared in power to the HMS *Victory* (Hitsman 1999: 251). Yeo did not attempt an attack on Chauncey's fleet at Sackets Harbor, but with his control of the lake was able to transport troops and provisions to the army on the Niagara Peninsula. After two such voyages, *St Lawrence* docked for the winter. Effectively, the rivalry that took place in the shipyards affected a stalemate on the lakes, as no battle took place between the two fleets since both Chauncey and Yeo were unwilling to risk the defeat of their squadron until they were certain the victory was theirs. Although both the British and Americans formulated plans for the 1815 sailing season, 1814 was the end of the naval conflict on the Great Lakes. The signing of the Treaty of Ghent on 24 December 1814 ended the War of 1812 (Malcomson 2001: 116).

In 1815, the United States had sixteen warships on Lake Ontario, twelve on Lake Erie and three on Lake Champlain (Rodgers 1985: 6). At Sackets Harbor, Henry Eckford was already constructing *New Orleans*, the rival for the British *St. Lawrence*, while brothers Adam and Noah Brown commenced construction on *Chippewa*. The economy of the United States could not support such a large fleet during peace time; and Chauncey was ordered to cease construction on the new vessels at Sackets Harbor. (Malcomson 2001: 134). Likewise, reductions to the fleet were enacted so as only the schooner *Lady of the Lake* remained on Lake Ontario, the schooners *Porcupine* and *Ghent* on the upper lakes, and the row galley *Allen* on Lake Champlain (Rodgers 1985: 6-7). The sale of several U.S. Navy vessels and reuse by local merchants helped to re-establish shipping on Lake Ontario that had been severely disrupted by the war (Van Cleve 1877:100).

The Royal Navy initially had no intention of disarming the Great Lakes fleet. The British were concerned for renewed hostilities along the border and wished to obstruct any future American attempts to capture British North American territories. These concerns were aggravated by the fact that British North America's population was substantially smaller than that of the United States, access to resources was less developed, and the St. Lawrence River was not navigable for Royal Navy ships from the Atlantic. Therefore, the British thought that disarmament on the lakes would be to their disadvantage (Rodgers 1985: 7).

In 1815 the Americans were busy "laying up in ordinary" the majority of their ships. However, the British continued to increase their navy on the inland lakes during the early part of 1815 (Figure 2-2) (Rodgers 1985: 7-8). In 1815, plans for constructing two first rates, *Canada* and *Wolfe*, that were to be very similar to *St. Lawrence* were made. Three gunboats, *Blazer*, *Mosquito*, and *Boxer* were launched along with a transport vessel named *Beckwith* (later named *Charwell*). By the summer of 1815, the only vessels still in use with reduced crews were *Prince Regent*, *Niagara*, *Montreal*, *Star*, and *Netley*. *Psyche* (a vessel sent in frame from Britain to be reconstructed in Canada in 1814), *Princess Charlotte*, *St. Lawrence*, and *Charwell* were in ordinary (Malcomson 2001: 135-136).

The chances of a renewed arms race compelled the Americans to approach the British government with a proposal from President Madison to reduce the number of armed vessels on the lakes (Rodgers 1985: 7-8). This led to the Rush-Bagot Agreement of 1817. The agreement stated that forces be reduced on Lake Ontario to one vessel not exceeding one hundred tons burden, and armed with one eighteen pound cannon; on the upper lakes to two vessels, not exceeding like burden each, and armed with like force; and on Lake Champlain to one vessel not exceeding like burden, and armed with like force. The agreement further stated that all other

vessels were to be unrigged and no other vessels constructed. There was no requirement for the vessels to be destroyed however, and both sides laid them up in ordinary. Similarly, the agreement did not stipulate that the dockyards or naval depots were to be closed; and, accordingly, they remained active, more so on the British than the American side (Rush-Bagot Agreement 1818).

After the Rush-Bagot Agreement, tensions on the lakes calmed. Of the four American ships which patrolled the lakes in 1815, none were fit for service by 1822. In March 1825, Congress authorized the president to sell all the vessels on Lakes Erie, Ontario and Champlain. The ships of the line *New Orleans* and *Chippewa*, now on the stocks at Sackets Harbor, were retained as insurance in the possibility of future outbreaks of hostility (Rodgers 1985: 15). During the summer of 1817, the Royal Navy had opened the naval base at Penetanguishene on Georgian Bay. Immediately, shipwrights set to work constructing three small schooners that were rigged without a topsail: *Bee*, *Wasp*, and *Mosquito*. With the limitations imposed in the spring, these vessels served only as transports. At Kingston, the British launched the two-gun gunboat *Radcliffe* and the schooner *Brock* (Malcomson 2001: 139). At the time that the agreement was signed, Commodore Sir Robert Hall commanded *Kingston* of 56 guns. These vessels were laid up in ordinary or anchored in Navy Bay and Hall bemoaned that “we are reduced to a Boat’s Crew on the civil establishment” (Hall to Bagot, 18 May 1817, in Stacey 1950: 12).

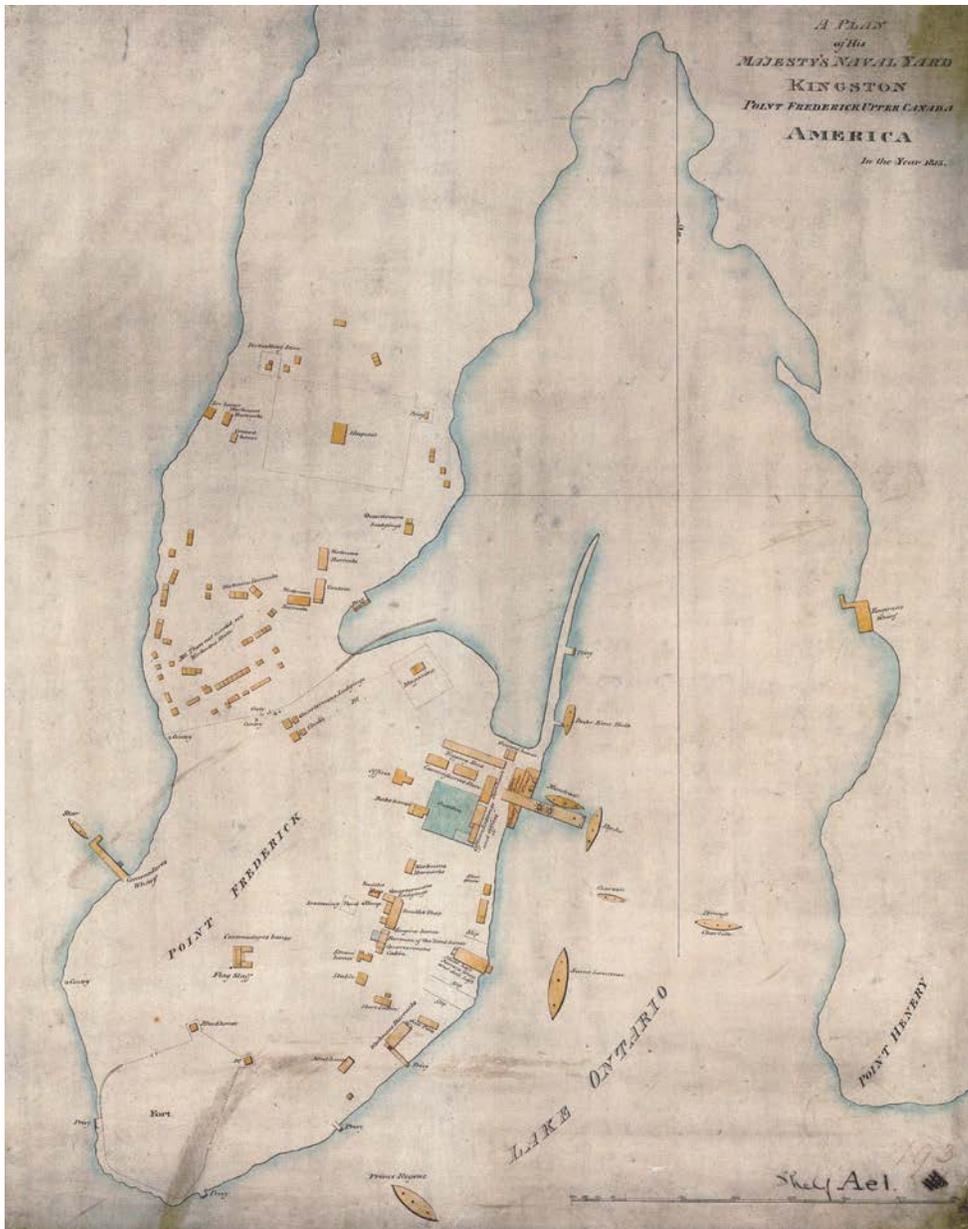


Figure 2-2: “A Plan of His Majesty’s Naval Yard Kingston...1815” shows Point Frederick and the dockyard and the ships of the Royal Navy force moored in Navy Bay or anchored along the shore (United Kingdom Hydrographic Office, Taunton, England, 193 Ael in Moore 2006: 17).

In 1818, command of the British naval forces on the Great Lakes passed from Hall to Captain Robert Barrie. Barrie arrived at Kingston in July 1819. At this time, the first rates *Canada* and *Wolfe* still remained on slips One and Two, awaiting completion. The sloop *Star* was on the Transport Slip. *Niagara* and *Psyche* were also hauled up, but the location was not listed. *St. Lawrence*, *Burlington*, *Kingston* and *Netley* were anchored in the middle of Navy Bay,

while *Charwell* and *Montreal* were docked alongside the naval wharf and used to barrack officers. Barrie also employed the yard boat *Bull Frog* in the bay (Brock 1967: 8). Barrie's instructions were to repair vessels on the lakes in readiness of conflict "but in a manner least likely to excite public notice or comment," consequently he had his officers complete regular inspections of the condition of the vessels at Kingston as well as the equipment located in the storehouses in order to evaluate needed repairs (Melville to Barrie in Preston 1958: 86; Malcomson 2001: 140). At least once a year Barrie also journeyed to the other depots in British North America to inspect the naval reserve (Brock 1967: 13).

In 1831, Barrie was asked to detail "the number, size and power of the Canadian steamers operating on the lakes, and their suitability for war purposes in case of an emergency" (Melville to Barrie in Preston 1958: 86). Later that year Barrie received instructions to sell the old warships and close all the naval establishments on the lakes (Moore 2006: 28). The decision to terminate the presence of the Royal Navy on the Great Lakes coincided with the opening of the Rideau Canal in 1832, which greatly strengthened Canada's defensive position by providing a secure transportation and communication route from Quebec to Kingston via the Bytown (present day Ottawa) (Stacey 1950: 13). While attempts were made to sell some of the now derelict vessels, the only definitive sale was that of *St Lawrence* which sold for £25 for use as a dock by a local brewer. After 1838, the remaining vessels were removed from the *List of the Navy* (Moore 2006: 28-29). Some ships were sunk in nearby Hamilton Cove (later named Deadman Bay) on the opposite side of Point Henry and, evidently, some rotten wreck remains lingered in Navy Bay. The dockyard was officially closed in 1853. In 1876, Point Frederick became the location of the Royal Military College of Canada. By this time, the dockyard structures and ships remained underwater or were lost to landfill operations (Moore 2006: 30).

While naval operations slowly came to an end on the Great Lakes after the War of 1812, the unprecedented immigration to the region encouraged trade and commerce. The war had greatly hindered commercial activities along both sides of Lake Ontario, and especially across the lake. At the end of the war, there were few merchant vessels on the lakes, as many had been commandeered for naval use. However, the sale of several vessels by the U.S. Navy helped to increase trade along the lakes. The later attempt by the Royal Navy to auction the remainder of their fleet was not as successful as the ships were old and in disrepair, had they sold them immediately following the war merchants may have been encouraged to buy those vessels. With peace restored, trade routes were re-established along the lake as soon as the spring of 1815, and a packet between Kingston and Sackets Harbor was established as early as 1818 (Melish 1818: 539). Traffic on the lakes was imbued with vigorous growth, first gaining in activity on Lake Ontario, where population size was rapidly growing within the permanency of older settlements.

With the need for more ships for commercial use, shipbuilding moved away from the naval yards. During the commercial boom from 1820 to 1860, almost every port, river or bay along the Lakes had a shipyard (Van Gemert 1972: 292). Passenger and cargo vessels soon outnumbered military vessels. While the majority of shipwrights on the Lakes in the early 19th century were trained in naval yards, it had already been established that schooners were better suited to the lakes than the typically square rigged naval vessels. These post war ships typically carried approximately 150 tons, or 1,500 barrels of cargo with a crew of three or four men. The advantages of the fore and aft rig of the schooner allowed for better headway into the wind. This was of great importance on the lakes which have predominantly westerly winds, as a square rigged vessel would have greater trouble sailing against the wind. The fore and aft rig also allowed for the vessel to easily maneuver in restricted areas, which is important as the lakes

geography presents several restricted spaces where a captain's ability to tack may be limited. Furthermore, schooners were built with shallower drafts which allowed them to bypass shoal waters. Other rigs existed on the Lakes that combined fore and aft square sails, such as brigantines and barkentines; however, schooners were the most prevalent vessel type on the Great Lakes during the 19th century (Ford 2009: 142). Brigantines became popular in the 1830s and 1840s and combined the best features of both square and fore-and-aft rigs. They operated with crews of eight to ten men and were not as maneuverable as schooners. Consequently, few brigantines were built after 1850 as they were too expensive to equip and operate compared to schooners. The most useful and profitable rig was the topsail schooner. It was designed for fast voyages with heavy freight and maneuverability with a small crew. Topsail schooners had the ability to sail close to windward, a characteristic of fore-and-aft rigged ships, and they added speed to otherwise slow schooners, particularly when running before prevailing westerly winds (Labadie et. al. accessed 2010).

Amidst the increasing population along the Lakes and the improvement in relations between the U.S. and British North America, commercial shipping on Lake Ontario prospered. The period of 1830-1870 represented a golden age of sailing commerce for the lakes. The early commerce concentrated on trade within the Lakes, but eventually the Lakes served as a waterway for transporting goods from the interior of the continent towards the Atlantic and the rest of the world (Ford 2009: 142-3).

Great changes in technology following the War of 1812 revolutionized ship construction on the Great Lakes. While sail vessels multiplied, steam transportation was introduced with the launch of the first steamer *Frontenac* in 1816 in Ernestown, Ontario, 18 miles west of Kingston (Cruikshank 1926: 40). Most of the early steam vessels were side-wheel steamers used primarily

for passenger and packet transportation. By the 1830s and 1840s steam propellers began to compete with sail for commercial trade. By the 1850s, most large vessels constructed were steam (Ford 2009: 176). Shipbuilding forever changed on the Great Lakes with the opening of the Welland Canal in 1829, which allowed for the first navigation between Lake Ontario and the upper lakes. The first purpose built vessel was launched in 1828, that became known as a canal schooner as it was constructed to fit within the dimensions of the locks (Monk 2003: 42). The Welland Canal was rebuilt in 1846, 1881, and 1932, each time increasing in size, until the present day version that accepts ocean-going vessels of up to 715 feet long (Ford 2009: 168-169). Each increase in size has improved commerce along the Great Lakes and drastically changed the terrain, from the early 1700s when it was difficult to maintain regular sail on the upper lakes, to the present day, when large ocean-going bulk carriers are now regular traders as far as Lake Superior.

CHAPTER 3 : PRE-WAR OF 1812 VESSELS

A great deal of archaeological evidence exists for eighteenth century Anglo-American vessels from North American contexts. Documented wrecks include merchant vessels and warships that plied the inland lakes and rivers of the continent as well as ocean-going craft. The scope of recorded sites ranges from multi-year projects that encompass complete excavation to quick archaeological mitigative surveys prior to modern construction. This archaeological evidence has furthered our understanding of eighteenth century ship construction through comparison with historical records and other archaeologically excavated vessels from the period.

Archaeologically documented vessels from the pre-War of 1812 period examined for this thesis include a selection of merchant and naval vessels constructed after the mid-eighteenth century in order to coincide with the first British sailing ships on the Great Lakes.

Archaeologically documented vessels include the 16-gun sloop *Boscawen* (Crisman 1985 and 1996) built on Lake Champlain in 1759; and the *Defence* (Morris 1991), an 18th century privateer lost during the Penobscot Expedition of 1779. Archaeological examples from the Great Lakes also include several vessels that were built prior to the War of 1812 and subsequently used during the war. These include the schooner *Nancy*, a merchant vessel built in 1789 and pressed into British service during the War of 1812 on Georgian Bay (Sabick 2004); the Southhampton beach wreck, now identified as *General Hunter*, built by the Provincial Marine in 1807 at Amherstburg and used throughout the war (Cassavoy 2005). As mentioned, schooners pressed into the service for the U.S. Navy include *Hamilton*, built in Oswego, New York in 1809, and *Scourge*, built at Niagara, Ontario in 1811, which both remain preserved and unexcavated at a depth of 300 feet in Lake Ontario (Cain 1983; Nelson 1983; Harris et al. 2009; Keyes and Moore 2009; Lockhart et al. 2009).

Boscawen

The warship *Boscawen* was built in 1759 for the British campaign on Lake Champlain during the French and Indian War (1754 to 1763). Colonial American shipwrights commanded by Royal Navy Captain Joshua Loring constructed the vessel in as little as three weeks (Malcomson 2001: 19). Prior to the vessel's discovery in 1983, historical records only indicated that it was a 115 ton, 16-gun sloop which sank at its moorings at the Fort Ticonderoga dockyards in the 1760s, likely due to swift decay of a hull constructed of unseasoned wood. Excavation and documentation of the vessel occurred during the summers of 1984 and 1985 (Crisman 1985: 356).

The white oak keel of *Boscawen* measured approximately 65 ft. (19.8 m) in length and was cut from one or possibly two timbers. It was molded 14 in. (35.6 cm) and sided 10.5 in. (26.7 cm) at the stem and tapered at the stern to 9.5 in. (24.1 cm) sided. The stern consisted of a single white oak sternpost that was secured to the keel with a pair of iron dovetail plates. It was sided 6 in. (15.2 cm) and molded 19 in. (48.3 cm) at the base, which narrowed to 13 in. (33 cm) molded. The sternpost was reinforced with four deadwood timbers fastened one atop the other with iron drift bolts. This included the stern knee that was cut from a naturally curved part of a tree and measured 6 in. (15.2 cm) sided and 11 in. (27.9 cm) molded near the top of the upper arm. The stem was constructed of three large white oak timbers; the main stempost, gripe, and apron which were fastened with 1 in. (2.5 cm) iron bolts. Approximately 11 ft. (3.3 m) of the stempost was attached to the hull with a flat scarf and measured 5.5 in. (14cm) sided and 11 in. (27.9 cm) molded. The gripe was sided 3.75 in. (9.5 cm) and molded 6 in. (15.2 cm) at the keel scarf increasing to 11 in. (27.9 cm) molded. Less than 2 ft. (60.9 cm) of the apron survived,

though it was much larger than the other pieces of the stem and measured 16 in. (40.6 cm) square (Crisman 1985: 358-360).

The frames on *Boscawen* demonstrated the speedy construction of the sloop. The framing was composed of a total of 26 white oak floors, fastened to the keel with a single bolt, alternating with first futtocks. The spacing of the floors greatly varied, but their centers averaged 28 to 34 in. (71.1 to 86.4 cm). The floors averaged 5 to 10 in. (21.6 to 25.4 cm) sided and were molded 12 in. (30.5 cm) at the keel, decreasing to 7 in. (17.8 cm) molded at their heads. Every floor timber had two limber holes that permitted bilge water to pass under the frames to the pump well. The shipwrights that constructed *Boscawen* did not utilize a common method of frame construction during the eighteenth century whereby the floor and futtocks were fastened together to form a complete rib which was then mounted on to the keel. Instead, all the floor timbers were fastened to the keel, and the outside of the hull was planked (Figure 3-1). After several planking strakes

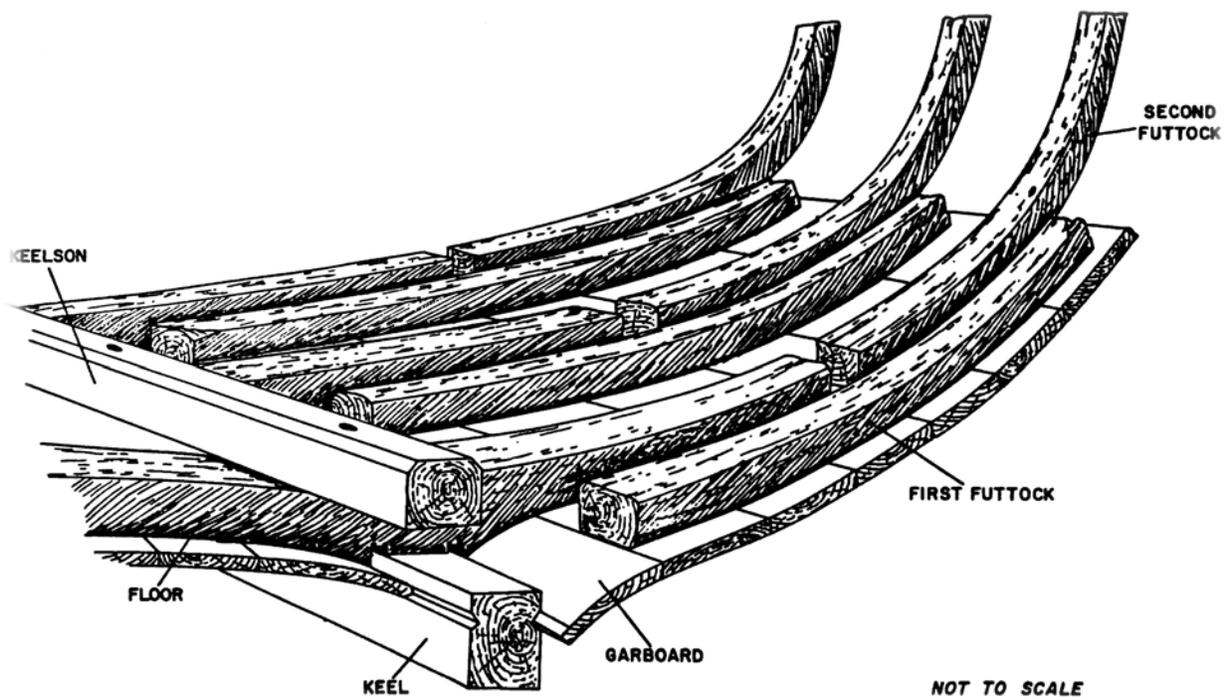


Figure 3-1: A schematic view of *Boscawen's* frame construction (Crisman 1985: 362).

were fastened to the floors, the first futtocks were placed between the floors, with their heels approximately 10 in. (25.4 cm) from the keel, and attached to the outer hull planking with iron spikes and treenails. This method continued with the placement of the second futtocks, which were not connected to the first futtocks. As it was not important for the floors and futtocks to fit together tightly, they could be crudely shaped and some still displayed bark on their surfaces. The first futtocks were more crudely shaped than the floors and varied from 4 to 8 in. (10.2 to 20.3 cm) sided and 7 to 10 in. (17.8 to 25.4 cm) molded. Two cant frames were recorded at the bow that butted against the sides of the keelson and the forwardmost floor timber instead of crossing over the keel, as if added later. Four to five half frames were found in the stern that butted against the stern deadwood and angled aft (Crisman 1985: 361-364).

The white oak keelson measured 53 ft. (16.2 m) long and was secured to every other floor timber by iron bolts. It consisted of two, or possibly three timbers flat-scarfed end to end. It did not extend all the way aft to the stern but stopped about 3 ft. (0.9 m) forward of the stern deadwood, or 10 ft. (3.5 m) from the sternpost. It is unclear if this gap was intended by the shipwrights or was the result of an error in construction. The keelson measured 10 in. (25.4 cm) sided and 6 in. (15.2 cm) molded near the bow and 11 in. (27.9 cm) sided and 10 in. (25.4 cm) molded towards the stern (Crisman 1985: 364).

The external and ceiling planking were all of white oak that measured 2 in. (5.1 cm) thick. The external planks varied from 11 to 15.5 in. (27.9 to 39.4 cm) wide and were fastened to the floors and futtocks with both iron spikes and treenails of white oak and white ash. The ceiling planking averaged 12 to 20 in. (30.5 to 50.8 cm) wide and were secured to the frames with iron spikes in a random pattern (Crisman 1985: 364-365).

Boscawen had a single mast step on the keelson located one-third of the hull length aft of the stem (Figure 3-2). The step consisted of a large white oak block that was notched over the keelson. It measured 4 ft 3 in. (1.3 m) long, 18 in. (45.7 cm) wide, and 16 in. (40.6 cm) in height. Similar to a saddle mast step, it sat perpendicularly to the keelson and was secured in place by two wedges of wood on either side of the step, placed longitudinally along the keelson. To prevent the mast step from twisting, two chocks were attached to the ceiling forward of the step. The step's mortise, which took the heel of the mast, was 16 in. (40.6 cm) long, 8.5 in. (21.6 cm) wide, and was cut completely through the block to the keelson (Crisman 1985: 365).

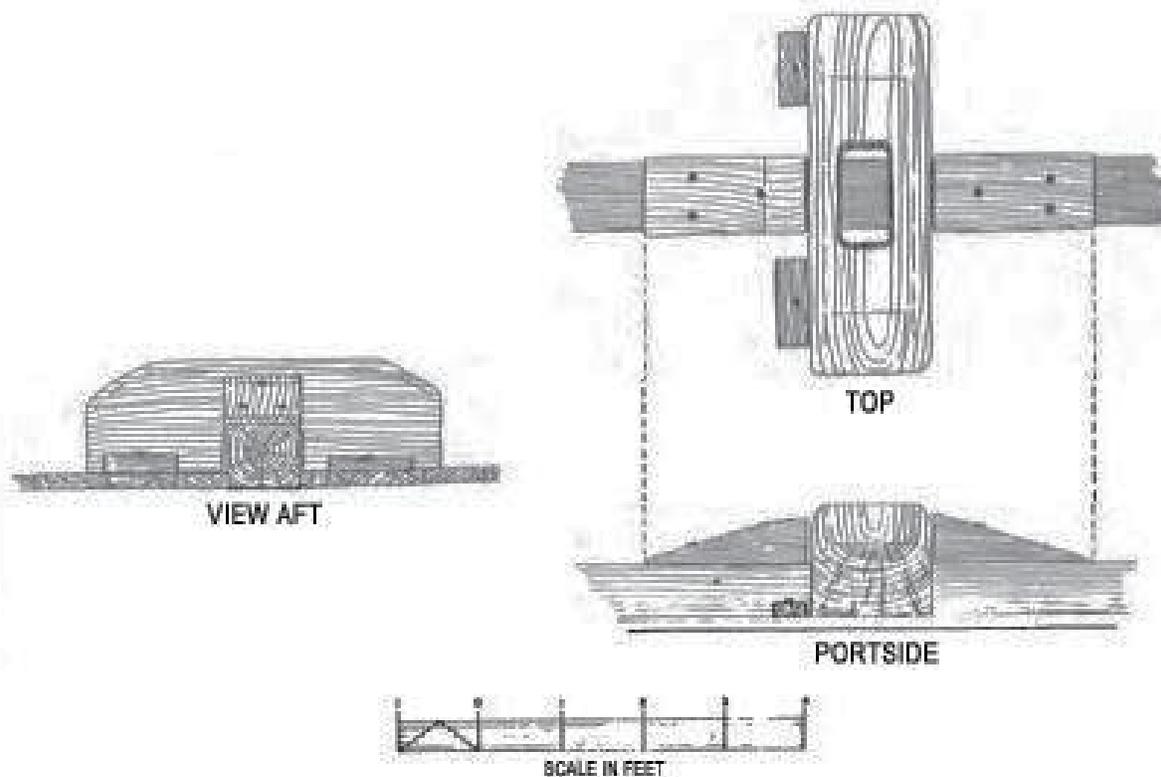


Figure 3-2: *Boscawen's* mast step (Crisman 1985: 366).

Three white pine deck beams that measured from 5 to 7 in. (12.7 to 17.8 cm) in diameter were found. They were unfinished round logs that had been adzed on the upper surface to allow

the decking to lie evenly. Several pieces of white oak deck planking were found that measured 0.75 in. (1.9 cm) thick (Crisman 1985: 365-367).

The archaeological documentation of *Boscawen* not only confirmed its identity, but revealed several construction shortcuts that were taken by the shipwrights in order to launch the vessel within three weeks. This was evidenced in the varying size and spacing of timbers, the unusual frame assembly method, and the lack of finishing as seen in the deck beams and frames. However, all the timbers were of sizable dimensions, were fashioned from strong white oak, and appeared adequately fastened with iron bolts and trenails, which made for a vessel that was hastily made but still a strong and durable warship (Crisman 1985: 368-370).

Defence

The Revolutionary War privateer *Defence* is thought to have been built in Beverly, Massachusetts in 1779. Less than a year old, and possibly on its maiden voyage, *Defence* joined a fleet in July 1779, that included ships of the Continental and Massachusetts state navies, twelve privateers, and transport vessels for the army. Assembled by the State of Massachusetts and commanded by Dudley Saltonstall, the fleet's purpose was to attack a British fort that was being built in Maine's Penobscot Bay. The attack was a disaster as the arrival of a small number of British vessels caused an American retreat up the Penobscot River after two vessels were captured. The remainder of the fleet was scuttled or burned to prevent capture by the British. *Defence* sank in Stockton Harbor after an explosion on board, probably in the powder magazine (Sands 1996: 155).

Defence was discovered in 1972 during a sonar survey conducted by the Massachusetts Institute of Technology (MIT) and the Maine Maritime Academy. Two seasons of preliminary inspections revealed artifacts from the eighteenth century, including a cannon made in

Massachusetts in 1778. A full excavation was organized in 1975 by the Maine State Museum with the Maine Maritime Academy, the Institute of Nautical Archaeology, and the Maine Historic Preservation Commission. The work was conducted in 1981 after the partially intact hull was recorded (Switzer 1981: 91; 1983: 44). The wreck remains stretched a total of 72 ft. (21.9 m) from stem to stern with a maximum breadth of 22 ft. (6.7 m). The vessel was made primarily of oak, including the frames, deck beams, deadwood, and planking. The masts, bulkheads and other internal structures were made of pine. Samples of larch were also found at the wreck site (Switzer 1981b: 92; 1983: 45). The ship was originally armed with 16 six pound cannon (Sands 1996: 156).

The keel of *Defence* was 8 in. (20.3 cm) molded and 14 in. (35.6 cm) sided. The keel was notched for the floor timbers, which varied from 8 to 9 in. (20.3 to 22.9 cm) molded forward to 15 in. (38.1 cm) aft. The first futtocks measured 8 in. (20.3 cm) square, and the rest of the futtocks averaged 8 in. (20.3 cm) molded and 4 to 5.5 in. (10.2 to 14 cm) sided at the preserved top section. The frame spacing was close, with only 5 in. (12.7 cm) gaps between the futtocks. Upon removal of a section of ceiling planking, it was discovered that articulated double frames were located every 4 to 5 ft. (1.2 to 1.5 m). They were fastened through the floors to the keel with $\frac{3}{4}$ in. (1.9 cm) diameter iron bolts. The other frames were like half frames as they did not have floors and were secured to the planking with octagonal treenails that measured 1.1 in. (2.8 cm) in diameter. Bark still remained on some of the frames and numerous timbers appeared to be cut from green wood, suggesting cheap or hurried construction, although compass timbers were used for the floors, futtocks, and other curved timbers (Switzer 1981b: 94-5, 98; 1981a: 149; 1983: 50; Wyman 1978: 5). The shape of the hull was very sharp in design, with a V-shaped

entrance forward, resulting in a speedy vessel. This is in contrast with the bluff bowed, surviving contemporary drawings (Sands 1996: 158).

The keelson was bolted through the frames and keel and measured 8 in. (20.3 cm) molded and 11.5 in. (29.2 cm) sided. Both fore and main mast steps were made of simple mortises cut into the keelson which were reinforced with oak chocks that were placed on either side of the keelson and secured to the floors with iron bolts. The stumps of both masts were present in the mast steps. They were made of white pine and measured 18 in. (45.7 cm) in diameter (Switzer 1981b: 95-6). A similar mast step was located on the Phinney Site, an American armed vessel scuttled during the Penobscot Expedition of 1779. The similarity occurs at the main mast step assembly of this vessel. Two mast chocks and an angled buttress or crutch were also observed on the Phinney Site that would have prevented the lateral movement of the mast step (Hunter 2004: 71-72).

The outer hull planking averaged 2 to 2.5 in. (5.1 to 6.4 cm) in thickness. The four lowest strakes of outer planking measured 12 in. (30.5 cm) wide, while the remainder averaged 8 in. (20.3 cm) wide. The planking was fastened to the frames using 1.1 in. (2.8 cm) diameter octagonal treenails. The heads of the treenails had been cut with 1.5 in. (3.8 cm) deep square mortises in order to wedge them into place. The ceiling planking was attached to the frames with square spikes that measured 0.4 to 0.5 in. (1 to 1.3 cm) in diameter. In the bow, the ceiling planking was nailed to every other frame. Further aft, only single nails were used in every third or fourth frame, which also indicates hasty construction (Switzer 1981b: 93-5).

Some of the internal fittings of the vessel were preserved including the shotlocker, bilge pump, and cookstove. The shotlocker and pump well were constructed of heavy pine boards. The mainmast was contained within the locker and the pump well was located in an unusual place,

forward of the mainmast. The structure of the locker and pump measured 5 ft. (1.5 m) in length and 2.5 ft. (0.7 m) in width and was preserved to a height of 4 ft. (1.2 m). The placement of this structure around the mainmast on top of the keelson and ceiling planking suggests that it was built after the vessel was launched (Switzer 1981b: 95-6). The brick cookstove was carefully constructed and built on a platform of heavy oak planks laid across the keelson and ceiling planking. It measured 5 ft. (1.5 m) high and contained a 68 gallon (257.6 liter) copper cooking pot (Switzer 1981b: 93, 96-7).

Defence was built specifically as a privateer in which speed was essential; this is supported by its sharp bow. This may also explain the hasty construction of the vessel, although some of the details demonstrate extra attention. Several of the timbers, including the keelson, the chocks reinforcing the mast steps, and the upper deadwood, were chamfered along the edges to remove sharp corners on the interior of the vessel. Furthermore, some of the timbers had decorative trim and other ornamental details (Switzer 1981b: 97-8). From these features on the interior and the care taken in the construction of the cookstove, it is clear that the appearance of the interior of the vessel was important to the builders; however, the presence of bark on some of the timbers also indicates financial prudence. As a privateer, the owner likely wished to have an attractive looking ship although he knew that it would likely have a short lifespan.

Nancy

The schooner *Nancy* was built in Detroit in 1789 for the trading company Forsyth, Richard and Co. as a transport vessel used in the fur trade on Lakes Erie and Huron. Although Detroit was officially part of America following the 1783 Treaty of Paris, the British were slow to surrender the location due to its importance in controlling the upper lakes. With the outbreak of the War of 1812, *Nancy* was pressed into service by the Provincial Marine and later the Royal

Navy. The schooner was primarily used for supply trips between the Nottawasaga River, which empties into Georgian Bay on Lake Huron, and Mackinac. *Nancy* was burned to the waterline by Lieutenant Miller Worsley on 15 August 1814, on the Nottawasaga River, to prevent capture by an attacking American force. In 1927, the remains of the schooner were excavated and removed from the banks of a small island in the Nottawasaga River to be displayed at the Nancy Island Historic Site. The hull timbers were not properly documented until 1997 (Sabick 2004).

Nancy was constructed of high quality old growth timbers of oak and red cedar. The construction methods display high workmanship as the timbers are tightly fitted and well fastened. The frames were shaped from naturally curved compass timbers with few knots. The remaining hull of *Nancy* measures 68 ft. (20.7 m) in length and 22 ft. (6.7 m) in beam, had a hold depth of 7 ft. 6 in. (2.3 m) and measured 100-120 tons. After almost a century on display without conservation, the majority of the timbers show signs of drying and cracking (Sabick 2004:84).

Nancy's keel was made from a single timber which measured 59 ft. 9 in. (18.2 m) in length. The dimensions of the keel varied from 14.75 in. (37.5 cm) molded and 9.5 in. (24 cm) sided forward to 13 in. (33 cm) molded and 8.75 in. (22.2 cm) sided amidships to 12 in. (30.5 cm) molded and 8 in. (20 cm) sided near the stern. At the stern the keel was mortised for the sternpost and inner sternpost, both of which are missing. Shallow mortises on either side of the keel reveal impressions for a pair of fish plates that would have added strength to the juncture of the keel and sternpost. The rabbets run from the stem to a place 14 in. (35.6 cm) from the keel's aftermost end (Sabick 2004: 85).

The underside of the keel was cut with 25 holes that appear to have contained treenails at some point. In several cases, the treenails have fallen out and were replaced with iron bolts recessed into the keel, 22 of these holes correspond with bolts that attached floors to the keel

(Sabick 2004: 85). This feature seems to be unique to this vessel, as it appears that the holes were augured into the bottom of the keel and the bolts driven in from below in order to secure the floors in these locations. By recessing the heads of the bolts, they would be protected from damage in the case that the vessel ran aground. Wooden plugs were then used to seal the holes and protect the bolts. This may be an indication of a later addition to the vessel in order to provide strength when the vessel was pressed into service by the Provincial Marine, or this may indicate that a false keel was fixed to the vessel at one point and later removed (VanHorn 2004: 119).

The stem assembly consisted of the stempost, apron, and gripe. The stempost was made from a single compass timber that measured 23.5 in. (59.7 cm) molded at its maximum and 7.25 in. (18.4 cm) sided. The stem of the vessel was hook scarfed to fit the keel and strengthened with two pairs of iron fishplates that were fastened through the sides of the keel-stem assembly. A 1 in. (2.5 cm) diameter stopwater was located at the after end of the scarf. On the starboard surface of the stempost, the Roman numerals IV and V are faintly visible. These were the draught marks that informed the crew how much water the vessel was drawing. The apron, keelson, and gripe were fastened to the stempost with iron bolts (Sabick 2004: 87). The apron measured 13 ft. (3.9 m) in length, 7 in. (17.8 cm) molded, and 15 in. (38.1 cm) sided and was cut from a single compass timber (Figure 3-3). It was notched on its sides and top to receive five floors, and on its upper end for cant frames (Sabick 2004: 91).

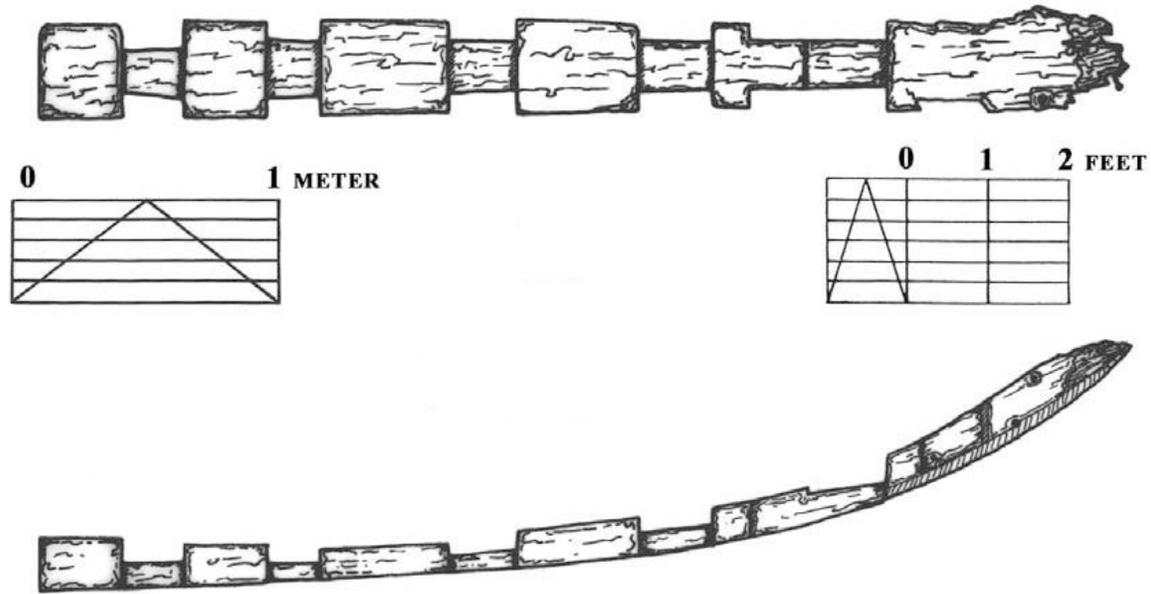


Figure 3-3: Plan and profile view of *Nancy's* apron (Sabick 2004: 91).

The sternpost and inner sternpost did not survive, but mortises in the keel indicate their positions. They were fastened with a pair of iron fishplates. The inner sternpost would have measured approximately 4 in. (10.1 cm) molded by 8 in (20.3 cm) sided. The main sternpost would have been approximately 12 in. (30.5 cm) molded and 8 in. (20.3 cm) sided, to match the dimensions of the keel. It is impossible to estimate the height of these timbers. A single deadwood timber buttressed the stern assembly (Figure 3-4). The timber was bolted to the top of the keel and notched to seat eight of the aftermost floors. It extended along the keel for 17 ft. 9 5/8 in. (5.4 m) ending 16 in. (40.6 cm) from the after end of the keel. Partway through the length of the timber, it was trapezoidal in section to form the rabbet for the garboard strake (Sabick 2004: 89-90).

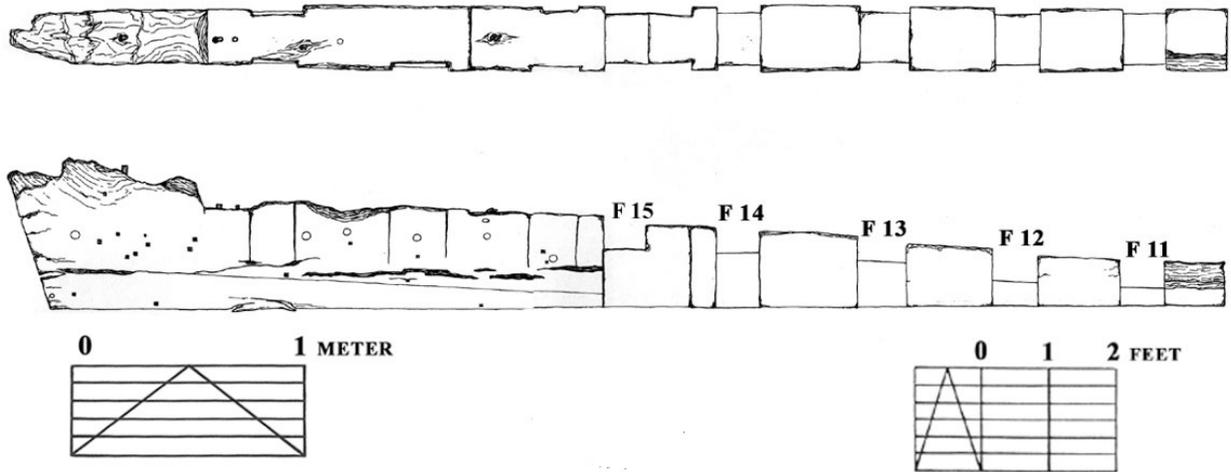


Figure 3-4: Plan and profile view of *Nancy's* stern deadwood (Sabick 2004: 90).

The lower framing on *Nancy* was well preserved, with the exception of the frames in the stern of the vessel, several of which are missing. Framing consisted of square frames in the hull and cant frames in the bow as well as additional timbers used as filler pieces, which may have been added later to reinforce the aging hull or to support taller bulwarks and frame gunports when the vessel was equipped as a Provincial Marine vessel. The vessel originally had 28 floor timbers, 25 of which remain, spaced an average of 25 in. (63.5 cm) apart on their centers. The floors varied in size from 7.5 to 9 in. (19 to 22.9 cm) molded and 8 to 9 in. (20.3 to 22.9 cm) sided. The frames are notched underneath to fit on top of the keel to form a strong joint. Triangular limber holes were cut into the floors on each side of the centerline. The first futtocks were offset from the keel by 7 to 10 in. (17.8 to 25 cm) and averaged 8 in. (20.3 cm) molded and sided. Ten of the frames were articulated master frames, that had the floors and first futtocks closely fitted and fastened together. They are fastened together with iron bolts that were driven in at an angle, although Sabick suggests that these were originally joined with horizontal treenails and the iron bolts were a later reinforcement. The rest of the first futtocks were separated from the floors with a space of 5 to 8 in. (12.7 to 20.3 cm) and were fastened to the hull planking. For

all the frames, the first futtocks were placed aft of floors forward of midships and forward of the floors aft of midships. The only exception is located at Frame 1, which does not have a first futtock related to it. This does not follow ship construction techniques laid out in treatises of the time. The upper futtocks were diagonally scarfed to the lower timbers. A total of 15 filler frames were placed near midships and the bow (Sabick 2004: 92-97).

The remains of four pairs of cant frames were present in the bow. One pair of cant frames rested in notches on the side of the apron, the remaining heels of the cant frames abutted it. The heels of the aftermost bow cant timbers formed a triangular wedge that filled the gap between the forwardmost square frame and the first radial cant frame. Many of the frame timbers have holes that would have contained fasteners for attaching the hull planking. The ½ in. (1.3 cm) size of the holes and the lack of iron staining, suggests that the hull planking was fastened with treenails. These holes do not appear on the filler pieces, which may further indicate that they were a later addition (Sabick 2004: 99-101).

The keelson was composed of two timbers fastened together with a 7 ft. (2.1 m) long hook scarf for an overall measurement of 53 ft. (16.2 m) in length, 12 in. (30.5 cm) molded, and 9 in. (22.9 cm) sided. It was notched to fit over the floors and bolted with ¾ in. (1.9 cm) diameter iron bolts through most of the floors and into the keel. Notching the keelson would have been time consuming for the shipwrights, but provides further evidence of the high quality craftsmanship of the schooner. A semicircular notch on the port side of the keelson aft of midships likely represents a cut for the pump well. There is no evidence of stanchion mortises on the top of the keelson, which would have acted as additional support for the deck (Sabick 2004: 101-102).

Nancy had two mast steps. The foremast step was a simple mortise cut directly into the keelson. As this area was heavily damaged and eroded, it was impossible to determine its dimensions. The mainmast step consisted of a large, semicircular saddle mast step type that was placed perpendicular to the centerline and notched to fit over the keelson just forward of the pump well (Figure 3-5). The mortise to take the squared off heel of the mast was cut into the top of the step and measured 13 in. (33 cm) wide by 5 in. (12.7 cm) long by 4.75 in. (12.1 cm) deep and did not pass completely through the timber. The main mast step was not secured in place, which may indicate that it was not in its original location (Sabick 2004: 102).



Figure 3-5: Image of *Nancy*'s mainmast step (Sabick 2004: 103).

The hull planking of the vessel averaged 2 in. (5 cm) in thickness and each strake was composed of two planks that varied in width from 6 to 10 in. (15 to 25 cm). It was fastened to the frames with 0.5 in. (1.3 cm) diameter iron spikes, although it is suggested that treenails were originally used as fasteners. The external planking contained numerous repairs, which suggests that the vessel was somewhat old at the time of its sinking. The ceiling planking is well

preserved and averages 1.5 in. (3.8 cm) in thickness and 7 to 9 in. (17.8 to 22.9 cm) in width. It was attached with iron spikes that measured 0.5 in. (1.3cm) in diameter. Four limber boards were present along each side of the keelson. These were not fastened to the floors to allow access to the bilge for cleaning. The ceiling planking does not show evidence of repair or patching (Sabick 2004: 104-105).

Nancy was fitted with an elaborate figurehead depicting a lady dressed from the waist up in then current fashion with a hat and feather. It was made by a carver in New York and shipped to Detroit (Sabick 2004: 23). The figurehead indicated the name of the vessel in non-verbal terms and demonstrated the wealth and status of the owner since it was not a functional piece but purely ornamental.

Nancy was a typical Great Lakes merchant vessel with a shallow draft to maneuver through shoal waters into ports. The hull's shape emphasized carrying capacity and stability under sail rather than speed, demonstrated by the bluff bow and rather flat floors. It was later armed with cannon, when it was pressed into service by the British, and the hull shows evidence of the reinforcement required for this purpose. The vessel was well built with good quality timber and high quality craftsmanship as evidenced by the fact that *Nancy* traveled the Great Lakes for 25 years, with a long career as a merchant vessel and ending as a naval vessel.

The Southampton Beach Wreck (*General Hunter*)

In 2001, low lake levels and a heavy spring ice scour uncovered about a dozen ship frames sticking up through the beach sand near Southampton, Ontario on the shore of Lake Huron. Excavations during 2001 and 2002 uncovered two adjacent wrecks, one of which was a small work barge from the late 19th century, and the other was a two masted ship from the early

19th century, later identified as HMS *General Hunter*. In 2004, the *General Hunter* was completely excavated and recorded (Cassavoy 2005: 2).

Master builder William Bell built *General Hunter* in the Navy Yard for the Upper Great Lakes at Fort Malden, Amherstburg, in 1805 or 1806. Historical references indicate that the vessel was designed to be 54 ft. along the keel, 18 ft. in breadth, of 70 to 74 tons burden and to carry up to 10 guns. Early references describe the vessel as schooner rigged; but by the War of 1812, it was rigged as a brig. The vessel was named after Peter Hunter, late commander of the British forces and Lieutenant-Governor of Upper Canada (1799-1805). After its launch in 1806, *General Hunter*, armed with six cannon, joined service with the Provincial Marine squadron engaged in transport and patrol of the upper lakes. In 1810, the ship *Queen Charlotte* replaced the *Earl of Camden*, thus leaving *General Hunter* as the only naval vessel with a shallow enough draft to clear the shallows of the St. Clair River and enter Lake Huron (Cassavoy 2005: 76).

During the War of 1812, *General Hunter* took part in several actions on Lake Huron and Lake Erie. On 10 September 1813, the British were defeated at the Battle of Lake Erie and the Americans gained command of all the British vessels on Lake Erie. The British vessels likely remained idle for the duration of the war, although *General Hunter* possibly participated in the failed American attempt to retake Fort Mackinac on 4 August 1814 (Cassavoy 2005: 77).

After the war, *General Hunter* was sold by the U.S. Army to John Dickson of Presque Isle (present day Erie), Pennsylvania on 8 July 1815. The vessel's name was shortened to *Hunter* and, for the remainder of the summer it made at least three or four voyages between Buffalo, Detroit, and Mackinac carrying private merchandise and American military stores and troops. At some point in the late fall or early winter of 1815, the U.S. Army purchased *Hunter* for use as a transport vessel. In the spring and summer of 1816, the vessel transported military supplies,

troops and passengers to Mackinac. It was on a return voyage from Mackinac to Detroit that *Hunter* was caught in a severe storm, blown across the lake to the vicinity of the Saugeen River, and wrecked on the shore of Lake Huron on 19 August 1816 (Cassavoy 2005: 77, 80).

The remains of *General Hunter* consist of the full length of the keel, preserved to a total length of 53 ft. 10 in. (16.41 m) (Figure 3-6). The starboard side is preserved to the turn of the bilge in some sections, while the port side is not as well preserved. At the midship frame, the width is 16 ft. 10 in. (5.14 m). The exterior of the vessel was not excavated except near the stern. The keel was molded 15 in. (38.1 cm) and sided 10 in. (25.4 cm). The keel was not notched for the frames (Cassavoy 2005: 27).



Figure 3-6: The exposed hull of *General Hunter* on Southampton Beach (From <http://www.chantryisland.com/Summary%20Weazel%20March%202nd,%202004.htm> Accessed September 2008).

Framing consisted of square frame pairs in the hull and cant frames in the bow. The vessel had 24 frame sets, 10 forward of the midship frame, and 13 aft of it. The frames were spaced an average of 25 in. (60 cm) apart on their centers with a 5 to 6 in. (12.7 to 15.2 cm) in between. The frames varied in size from 6 to 7 in. (15.2 to 17.8 cm) molded and 8 to 10 in. (20.3 to 25.4 cm) sided. The first futtocks were attached to the floors with treenails that were driven sideways, indicating that the frames were likely assembled prior to lifting them into place on the keel. The first futtocks started approximately 9 in (22.9 cm) away from the keelson edge. A rough, split piece of wood was used as a spacer between the frame sets along the top of the keel and keelson, which were left in place during construction and found *in situ*. The first futtocks were located on the aft side of the floors aft of the midship frame, and forward of the floors forward of the midship frame. The keelson was notched in. (1.9 cm) to fit over the frames and measured 10 in. (25.4 cm) sided and 7.5 in. (19 cm) molded. Only every second frame set was secured with two iron drift bolts driven down through the keelson (Cassavoy 2005: 27, 34, 36).

Up to 7 ceiling plank strakes remained on the port side, and 10 strakes on the starboard side. The ceiling planks varied in size; the widest strake measured 13 in. (33.2cm) wide, and the longest plank was 29 ft. 9 ½ in. (9.1 m). On average the ceiling planks measured 2 in. (5 cm) thick. Many of the joints between the planks were still tight and uniform. The limber boards and first ceiling planks were beveled to facilitate easy lifting, and fit tightly when in place. The limber boards measured 1 ¾ in. (4.4 cm) thick and had notches cut out so that they could easily be lifted out. Sections of the exterior planking that could be measured were between 2 to 2 ½ in. (5-6.3 cm) thick. Atop the ceiling planking on the portside was a breasthook made from compass timber (Cassavoy 2005: 36). A rectangular burned area on the ceiling planking near the foremast

was located on the starboard side. What resembled parts of a stove were also located in this area, indicating that the stove was located in this area (Cassavoy 2005: 29).

Two mast steps were located along the keelson of the vessel. The foremast consisted of a simple mortise cut into the keelson, which showed evidence of breakage and erosion. The main mast consisted of a saddle type mast step that was notched over the keelson and held in place with two large blocks (Figure 3-7). The two blocks were spiked into place with two round, and three square spikes. The step itself was not fastened to the keelson, which would have allowed for easy repositioning of the step for location or angle of the mast (Cassavoy 2005: 29-30).

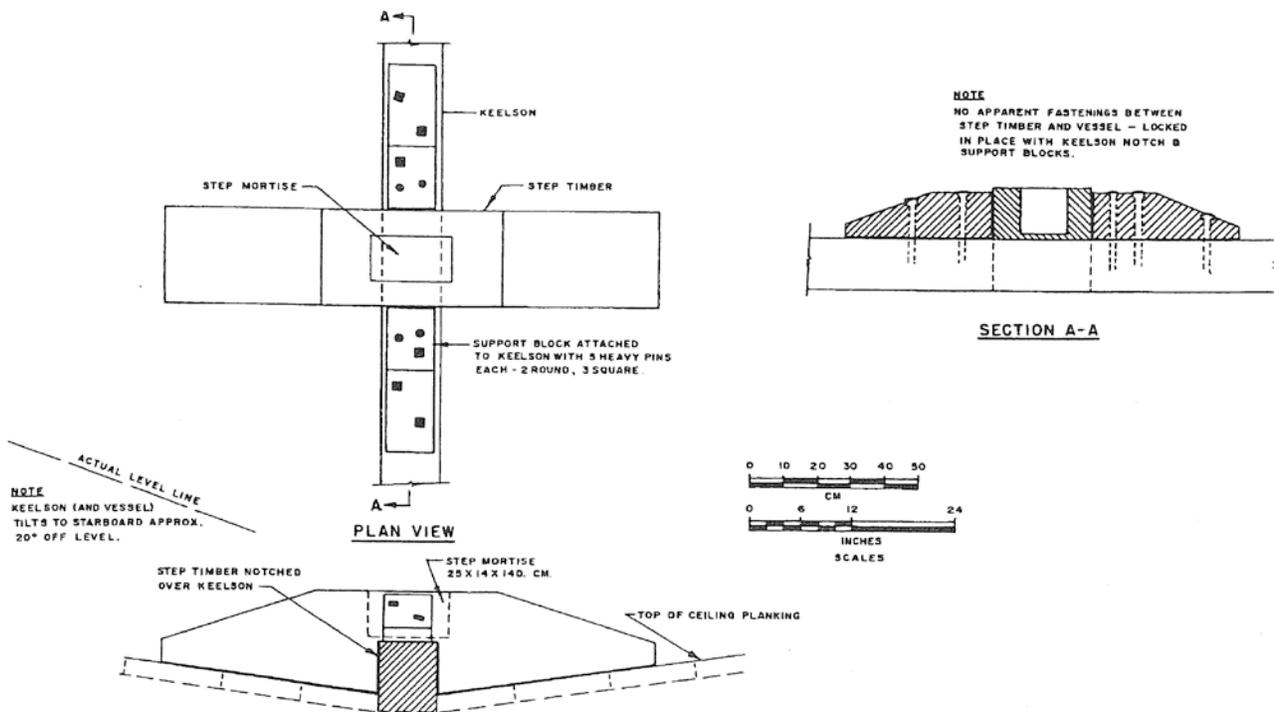


Figure 3-7: Saddle-type mainmast step of *General Hunter* that is held in place with two blocks (Cassavoy 2005: 30).

Excavation on the exterior of the vessel did not reveal the rudder or any of the associated hardware. Exterior excavations revealed Roman numeral draft marks located on both the stern and stem posts. They were located only on the port side on the stempost and the starboard side on the sternpost. Several types of fasteners were observed throughout the vessel, but the mitigative nature of the excavations did not allow time for determining their pattern. An assortment of iron nails, iron bolts, and trenails were employed (Cassavoy 2005: 38-39).

Great care and attention to detail was employed in the construction of *General Hunter*. This is demonstrated in the time consuming labor of notching the keelson to fit over the floors and the use of trenails for fastening the vessel. The craftsmanship of the shipwright is noted in the fact that the joints between the planks were still tight and uniform nearly two hundred years later. The use of limber boards to access the bilge water ensured that water would not pool in the hull and cause rot. All of these factors indicate that the vessel was intended to have a long career on the upper lakes.

Hamilton (Diana) and Scourge (Lord Nelson)

The *Lord Nelson*, later named *Scourge*, was a merchant vessel constructed in Niagara, Ontario and launched 1 May 1811 (Cain 1983: 36). While shipping goods across Lake Ontario, the schooner was stopped by U.S. Navy Lieutenant Woolsey. Upon suspicion of smuggling goods from the States to Canada, the schooner was confiscated and eventually ended up in the American fleet at Sacket's Harbor (Cain 1983: 54-55). The *Diana*, later renamed *Hamilton*, was a merchant schooner built at Oswego, NY in 1809 (Cain 1983: 27). On 12 October 1812, the schooner was purchased by the U.S. Navy for service in the Lake Ontario squadron (Cain 1983: 65). The converted merchant ships had their bulwarks raised and heavy guns added, making them very top heavy vessels. The heavy weight of these guns ultimately led to their sinking

during a squall near present day Port Dalhousie, Ontario on 7 August 1813 (Nelson 1983: 290). The account of the night was later recorded in detail by one of the survivors, Ned Myers (Cooper 1843).

During the night, both the British and American fleets anchored near Twelve Mile Creek on the British side of the Niagara River. Myers reported that the British fleet was “so near, indeed, that we could almost count their ports...Our object was to get together lest the enemy should cut off some of our small vessels during the night” (Cooper 1843: 78). As mentioned earlier, it was not the British that caused the loss of the two American schooners that night, but a severe and sudden squall. Myers recalled that “a flash of lightening almost blinded me. The thunder came the next instant, and with it a rushing of winds that fairly smothered the clap” (Cooper 1843: 81). The *Hamilton* and *Scourge* both foundered in this unexpected squall. Only sixteen crewmembers from these ships survived.

Searches for both wrecks began in 1971 by Dr. Daniel Nelson, an avocational archaeologist from St. Catharines, Ontario, using the logbook of HMS *Wolfe* to pinpoint the location. In 1972, magnetometer and side-scan sonar searches were conducted, and likely targets were revealed in 1973. In 1975, researchers used deep-tow side-scan sonar to gain the first views of the vessels, upright on the lakebed with their masts still intact, as if they had peacefully floated to the bottom (Cain 1983: 130-131). The Royal Ontario Museum (ROM), which had collaborated with Dr. Nelson in the search for the schooners, persuaded the U.S. Navy to sign over the rights of the vessels in 1979. For the rights, the ROM agreed to study the wrecks with the goal of determining if they could be raised and displayed. Also, any human remains uncovered would be returned to the United States. These are the only U.S. naval vessel that have been released from American ownership. After a few months, the ROM gave responsibility of

the vessels to the City of Hamilton. In the early 1980s, Jacques Cousteau, and then National Geographic filmed the schooners, bringing a great deal of publicity to the wrecks. This publicity led John Lehman, American naval secretary at the time, to offer to help raise the wrecks in exchange for the *Hamilton* and its artifacts (Cain 1983: 131-132). The City of Hamilton declined and, until recently, no detailed archaeological studies have been conducted.

In the past decade, evidence has been uncovered that divers have recently been visiting the site (Moore and Keyes 2009: 148). Diving visitation was not a problem at the time of discovery, as they lay in 300 feet of water, well beyond the range of sport diving equipment, but modern technology has now allowed divers to explore these underwater graves. The City of Hamilton has installed a radar system to warn against unauthorized divers; however, with sophisticated breathing apparatus, this system can be eluded and these sites are now in danger of being looted. These wrecks are the most complete and intact examples of converted merchantmen on the Great Lakes. As such, they are extremely significant sites.

In 2008 and 2009, a site condition survey was conducted of the two wrecks, initiated by the City of Hamilton working with Parks Canada and other partners. A remotely operated vehicle (ROV) was utilized to inspect the ships for quagga and/or zebra mussel growth and to carry out further archaeological recording (Keyes and Moore 2009: 129; Moore et. al. 2011). In preparation for the ROV survey, two multi-beam sonar surveys were conducted by the Canadian Hydrographic Service in 2004 and 2005. Parks Canada conducted a week long side scan sonar survey in 2007. The aim of these surveys was to obtain more images of the wrecks and their debris fields to support planning for the ROV inspection (Harris et al. 2009: 141-143).

The original construction of the *Diana* and *Lord Nelson* and their conversion into the United States Navy armed schooners *Hamilton* and *Scourge* are poorly documented in the

historical record. Information about their construction, including lines plans, construction drawings and contemporary images are lacking. Some historic documents do provide glimpses of their construction, for instance an account book for the building of *Lord Nelson (Scourge)* and first hand operations of the *Scourge* by Ned Myers (Cain 1985; Cooper 1843). The 2008 site survey collected data that was used to determine the dimensions of both the vessels and to create a preliminary scaled site plan, unlike the previous not to scale rough sketched site plans (Lockhart et al. 2009).

During the 2008 survey, the ROV was only able to obtain interior views from the forward hatch of *Scourge*, since the aft hatch was blocked by fallen pikes. Views of the deck beam stanchions, the riding bitts, and the base of the foremast were observed from the forward hatch. A great deal of damage was evident since the last ROV dives in 1990. Damage was observed on the starboard stern quarter and at the transom where planking has separated from the counter timbers. The iron bowsprit cap has broken and the jib boom has separated from the vessel and lies on the lakebed (Moore and Keyes 2009: 152-153). Both dual-axis and sector sonar scans were conducted in order to accurately map the two wrecks. The length of *Scourge* from the taffrail to the knightheads was determined to be 57.4 ft. (17.5 m). The overall length of the vessel could not be determined since the jib boom had separated from the rest of the vessel, and the end of the bowsprit was not captured in the scans. The maximum breadth at deck level was measured at 14.4 ft. (4.4 m), the midship breadth at 13.1 ft. (4 m), and the stern breadth at 12.8 ft. (3.9 m). The distance from the foremast to the bow was 10.8 ft. (3.3 m), the distance between the two masts 21.3 ft. (6.5 m), and the distance from the mainmast to the stern was 25.6 ft. (7.8 m). Interior deck beams were visible at the stern of the vessel through the stern gallery windows and were spaced 1.6 ft. (0.5 m) apart (Lockhart et al. 2009: 177-178).

Video and photos of *Scourge* reveal that the planks are mostly intact and the hull appears to be in good condition, except for the transom. However, the dual-axis sonar data revealed that there is some warping of the hull as it is twisted from bow to stern. Furthermore, the sonar data revealed that the starboard bow bulwark was slightly caved in. This may have been caused during the wrecking, and is not observed below the bulwarks. The bulwarks were part of the modification of the merchant vessel to a warship, and video from 1982 suggests that they were roughly constructed. By comparing the 2007-2008 data with previous site plans, it is clear that these two schooners are smaller than previously believed (Lockhart et al. 2009: 178-179).

ROV inspection of *Hamilton* revealed that mussels now covered almost all of the surfaces of the vessel, more heavily on the horizontal surfaces and the ordnance. Interior video footage was taken at the open aft hatch and the forward hatch. At the aft hatch, a transverse bulkhead dividing the stern cabin was observed, which had two openings leading forward. At the foot of the ladder was a rack of approximately 10 muskets resting in place. Also a possible berth or low stowage box was seen against the starboard hull. Much of the cabin was filled with sediment and some mussel occupation; therefore, other interior features could not be distinguished. Through the forward hatch opening, two wooden steps nailed to a deck beam stanchion were observed. Some indistinct components of the lower hull could be seen projecting from the silt (Moore and Keyes 2009: 150-151). The sector-scan images revealed that *Hamilton*'s determined length from the taffrail to the knightsheads measured 65 ft. (19.8 m) in length. The midship breadth measured 18.7 ft. (5.7 m) and the stern breadth 15.7 ft. (4.8 m). The distance from the mainmast to the stern measured 30.2 ft. (9.2 m). Determined length for *Scourge* was 57.4 ft. (17.5 m), measured from the taffrail to the knightshead. The midship

breadth measured 13.1 ft. (4 m). The distance from the mainmast to the stern measured 25.6 ft. (7.8 m) (Lockhart et al. 2009: 177-8).

Both vessels demonstrated elaborate figureheads that embellished their bows. *Scourge* (originally *Lord Nelson*) displayed the striding figure Admiral Horatio Nelson on the prow of the vessel (Figure 3-8). Nelson died at the Battle of Trafalgar in 1805 and was the most celebrated contemporary naval hero. Although it was a well-known fact that Nelson lost his right arm in 1797, the figurehead was depicted with both arms. The striding pose of the figurehead is common in the 19th century (Cain 1983: 55). The figurehead of *Hamilton* (originally *Diana*) represented the classical goddess of the hunt and motherhood, Diana. On her left side, the goddess is portrayed with only her quiver and its strap, while she is portrayed in Empire dress on the right. Her hairstyle is suggestive of an ancient warrior's helmet. Partially-clad goddess figureheads were common throughout the 19th century, though typically in classical rather than contemporary dress (Cain 1983: 40).



Figure 3-8: Figure of Lord Horatio Nelson on the prow of the *Scourge* (originally *Lord Nelson*) (Cain 1983: 55).

Since in depth archaeological recording of these wrecks has not been completed due to the limiting factors of their location, it is difficult to determine their specific construction details and techniques. It is clear from their excellent preservation more than two hundred years later that they were sturdy and well-constructed vessels. Desire for ornamentation on these vessels demonstrates that attention to detail was important to the owners of the vessels and that these were schooners that were intended for use over a considerable length of time. These vessels do present a remarkable understanding of what merchant craft at this time resembled since they remain intact. It is possible to understand their modification from merchant vessels to warships by observing the addition of the upper works and deck layout of these two vessels. Further study of these two vessels will yield a great deal of information about merchant craft from the early 19th century.

Pre-War of 1812 Vessel Attributes

The Anglo-American vessels built in North America from the late eighteenth and early nineteenth century demonstrate differences between freshwater and ocean going vessels as well as merchant and naval vessels through their hull shapes and construction techniques. *Defence* exhibited a very sharp design, with a V-shaped entrance forward. This was critical in its role as a privateer, where speed was essential. The other vessels operated on the inland lakes where a shallow draft was advantageous for navigating the shoals of the lakes. These vessels displayed flat floors that reduced their draft at the expense of speed. While speed may have been desired in the warship *Boscawen*, the ability to duck into shallow harbors was of greater value. For the merchant vessels *Nancy*, *Lord Nelson*, *Diana*, as well as *General Hunter*, whose primary role in the Provincial Marine was that of a transport vessel, the full shape of their hulls allowed for increased hold space for transporting goods, and stability, which were more important than

speed. These vessels also demonstrated very bluff bows, which allowed for more cargo capacity at a reduction in speed. The following table presents the features of the wrecks that have been discussed in order to compare their various characteristics. The label ‘unknown’ in the table indicates that this information was unavailable due to lack of investigation and/or excavation, while the term ‘not listed’ indicates that that information was not supplied in the report.

Pre-War of 1812 ship construction demonstrates deliberate craftsmanship, the use of good quality timber, and attention to detail in construction. The majority of the vessels’ framing components appear to have been carefully fashioned from strong white oak. White oak’s physical properties made it a favored timber for ship construction. The wood is heavy, hard, strong and durable. Oak has large rays that prevent it from shrinking radially during seasoning, meaning that it will only shrink slightly and warping should be negligible. The wood holds fasteners well; but, it is known to react with iron, meaning that iron fasteners may be disadvantageous due to tangential shrinking (Mitchel 1994: 84). Shipwrights in North America during this period benefitted from the advantage of sizeable untouched forests, and an abundance of good quality timber, allowing them to build sturdy vessels, unlike British shipwrights who were already experiencing the depletion of English forests (Hall 1884: 243).

Table 1: Characteristics of Pre-War of 1812 Vessels

	<i>Boscawen</i>	<i>Defence</i>	<i>Nancy</i>	<i>General Hunter</i>	<i>Hamilton</i>	<i>Scourge</i>
Date	1759	1779	1789	1805 or 1806	1809	1811
Nationality	British	American	British	British	American	British
Vessel function	Warship	Privateer	Merchant, converted warship	Provincial Marine	Merchant, converted warship	Merchant, converted warship
Length overall	Not listed	72 ft.	68 ft.	Not listed	65 ft.	57.4 ft.
Beam	Not listed	22 ft.	22 ft.	18 ft. (historical sources)	18.7 ft.	13.1 ft.
Keel length	65 ft.	Not listed	59 ft. 9 in.	53 ft. 10 in. (preserved length)	Unknown	Unknown
Keel molded	14 in.	8 in.	12-14.75 in.	15 in.	Unknown	Unknown
Keel sided	10.5 in.	14 in.	8-9.5 in.	10 in.	Unknown	Unknown
Keel wood type	Oak	Oak	Oak	Not listed	Unknown	Unknown
Keel notched	Not listed	Yes	Apron, stem and stern deadwood notched (floors notched to fit over keel)	No	Unknown	Unknown
Keelson length	53 ft.	Not listed	53 ft.	Not listed	Unknown	Unknown
Keelson molded	6 in.-10 in.	8 in.	12 in.	7.5 in.	Unknown	Unknown
Keelson sided	10 in.-11 in.	11.5 in.	9 in.	10 in.	Unknown	Unknown
Keelson wood type	Oak	Oak	Oak	Not listed	Unknown	Unknown
Keelson notched	No	No	No	Yes	Unknown	Unknown
Floor avg. molded	12 in.	8-15 in.	7.5-9 in.	Not listed	Unknown	Unknown
Floor avg. sided	5-10 in.	Not listed	8-9 in.	Not listed	Unknown	Unknown
Futtock avg. molded	7-10 in.	8 in.	8 in.	6-7 in.	Unknown	Unknown
Futtock avg. sided	4-8 in.	8 in.	8 in.	8-10 in.	Unknown	Unknown
Frame spacing	Various	5 in.	5-9 in.	5-6 in.	Unknown	Unknown
Frame wood type	Oak	Oak	Oak, red cedar	Not listed	Unknown	Unknown
Frames notched	No	No	Yes	No	Unknown	Unknown
External planking thickness	2 in.	2-2.5 in.	2 in.	Not listed	Unknown	Unknown
External planking wood type	Oak	Oak	Not listed	Not listed	Unknown	Unknown
Ceiling planking thickness	2 in.	Not listed	1.5 in.	2 in.	Unknown	Unknown
Ceiling planking wood type	Oak	Oak	Not listed	Not listed	Unknown	Unknown
Number of masts	One	Two	Two	Two	Two	Two
Mast step type	Saddle type	Simple mortises	Fore mast: simple mortise Main mast: saddle type	Fore mast: simple mortise Main mast: saddle type	Unknown	Unknown
Compass timbers	Yes	Yes	Yes	Yes	Yes	Yes
Fasteners	Iron, treenails	Iron, treenails	Mostly iron, some treenails	Iron, treenails	Iron	Iron

White oak's elasticity also made it an ideal wood for the construction of frames and other curved timbers; likewise, it provided a large quantity of both straight and compass timbers (Mitchel 1994: 84). The use of compass timbers is seen throughout these vessels for various strengthening timbers such as the stern knee on *Boscawen*; the floors on *Defence*; the frames, sternpost, and apron on *Nancy*; and the breasthook on *General Hunter*. It is likely that compass timbers were also employed in the construction of *Lord Nelson* and *Diana*. The use of treenails alongside iron fasteners in the construction of *Boscawen*, *Defence*, *Nancy*, and *General Hunter* ensured tight fitting joints, since treenails swelled when wet. This also indicates care in construction, since they were time consuming to shape and install. Further study of *Lord Nelson* and *Diana*, including wood species analysis, may show that oak was utilized in their construction and that treenails were also employed on these schooners.

The merchant vessels *Nancy*, *Lord Nelson* and *Diana* as well as the privateer *Defence*, all demonstrated additional craftsmanship in the form of ornamental details such as decorative trim and figureheads. The Provincial Marine vessel *Earl of Moira* launched from the Kingston naval yard in 1805, was also planned to carry an elaborate figurehead that depicted the vessel's namesake, a prominent British soldier and government official, pointing the way with a telescope in hand. Several different views of the figurehead were drawn and proposed; however, it is uncertain if the ornamentation ever adorned the bow (Malcomson 2001:50). These details were unnecessary additions for the sailing qualities of the vessels; however, they did serve to easily identify a vessel. Chiefly, these ornamentations to the vessels demonstrate the pride that the original owners had for their vessels and the craftsmanship of the builders.

The size and shape of the keel would have influenced a vessel's sailing ability. A deeper keel would have prevented lateral draft, while a shallow keel would have allowed for access to

shoal waters (VanHorn 2004: 178). As expected of an ocean going vessel, the *Defence* demonstrated the deepest keel, although somewhat narrow. The *Boscawen*, *Nancy*, and *General Hunter* were all vessels that sailed on the inland lakes. Likewise all had keels of similar dimensions. These keels were deeper than they were wide, which may have improved their sailing qualities despite shallow drafts expected of vessels of the inland lakes. *Nancy*'s keel was slightly smaller, which may be accounted for by travel within the shallows of Georgian Bay. The shallow draft of *General Hunter* is important, considering it was the only naval vessel with enough clearance to cross the shallows of the St. Clair River and enter Lake Huron at the time of its construction. Typically the keels of these vessels were made from one or two timbers, and evidence from *Nancy* and *Boscawen* of the use of fishplates to secure the stem and keel joint suggests that this method was employed in both merchant and naval contexts.

The average size of the frames was comparable between the vessels, although the floors of *Boscawen* were slightly larger, and the futtocks of the *General Hunter* were slightly larger. The frame spacing, on average, was a minimum of 5 in. distance, while the largest spacing was up to 9 in. *Boscawen* demonstrated an unusual framing pattern: the futtocks were not joined to the floors to create continuous frames, rather they were secured to the external planking with spaces of up to 10 in. between the floors and first futtocks, continuing on with the second futtocks. On *Defence*, mold frames were placed evenly along the keel, but half frames and futtocks were employed as intermediate frames. *Nancy* demonstrated articulated timbers at every third frame, with filler futtocks located between them. *General Hunter* demonstrated double frames throughout the hull of the vessel. *Boscawen* had definite mold frames that were placed every fourth frame. Both *Nancy* and *General Hunter* demonstrated cant frames in the bow. *Boscawen* employed the use of cant frames in both the bow and stern sections of the vessel.

The keelsons of these vessels generally measured approximately the same dimensions as that of the keel, or slightly smaller. In the case of *Boscawen*, the keelson was not as wide as the keel, but just as thick. The keelson of *Defence* was the same width as the keel, but not as thick. The keelson of *Nancy* was smaller in both dimensions than its keel. In the case of *General Hunter*, the keelson was just as wide as the keel, but half the thickness.

Notching of the keel, floors, or keelson was a labor intensive process; however, it ensured additional strength and stiffness in the hull. The first major treatise on ship construction during the eighteenth century was completed by William Sutherland, a Master Carpenter for the Royal Navy. Although his experience was with naval vessels, the treatise was intended for shipwrights of naval and merchant craft alike. His third essay, on marine architecture, indicated that the keelson should be notched to fit over the floors and bolted through every other floor (Sutherland 1711: 26). Evidence from colonial contexts in the late eighteenth to early nineteenth centuries indicates that, while notching was considered important for strengthening the hull, shipwrights did not necessarily follow convention. Notching of the keelson over the floors is only demonstrated on *General Hunter*, whereas the keel of *Defence* was notched to accept the frames. While the apron and deadwood of *Nancy* were notched for the floors, it was the floors themselves that were notched to fit over the keel. Neither the keel nor keelson of *Boscawen* demonstrated notching to secure the frames. It is interesting to note that this purposely built British warship did not follow Sutherland's treatise. This may be due to the short amount of time in which the vessel was constructed and similarly coincides with the unusual frame construction method.

Mast steps on these vessels consisted of either a simple mortise cut directly into the keelson or athwarships 'saddle type' step. The simple mortise cut mast step was employed as a

forward mast step on *Nancy*, *General Hunter*, and the fore and main mast steps on *Defence*. This type of mast step appears to be typical of small to medium sized vessels constructed during the mid- to late-18th century. One of the problems associated with this type of mast step was that it significantly weakened the keel of the vessel. The Reader's Point vessel, a pre-1765 sloop excavated in Jamaica, demonstrated a longitudinal crack in the keelson at the location of the mortise cut mast step that was repaired with a reinforcement timber and two sister keelsons (VanHorn 2004: 193). The oak chocks located on either side of both mast steps on *Defence* may have been pre-emptive measures, as the shipwrights may have been aware of the strain that the mast would put on the keelson. The forward mast step on *Nancy* was severely damaged; this may have been from use during the vessels career or from poor preservation.

The saddle type mast step represents a stronger step type since the wood grain ran perpendicular to the forces placed on the mast and it did not compromise the strength of the keelson itself. VanHorn suggests that this type may represent a later development in mast step construction (2004: 195). Saddle mast steps were employed as the main mast step on *Nancy*, *General Hunter*, and the single mast step on *Boscawen*. Another advantage of this type of mast step was that it could easily be repositioned since it was secured to the keelson with bolted chocks on either side.

Construction shortcuts in the design and assembly of *Boscawen* and *Defence* may be indicative of their purpose as warship and privateer, which ensured that the vessels were launched quickly to compensate for their potential loss. *Boscawen* demonstrated varying size and spacing of frames, an unusual frame assembly method, and roughly hewn deck beams and frames. *Defence* exhibited irregularly spaced frames and fastener patterns and a lack of finishing on the floors and futtocks.

The construction details of these vessels indicates that their purpose dictated the amount of care and precision that was employed in their creation. Merchant vessels were intended for many years of service and so were built with good quality timbers and attention to detail. The warship *Boscawen* and privateer *Defence* were constructed quickly in order to be launched in a short time, but the short cuts exhibited did not compromise the strength of the vessels. All of these vessels exhibited traditional English ship building techniques and benefited from the ample forests of North America with the abundance of preferred white oak and compass timbers.

CHAPTER 4 : WAR OF 1812 VESSELS

During the War of 1812, the North American theater of war was determined by the geography of the region. Much of the fighting in the north primarily took place along the Niagara frontier and later along the St. Lawrence River. From the outset, both the Americans and British realized that gaining the upper hand in the conflict depended upon control of the Great Lakes. Crucial to achieving ascendancy upon the Great Lakes was the development of a significant and powerful inland navy. By necessity, this had to be built in place, as ships could not be brought in from the Atlantic due to the shallows and rapids along the St. Lawrence River. This led to a shipbuilding race on both shores in a region where supplies were not always guaranteed, since they needed to be transported from the eastern seaboard. In addition, the Royal Navy and U.S. Navy converted and upgraded for use some earlier commercial ships. The isolation of the Great Lakes from the ships of the Atlantic, the different sailing requirements of the lakes, and the shortage of supplies led to the development of some unique and innovative ship construction techniques.

Archaeologically documented warships from the War of 1812 period include the U.S. Brig *Eagle* (Crisman 1987) and HMS *Linnet* (Washburn 1996 and 1998) on Lake Champlain; U.S. Brig *Jefferson* on Lake Ontario (Crisman 1989); HMS *St. Lawrence* (Moore 2006), HMS *Prince Regent* (Moore 2006), and HMS *Princess Charlotte* (Moore 2006; Walker 2006) have been identified and studied in the Kingston area of Lake Ontario.

U.S. Brig *Eagle*

The U.S. brig *Eagle* was built by New York shipwrights Adam and Noah Brown at Vergennes, Vermont as part of Thomas Macdonough's Lake Champlain fleet during the War of 1812. The brig was constructed in record time in a frontier region where supplies were often

unavailable. The hull was launched 19 days after the keel was laid on 11 August 1814 with the name *Surprise* (Crisman 1987: 42). On 6 September 1814, the name of the brig was changed to *Eagle* (Crisman 1987: 61). In the Battle of Plattsburgh (11 September 1814), the brig played a major role in the decisive victory over the British fleet. After the war, the brig, along with the rest of the Lake Champlain fleet, was laid up in ordinary at Whitehall, New York. The vessels were in such a poor state of preservation that the Board of the Navy Commissioners declared the Lake Champlain squadron unworthy of preservation on 20 January 1821. On 13 September 1825, the Navy sold the squadron for \$6,632.83, likely to merchants or shipbuilders to salvage the iron fittings from the hulls. *Eagle* likely sank not long after its sale to the salvors (Crisman 1987: 105-110). The brig was rediscovered on the bed of the Poultney River in the Champlain Valley between New York and Vermont on 23 July 1981, along with the remains of the U. S. row galley *Allen* and HMS *Linnet* (Crisman 1987: 117-118). Three consecutive years of fieldwork (1981-1983) and historical research provided a great deal of information for reconstructing naval design and construction from this period.

The keel of *Eagle* was composed of three timbers that were flat scarfed together for an overall length of 106 ft. 5 in. (32.43 m) and averaged 18 in. (45 cm) molded and 12 in. (30 cm) sided. Flat scarfed to the stempost was a timber of hard maple that measured 37 ft. (11.2 m) in length, and at the extreme forward end, it was sided 8 in. (20.3 cm). The remainder of the keelson measured 78 ft. (23.7 m) and was covered by several feet of mud. It was determined from wood species analysis that this part of the keelson actually consisted of two separate timbers; the central timber was of hard maple and the aft timber of white oak. The aftermost 24 ft. 8 in. (7.5 m) of the keel was molded only 10 in. (25.4 cm) as it was cut down for the lowest deadwood timber. The keel timbers were fastened together with iron fish plates and drift bolts.

There were four pieces of stern deadwood, the lowest of which measured 23 ft. (7 m) in length. The white oak timber was molded 14 in. (35.5 cm) at its forward end and increased to a maximum height of 19 in. (48.2 cm). It was sided the same dimensions as the keel: 12 in. (30.4 cm) at its forward end that tapered to 8 in. (20.3 cm) at its after end. The keel rabbets extended onto each side of the lowest deadwood timber and gradually rose where it met the sternpost. The second deadwood timber was 13 ft. (3.9 m) in length, molded 13 in. (33 cm), and sided 10 in. (25.4 cm) at its forward end, narrowing significantly at the aft end directly above the rabbet. The third and fourth deadwood timbers were wedges that angled upward from the keel to the sternpost. The four deadwood timbers were fastened to the keel and sternpost by several iron drift bolts driven in from above. Round wooden plugs filled the drift bolt holes on the after end of the sternpost. The sides of the deadwood timbers were notched to receive the heels of the futtocks and half frames (Crisman 1987: 141).

The stempost assembly consisted of three components: an inner and outer stempost, of which the lower 10 ft. (3 m) remained; and the entire lower apron (Figure 4-2). The inner stempost consisted of a white oak compass timber that extended 12 ft. 6 in. (3.81 m). It was flat scarfed to the keel and fastened by drift bolts and a pair of iron fish plates. It was molded 6 in. (15.2 cm) at the after end of the keel scarf and 22 in. (55.8 cm) at the forward end of the keel. It was sided 8 in. (20.3 cm) on its forward surface and widened to 10 in. (25.4 cm) on its after surface. Two drift bolts at the top of the inner post indicated where the second inner stem timber was once located. The after corners of the inner post formed rabbets for the outer planking. The outer stempost was also of white oak and was fastened to the inner post by three 1 ¼ in. (4.4 cm) diameter drift bolts that were driven through the forward face of the post, that was further strengthened with a pair of iron fish plates at the lower end of the post. The outer stempost had a

maximum molded dimension of 12 in. (30.4 cm) and was sided 6 in. (15.2 cm) on the forward face and 8 in. (20.3 cm) on the after face (Crisman 1987: 138-139).

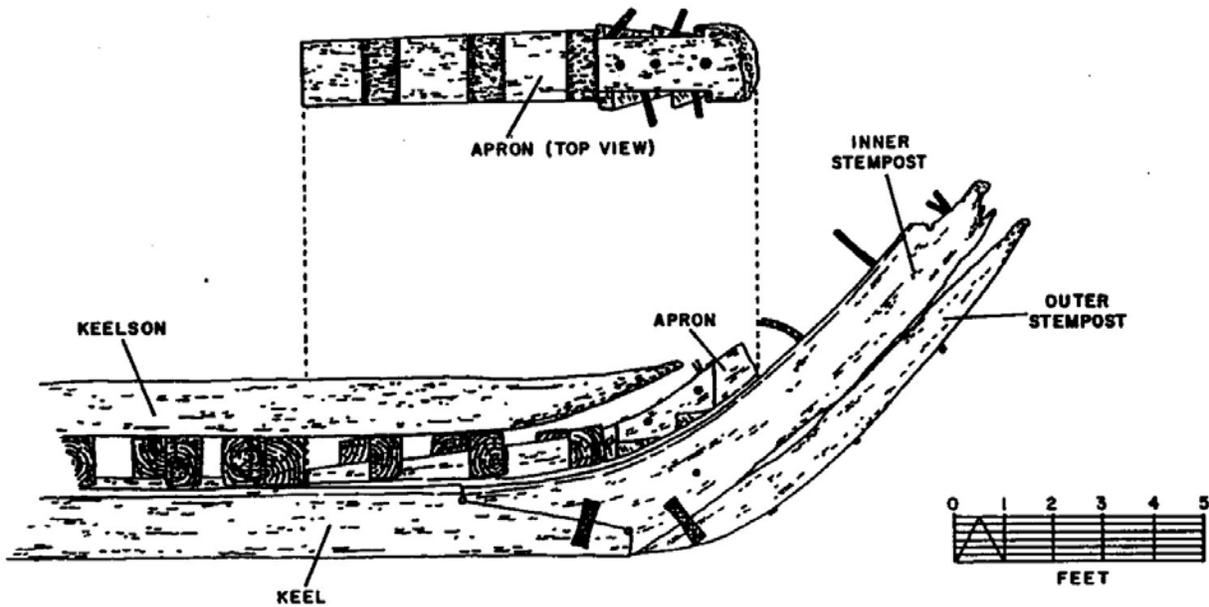


Figure 4-2: The stem of *Eagle* (Crisman 1987: 138).

The curved stem apron measured 9 ft. (2.7 m) in length and was carved to fit two cant frames as well as the port and starboard garboard strakes. It was molded 3 in. (7.6 cm) on its after end and widened forward to a maximum of 11 in. (27.9 cm). The aft 6 ft. (1.8 m) of the timber was notched on top to fit three floor timbers that were likewise notched on the bottom to form an interlocking join. The lower corners of the forward portion of the apron were sloped to form a rabbet that met that on the inner stempost. Iron bolts driven into the aft face of the upper portion of the inner stempost that protruded 15 in. (38 cm) indicated that a second apron timber originally existed above the first (Crisman 1987: 139).

A total of 55 frames were present on *Eagle*, in various states of preservation: two cant frames at the stem, 44 square frames, and 9 half frames at the stern. The floor timbers were fastened to the keel by an iron drift bolt that was usually offset from center in order to allow for

the drift bolt that would later d fasten the keelson, floor, and keel. The floors averaged 11 in. (27.9 cm) molded between the keel and keelson, 12 to 13 in. (30.4 to 33 cm) molded at the rabbet, to 10 in. (25.4 cm) at the end of the floor. The sided dimensions averaged between 8 and 10 in. (20.32 to 25.4 cm). From the keel centerline to the outermost end of the floor averaged 4 to 6 ft. (10.2 cm to 15.2 cm) in length. From the site plan, it appears that the frame spacing average about 6 in. (15.2 cm). The first futtocks had the same molded and sided dimensions as the floors and were fastened to them with 1 in. (2.5 cm) iron bolts. The heels of the first futtocks abutted over the centerline of the keel. The starboard first futtocks were broken off at the keel; however, the intact first futtocks on the port side averaged 11 to 12 ft. (3.3 to 3.6 m) in length, with two that survived to the level of the cap rail. Limber holes were cut into the floors and first futtocks of every frame (Crisman 1987: 142).

The second futtocks abutted the heads of the floors and were bolted to the first futtocks. These timbers averaged about 9 ft. (2.7 m) in length. The third futtocks were attached in a similar fashion to the second futtocks and averaged 10 to 11 ft. (3 to 3.3 m) in length. The heads of the third futtocks formed the tops of the frames. Top timbers, which averaged 7 to 8 ft. (2.1 to 2.4 m) in length, were added that abutted the heads of the second futtocks and were bolted to the third futtocks in order to complete the square frame assembly. The 17th floor timber aft of the stem was the midship frame. Frames forward of the midship frame were constructed with the first futtocks fastened to the after faces of the floor timbers, while frames aft of the midship frame were assembled with their first futtocks forward of the floors. Eight pairs of half frames were positioned into the sides of the stern deadwood. These frames were severely damaged on the port side, while only stumps remained on the starboard side (Crisman 1987: 143).

The white oak keelson was constructed of four timbers that were flat scarfed and extended from the apron to the uppermost stern deadwood. Its dimensions were 14 in. (35.5 cm) molded and 12 in. (30.4 cm) sided and was fastened to the frames and keel with 1 ½ in. (3.8 cm) diameter iron drift bolts on alternating frames. Care was taken by the shipwrights to drive the drift bolts through the floors and not the first futtocks. The foremast step was no longer present but represented by four bolt holes drilled into a rectangular pattern. Likely these secured a saddle type mast step. A similar arrangement was found for the mainmast step. Nine rectangular slots were also located along the top of the keelson between frames 1 to 8 for the stanchions posts to support the deck beams. They were between 2 in. (5.1 cm) and 4 in. (10.2 cm) wide, and ranged in length from 6 in. (15.2 cm) to 23 in. (58.4 cm). Each sloped in a forward or aft direction to a depth of about 1 in. (2.5 cm) (Crisman 1987: 147).

A large portside clamp was found that was composed of three or four flat scarfed timbers that extended 112 ft. 3 in. (34.2 m). The top of the clamp was notched to fit the ends of the deck beams. There was a large degree of variation in the spacing of the deck beams. Thirty notches for deck beams were counted on the port side; there were likely one or two more at the stem and stern which would account for a total of between 32 and 34 deck beams. The deck beams were not reinforced by lodging, hanging, or dagger knees. A waterway fastened the deck beam ends that survived to a length of 115 ft. (35 m) and was composed of four or five abutted timbers. The lower surface of the waterway was notched to fit over the deck beams. Bolts were driven from the top of the waterway through the deck beams and clamp. There was one bolt per deck beam (Crisman 1987: 149).

Most of the ceiling planking on the portside was intact. The limber boards were missing, but the space between the keelson and the first ceiling plank indicated that they measured 15 in.

in width. The first several ceiling planks consisted of wide, thin planks made from white pine that averaged 15 ft. (45 m) in length, 9 to 15 in. (22.8 to 38 cm) wide, and 1 ½ in. (3.8 cm) thick. Outboard of these first four to five planks were white oak planks that averaged between 7 and 17 ½ in. (17.7 to 44.5 cm) wide and 2 to 3 in. (5 to 7.6 cm) thick. These likely served as footwales, heavy planks that reinforced the frames at the turn of the bilge. The final three planks before the clamp consisted of long spruce or white oak timbers between 7 and 11 in. (17.7 to 27.9 cm) wide and 2 to 4 in. (5 to 10 cm) thick. A single spruce plank extended below the clamp. The ceiling planking was fastened to the frames with iron spikes (Crisman 1987: 156-157).

The external planking on *Eagle* was not accessible, as most of the portside planking was underneath the wreck and only five severely eroded starboard strakes could be analyzed. The garboard strake on the starboard side measured 13 in. (33 cm) wide and expanded aft to 15 in. (38.1 cm). Its inboard edge was carved to a point to fit into the keel rabbet. It measured 1 ½ in. (3.81 cm) thick, but likely originally measured closer to 2 in. (5 cm). The strake thickness of the external planking was taken from below the gunports, and measured between 3 ½ and 4 in. (8.8 cm to 10 cm) thick (Crisman 1987: 151, 155).

Suggestive of hurried construction were chocks, wedges, and other filler pieces that were added to compensate for insufficient molded or sided dimensions. Many of the frame timbers were unfinished, with edges or entire faces that were the original tree surface. Other evidence of hasty construction included some interesting shipbuilding shortcuts. These included frame 26, that combined the floor timber and first futtock in one piece as a means of saving time and timber (Crisman 1987: 146). The frames were constructed of an assortment of different types of wood including white and red oak, American elm, white ash, American chestnut, white pine and spruce, which also serves to indicate the hasty construction since hard woods were not the only

type chosen (Crisman 1987: 146). These shortcuts were what enabled *Eagle* to be launched in only 19 days. Clearly the vessel was only intended for upcoming battles rather than long term use.

HMS *Linnet*

HMS *Linnet* was built at Ile-aux-Noix, Quebec, the British base in the Richelieu River close to Lake Champlain, by William Simons, a shipwright from Kingston, Ontario. A dockyard was built during the winter of 1813-14 to commence construction on the brig in the spring. The brig, initially named *Niagara*, was launched in April 1814 and the name was changed to *Linnet* when the Royal Navy took command of all naval matters from the army in January (Washburn 1998: 22, 25). *Linnet* was the first large warship built on Lake Champlain during the War of 1812 (Washburn 1996: 14). That summer, *Linnet* sailed the lake harassing Americans along its shore until the American fleet reappeared on the lake and the British returned to the Richelieu River. The British squadron, which consisted of the new flagship frigate *Confiance*, the sloops *Chub*, *Finch*, and *Icicle*, the brig *Linnet*, and 13 gunboats, re-emerged 11 September for the Battle of Plattsburgh. The British were defeated after a battle that lasted only two hours and twenty minutes. *Linnet* was the last major warship to surrender to the Americans on Lake Champlain (Washburn 1998: 40-41). The British squadron was taken to Whitehall, New York, where it was laid up in ordinary in a channel below the town. In 1825, the British squadron was moved to the mouth of the Poultney River with plans for auction; however, no bids were received and the brig eventually sank at its moorings (Washburn 1998: 47-48).

HMS *Linnet* was first discovered in 1949 and raised via tractor by a small group of farmers. The wreck was dragged from New York to the Vermont side of East Bay. Various artifacts were recovered from the wreck, and it was falsely identified as a Revolutionary War

period wreck. In the process of raising the wreck the bow broke apart and spun around to face down the Poultney River, unlike the other wrecks from the fleet on the opposite side of the bay (Washburn 1996: 17). After the salvage in 1949, the hull of the vessel settled back into the river and listed severely to port. On 23 July 1981, *Linnet* was rediscovered and identified by Kevin Crisman and Arthur Cohn during an archaeological survey of the Poultney River. *Linnet* was eventually excavated as part of the 1995 Lake Champlain Nautical Archaeology Field School, which also excavated the U.S.N. row galley *Allen*. *Linnet* was poorly preserved after the salvage attempt in the 1940s. Little of the bow remained and the stern was incomplete; all the frames from the stern section are missing and only three futtocks remain on the starboard side (Washburn 1998: 54-55).

The remaining 58 ft. (17.7 m) of the keel survives from the base of the sternpost to just forward of amidships. The missing 27 ft. (8.2 m) comprised a small portion of the stern and the majority of the bow. It was made of a single piece of white oak that was molded 13 ½ in. (34.3 cm) and the sided dimensions narrowed aft from 8 ¼ in. (21 cm) to 3 ¾ in. (9.5 cm). A single rabbet along the keel was estimated based on dimensions taken at frame sections that were loose. The sternpost and stem assembly were missing from the remains of the wreck. The one piece of white pine stern deadwood was attached to the keel with three iron bolts that had become loose. It measured 9 ½ ft. (2.9 m) in length, molded 10 in. (25.4 cm) and sided 3 to 7 in. (7.6 to 17.8 cm) (Washburn 1998: 60-61).

A total of 23 white oak floor timbers and three white oak first futtocks were observed on the starboard side. A midship frame was not identified during recording of the wreck. Frames were spaced rather evenly, ranging from 18 to 24 in. (45.7 to 61 cm) center to center. The average dimensions of the floor timbers were 9 to 10 in. (22.9 to 25.4 cm) molded and 7 to 9 in.

(17.8 to 22.9 cm) sided and varied in length from 3 to 8 ft. (0.9 to 2.4 m). They were all made from compass timbers, sawn along the grain and bolted to the keel. Limber holes were not always present, and not all were cut square; but where they were present, there were two per floor that were 3 in. (7.6 cm) square and were approximately 3 in. (7.6 cm) outboard of the keel. The first futtocks were placed on the aft side of the floor timbers with their heels roughly 1 ft. (30 cm) from the keelson. They were bolted laterally to the floor timbers with iron drift bolts (Washburn 1998: 61-63).

The white oak keelson survives to a length of 44 ft. (13.4 m) and is made from a single timber. It is well preserved except for the upper surface under the mast step. It varied in molded dimension from 11 ¼ to 12 ½ in. (28.6 cm to 31.8 cm) and 6 to 8 ½ in. (15.2 to 21.6 cm) sided. Rough notches that varied in depth and were not always present were cut on the underside of this timber to fit over the floors. These notches were not present directly under the mast step. The keelson was fastened to the floor timbers at alternating frames along the centerline of the keelson (Washburn 1998: 64).

The main mast step was a 3 ft. 8 ½ in. (1.13 m) long by 1 ft. (30.5 cm) wide block of oak that was located a third of the vessel's length forward of the stern (Figure 4-3). It was secured to the keelson with six 7/8 in. diameter (2.2 cm) iron bolts and four spikes. A rectangular mortise was cut into this block to receive the mast and was reinforced with an iron bar on each side that were fastened to the step with two bolts per side (Washburn 1998: 65). There was no discussion of the foremast step.

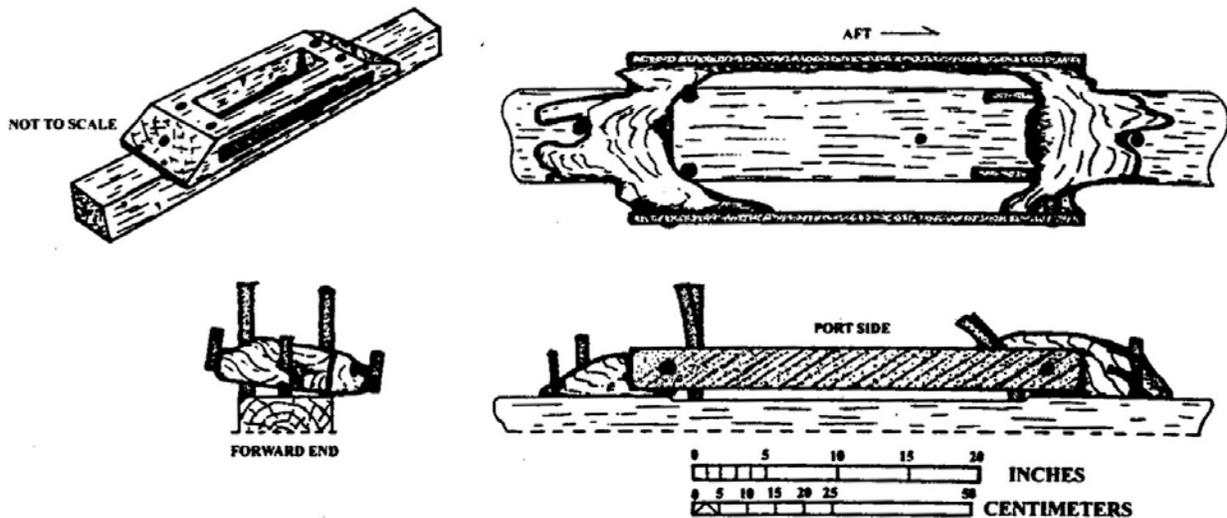


Figure 4-3: The mainmast step of *Linnet* with a reconstructed view in the upper left (Washburn 1998: 154).

The ceiling planking was missing, but the iron spikes and trenails that were used to attach it were still present on the floors and futtocks. Some external planking was still attached to the starboard frames. These pine planks were all 2 in. (5.1 cm) thick, but varied in width from 10 in. (25 cm) to 22 in. (56 cm). These were fastened to the frames with iron spikes. Seven strakes were present between the keel and the turn of the bilge. The garboard strakes were fastened to the floor timbers and rabbeted into the keel (Washburn 1998: 65-66).

A degree of craftsmanship is apparent in the construction of *Linnet* from the use of primarily white oak timbers to the use of compass timbers for the floors. Likewise, the use of notches on the base of the keelson over the floors suggests care for detail in construction. Although the vessel only served one sailing season on Lake Champlain, it was likely constructed with the intent of more.

U.S. Brig *Jefferson*

The U.S. Brig *Jefferson* was built at Sackets Harbor, New York on Lake Ontario by Henry Eckford. It was launched 7 April 1814 and was rigged and ready to join the squadron by 19 April. Commodore Chauncey assigned Master Commandant Charles G. Ridgely and a crew of 160 men to crew the vessel (Crisman 1989: 70-73, 97). After three months of inactivity, *Jefferson* first sailed with the U.S. squadron on Lake Ontario towards the head of the lake to blockade the Niagara River and intercept supplies intended for the British in the Niagara frontier. After a month of blockade duty at the mouth of the Niagara River, *Jefferson* sailed to rejoin Chauncey. During the passage, the vessel nearly foundered during a severe storm, and was only saved by throwing ten of the brig's sixteen 42-pounder carronades overboard (Crisman 1989: 129-130). *Jefferson* rejoined the American fleet on 17 September for the remainder of the navigation season. At the end of November the American squadron was laid up in ordinary for the winter, and remained that way after peace was declared (Crisman 1989: 144, 151). The American fleet was housed over in 1816 and Commodore Woolsey attempted to maintain and repair the vessels, but dry rot was inevitable. By 1818 *Jefferson* had sunk. The official navy list for 1822 listed all the large warships at Sackets Harbor as sunk and decayed (Crisman 1989: 169, 172-173). In 1825, the American fleet at Sackets Harbor was sold to Robert Hugunin, an Oswego shipper and businessman, who raised and converted at least four of the hulls for commercial use. Hugunin did not raise *Jefferson* from its resting place inside Navy Point, as its frames were irreparably cracked from when it settled on its portside. Thus it remains the sole vessel of the eight large warships that Henry Eckford built whose final resting place is known and has been preserved in its original form (Crisman 1989: 175-176).

Several attempts were made to raise *Jefferson* throughout the mid-1900s, as it was visible during periods of low water (Crisman 1989: 181-186). Renewed interest in the wreck was generated in the 1980s with the discovery of *Eagle* on Lake Champlain, and the wreck was relocated in 1984 (Figure 4-4). Just under half of the original hull was intact and well preserved. A four year archaeological study of the wreck was initiated under the direction of Kevin Crisman and Arthur Cohn (Crisman 1989: 191-200).

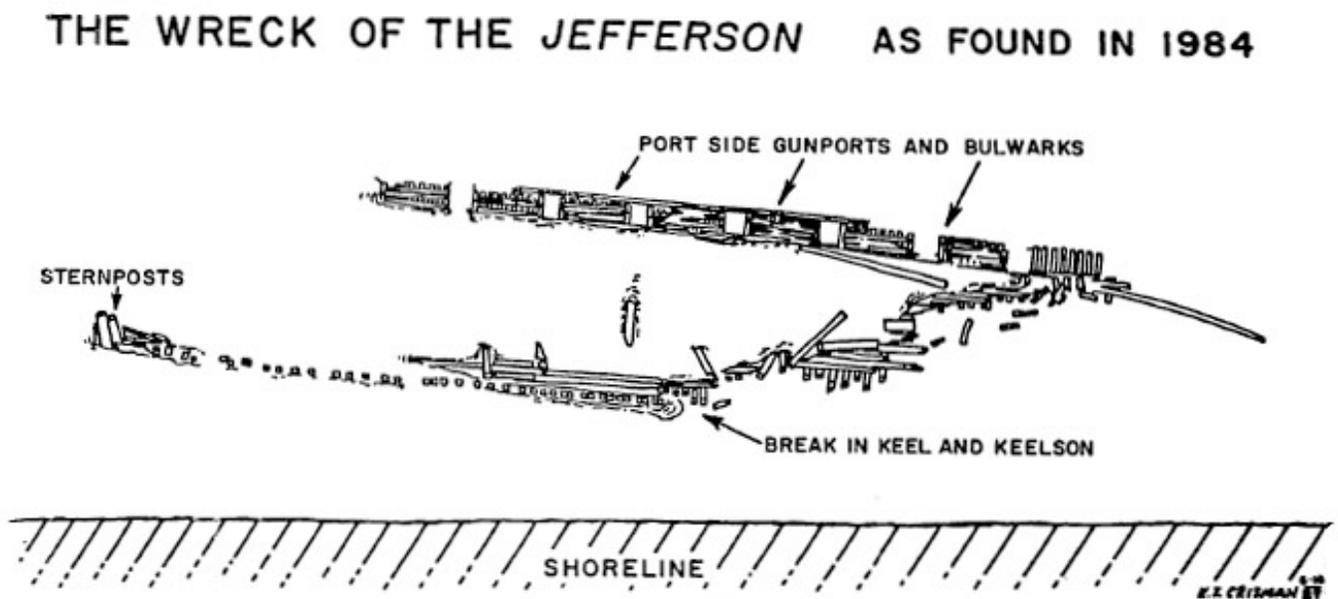


Figure 4-4: The 1984 site plan of *Jefferson* (Crisman 1989: 197).

The white oak keel of *Jefferson* measured a total of 108 ft. 9 in. (33.14 m) in length. It was broken amidships and only the aftermost 60 ft. (18.2 m) was still present. It was molded 1 ft. 11 in. (5.8 m) and sided 11 ½ in. (29.2 cm) and narrowed to 7 in. (17.7 cm) sided at the after end. The aftermost 3 ft. 9 in. (1.14 m) of the keel was cut down to allow for the attachment of three sternposts. Photographs from the 1930s of the missing forward section show that this section had a 3 in. (7.6 cm) molded shoe that was added to make the forward half equal the after end. No scarfs were located on the after end of the keel, and none seemed apparent in the photographs of

the forward portion, indicating there was only one scarf along the keelson. The stempost was attached to the forward end of the keel with a hook scarf and secured with a pair of iron dovetails (Crisman 1989: 271-273).

A rabbet was cut into each side of the keel several inches below the upper surface. The dimensions of the rabbet differed over the length of the keel. Amidships, the rabbets were 2 in. (5 cm) below the top of the keel and 2 in. (5 cm) deep. Aft of the main mast step, the starboard rabbet was 4 ½ in. (11.4 cm) below the top of the keel, 3 ½ in. (8.8 cm) wide, and 2 in. (5 cm) deep. Between the forward end of the deadwood and the sternposts the rabbet gradually sloped down the side of the keel (Crisman 1989: 273).

Jefferson's stern assembly was well preserved and consisted of three white oak timbers: the inner, main, and false posts. The posts were bolted together with several square iron bolts and positioned on the keel. The inner sternpost had a molded dimension of 18 in. at the base and 14 in. (35.5 cm) at the uppermost deadwood timber. Its forward face was sided 10 in. (25.4 cm). The remaining length of the inner sternpost measured 12 ft. 6 in. (3.81 m). On the upper end were two notches in its forward face to fit transoms. The after ends of the external planking were attached to the inner post with spikes, and sat in the groove between the inner and main posts. The remaining portion of the main sternpost measures 11 ft. 10 in. (3.6 m) in length, was molded 18 in. (45.7 cm) at its base and 14 in. (35.5 cm) at the level of the uppermost deadwood, and was sided 7 in. (17.7 cm). It was secured to the keel with a set of iron dovetails. Likely the inner and false sternposts were fashioned in this way, but this could not be confirmed. The false post was molded 8 in. (20.3 cm) at its base and 5 in. (12.7 cm) at the upper gudgeon, and was sided 7 in. (17.7 cm). Above the upper gudgeon, the false post was broken. Two iron gudgeons were fastened to the false post as well as an iron pintle stop (Crisman 1989: 276-278).

The deadwood consisted of six horizontal timbers that were stacked above the keel. The piece of deadwood that lay directly over the keel and measured 21 ft. 8 in. (6.6 m) in length and was 16 in. molded and approximately 11 in. (27.9 cm) sided. It appeared to maintain the same molded dimensions over its length, but it was the least accessible of the timbers and, therefore, the hardest to record. It narrowed in sided dimension to correspond with the tapering of the stern. The next two timbers extended all the way back to the inner sternpost. The three uppermost timbers tapered down at their forward ends to form an almost continuous slope. Rectangular mortises were cut into the deadwood timbers to accept the heels of the stern half frames, which were fastened in place with a single iron bolt (Crisman 1989: 278-280).

The only evidence of the stempost assembly came from photographs taken in the 1930s and 1950s. These photos indicate that the stem was composed of an apron, stempost, and gripe. The apron was badly eroded; two iron bolts once fastened the upper end of the apron to the inner face of the stem post. Three long iron bolts also project forward that once fastened the apron and stempost to the forward end of the keelson. The stempost was hook scarfed to the forward end of the keel, extended forward and up 12 ft. 2 in. (3.7 m) and terminated in a scarf for an upper stempost. The gripe was badly deteriorated, and its upper end is eroded, likely from ice damage. It was estimated from the photograph that the gripe measured on average 13 in. (33 cm) molded and was similar to the stern false post, which was sided 7 in. (17.7 cm). The numerous photographs of the Jefferson's stem show a pronounced forward rake, suggesting the vessel had a sharp bow (Crisman 1989: 275-276).

Photographs show that *Jefferson's* frames survived nearly intact until the 1960s. Construction of a marina in the 1960s caused damage to the wreck. It is estimated that *Jefferson* originally had between 62 and 66 frames: 45 square frames, between 4 and 8 stem cant frames,

and 13 stern half frames (Crisman 1989: 281). The square frames were spaced along the keel between 1 ft. 9 in. to 1 ft. 10 in. (5.3 to 5.5 m) on their centers, meaning there was a 5 in. (12.7 cm) space between the frames. Over three years of excavation, four of the vessel's frames were uncovered and recorded, all of which were aft of the midship frame. The first frame that was examined consisted of a floor timber of hard maple that was molded 13 ½ in. (34.2 cm) between the keel and keelson, 16 in. (40.6 cm) at the rabbet, and 9 ½ in. (24 cm) at its head. It was sided 9 in. (22.8 cm) at the keel and increased to 9 ½ in. (24 cm) at its head. It was notched to fit over the keel and fastened with a single iron drift bolt. It was laterally fastened to the first futtock with square iron bolts (Crisman 1989: 283).

The portside white oak first futtock was fastened to the forward face of the floor timber, and initially abutted the starboard side first futtock. It was molded 16 in. (40.6 cm) and sided 7 1/8 in. (18 cm) at the rabbet; at the head it was 8 ½ in. molded and 7 ½ in. (19 cm) sided. The first futtock was almost straight due to the sharp deadrise of the hull. Limber holes were not cut into the base of the frames. The portside second futtock was also of white oak and was molded 9 ½ in. (24.3 cm) and sided 7 in. (17.7 cm) at the heel, molded 4 in. (10 cm) and sided 4 ½ in. (11.4 cm) at the head. It abutted the head of the floor timber and was laterally bolted to the first futtock. The second futtock was also a top timber, as the top 5 ft. (1.5 m) of its length was also part of the portside bulwarks. The top timber was made of spruce and molded 8 ½ in. (21.5 cm) and sided 7 in. (17.7 cm) where it abutted the first futtock, and narrowed upwards to 4 in. (10 m) molded and 6 in. (15.2 cm) sided (Crisman 1989: 284-285). The frames of *Jefferson* displayed a high level of craftsmanship. They were made of durable hardwoods, such as white oak, for the timbers and futtocks. To minimize the weight near the bulwarks, white pine, hemlock, and

spruce were used. The timber faces were smooth and showed evidence of a skilled carpenter (Crisman 1989: 288).

The keelson of *Jefferson* was broken 10 ft. (3 m) forward of the mainmast step and only the after 57 ft. (17.3 m) remained. The original length of the keelson is estimated to be 109 ft. 3 in. (33.2 m). The keelson consisted of two levels of white oak that were bolted atop one another and flat scarfed end to end. It measured 21 in. (53.3 cm) molded and 10 to 10 ½ in. (25.4 to 26.6 cm) sided. Originally, three timbers that were molded 11 in. (27.9 cm) comprised the lower row of the keelson, but only one remains. The keelson was fastened to the frames and keel with iron drift bolts. Along the upper surface of the keelson were four rectangular mortises that sloped downward from back to front to accept stanchion posts (Crisman 1989: 289).

Only approximately 50 ft. (15.2 m) of the portside shelf clamp was exposed. It was made from white oak and measured 11 in. (27.9 cm) molded and sided, and was shaped to fit the inside of the frames below the gunports. It was attached to the frames by 1 in. (2.5 cm) iron drift bolts at random. On the top surface of the clamp were cut 1 in. (2.5 cm) deep by 16 in. (40.6 cm) wide notches to accept the ends of the deck beams at 42 to 46 in. (1 to 1.1 m) intervals. The deck beams were placed so that there was one deck beam located beneath every gunport and one beam in between every gunport. The white oak beams were molded 10 in (25.4 cm) and the sided dimensions varied between 10 and 14 in. (25.4 to 35.5 cm). On each end was a shallow notch, 1 in. (2.5 cm) deep on the sided dimension that allowed the deck beam to fit between the clamp and waterway. The deck beams were fastened with square iron bolts driven down through the waterway. The waterway was made from white oak and was 10 in. (25.4 cm) square (Crisman 1989: 290-292).

The sizes of the external planking strakes varied; the lower planks were larger, about 10 to 15 in. (25.4 to 38.1 cm) in width. These strakes ranged from 1 ½ in. to 2 in. (3.8 to 5 cm) in thickness. At the turn of the bilge the planks measured between 8 and 9 in. wide and outside the bulwarks, the planks were between 3 and 4 in. (7.6 to 10 cm) thick. The lower strakes were predominantly of white oak, while those near the bulwarks were composed of lighter timbers such as white pine. The external planking was fastened to the frames with iron spikes. The ceiling planking was rather uniform in size, ranging between 10 and 13 in. (15.4 to 33 cm) wide and 2 and 2 ½ in. (5 to 6.3 cm) in thickness. A total of 17 strakes were counted from the keelson to the clamp. The four uppermost strakes were of white oak and were slightly thicker. The lower strakes were a combination of oak and white pine, with two strakes of thick oak directly beside the keelson. These strakes were fastened to the frames with one or two 5 to 6 in. (12.7 to 15.2 cm) long iron spikes per frame. An unusual feature employed by Eckford in the construction of *Jefferson* was the use of riders or large fore-and-aft diagonal reinforcing timbers placed from the keelson to the clamp. Their presence indicates that there was a concern of the ability of the clamp to support the weight of the deck with heavy guns mounted on top. It is likely that the hull contained ten riders, and possibly eleven, that varied from 7 to 10 in. (17.7 to 25.4 cm) in length and were fastened to the ceiling and frames with iron drift bolts (Crisman 1989: 293).

The mainmast step was completely excavated and studied. Historical evidence indicated that the mast was re-stepped from its original location, and this was seen in the form of two adjacent steps. The original step was made of two large pieces that extended across the keelson and two smaller timbers that fit between them and parallel to the keelson. When the mast was re-stepped, a third cross piece was simply added aft of the original step. It was notched to fit over the keelson like a saddle-type mast step (Crisman 1989: 296-298).

A great deal of care and attention to detail was employed in the construction of *Jefferson*. Timbers were fitted with great precision, and few spaces needed to be filled with chocks. All of the longitudinal timbers were made of sturdy white oak, while soft woods were used where strength was not as important. While Eckford attempted to build the best possible ship, some short cuts were taken to allow for the short period of construction. Iron fasteners were used throughout the vessel, which were much faster to secure although not as durable as treenails implying that the vessel was intended only for immediate use. The absence of limber holes may also indicate hurried construction and lack of concern over the longevity of the vessel, since this would have made it very difficult to remove bilge water leading to rot. The absence of knees also indicates hurried construction (Crisman 1989: 304-305).

HMS Princess Charlotte and HMS Prince Regent

In the fall of 1813, two frigates were commissioned to be built at the Royal Naval Dockyard at Kingston. The frigate *Princess Charlotte* was to be built under the command of George Record, and the *Prince Regent* under the command of John Goudie. Discord over the higher wages of Goudie's crew eventually caused the Admiralty to enter into a private contract with Record for the construction of the vessel. On 14 April 1814, *Princess Charlotte* was launched and, only a half hour later that same day, *Prince Regent* was sent down the slipway. By 1 May 1814, both vessels were ballasted, rigged, provisioned, armed, and ready to begin their service on Lake Ontario. The launching of these two frigates gave the Royal Navy uncontested control of Lake Ontario early in the navigation season. *Princess Charlotte* and *Prince Regent* took part in attacks on Fort Oswego and Sackets Harbor (Walker 2006: 33-35). With the peace after the War of 1812, the Rush-Bagot Agreement of 1817 limited the number of active armed vessels on the Great Lakes and all other vessels were to be put up in ordinary. In 1832, the

decision was made to terminate the presence of the Royal Navy on the Great Lakes. On 15 March 1832, instructions were issued to sell all vessels and naval stores on the Lakes. While attempts were made to sell some of the vessels remaining in the dockyard, only the *St. Lawrence*, was definitely sold. *Princess Charlotte* and *Prince Regent* were later sunk in Hamilton Cove (later named Deadman Bay) on the opposite side of Point Henry (Moore 2006: 23).

It was not until 1938 that the two wrecks in Deadman Bay were first investigated. Ronald Way, the Director of Fort Henry, built a platform over the wrecks in February of that year to enable a hard-hat diver to recover artifacts from the wrecks (Figure 4-5). In 1952, Dr. Richard Preston of the Royal Military College (RMC) wrote a paper on the vessels in Deadman Bay based on several dives by a RMC diver. At that time, the wrecks were so well preserved that the diver could enter below the lower deck of the *Prince Regent*. In 1987-1988, Preserve Our Wrecks, an organization dedicated to the preservation of the shipwrecks in the Kingston area, revisited the site and surveyed the wrecks. Between 1995 and 1998, a photographic survey of the wrecks was conducted by Jonathan Moore with stimulus from the introduction of zebra and quagga mussels to the Great Lakes (Moore 1998). By 2000-2001, Jonathan Moore had integrated historical research with data collected from further survey of the wrecks conducted by himself and Daniel Walker a Texas A&M graduate student, along with detailed measurements of the mast steps removed from *Princess Charlotte* by Ronald Way, now held by Fort Henry National Historic Site and the Marine Museum of the Great Lakes at Kingston, in order to establish the identities of the wrecks (Moore 2006).



Figure 4-5: Photograph of the 1938 salvage operations, hoisting a gun from *Princess Charlotte* through the ice (Fort Henry Museum, Kingston, Ontario).

HMS Princess Charlotte

In 2000, a non-disturbance survey of *Princess Charlotte* was conducted by a team of three Texas A&M graduate students under the direction of Daniel Walker, whose MA thesis assembled the research from the survey. During the 2000 field season, the stem and stern assemblies were recorded, the full length of the keelson, the cross chocks, 13 frame sections, and various other disarticulated timbers (Walker 2006: 53).

The wreck lies in approximately 14 ft. of water with zebra and/or quagga mussels completely covering the hull and obscuring construction details. The bottom shell of the wreck is intact from stem to stern, the frames on the starboard side are intact to the turn of the bilge and have mostly broken away from the keel and keelson. The frames on the portside continue past the turn of the bilge and are mostly still attached to the keelson since the wreck is listing to the

portside. Many timbers from the upper works of the ship now lie detached in the hold, which made recording frame assemblies in these sections impossible. A debris field around the wreck includes disarticulated futtocks and a transom timber abaft of the stern post (Walker 2006: 58).

The white oak keel of *Princess Charlotte* was 121 ft. 4 in. (36.97 m) in length, 16 in. (40 cm) molded, and 12 in. (30 cm) sided. The upper surface of the keel was notched for the floors on average 4 in. (10 cm). The rabbet for the garboard strake measured 3 in. (7.62 cm) wide along the face of the keel and 1.5 in (3.8 cm) deep and was located about 1 in. (2.54 cm) below the bottom of the cross chocks. The scarfs on the keel were buried in the sediment and, therefore, not visible, although they were likely similar to those found on the keelson. A false keel was visible for less than 6 in. (15 cm) at the stern. During recording it was evident that the keel had broken where the deadwood begins to rise towards the sternpost. The sternpost was fastened to the keel with fishplates, and the keel terminated in a skeg to protect the rudder (Walker 2006: 59).

Most of the stern deadwood construction was obscured from view by the exterior planking (Figure 4-6). The white oak stern post measured 13 1/8 in. (36 cm) molded, 12 in.(30 cm) sided, and rose 13 ft. 9 in. (4.2 m) from the keel. The inner sternpost was molded 15 in. (38 cm) and sided 12 in. (30 cm). It was notched at a height of 12 ft. 2 in. (3.7 m) for the first transom that was held in place with a 1 in. (2.5 cm) bolt. A deadwood knee rose to a height of 11 ft. 2 in. (3.4 m) on the inner sternpost and abutted the keelson on its forward edge. Two wrought iron gudgeons are intact on the sternpost at a height of 3 ft. 9 in (1.14 m) and 10 ft. 6 in. (3.2 m) from the base of the keel. Both gudgeons are 8 in. wide, though the straps of the lower one extended 5 ft. (1.52 m), while that of the upper one extended only 3 ft. 6 in. (1.07 m). A triangular pintle stop was located 7 in. (17.8 cm) beneath the upper gudgeon. The rudder is no longer present (Walker 2006: 61-62).

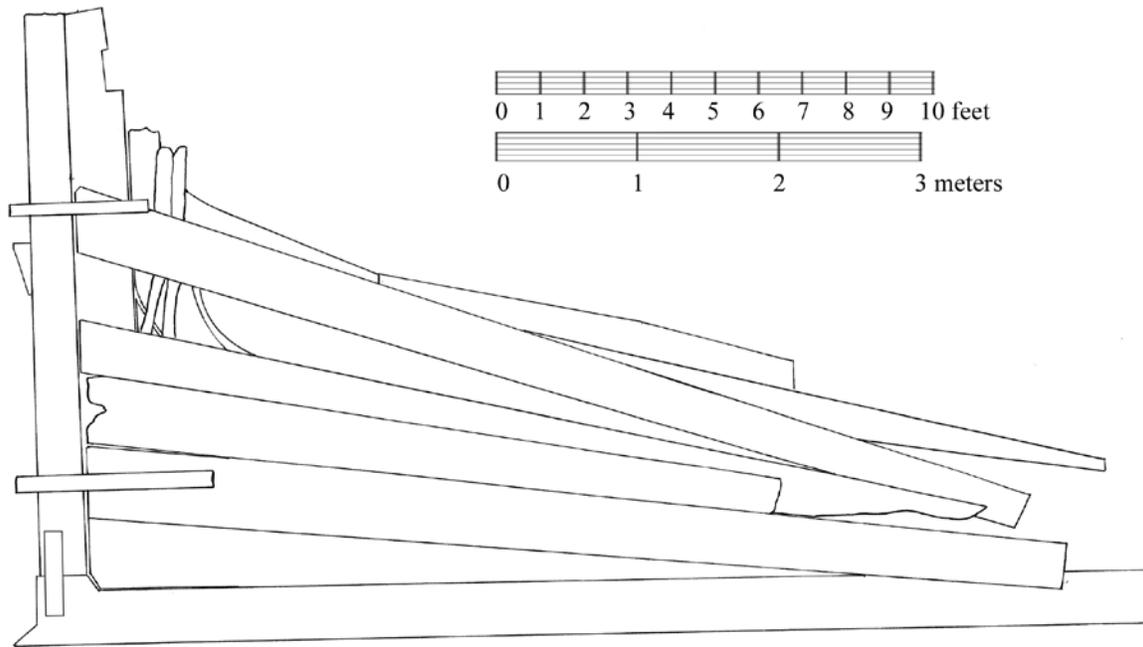


Figure 4-6: The stern assembly of *Princess Charlotte*, which is mostly obscured by the exterior planking (Walker 2006: 61).

The stem was assembled from eight large white oak timbers that were fastened with 1 in. (2.5 cm) diameter iron bolts (Figure 4-7). The gripe, stem post, knee of the head, and a wedge were fastened with a pair of circular iron bands bolted from opposite sides of the gripe. This band served a similar purpose to a horseshoe plate. Two apron timbers and a large stemson timber were present on the inner portion of the stem. Cant frames were fastened directly to the apron using 1 in. (2.5 cm) bolts. Compass timbers were not used in this assembly, but straight timbers that were shaped and joined. The two inner stemposts were rabbeted for the ends of the planking (Walker 2006: 59-60).

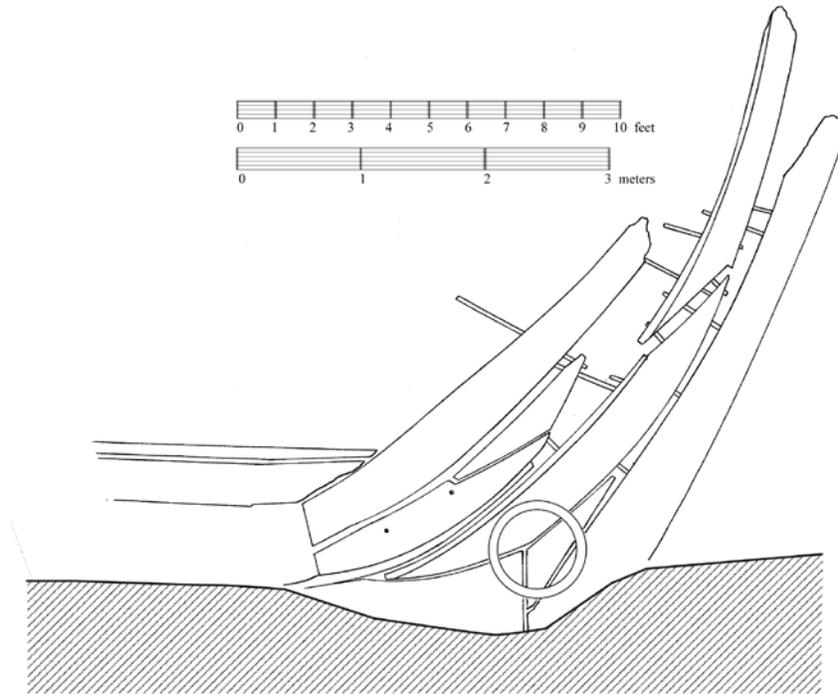


Figure 4-7: The bow assembly of *Princess Charlotte* (Walker 2006: 60).

As a purpose built warship, the vessel was heavily framed with less than 1.5 in. (4 cm) between the frames. The floors were constructed by fastening two frame timbers to a cross chock using three bolts per side. These fit together with vertical scarfs that extended from the centerline of the keel to the outer ends of the cross chock (Figure 4-8). At the keel, the floors averaged 16 in. (40 cm) molded and 12 in. (30 cm) sided. This frame assembly was fastened to the keel with a 1 in. (2.5 cm) diameter bolt driven through the keelson, cross chock and keel. The cross chocks differed in dimensions, and were clearly made to fit individual floors. The first futtocks were notched to fit over the keel and a triangular chock that was unfastened fit atop the heels to fill the space between the frame and keelson. This system would have compensated for the lack of compass timbers and provided a fast construction technique (Rodgers 2001, pers. comm.). The top surface of the keel was notched to fit the floors. Forward of the midship frame, the cross chocks were placed aft of the frames, and aft of midships they were positioned forward of the

floors. The first futtocks were always located on the same side as the chocks, meaning that at midships, there is a single first futtocks between two floors. On the port side, the vessel is preserved to the third futtock. Frames were connected with simple butt joints except for the head of the first futtock and the heel of the third futtock that were reinforced with a chock. The system of cross chocks and frames that was used allowed for greater deadrise (Walker 2006: 63, 67).

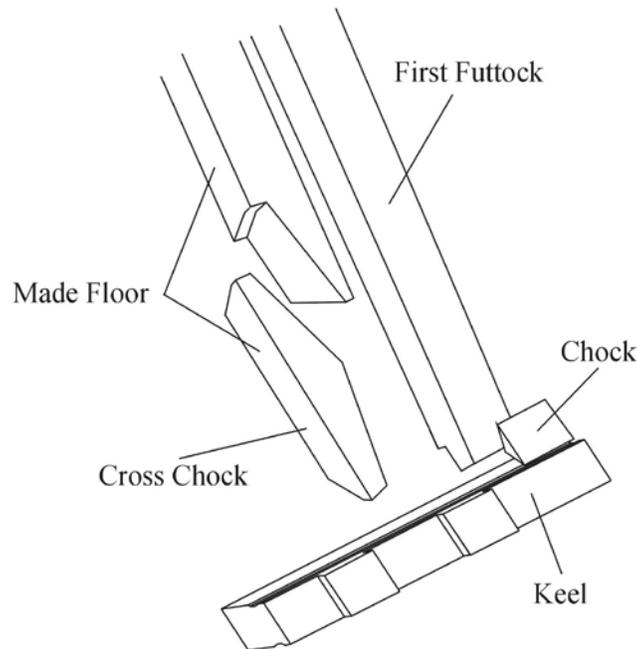


Figure 4-8: The frame assembly method on *Princess Charlotte* (Walker 2006: 66).

The six frame sets furthest aft differ from the others, since the deadrise increased towards the stern the floors were modified to fit this structure. The cross chocks increased in sided dimensions and were notched on the after face and the floors were notched on the forward face and were attached with four large bolts. These floors do not cross the keel, but rest their heels on the deadwood. The cant frames in the bow were attached to the stem timbers with 1 in. (2.5 cm) diameter iron bolts (Walker 2006: 67-69).

The keelson consisted of five white oak timbers that ran from the stemson to the deadwood knee at the stern that were flat scarfed together and bolted in place. It measured 12 5/8

in. (32 cm) molded and 12 in. (30 cm) sided. The keelson was not notched to fit over the floors. A rider keelson was positioned atop the keelson, made from four smaller white oak timbers that measured 5 ½ in. (14 cm) molded by 12 in. (30 cm) sided. The rider was fastened to the keelson with iron spikes driven down from either side of the centerline. Although the rider keelson hides the bolting pattern of the keelson, it was clear that a bolt was driven in place through each cross chock into the keel. The keelson does not curve up at the bow, but ends at the stemson. The upper surface of the rider keelson was notched for deck beam stanchions. The markings indicate that these were inserted after the deck beams were already in place (Walker 2006: 70).

The mainmast and foremast steps were removed from the wreck in 1938 by Ronald Way's salvage team. Both were saddle type mast steps that were notched to fit over the keelson and the outboard edge was angled to accommodate for the lateral shape of the ship (Figure 4-9). The mast steps were made from one solid piece of wood that measured 12 in. (30 cm) square with four fish plates with four 1 in. (2.5 cm) diameter bolts between each pair and four vertical bolts. The mast steps were fastened in place with four vertical bolts to the frames (Walker 2006: 73; Jonathan Moore pers. comm.).

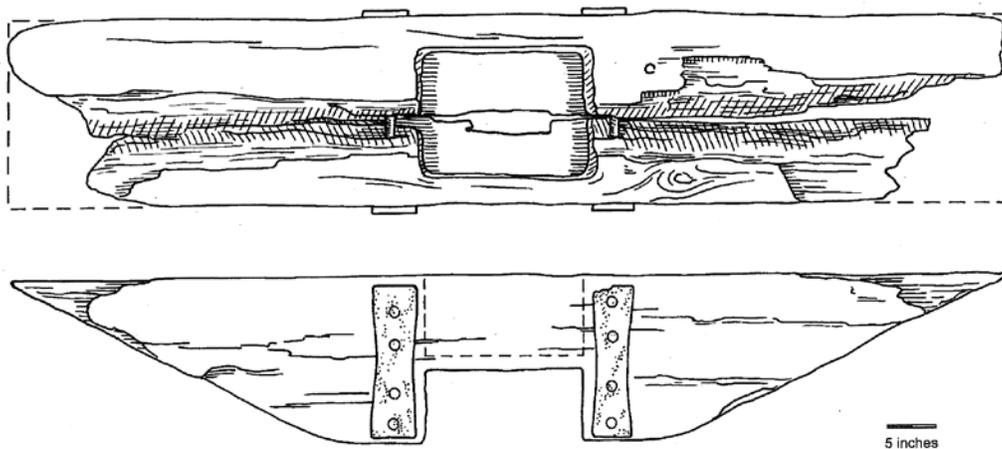


Figure 4-9: Plan and profile views of the mainmast steps salvaged from *Princess Charlotte* in 1938 (Moore 2006: 68).

The majority of the ceiling planking on the port side is still intact. At midships, there are 16 white oak strakes between the keelson and the clamp. They measure between 8 5/8 in. (22 cm) and 12 5/8 in. (32 cm) wide and 1 in. (2.5 cm) thick. The external hull planks are butt joined and attached to the hull with 7 1/2 in. (19 cm) long spikes driven diagonally, two per frame. At the turn of the bilge, the hull planking measures 12 in. (30.5 cm) wide and 3 in. (7.6 cm) thick; while at the stern, the garboard and the two adjacent strakes are 20 in. (51 cm) wide and narrow slightly forwards (Walker 2006: 76-78).

Princess Charlotte was constructed of white oak, except for two samples from a hull plank and the false keel that were of chestnut (Moore 2006: 62). There was a lack of fasteners noted on the wreck as the chocks between the first and third futtocks were often not bolted or spiked, but held by ceiling planking or the clamp. This fits the lack of iron fasteners that were noted in the Kingston yard during the construction of *Princess Charlotte* and *Prince Regent* (Walker 2006: 97). This indicates that, where possible, the best resources, such as white oak were employed; but often the shipyard, located in a frontier region, was limited by lack of supplies such as iron fasteners.

HMS *Prince Regent*

The wreck of HMS *Prince Regent* lies approximately 0.24 mi. (0.38 km) from HMS *Princess Charlotte*, tucked further in Deadman Bay. The only archaeological recording conducted on this wreck was conducted by Jonathan Moore with the aim of measuring the dimensions of the wreck, taking measurements of timber and fastener scantlings, and recording the frame assembly method. A detailed archaeological recording project, like that conducted on HMS *Princess Charlotte*, has yet to be conducted on this wreck (Moore 2006).

The wreck consists of an unbroken hull section that is present from the forefoot to the aft face of the sternpost with a total length of 160.7 ft. (49 m). The wreck is heeled to port and, therefore, better preserved on the portside where it is mostly buried in the sediment. On the portside, the wreck survives to the turn of the bilge, while the starboard side is only intact to the heads of the floor cross chocks. At least 108 alternating floor and first futtock positions are apparent along the hull. The hull is fastened with iron bolts joining the structural components and frames, and nails or spikes to attach the planking (Moore 2006: 50).

The stern assembly consists of the sternpost, inner sternpost, and deadwood. Three gudgeons and gudgeon straps are attached to the sternpost, and a cast iron pintle stop is bolted to the sternpost under the upper gudgeon. The inner sternpost is only partially intact, with two small transoms attached that rested atop the deadwood. There is no evidence of a large knee connecting the inner sternpost with the aft end of the keelson. The base of the sternpost and the aft end of the keel are buried, but the top of a third rudder gudgeon was discovered with some probing. The bow demonstrates a poor state of preservation, as only a small section of the forefoot and an iron horseshoe plate remain articulated at the bow (Moore 2006: 50, 52).

The frames on the portside are mostly covered by the ceiling planking, silt, and other debris. The limber strake on the portside runs the length of the keel and is offset 11 in. (0.28 m). The eroded frame ends are visible at the turn of the bilge. Unfortunately, the wreck did not survive to the point of the orlop deck, where the deck beams would have joined with the clamp, waterway, and other reinforcing timbers. The lower framing consisted of three components: cross chocks for both the half-floors and first futtocks; half-floors; and first futtocks. The cross chocks are still articulated with the keel and keelson, but all of the starboard half-floors, first futtocks, and planking have collapsed to the lakebed. The floor cross chocks alternate with the

first futtocks in order to create double frames. The cross chocks and first futtocks show no evidence of limber holes; and with the tight spacing of the frames, bilge water must have collected in the hold. There are no surviving cant frames (Moore 2005: 52).

The keelson is mostly flat, with only a gentle deadrise at the stern and little rise at the stem. It consists of five timbers, of which the longest is approximately 36 ft. (11 m) long. All were joined by a diagonal hook scarf except for that located at the mizzenmast step, which was joined by a plain diagonal scarf. A rider keelson was located above the keelson joined by a flat scarf. A 19.2 ft. (5.85 m) section between the fore and main mast steps is no longer present (Moore 2006: 50).

Three masts steps were located along the keelson that were all made in an unusual method. They were not made as saddle type mast steps, with timbers that fit over the keelson, but rather from the timbers of the keelson and rider keelson. Each step is delineated by a fore-aft break in the rider keelson with a fore-aft timber on either side bolted to the molded sides of the keelson and rider keelson (Figure 4-10). Large bolsters on either side of the step provided additional support. All three mast steps are 11 in. (27.9 cm) wide, or the width of the keelson. Aft of the main mast step is a small, rectangular step located in the rider keelson that likely served as a step for a deck beam, bulkhead stanchion, or the capstan. The ceiling planking near the main mast step is similarly mortised for stanchions for the shot locker or other bulkheads. Two bulkheads are located in these positions on the original lines plan of *Prince Regent* (Moore 2006: 50).



Figure 4-10: The unusual mast step assembly of HMS *Prince Regent* constructed of a break in the rider keelson with fore and aft timbers on either side (Photo courtesy Jonathan Moore, Parks Canada).

Of eleven wood species collected from the hull of *Prince Regent*, all were of oak. The use of straight grained wood alongside the crude construction of the bottom timbers indicates that this vessel was made quickly and that the shipwrights were not concerned with its longevity (Moore 2006: 52).

HMS *St. Lawrence*

While the *Prince Regent* and *Princess Charlotte* were nearing completion, Sir James Lucas Yeo, commander of the British naval forces in the Great Lakes, heard news of new vessels on the stocks at Sackets Harbor (the *Jefferson*, *Jones*, and *Superior*) (Moore 2006: 10). Yeo's response was to build a third vessel, a three-decked 102 gun ship, which would become the largest built at Kingston and the only Royal Navy ship of the line ever to be launched and

operated entirely in fresh water (Malcomson 2001: 112). The keel for HMS *St. Lawrence* was laid 12 April 1814. It was designed by William Bell, the master shipwright of the Provincial Marine dockyard at Amherstburg, who had arrived in Kingston in November 1813, and was completed by Thomas Strickland when Bell returned to England (Malcomson 2001: 114).

As *St. Lawrence* was being constructed, some fears arose as to its sturdiness, since it was built with very few knees. Advertisements in the *Kingston Gazette* announce that the Navy Yard was searching for knees of oak, elm, or spruce (1814: 3). The drafts of *St. Lawrence* show sixty lodging knees on the orlop deck; however, no hanging knees appear on the original cross section plan, which shows the beams mortised and tenoned to the frames and resting on clamps. The deck was also depicted as supported only by a large shelf that was bolted to the frames and waterway. Bell stiffened the frame with three rows of carlines against each other, bolted to the frame (Figure 4-11). However, the vessel must have been deemed sturdy as it was launched and completed in a period of less than 10 months (Malcomson 2001: 112-114).

The launch of *St. Lawrence* at Kingston on 10 September 1814 allowed Yeo command of the lake, although late in the war (Malcomson 2001: 115-116). This first rate ship was the largest on the lake, and has been compared in power to HMS *Victory* (Hitsman 1999: 251). Yeo did not attempt an attack on Chauncey's fleet at Sackets Harbor, but with his control of the lake was able to transport troops and provisions to the army on the Niagara Peninsula. After two such voyages, *St. Lawrence* docked for the winter. Although both the British and Americans formulated plans for the 1815 sailing season, 1814 was the end of the naval conflict on the Great Lakes on account of the signing of the Treaty of Ghent on 24 December 1814, ending the War of 1812 (Malcomson 2001: 116).

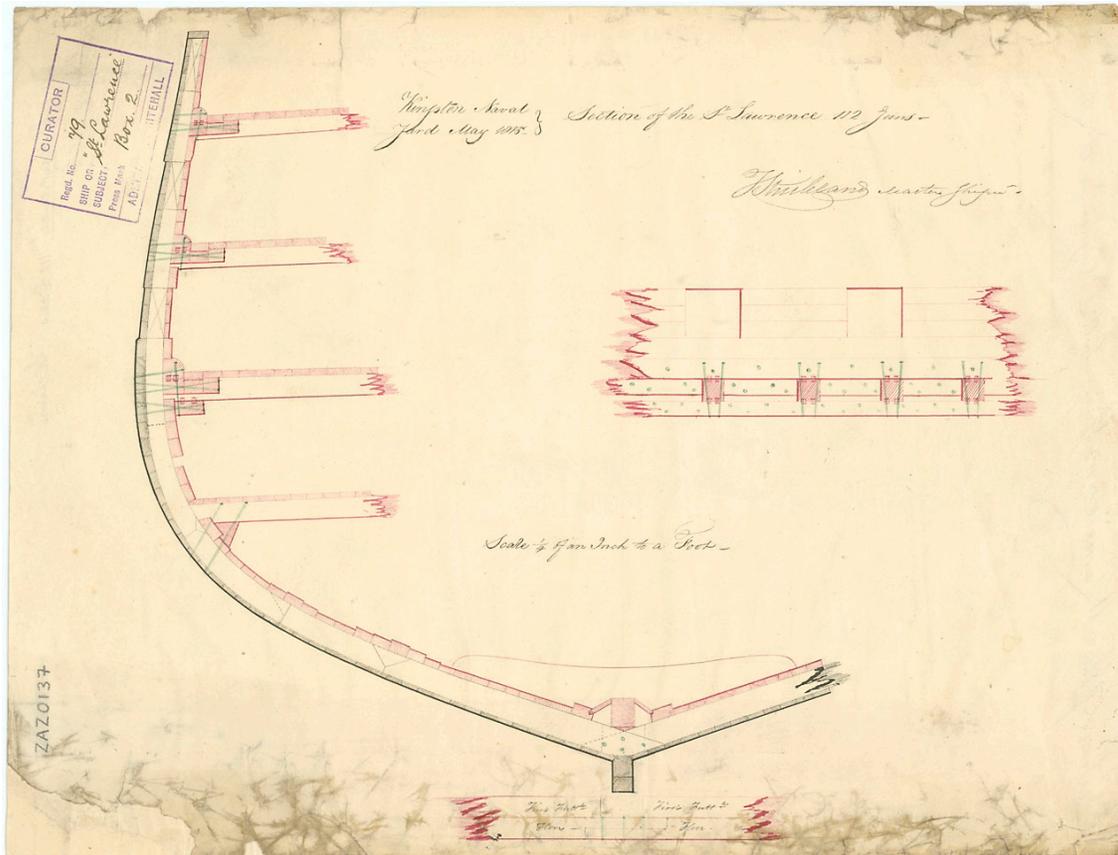


Figure 4-11: Cross section draft of HMS *St. Lawrence* shows the ‘kneeless’ system used in construction (National Maritime Museum, Greenwich, London, Regd No. 79).

The vessel sat in ordinary in Navy Bay until 1832, when the British began their final withdrawal from the inland waters of Canada (Malcomson 1998: 326). At this time, ships that had not already been scrapped were disposed of in another manner. *St. Lawrence* was sold in 1833 for £25 to a Kingston brewery to serve as a wharf (Malcomson 1998: 326, Moore 2006: 23). Recording *St. Lawrence* became a part of the 1995-1998 photographic survey undertaken by Jonathan Moore for Preserve Our Wrecks. In 2006, Jonathan Moore continued research on the wreck (Moore 2006).

All that remains of *St. Lawrence* is a 105.35 ft. (32.12 m) long segment of one side of the lower framing that would have originally been positioned next to the keel and keelson (Figure 4-12). This section consists of 35 square frames. At the east end of the site, exterior hull planking projects out from under the framing up to 6 ft. 10 in. (2.1 m). The surviving parts of the

frames include half-floors, first futtocks, and second futtocks. The recesses for chocks are visible at the terminal ends of some frames. The half-floor heels were attached to each other with a lap scarf and secured with four bolts with roves arranged in a diagonal pattern. The half-floor and futtocks are fastened with bolts with square shanks that were 1 ¼ in. (3.2 cm) thick. The first futtock heels would not have extended all the way to the keel, but would have terminated at the garboard strake. There is no evidence of limber holes within the half-floors or first futtocks. The frame spacing on the vessel measured 12 in. (30.5 cm) (Moore 2006: 70).



Figure 4-12: The remains of one side of the lower framing of HMS *St. Lawrence* (Photo courtesy of Jonathan Moore, Parks Canada).

Few longitudinal timbers from the wreck survive. All that survives is a part of the limber strake and one ceiling plank. The limber strake has a groove to accept the limber board. The

external hull planking that exists was fastened to the frames with $\frac{3}{4}$ in. (1.9 cm) iron nails. It is not possible to determine the orientation of the bow and stern based on the remaining frames, nor whether this section is from the port or starboard sides. Since all the frames are perpendicular to the original keel, this clearly represents a mid-section of the vessel (Moore 2006: 45-46).

A total of five wood species samples were collected from the remains of *St. Lawrence*, all of which are white oak, except the half floor that is rock elm (Moore 2006: 48). This demonstrates that the shipwrights took care to use sturdy timbers for the parts of the vessels that would take the majority of the strain. An absence of limber holes indicates hasty construction and that the vessel was not intended for an extensive career (Moore 2006: 48).

War of 1812 Vessel Attributes

The ships that were built and launched on the interior lakes for the War of 1812 were of a unique construction design. These were purpose built warships designed to sail on freshwater, which allowed the ships to be heavily armed, included a high degree of deadrise, but were still required to have a shallow draft. Large timbers and substantial framing was essential for these ships to meet in battle and carry their heavy armaments, unlike the earlier merchant vessels that needed to be strengthened before they were battle ready. Although the British opted to carry more carronades than long guns, due to their lighter weight, these vessels were still heavily constructed. The majority of these vessels were built with double frames so that there was minimal space between the frames. Before the attachment of the planking, these ships must have already appeared very solid and durable. As the vessels operated on the fresh water lakes, this eliminated the need to carry fresh water in the hold while permitting the vessels extreme deadrise in order to be quick and weatherly but still carry heavy guns. The following table demonstrates the characteristics and scantlings of these War of 1812 vessels for easy comparison.

Table 2: Characteristics of War of 1812 Vessels

	<i>Eagle</i>	<i>Linnet</i>	<i>Jefferson</i>	<i>St. Lawrence</i>	<i>Princess Charlotte</i>	<i>Prince Regent</i>
Date	1814	1814	1814	1814	1814	1814
Nationality	American	British	American	British	British	British
Vessel function	Warship	Warship	Warship	Warship	Warship	Warship
Length overall	Not listed	Not listed	Not listed	Not listed	Not listed	160.7 ft.
Beam	Not listed	Not listed	Not listed	Not listed	Not listed	Not listed
Keel length	106 ft. 5 in.	85 ft.	108 ft. 9 in. (preserved)	Not listed	121 ft. 4 in.	Not listed
Keel molded	18 in.	13.5 ft.	1 ft. 11 in.	Not listed	16 in.	Not listed
Keel sided	12 in.	8.25-3.75 in.	11.5 in.	Not listed	12 in.	Not listed
Keel wood type	Hard maple, oak	Oak	Oak	Oak	Oak	Oak
Keel notched	No	No	No	Not listed	Yes	Not listed
Keelson length	Not listed	44 ft. (preserved)	57 ft. (preserved), estimated total 109 ft. 3 in.	Not listed	Not listed	Not listed
Keelson molded	14 in.	11.25-12.5 in.	21 in.	Not listed	12 5/8 in.	14. 1/2 in.
Keelson sided	12 in.	6-8.5 in.	10-10.5 in.	Not listed	12 in.	11
Keelson wood type	Oak	Oak	Oak	Oak	Oak	Oak
Keelson notched	No	Yes	No	Not listed	Yes	Not listed
Floor avg. molded	22 in.	9-10 in.	13.5-16 in.	18 in	16 in.	35 in.
Floor avg. sided	8-10 in.	7-9 in.	9-9.5 in.	Not listed	12 in.	13 1/2 - 14 in.
Futtock avg. molded	Not listed	Not listed	16 in	15-16 in.	13 1/2 - 16 in.	17 in.
Futtock avg. sided	Not listed	Not listed	7 1/8-9.5 in.	10-11 in.	4-7 in.	12 in.
Frame spacing	Approx.. 6 in.	18-24 in. on centers	5 in.	12 in.	1.5 in.	1-2 in.
Frame wood type	Not listed	Not listed	Maple, oak	Rock elm	Not listed	Not listed
Frames notched	No	No	Notched to fit over keel	Not listed	Not listed	Not listed
External planking thickness	Not listed	Not listed	1.5-2 in. and 3-4 in.	2-2 1/2 in.	3 in.	2 in.
External planking wood type	Not listed	Pine	Mostly oak and some white pine	Oak	Chestnut	Oak
Ceiling planking thickness	1.5 in.	2 in.	2-2.5 in.	7-9 in.	1 in.	2-2 1/2 in.
Ceiling planking wood type	White pine	Not listed	Oak, white pine	Oak	Oak	Oak
Number of masts	Two	Two	Two	Three	Two	Three
Mast step type	Saddle type	Block on top of keelson (not saddle)	Saddle type	Not listed	Saddle type	Keelson and rider keelson
Compass timbers	No	Yes	Not listed	Yes	No	No
Fasteners	Iron	Iron, treenails	Iron	Iron	Iron	Iron

In both the British and American cases, the majority of the materials required to construct, ballast, and arm these vessels needed to be shipped to the shipyards from the industrialized cities on the Atlantic Coast, in Lower Canada, and even Great Britain. These limitations, along with a lack of seasoned timber supplies, forced the shipwrights to modify their construction techniques. While the British were able to locate oak for the construction of their vessels, the Americans used whatever timber species were available, and both used green wood. In England, a tree was aged one year for each inch of its thickness, but this was not possible when building vessels for war on the Great Lakes where reserves of wood were not stockpiled (Bamford 2007: 134). The British vessels *Linnet*, *St. Lawrence*, *Prince Regent*, and *Princess Charlotte* demonstrate the use of oak throughout their construction. The *St. Lawrence* demonstrated the use of rock elm for some of the frames. As *St. Lawrence* was one of the largest vessels built on the Great Lakes at the time and it was built near the end of the war after the shipyard in Kingston had already constructed several vessels, the oak supplies in the surrounding region were already greatly depleted, resulting in the use of other types of wood in the vessel's construction. If more of the vessel survived, it could be possible to determine that other aspects of the construction did not require the strength of oak and were constructed from rock elm or spruce, the wood species specified in the advertisement in the *Kingston Gazette* (1814:3). One piece of deadwood and all the external planking on *Linnet* was constructed from white pine rather than oak.

While the American shipwrights also employed oak in the construction of their vessels, these stores must have been greatly exhausted as hard maple was used alongside oak for the keel of *Eagle*, as well as for the frames of *Jefferson*. Hard maples are heavy, strong, and stiff. They have good shock resistance, moderate shrinkage, and grow up to 100-125 feet in height. While

hard maple was more commonly employed in furniture, it was often used in ship construction as well (Mitchel 1994: 82-82). White pine was used for the ceiling planking of *Eagle* and *Jefferson* as well as some of the frames of *Jefferson*. White pine was a moderately soft, light, yet strong wood. The species was a preferred wood for furniture construction as it was inexpensive and easy to work, which may account for its use in ceiling planking. Ceiling planking needed to be strong, durable, water resistant, and able to bend and fit the ships curves (Mitchel 1994: 92, 66). As white pine was easily worked, strong, and readily available in the forests surrounding the Great Lakes, it made for an ideal wood for planking.

Linnet clearly employed the use of compass timbers, which were used for all of the floors. It is also likely that compass timbers were also employed for knees throughout the vessel which no longer remain. While knees were also employed on the *Princess Charlotte* for the knee of the head and the stern deadwood knee and it is likely for other portions of the vessel that no longer remain. *St. Lawrence* employed the use of compass timbers as the advertisement in the Kingston Gazette specifically sought knees of oak, elm, or spruce. Likewise, the drafts of *St. Lawrence* show sixty lodging knees on the orlop deck. However, the lack of adequate compass timbers required the shipwrights to fashion curved pieces from straight grained old growth timbers fastened together with bolts and metal plates which necessitated the limited use of knees in vessels such as *St. Lawrence*. The modified strengthening techniques employed on *St. Lawrence* indicate that care was taken to ensure that the vessel was sturdy for sail and battle. No knees were employed at all in the construction of *Eagle* or *Jefferson*. The lack of knees in the American vessels demonstrate hurried construction and possible disregard for the sturdiness of these vessels, as they were constructed hastily for the purpose of only a few battles.

Linnet is the only War of 1812 vessel that demonstrated the use of treenails, while iron fasteners were employed in the construction of the other lake warships. Treenails are driven through planking and frames to ensure a tight fit. While they created a secure joint, treenails were also time-consuming to fashion and install. When speed of construction was imperative and iron was available, iron fasteners were likely used to accelerate construction; therefore, treenails were seldom used during the War of 1812.

The shape of the keel of these vessels are very similar to those from before the War of 1812 that sailed on the Great Lakes, but the keels are deeper than they are wide. Surprisingly, although the vessels built during the war were much larger than the merchant vessels built before the war, the dimensions of the keel are not significantly larger. The keels of all of these vessels were made from strong oak. The smallest of the vessels, *Linnet*, had a keel that was made from a single timber, while the other vessels had keels composed of between two to three timbers scarfed together.

The average size of the frames was comparable between the vessels. All employed the use of square frames; however, the *Princess Charlotte* used a system of cross chocks and frames that allowed for greater deadrise. Many of the frames on *Eagle* were unfinished with some surfaces that were the original tree surface. This greatly differed from the other American vessel, *Jefferson*, which displayed a high level of craftsmanship with finished timbers that showed evidence of a skilled carpenter. Clearly, more care was taken in the construction of *Jefferson*. These vessels displayed tight frame spacing, the most extreme exhibited by *Princess Charlotte* with less than 1.5 in. between the frames. The heavy construction of these vessels was a result of their purpose as warships.

The keelsons of these vessels all measured slightly smaller than their keels. British shipwrights tended to follow the conventions set out by Sutherland to notch the keelson to fit over the floors (1711: 26-27). Notches are not evident on the keelsons of the American warships *Eagle*, *Jefferson*, and the gunboat *Allen* (Emery 2003) from 1812 but are present on the British *Linnet*, *Princess Charlotte*, and the gunboat *Radcliffe* (Amer 1986: 81). In the case of the *Princess Charlotte*, both the keel and keelson showed evidence of notching for the frames. *Jefferson*'s hull was strengthened by notching the frames to fit over the keel.

The majority of mast steps on these vessels were of the saddle type, which was a very strong step since the wood grain ran perpendicular to the force enacted upon it. Two exceptions were noted, that of the mainmast step of *Linnet* and all of the steps from *Prince Regent*. The mainmast step of *Linnet* consisted of a wide block that was bolted to the keelson. Unlike a saddle mast step, it did not extend on either side of the keelson, and likely could not take the same force as the saddle type step. The mast steps on *Prince Regent* were made in an unconventional fashion, with large bolsters on either side of the keelson to support the mast. This was likely a quick way to fashion a mast step that would have allowed the vessel to be quickly armed for battle.

The American vessels demonstrate hasty construction methods in order to quicken the launch of these ships, such as roughly hewn timbers as well as chocks, wedges, and other filler pieces that were added to compensate for insufficient molded or sided dimensions indicating improper measurements before cutting and shaping timbers. The British vessels built in Kingston do not show the use of limber holes, with the tight spacing of the frames water would have collected in the bilges, while the *Linnet*, built at Ile-aux-Noix, demonstrated some limber holes.

Jefferson was also lacking limber holes. This indicates a lack of concern for longevity of these vessels, since they were only intended for the war.

The construction of these purpose built warships during the War of 1812 was the product of the function for which they were built as well as the logistical difficulty in procuring supplies. These vessels were only intended to survive the period of the war and needed to be constructed quickly in order to gain supremacy on the lakes as command depended upon the size of the fleet and its potential to overpower the enemy. Early in the war, the importance of a strong naval force to control the waterways was deemed essential. Throughout the course of the war, both the British and the Americans increased the size and armament of their ships built on the lakes in order to maintain naval parity or gain ascendancy, since naval power was determined not through fleet interaction but fleet intimidation.

CHAPTER 5 : DETAILS OF POST- WAR OF 1812 VESSELS

The War of 1812 was inconclusive and a stalemate was officially recognized when the war ended with the signing of the Treaty of Ghent on December 24, 1814. After the war, the Rush-Bagot Agreement of 1817 was signed between representatives Richard Rush of the United States and James Bagot of Britain. Though not a formal treaty, it limited the number of active armed vessels on the Great Lakes. British and American warships were placed in ordinary and soon showed signs of dry rot. Consequently, they were broken up, hauled up on land, or sunk. While naval operations slowly came to an end on the Great Lakes after the War of 1812, the unprecedented immigration to the region encouraged trade and commerce. The war had greatly hindered commercial activities along both sides of the border and, especially, across the lakes. At the end of the war, there were few merchant vessels on the lakes, since many had been commandeered for naval use (Ford 2009: 140).

With the need for more ships for commercial use, shipbuilding moved away from the naval yards. During the commercial boom from 1820 to 1860, almost every port, river, or bay along the lakes had a shipyard (Van Gemert 1972: 292). Passenger and cargo vessels soon outnumbered military vessels. While the majority of shipwrights on the Lakes in the early 19th century were trained in naval yards, it had already been established that schooners were better suited to the lakes than the typical square rigged naval vessels. Great changes in technology following the War of 1812 revolutionized ship construction on the Great Lakes. While sail vessels multiplied, steam transportation was introduced in 1816. By the 1850s, most large vessels constructed were steam (Ford 2009: 176). Shipbuilding forever changed on the Great Lakes with the opening of the Welland Canal in 1829, which allowed for the first navigation between Lake Ontario and the Upper Lakes. Merchants sought vessels that would fit the dimensions of the

locks, 110 ft. by 22 ft. (33.5 m by 6.7 m) and a distinct type of canal schooner developed (Jackson 1997: 42; Monk 2003).

Archaeologically documented sailing vessels on the Great Lakes built immediately after the War of 1812 period are limited. The *Tecumseth* and *Newash* were constructed on Lake Erie following the peace after the War of 1812 and prior to the restrictions set in place by the Rush Bagot Agreement in 1817 (Gordon 2009). During the commercial boom from 1820 to 1860, sailing vessels dominated on the Great Lakes waters. Few records exist which describe the design and construction of these vernacular craft that were constructed in almost every port, river or bay along the lakes and archaeology serves as a tool for understanding the construction of these regional craft. The Millecoquins wreck, excavated near the mouth of the Millecoquins River in northern part of Lake Michigan, likely dates to the early 1830s (Whitesides 2003). The Griffon Cove wreck, located in Georgian Bay, dates to between 1840 and 1860 (Hundley 1980).

Many of the wrecking events on the Great Lakes took place along the shoals and near shorelines, and were quite often salvaged shortly after the wrecking event. Vessels that foundered in the middle of the lakes did so in depths that often exceeded several hundred feet. Shipwrecks located in these depths are beyond the range of recreational divers and require costly search and support equipment to locate and document them. Recently, several vessels that date from after the War of 1812 have been discovered, but have yet to be systematically recorded. These include the Tiller Wreck near Port Dalhousie on Lake Ontario (Garrington 1997), the schooner *Orcadian* near Sodus Point, New York (Kennard 2006), and the schooner Milan near Oak Orchard, New York (Kennard 2005). Further study of these vessels would greatly aid in understanding the construction techniques used on vernacular sailing vessels and schooners on the Great Lakes.

HMS *Tecumseth* and *Newash*

At the end of the war, ships remained essential on the upper lakes for the transportation of men, supplies, and news. Word of peace did not reach Fort Michilimackinac, at the upper end of Lake Huron, until nearly five months after the Treaty of Ghent was signed (McDouall to Forster, 15 March 1815, in Wood 1920: 532). While the entire Royal Navy squadron on the upper lakes had been captured at the Battle of Lake Erie, in the fall of 1814, the British captured two American schooners used for carrying supplies and renamed them *Huron* and *Sauk*. However, two vessels were not sufficient for carrying provisions and stores; therefore, Commodore Edward William Campbell Rich Owen, Commodore James Lucas Yeo's replacement on the Great Lakes at the end of the war, resolved to build a small number of transport vessels for service on the upper lakes. With the authorized closure of the shipyard at Penetanguishene on Lake Huron, the shipwrights returned to Kingston and E.W.C.R. Owen decided instead to construct two new schooners on Lake Erie, *Tecumseth* and *Newash* (Gordon 2009: 13).

A plan for the two schooners was drafted by Robert Moore, the assistant shipwright at Kingston, and a party of shipwrights departed for Lake Erie. The shipwrights selected the location of Street's Creek along the Niagara River, near the mouth of the Chippawa River. This site was only nine miles from the town of Queenston on Lake Ontario, enabling supplies to be easily transported. The keels of *Tecumseth* and *Newash* were laid in the middle of May 1815 and were launched nearly three months later on 13 August 1815. They measured 70 ft. 6 in. (21.4 m) in length on their decks and 24 ft. 5 in. (7.4 m) in beam. In addition to transporting stores, it was critical that the two schooners were also capable of serving as warships in the event that hostilities with America resurfaced. The schooners were designed to carry four guns each, two

24-pounder guns and two 32-pounder carronades, all carried on the deck. *Tecumseth*, *Newash*, *Huron*, and *Sauk* were the only royal authority on the upper lakes. They were used not only for transportation of goods, but also for enforcing revenue laws on Lake Erie (Gordon 2009: 14, 26, 28).

The Rush-Bagot Agreement rendered *Newash* and *Tecumseth* inoperable, since even without their 24-pounder guns, the hulls were larger than 100 tons. The vessels were therefore laid up in ordinary, stripped of their guns and equipment, and left at anchor on 18 June 1817 in Penetanguishene Bay on Lake Huron. By 1819, *Tecumseth* and *Newash* were already showing signs of dry rot when Commodore Robert Barrie visited Penetanguishene. By the 1820s, both vessels were rotten and sinking at their moorings. A survey conducted in 1827 noted that *Tecumseth* and *Newash* were “completely rotten” and that *Newash* was “on the beach.” In 1831, the hulls were included on a list of naval stores to be auctioned, but neither were sold and they remained in the bay. The establishment at Penetanguishene officially closed in 1834 (Gordon 2009: 81-86)

On 29 August 1953, *Tecumseth* was removed by a dredge from Penetanguishene harbor. It was originally believed that this was the wreck of *Scorpion*, an American built schooner that was captured by the British in 1814, and renamed *Confiance*; however, it was determined to be too large, but the dimensions did correspond with those of *Tecumseth* and *Newash*. The wreck was determined to be *Tecumseth* through evidence of the rig, since *Newash* had been re-rigged as a brigantine and its foremast removed. At that time, the wreck was labeled and displayed outdoors on the grounds at the former naval depot at Penetanguishene, where a museum called Discovery Harbour was established. In 1977, wood samples from the wreck were sent to the Canadian Conservation Institute (CCI) for analysis. The condition of the vessel was not good, as

it had been exposed to the elements for over 20 years; the deterioration of the improperly conserved wood resulted in warping and splitting. Likewise, exposure to the elements resulted in damage from microorganisms. While studies were undertaken shortly after the vessel was removed from the harbor, a detailed archaeological study of *Tecumseth* was not conducted until June 1997 by a team of students from Texas A&M (Gordon 2009: 88-95). The Texas A&M team conducted a non-disturbance survey on the remains of *Newwash* in situ at the bottom of Penetanguishene harbor the following summer. The remains of *Newwash* were located in 6 to 12 ft. (1.83 to 3.66 m) of water, listing to the port side (Figure 5-1). Zebra mussels covered some of the wreck, particularly the iron fasteners (Gordon 2009: 99).

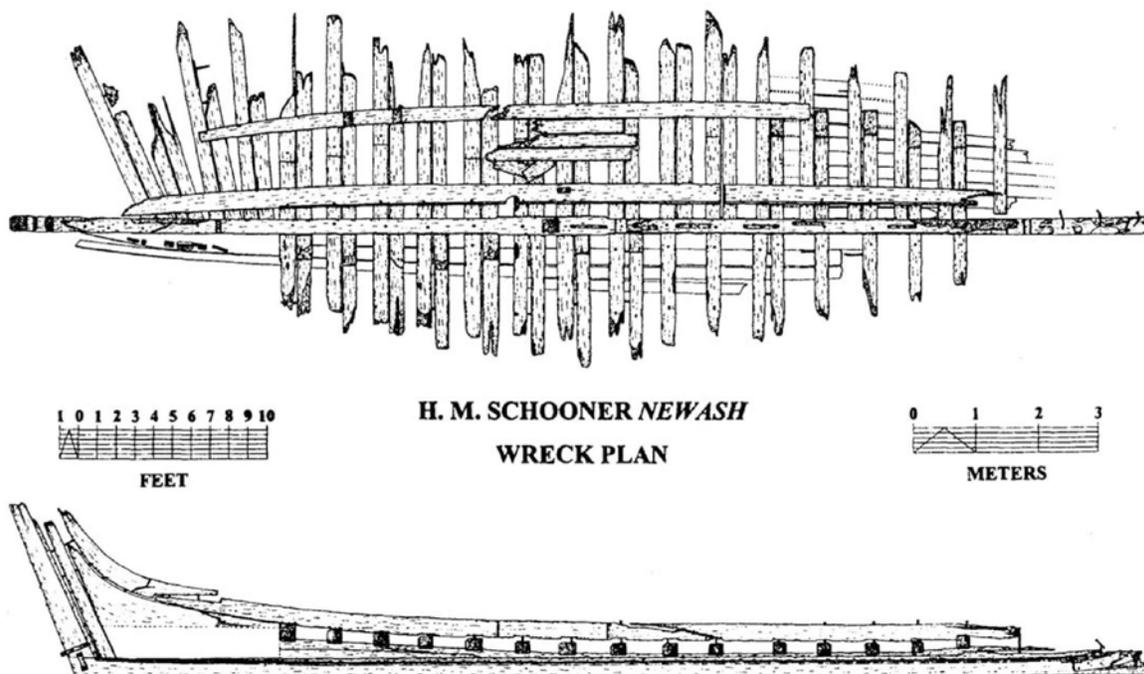


Figure 5-1: Plan of *Newwash* remains (Gordon 2009: 96).

Tecumseth's keel was made of a single piece of unseasoned white oak that measured 55 ft. 9 ¾ in. (17.02 m) long (Figure 5-2). It was sided 10 in. (25.41 cm) and molded 13 in. (33.03 cm). *Newwash*'s keel was almost completely buried in the sediment and measurements could only

be taken near the bow. It was sided 8-10 in. (20.3 to 25.4 cm) and molded 13 ¾ to 16 ½ in. (34.9 to 41.9 cm). No false keel was observed near the bow; however, two grooves along the bottom of the keel may demonstrate its existence and several iron bolts extended below the keel, which may have been used to attach the false keel (Gordon 2009: 101-102).

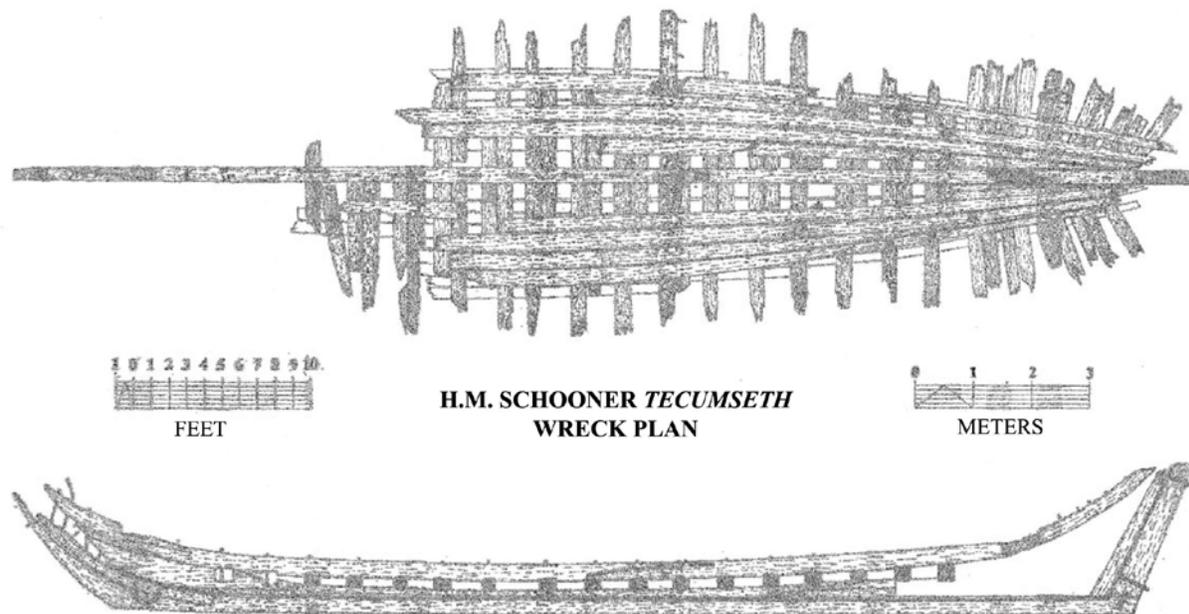


Figure 5-2: Plan of *Tecumseth* remains (Gordon 2009: 97).

Tecumseth's stem was joined to the keel with a boxing scarf, a complex joint that indicates great care in construction. The stem only partially survived to a length of 13 ft. 4 in. (4.07 m) in length and was made from compass timber. The gripe was attached to the keel forward of and below the stem and was made from straight grained timber. Only the lower 8 ft. 9 in. (2.67 m) of the gripe remained. It was sided 10 in. (27.9 cm) and molded 18 ¼ in. (46.37 cm) at its greatest depth. Reinforcing the joint of the gripe and keel were two ½ in. (1.27 cm) thick iron horseshoe plates attached with five iron bolts, placed on either side of the keel. The upper ends of the plate were bolted to the stem. The joints of the stem and keel and the gripe and keel

were offset so that they did not directly overlay each other. The deadwood was only accessible near the bow and was molded 3 in. (7.62 cm) (Gordon 2009: 102-108).

Tecumseth's sternpost was attached to the keel with a mortise and tenon joint reinforced with two iron fishplates attached with six round bolts. The rabbet in the keel continued up the forward corners of the sternpost. Ceiling planking obscured the sternpost and stern knee that were visible on the original construction draft. The after sternpost was beveled on each side to allow for the rudder. Two gudgeons survived that were placed 6 ft. 2in. (1.88 m) apart. Only one gudgeon could be located on *Newash's* sternpost (Gordon 2009: 106-108).

The frame assembly methods were comparable on both *Tecumseth* and *Newash*. The first futtocks were placed aft of the floors forward of the midship frame, and forward of the floors aft of the midship frame. The first futtocks met at the centerline but did not cross it. The interior and exterior planking of *Tecumseth* remained intact; however, some of the planking had eroded or been torn away, allowing access to the framing. There were sixteen square frames, and an indefinite number of cant frames in the bow and half frames at the stern. A sample taken from one frame in 1976 identified it as white oak, while some of the frames studied in the 1950s were noted to be of pine. The frames averaged 9.10 in. (23.12 cm) molded and 10 in. (25.4 cm) sided. The frames were placed on 30 in. (79.22 cm) centers (Gordon 2009: 110). Roughly cut limber holes were cut into the bottom of all floors and first futtocks, with one hole on either side of the keel (Gordon 2009: 118).

Tecumseth's white oak keelson consisted of two separate timbers hook scarfed together. It was sided 9 ¼ in. (23.5 cm) and molded 11 in. (27.9 cm). It was also hook scarfed to the stemson and sternson. It was notched to fit over the floors and fastened with 1.13 in. (2.86 cm) diameter bolts. The stemson was made of a piece of compass timber. *Newash's* keelson was

made of two separate timbers scarfed together (Gordon 2009: 111). *Tecumseth's* keelson displayed weathered shallow impressions for deck beam stanchions. Six deck beam stanchion mortises were found atop *Newash's* keelson forward of the mainmast step, but there were no traces of stanchions aft of the mainmast step (Gordon 2009: 118).

Evidence of the forward mast steps could not be found on either of the wrecks; however bolts remained on *Tecumseth* that indicated its location far forward in the bow (Gordon 2009: 112). Since *Newash* was re-rigged as a brigantine and the foremast moved, the original location would have been equivalent to that of *Tecumseth*. The original drafts of the *Tecumseth* and *Newash* show the foremast stepped so far forward as to be in the lower portion of the stemson (National Maritime Museum 1815) (Figure 5-3). The extreme location forward of the foremast was presumably to compensate for the steeper rake of the schooner's masts.

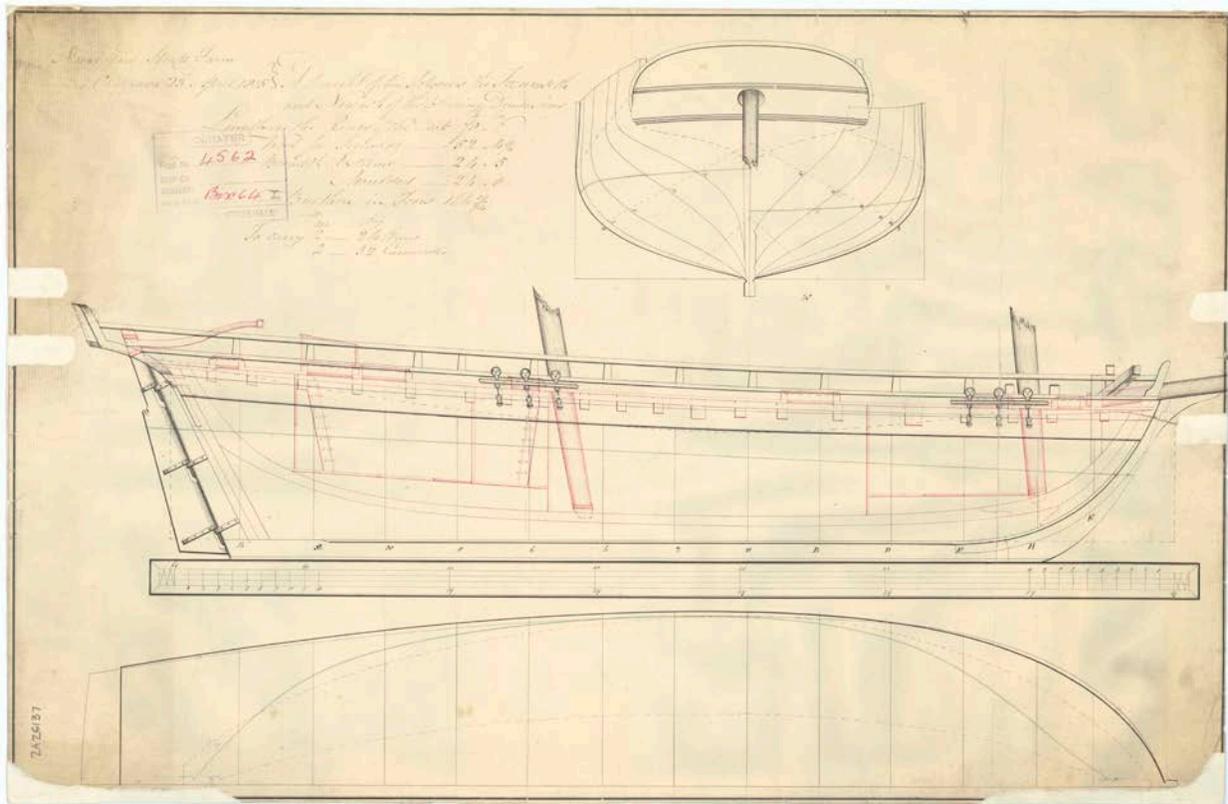


Figure 5-3: Admiralty lines plan of *Tecumseth* and *Newash* showing the foremast stepped far forward in the lower portion of the stemson (National Maritime Museum, Greenwich, London ZAZ6137).

The mainmast steps on both *Tecumseth* and *Newash* were mortises cut directly into the top of the keelson. On *Tecumseth*, this mortise was located 8.63 in. (21.9 cm) aft of the hook scarf. It measured 6.69 in. (16.9 cm) wide and 9 ½ in. (24.1 m) long. Dry rot prevented obtaining accurate depth measurements. The mainmast step was reinforced with an iron plate on either side. *Newash*'s mainmast step differed slightly from that found on *Tecumseth*. The width of the keelson remained uniform on *Tecumseth*; however, on *Newash* the keelson widened where the mainmast step was located. The enlarged portion of the keelson measured 5 ft. 8 ¼ in. (1.73 m) long and 11 ½ in. (29.22 cm) sided. The mortise measured 8 ½ in. (21.6 cm) wide and 10 ¼ in. (26 cm) long. At its forward end, the mortise measured 4 ¾ in. (12 cm) deep, and sloped to 5 in. (12.7 cm) at its after end. There was no evidence of reinforcing iron plates on the sides of the mortise (Gordon 2009: 91, 112-115).

Observations made in 1953 indicate that *Tecumseth* was constructed without hanging knees, but instead with an enlarged clamp and waterway to stiffen the vessel. The clamp and waterway no longer survive on *Tecumseth*, and disarticulated timbers surrounding *Newash* may represent these internal bracing pieces. As smaller vessels, *Tecumseth* and *Newash* may not have required the internal reinforcement of knees (Gordon 2009: 122).

Tecumseth's ash garboard strake measured 12 in. (30.49 cm) wide and 2 in. (5.08 cm) thick, although these may have warped and shrunk due to exposure to the elements since the construction draft indicated that they were originally 2 ½ in. (6.35 cm) thick. Oak and pine were used for the remainder of the exterior planking, which were fastened to the frames with ½ in. (1.27 cm) square spikes and treenails (Gordon 2009: 126).

Tecumseth and *Newash* were constructed during a time of uncertain hostilities on the Great Lakes. The War of 1812 had just ended when their construction was ordered, yet the

certainty that hostilities would not be renewed that followed the Rush-Bagot agreement had yet to come. They were not purpose built warships like those built during the War of 1812, but a hybrid of warship and the merchant. Their construction demonstrates a shift in the paradigms that influenced ship construction following the war.

Millecoquins Wreck

The Millecoquins wreck was discovered in the spring of 1990 by two residents of Naubinway, Michigan in the Millecoquins River, approximately 1.5 miles from Naubinway. The Millecoquins River is located on Michigan's Upper Peninsula and flows into Lake Michigan approximately 50 miles west of the Straits of Mackinac. The wreck lies on the west bank of the river approximately 328 ft. (100 m) inland from the present Lake Michigan shoreline and is oriented generally east-west. The wreck is well preserved, as it remained intact below the sheer as well as the interior arrangement. Furthermore, still present are large portions of the ship's cargo, equipment, and crew's personal items. Three seasons of investigations were carried out on the Millecoquins wreck: a preliminary survey by John Halsey and Patrick Labadie in 1990, and two seasons of excavations conducted by East Carolina University in 1991 (Figure 5-4) and 1994 (Whitesides 2003: 18-19).

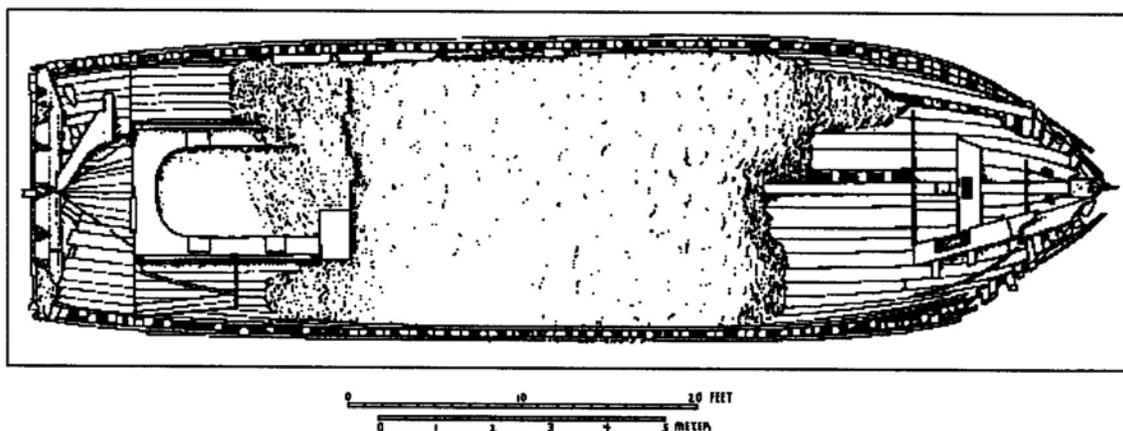


Figure 5-4: Plan of the Millecoquins wreck after the 1991 excavations (Whitesides 2003: 24).

The overall length of the Millecoquins wreck measured 62 ft. (18.8 m) in length and 17 ft. 5 in. (5.3 m) in beam, with a maximum draft of 7 ft. (2.1 m). The white oak keel measured 12 in. (30.5 cm) molded and 8 in. (20.3 cm) sided. These measurements were taken at the bow where the keel transitioned into the forefoot and are believed to represent the maximum molded dimensions. Where the forward end of the keel meets the stem, the stempost measured 5 in. (12.7 cm) sided and widens to 8 in. (20.3 cm) sided at the forefoot. It is molded 10 in. (25.4 cm) at the rabbet (Whitesides 2003: 27).

The only surviving pieces of the upper stern transom included the outer sternpost and two horizontal transom timbers. The lower transom timber was directly atop the deadwood or a deadwood knee. No measurements were stated for the deadwood timbers. The only portion of the sternpost that was accessible for measurement was just above the upper transom. Here, it measured 5 in. (12.7 cm) sided and 10 in. (25.4 cm) molded with a concave aft face to accept the rudder. A “VII” draft mark was carved on the sternpost and two gudgeon straps were located below this mark (Whitesides 2003: 27-28).

The framing on the Millecoquins wreck consisted of square frames throughout the hull and cant frames in the bow. The floors measured 6.5 in. (16.5 cm) sided and 9.5 in. (24.1 cm) molded and were spaced 11 - 12 in. (27.9 – 30.4 cm) in their centers. Only a single floor timber was located in the bow and stern of the vessel. The second futtock was scarfed to the floor with a lipped joint. At the maximum beam, several of the frames were tripled, instead of the typical double framing pattern. The cant frames in the bow consisted of single frames, and in the stern the double frames transitioned to single or half frames (Whitesides 2003: 28).

The white oak keelson was sided 7 in. (17.7 cm) and 8.5 in. (21.5 cm) molded and runs the entire length of the vessel; however, it is unclear if this was a single timber. The keelson was

notched to fit over the floors. Forward, the keelson is attached to the stem by the forefoot. In the stern, it was believed that a stern knee would have originally attached the keelson to the transom timbers, but none of this was visible since the ship is completely intact to the deck but buried (Whitesides 2003: 28).

The ceiling planking was present the full length of the vessel and covered the frames from the keelson to the clamp. It ranged in thickness from 1 – 2.5 in. (2.5 – 6.3 cm) in thickness. The ceiling planking was fastened to the frames with iron spikes and there were indications of blue paint near the spike heads. The ceiling planks were originally loosely fit and tightened with wedges placed between the seams. The exterior hull planking was mostly inaccessible due to the fact that the hull was buried in the sand. The planking that was recorded varied in thickness from 2.25 – 3 in. (5.7 – 7.6 cm) (Whitesides 2003: 28-29).

Two mast steps were present on the vessel. The foremast step is a saddle type mast step which measured 2 ft. 2 in. (65 cm) long and 5 in. (12.7 cm) wide that was notched to fit over the keelson with a mortise to accept the mast and located 6 ft. (1.8 m) aft of the stem. An 1833 United States penny was located under the foremast, likely placed there when it was first stepped. The mainmast was also a saddle type step, notched to fit over the keelson and mortised to accept the mainmast. Only the starboard section of the mainmast step was uncovered, which revealed that it extended 2 ft. (0.6 m) from the centerline and measured 15 in. (38 cm) in width (Whitesides 2003: 29-30, 33).

Artifacts uncovered from the Millecoquins wreck led researchers to conclude that the vessel was involved in the Great Lakes commercial fishing trade, supplying communities around upper Lake Michigan (Whitesides 2003: 33). This vessel likely represents a typical sailing merchant vessel for the region and time period of the second quarter of the 19th century.

Griffon Cove Wreck

The Griffon Cove wreck was discovered in 1955 in a small cove on Russel Island in Lake Huron, within the boundaries of Fathom Five National Marine Park, Canada. The remains were originally believed to be the famed 17th century vessel *Le Griffon* built by René Robert Cavelier, Sieur de La Salle that was lost somewhere between Green Bay and the Niagara River. One of many claims to locating the well-known shipwreck, further investigations disproved the vessel's anticipated identity. Instead, the wreck represents a sailing vessel typical of those found on the Great Lakes in the mid-1800s. Artifacts recovered from the wreck, specifically ceramics, indicate a date between 1840 and 1860 (Hundley 1980: 2, 80, 99).

In 1955, some timbers were removed from the wreck. It was not until 1978 that a team from Texas A&M photographed, drew, and catalogued the ship's timbers (Figure 5-5). A scale model was constructed to aid in understanding the vessel's construction. Archaeological investigations at the wreck site were conducted by the Fathom Five National Marine Park staff from June to September 1978. These included a site survey of the surrounding inner and outer coves, as well as the adjacent shoreline, followed by excavation of the wreck site. Alongside these excavations, students from Texas A&M returned to the wreck to examine and photograph the keel, stem, stern knee, and floor timbers (Hundley 1980: 2, 26-28).

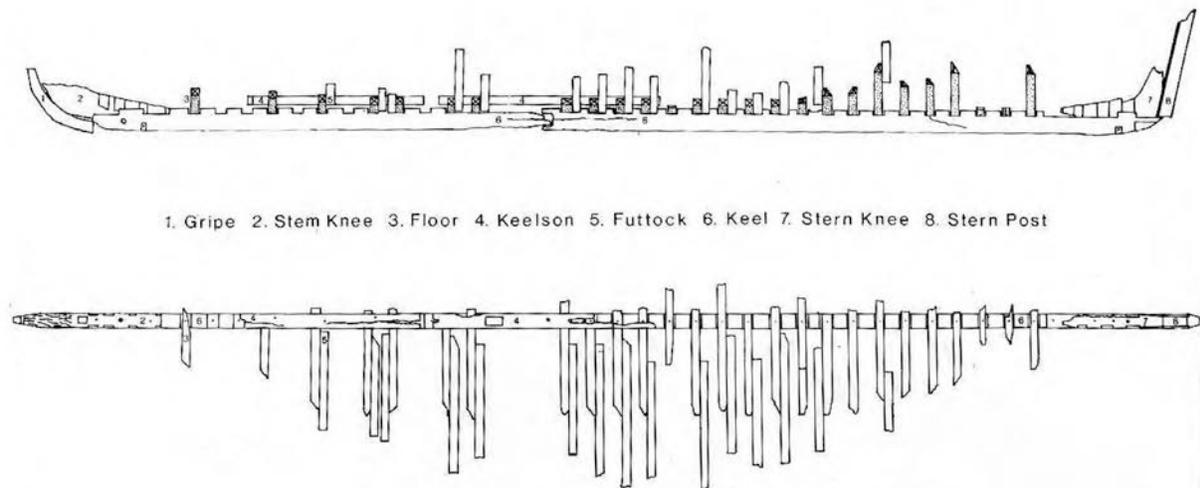


Figure 5-5: Plan and profile of Griffon Cove Wreck (Hundley 1980: 91).

During recovery of the wreck in 1955, the keel broke into two pieces likely at the location of a bolt hole. One section measured 18 ft. (5.4 m) and the other 24 ft. 8 in. (8.27 m) in length. It measured a maximum of 10.25 in. (25.9 cm) molded and 6.25 in. (15.8 cm) sided. It is likely that the white oak keel was made from a single timber that measured approximately 42 ft. (12.6 m) in length. The top of the keel was notched to receive a total of thirty floor timbers. These notches varied from 1.3 to 2.5 in. (3.2 to 6.4 cm) in depth and were approximately 5.2 in. (13.2 cm) in length. A hole for an iron bolt no longer present was located in the center of each notch that would have secured the frames. There was no evidence of a rabbet in the keel; however, where a rabbet would be expected, there were slight indentations at various points alongside the keel likely caused by abrasion of the garboard strake along the keel. On the underside of the keel are six holes for 0.75 in. (1.8 cm) square iron bolts that were spaced 4 to 5 ft. (1.2 to 1.5 m) apart that would have fastened the shoe to the keel (Hundley 1980: 34, 39, 61).

Three holes were located in the side of the keel, two of which went completely through. These were likely to facilitate launching and hauling up of the vessel by placing iron bars through the keel. Similar bars were also found on *Nancy* and *Tecumseh*, built in the Georgian

Bay area. This technique was employed in the Tobermory area of Georgian Bay into the 20th century (Hundley 1980: 66).

The stem assembly consisted of a stempost and a gripe. The stempost measured 4 ft. 8 in. (1.4 m) in length, 10 in. (25.3 cm) molded, and 8 in. (20.2 cm) sided. Four small notches along the side of the stempost indicate the attachment points for the half frames. A deteriorated rabbet is present forward of where the stempost was scarfed to the keel and secured with four iron bolts. The gripe measured 35 in. (88.5 cm) long on the interior face and 41 in. (1.03 m) on the exterior face. The gripe is tapered from the head to heel and from the inside edge that rests against the stem knee to the leading edge (Hundley 1980: 42-45). A mortise was located on the stempost that may have supported a stanchion, bit, or foremast (Hundley 1980: 70).

The stern assembly consisted of a stern knee scarfed to the keel and a sternpost bolted to the knee. There was no evidence of any other timbers, such as deadwood timbers, in this portion of the vessel, indicating this was a small vessel of simple construction. The stern knee was made from compass timber and measured 4 ft. 2 in. (1.25 m) in length and was molded 8 in. (20.2 m). Four notches and nail holes alongside the knee indicate where the frames were attached. The surviving portion of the sternpost measured 4 ft. 8 in. (1.4 m) in length, was molded 4.5 to 5.3 in. (11.3 to 13.4 cm), and was sided 5 to 10 in. (12.5 to 25.3 cm). The sternpost was fastened to the knee with a single iron bolt; it was not mortised to the keel as was common on larger vessels. A rabbet was present in the sternpost and a row of nails indicated where the external planking terminated. The rabbet was approximately 2 in. (5.1 cm) deep (Hundley 1980: 46-49). A notch on the after side of the sternpost appears to be one of the points for attaching the rudder hardware. Two gudgeons would have held the rudder in place, however, there is no evidence for the location of another gudgeon just above the keel (Hundley 1980: 71).

As indicated by the notches in the keel, the Griffon Cove wreck had thirty square frames that consisted of one floor timber and two futtocks. A total of 27 floor timbers, 37 futtocks and 5 broken frame ends were recovered from the wreck site. The frames in the bow and stern were not canted. The floors were bolted to the keel with 0.5 in. (1.2 cm) iron bolts along the centerline and spaced at 1 ft. (30 cm) intervals. All the floors measured 3.5 to 4 in. (8.8 to 10.1 cm) molded and sided. On either side of the keel, limber holes were cut that measured 1 in. (2.5 cm) deep and 4 in. (10.1 cm) wide. The futtocks were fastened to the floors with iron nails in one or two locations (Hundley 1980: 49, 72).

Two segments of the keelson were recovered. One section is 8 ft. 5 in. (2.4 m) in length, molded 7.5 in. (18.9 cm), and sided 3 in. (7.5 cm). A 4.5 in. (11.3 cm) by 9 in. (22.7 cm) rectangular hole was in the keelson 13 ft. (3.9 m) forward of the stern knee. Hundley suggests that this may not represent the mainmast step since it is too far aft in the vessel, but may instead represent a mortise stanchion that supported a small after deck. The other piece measured 6 ft. 10 in. (2.05 m) in length with a maximum molded dimension of 8.5 in. (21.5 cm) and sided dimension of 3 in. (7.5 cm). The keelson was bolted to the keel between every other floor. To avoid splitting the keel, the fasteners were driven consecutively through the portside, center, and starboard side. The keelson likely terminated 56 in. (1.4 m) or 5 frames forward of the stern knee. Evident here is a crack in the side of keel that may have been caused by hitting rocks or a grounding, since it lacked additional strength from the keelson (Hundley 1980: 42, 62).

Small nail holes on the inner and outer faces of the futtocks indicate that the ceiling and external planking were also attached with nails. Only a few floor timbers had nail holes in their inner planking, likely because a limber board existed for clearing the bilge water. Fourteen planks or fragments were recovered from the Griffon Cove wreck. Intact nails indicate that the

original plank external thickness was 1.5 in. (3.7 cm). Three fragments of the garboard strake were identified. The edge that abutted the keel is beveled (Hundley 1980: 49-52).

Reconstructive modeling of the vessel indicated that the total length of the Griffon Cove wreck was 44 ft. 9 in. (13.42 m) and the extreme breadth was 14 ft. 7 in. (4.37 m). The depth of the hold was approximately 3 ft. (0.9 m) with an estimated draft of 2 ft. (0.6 m), indicating this was a small vessel (Hundley 1980: 112).

The Griffon Cove wreck represents a small sailing vessel that was typical of vessels on Georgian Bay and Lake Huron in the mid-1800s. Hundley concluded that based on the vessel remains alone, it was impossible to determine the origin and period from which the vessel was constructed due to the fact that this vessel represented a vernacular sailing vessel for which there exists little documentary evidence of the techniques used and their evolution over time. He further suggests that investigation and publication of more vessels from the Great Lakes would make it possible to more closely define the construction techniques used for local merchant craft (Hundley 1980: 79).

Post-War of 1812 Vessel Attributes

Vessels that were constructed after the War of 1812 contrasted sharply from the purpose built warships; however, their construction methods did not simply return to that of the merchant vessels of the pre-War of 1812 period. After the war, vessels were built to be simple and utilitarian. Many of the shortcuts employed during the war were carried over as they proved not to harm the sailing qualities of the vessels, such as the use of green timber and lack of compass timbers or knees. The following table displays the characteristics of these post-War of 1812 period vessels.

Table 3: Characteristics of Post-War of 1812 Vessels

	<i>Tecumseth</i>	<i>Newash</i>	Millecoquins wreck	Griffon Cove wreck
Date	1815	1815	Circa 1830	1840-1860
Nationality	British	British	American	British
Vessel function	Hybrid merchant/warship	Hybrid merchant/warship	Merchant	Merchant
Length overall	70 ft. 6 in.	70 ft. 6 in.	62 ft.	44 ft. 9 in.
Beam	24 ft. 5 in.	24 ft. 5 in.	17 ft. 5 in.	14 ft. 7 in.
Keel length	55 ft. 9 ¾ in.	Not listed	Not listed	42 ft.
Keel molded	13 in.	13 ¾ -16 ½ in.	12 in.	10.5 in.
Keel sided	10 in.	8-10 in.	8 in.	6.5 in.
Keel wood type	White oak	Not listed	White oak	White oak
Keel notched	No	Not listed	No	Yes
Keelson length	Not listed	Not listed	Not listed	Not listed
Keelson molded	11 in.	Not listed	8.5 in.	7.5-8.5 in.
Keelson sided	9 ¼ in.	Not listed	7 in.	3 in.
Keelson wood type	White oak	Not listed	White oak	White oak
Keelson notched	Yes	Not listed	Yes	No
Floor avg. molded	9.1 in.	Not listed	9.5 in.	3.5-4 in.
Floor avg. sided	10 in.	Not listed	6.5 in.	3.5-4 in.
Futtock avg. molded	Not listed	Not listed	Not listed	Not listed
Futtock avg. sided	Not listed	Not listed	Not listed	Not listed
Frame spacing	10 in.	Not listed	11-12 in. on centers	1 ft.
Frame wood type	Not listed	Not listed	Not listed	White oak
External planking thickness	Not listed	Not listed	2.25-3 in.	1.5 in.
External planking wood type	Oak and pine	Not listed	Not listed	Not listed
Ceiling planking thickness	Not listed	Not listed	1-2.5 in.	Not listed
Ceiling planking wood type	Not listed	Not listed	Not listed	Not listed
Number of masts	Two	Two	Two	One
Mast step type	mortise	mortise	Saddle type	Mortise
Compass timbers	yes	Not listed	Not listed	Not listed
Fasteners	Treenails and iron	Treenails and iron	Iron	Iron

The vessels built after the War of 1812 were designed to be simple and functional and did not display the additional craftsmanship in ornamental detail that the vessels did prior to the war. All of the vessels had plain utilitarian bow arrangements, much like those seen during the War of 1812. Vessels built prior to the war typically had elaborate figureheads embellishing their bows. These detailed bows can be seen on *Nancy*, *Hamilton* and *Scourge*, and was likely present on the *Earl of Moira*. Likewise, the privateer *Defense* demonstrated decorative trim throughout the vessel.

Several features of *Tecumseth* and *Newash* demonstrate that, while they were constructed quickly, it is not reminiscent of the hurried construction typical of some of the War of 1812 period warships. One of the greatest constraints on shipwrights during the War of 1812 was time, as ships were required immediately. Consequently, corners were cut during construction in order to quickly launch and prepare vessels for sailing. The fact that *Tecumseth* and *Newash* did not have hanging knees to strengthen the hull may not indicate hurried construction. While several of the lake warships did have these reinforcing compass timbers, many of the vessels did not have knees but some other configuration for internal support, such as that of carlines bolted to the frame on the *St. Lawrence*. The reason for lack of hanging knees on *Tecumseth* and *Newash* may have been that the shipwrights determined that these smaller vessels were not under the same stress as a larger ship and would not need as much reinforcement (Gordon 2009: 130).

Indicative of care and unhurried construction was that fact that treenails were employed alongside iron spikes to fasten the hull planking on *Tecumseth* and *Newash*. The Millecoquins wreck and Griffon Cove wreck only employed the use of iron fasteners, indicating that these may have been constructed in a hurried manner or the shipwrights may have believed that the forces

enacted on the smaller vessels did not require the strength of treenails and iron fasteners were sufficient.

During the war, vessels were built of green wood since there was no time to allow timbers to season. Likewise, *Tecumseth* and *Newash* were constructed of green wood; however, this was likely due to the fact that timber reserves were depleted during the war. By the time that both schooners were built, shipwrights had been constructing vessels of green wood for a few years and, knowing that these vessels would not be subject to the strains of heavy deck loads and long sailing careers, determined that green wood would not be a problem in their construction. It is unclear whether or not the unseasoned wood was used in the construction of the Millecoquins wreck or Griffon Cove. Due to the fact that the Millecoquins wreck may have been constructed far from the epicenter of ship construction during the War of 1812, it may have benefitted from stores of seasoned wood.

Since all of these vessels operated on the upper lakes, their keels were deeper than they were wide, which may have improved their sailing abilities despite the shallow drafts that may have enabled them to clear the shallows of the St. Clair River and enter Lake Erie. The keels of all of these vessels were made from strong oak. The keel of the Griffin Cove wreck was notched to strengthen the join between the frames and the backbone of the vessel.

Once the war was over, it was no longer necessary for shipwrights to construct warships that were built to withstand heavy fighting. Warships were constructed of heavy, solid timbers with little spacing between frames. Although *Tecumseth* and *Newash* were constructed as merchant vessels that could be armed in the case of hostilities, they did not demonstrate the same heavy framing of the War of 1812 period vessels. The two schooners were built with frames of modest size with comparatively wide spaced frames (Gordon 2009: 131). The type of robust

construction exemplified in the Great Lakes warships was, in fact, a hindrance to speed on the lakes, which is unfavorable for merchant vessels that wish to make good time. Likewise, the Millecoquins wreck and Griffon Cove wreck were constructed of much lighter framing methods and spacing between was approximately 1 ft. on the centers. The average size of the frames was comparable between the vessels. All employed the use of square frames; however, the Griffon Cove wreck did not use cant frames in the bow or stern, likely due to its much smaller size.

The keelsons for these vessels generally measured approximately the same dimensions as that of the keel, or slightly smaller. The exception is the Griffon Cove wreck which had a significantly smaller keelson, especially in its molded dimension. The keelsons of the *Tecumseth*, *Newash*, and Millecoquins wreck were all notched as noted in the standards set out by Sutherland (1711: 26).

Mast steps on these vessels consisted of a simple mortise cut directly into the keelson on *Tecumseth*, *Newash*, and the Griffon Cove wreck. The simple mortise cut mast step on *Tecumseth* was reinforced with metal plates on either side of the step and the keelson was actually widened at the location of the step on *Newash* to provide additional strength. A saddle type step was employed on the wreck of the Millecoquins wreck, indicating that the shipwrights took care to ensure that the point mast was strong to harness the power of the wind.

The vessels constructed after the war demonstrate that the War of 1812 subtly influenced the development of ship construction on the Great Lakes. Construction techniques did not entirely return to the way they were prior to the war; likewise, they were influenced by the knowledge and techniques gained through several years of hurriedly building ships in these frontier regions with lack of supplies.

CHAPTER 6 : THE NAVY BAY WRECK: A CASE STUDY

In order to determine if the characteristics outlined in the previous chapters can aid in identifying the period of origin of a vessel, these attributes will be applied to the Navy Bay Wreck, an unknown shipwreck in Kingston, Ontario. By reason of its location in Navy Bay, the former center of operations for naval vessels on Lake Ontario and headquarters for the Royal Navy on the Great Lakes and Lake Champlain, it is believed to relate to these former naval facilities. The wreck may relate to the period of the Provincial Marine, the War of 1812, or the post-war era. Indeed, the career of the vessel might have straddled all of these periods.

In 2002 and 2004, the Underwater Archaeology Service (UAS) of Parks Canada conducted a submerged cultural resources study of Fort Henry National Historic Site (NHS) which inventoried resources from Navy Bay, Deadman Bay, and parts of Kingston harbor (Figure 6-1). A side-scan sonar survey of Navy Bay in 2002 revealed a wreck along the west shore, now known as the Navy Bay Wreck (Parks Canada provenience number: 66M14A1). Jonathan Moore of the parks Canada Underwater Archaeology Unit and Steve Flaherty a local Kingston diver first dived the wreck in 2004 in order to photograph and measure the wreck. From these first findings, a preliminary list of possible candidates was constructed (Moore 2008: 38). In 2006, Jonathan Moore suggested to the author the further survey and identification of the Navy Bay Wreck as part of a Masters thesis.

The Navy Bay Wreck is located next to the shoreline, near present day athletic fields, in approximately 8 feet (2.4 m) of water. It is heeled to port and lies approximately 35° to the shoreline with the bow facing northeast. The majority of the vessel is covered in zebra and/or quagga mussels. The wreck survives from the forefoot to the aft face of the heel timber. Most of the port side is buried under silt, and the starboard side appears intact to the head of the first

futtocks. The wreck measures 61.0 feet (18.6 m) in length and its measured half-breadth from the keelson to the outer edge of the remaining port side framing was 10.98 feet (3.35 m). This would generate a complete hull breadth of 21.98 feet (6.7 m) (Moore 2008: 38).

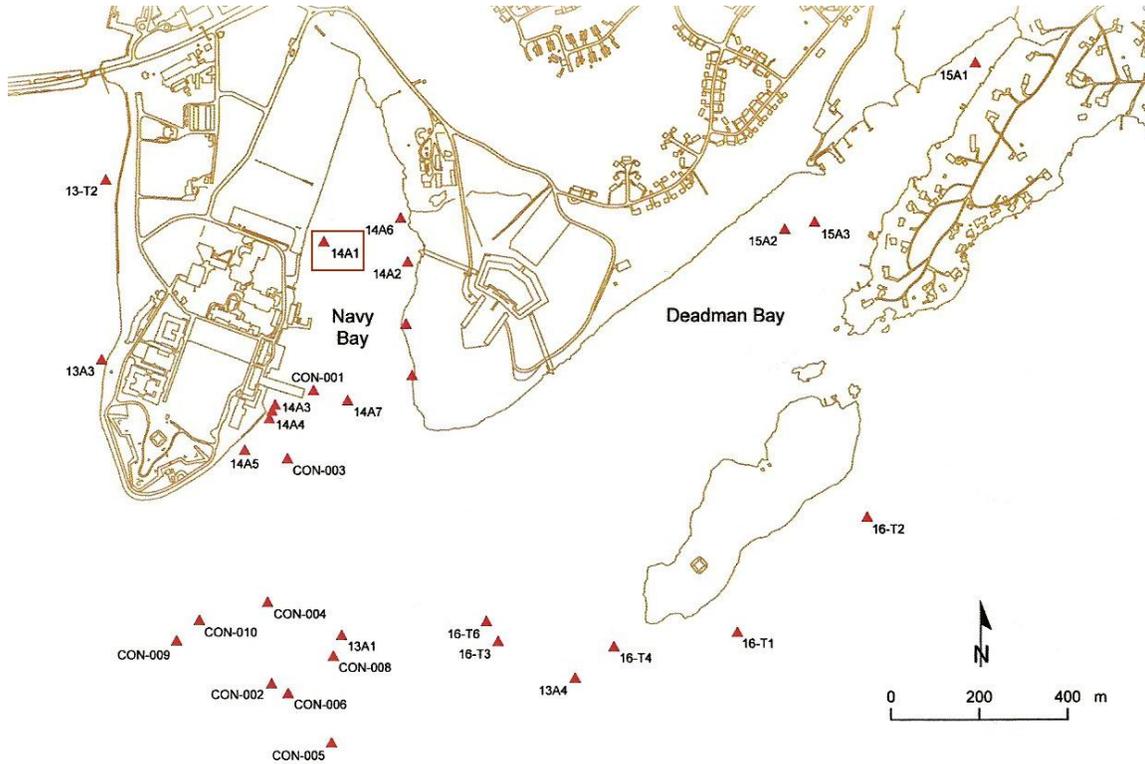


Figure 6-1: Location of submerged cultural resources in Deadman Bay, Navy Bay and off Points Frederick and Henry. 14A1 marks the Navy Bay Wreck. The full Parks Canada provenience number is 66M14A1 (Moore 2006: 12).

The fieldwork required for documenting the Navy Bay Wreck was completed from June 1-9, 2008. Water temperatures were chilly, ranging from 53-57°F (12-14°C), entailing 2-3 dives per day that ranged between 30-45 minutes each. Volunteers from the Kingston Dolphin Scuba Club and members of Preserve Our Wrecks Kingston assisted with the recording of the Navy Bay Wreck. Some of the volunteers were Nautical Archaeology Society trained in archaeological recording techniques, though most were not. However, this did not play a factor in the recording since the mapping of the wreck was done using the software Site Recorder 4, and so this was a new type of recording system for all those involved.

Site Recorder 4 is a Geographic Information System (GIS) and Information Management System (IMS) designed for use in maritime archaeology and intertidal archaeology. Site Recorder allows for full 3D survey data collection and processing based on distance, depth and position measurements (3H Consulting n.d.). In order to take measurements of the wreck, an interlaced series of control points are required. Positions of wreck features are obtained by measuring the distance from at least two of these control points and a depth measurement. Once measurements are input to the program, it uses a least-squares adjustment to compute the optimum position of the survey points. These points can then be used for the frame for drawing the site plan.

The first step to setting up this survey was to establish the control network. A total of nine control points were first established. Seven of these were stakes that were hammered around the periphery of the wreck and two were located at visible features along the keelson. Measurements were taken between each of the control points to enable the software to form the grid from which all other measurements were taken. Depth measurements were also taken. Since depth gauges do not provide sufficient detail, especially in such a shallow environment, another method for measuring depths was developed. Given the fact that the wreck is located in a rather sheltered position in Navy Bay with considerably calm waters, it was possible to rig a measuring tape with a float so that depth measurements could be taken at an accuracy of ± 5 centimeters.

Once the control network was set up, the survey progressed steadily. The wreck was divided into manageable sections which volunteer pairs were assigned to record by measuring features from two of the control points as well as depth (Figure 6-2). All measurements were input into the Site Recorder software after the daily dives to ensure the accuracy of each measurement. In this way, any measurements that were rejected by the program could be easily

checked the following day before starting measurements in new sections. The datum markers were surveyed using a total station in order to be tied into the map of RMC and Fort Henry NHS, to see the relation to other War of 1812 sites in the area. Once the survey was complete, the site plan generated by Site Recorder was used to create the final site plan (Figure 6-3).

Detailed drawings were made of both the stem and stern assemblies as well as features along the keelson. Unfortunately time did not allow the retrieval of molded and sided dimensions for all of the timbers on the wreck. A total of eight wood samples were taken from the keel, stem post, stern deadwood, floor, futtock, keelson, ceiling plank, and external planking. They were analyzed by the Analytical Section at the Ontario Service Centre of Parks Canada, all of which proved to be white oak (Appendix A). Photos and video were taken of the site.

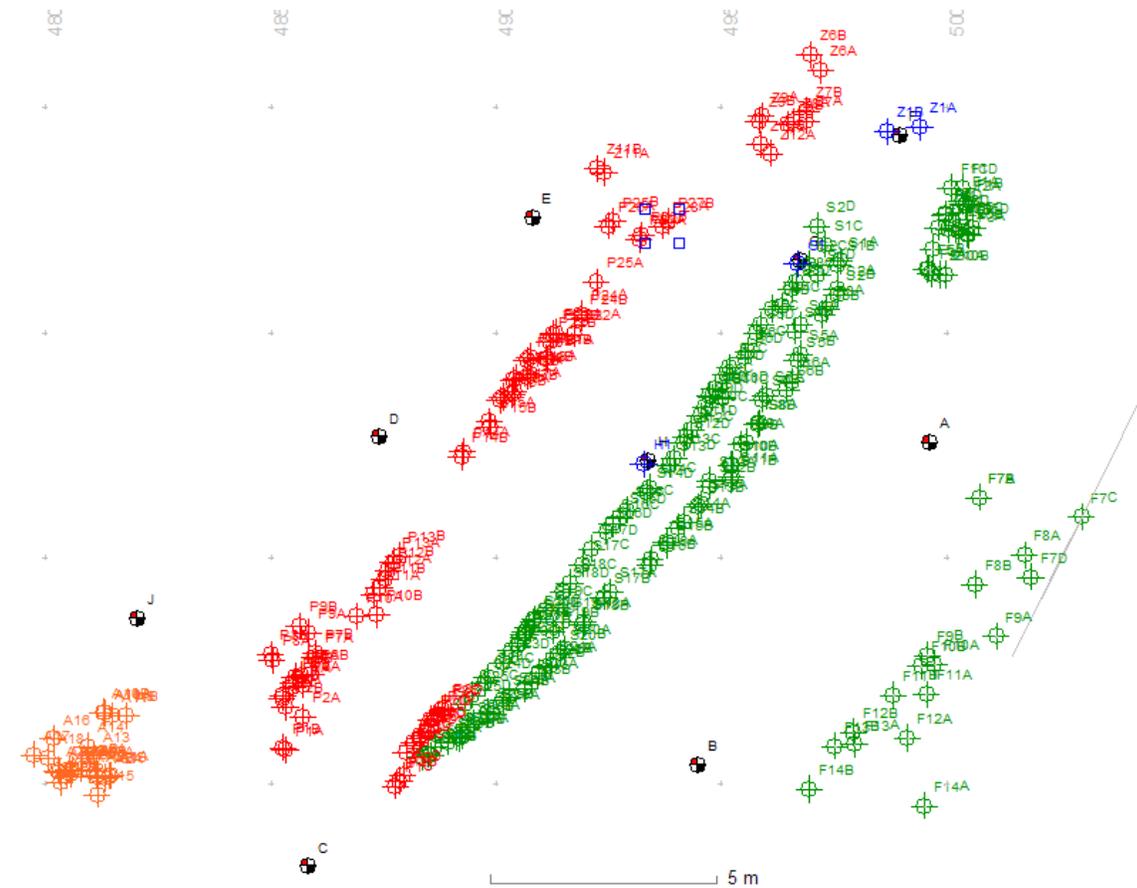


Figure 6-2: Screen shot from Site Recorder showing datum markers (letters) and points measured (color coded for easier data processing).

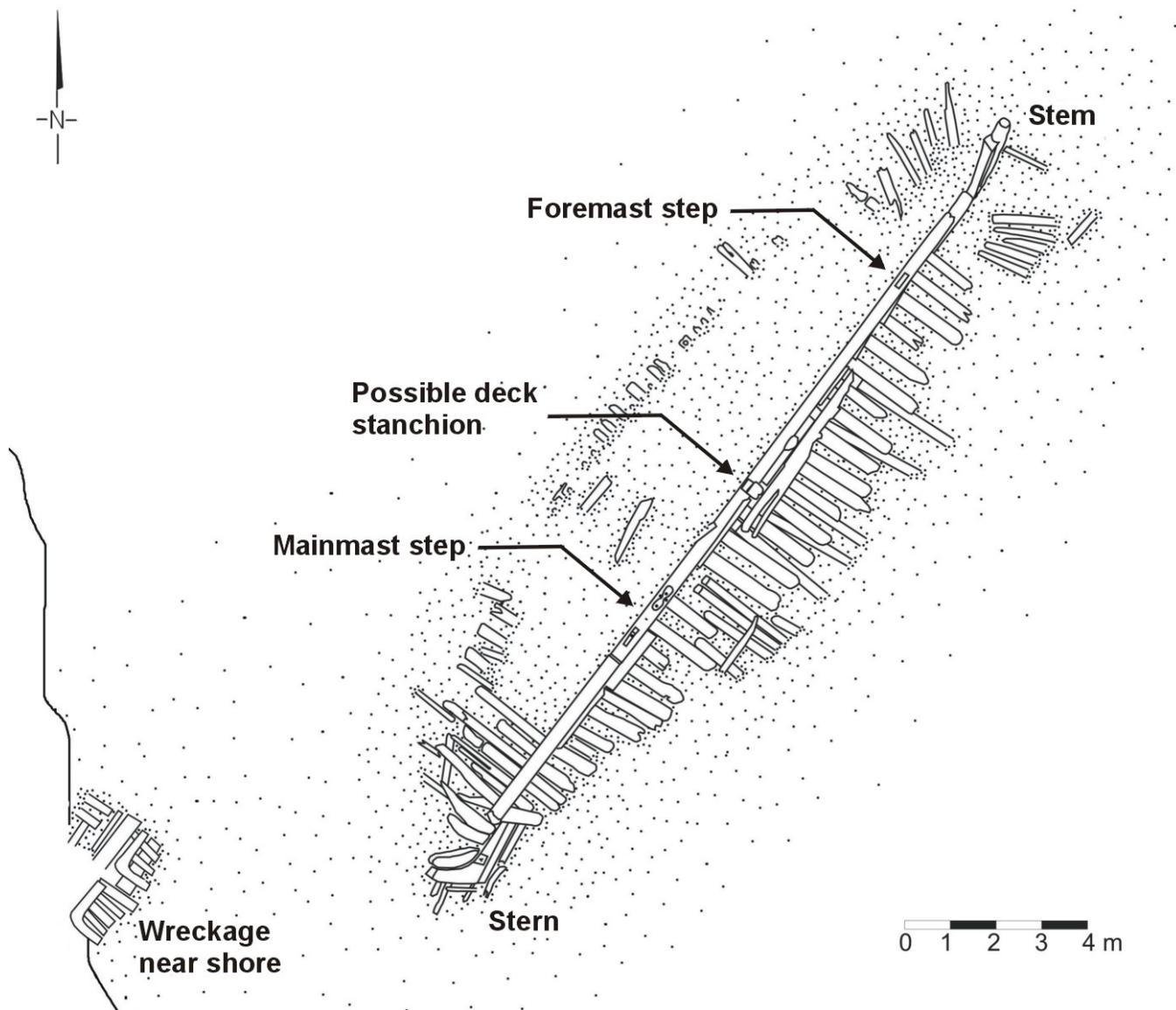


Figure 6-3: Navy Bay Wreck site plan (Kopp 2008).

The white oak keel measured approximately 60 ft. 8 in. (18.5 m) in length; but, unfortunately since is buried by sediment, measurements of its sided and molded dimensions could not be taken. The stem assembly consists of three components: the apron, stem post, and gripe. Only the heel of the stem and apron survive, and the grip is largely buried in the silt. The fourth timber appears to be a piece of stem deadwood; however, it is mostly buried in the silt.

Only a sliver of the sternpost survives, with no rudder irons attached to the heel. Three pieces of stern deadwood are present.

The framing consists of 26 square frames, four disarticulated cant frames located at the stem on both the port and starboard sides, and Y-frames in the stern. The midship frame is located 32 ft. 9 in. (10 m) aft of the stem. As was typical of ship construction in the late 18th and early 19th century, the frames forward of the midship frame were constructed with the first futtocks fastened to the forward faces of the floor timbers, while frames aft of the midship frame were assembled with their first futtocks aft of the floors. Spacing between the frames averaged 4.7 in. (12 cm). The vessel is iron fastened, and there is no indication of the use of treenails.

The keelson is sided 7.2 in. (18.5 cm) and molded 6.8 in. (17.5 cm), there is no rider keelson. It is scarfed in two places, just aft of the stem and aft of the main mast step. It is fastened to the keel with iron bolts located between every other frame. Three features were located along the keelson. The furthest forward is the forward mast step, located 6 ft. 10 in. (2.1 m) abaft the stem (Figure 6-4). It is a simple rectangular mortise cut directly into the keelson that measures 10.6 cm (4.2 in.) wide, 24.3 cm (9.6 in.) long, and 4.5 cm (1.8 in.) deep. The mast step is generally intact, except for erosion, and shows no sign of breakage from strain on the step. Chocks and buttresses might have originally existed as a part of this mast step assembly in order to reinforce the step, however, they are not present on the wreck. A loose wrought iron spike was found resting inside this mast step. Simple mortise cut mast steps appear to be typical of small to medium sized vessels constructed during the mid- to late-18th century.

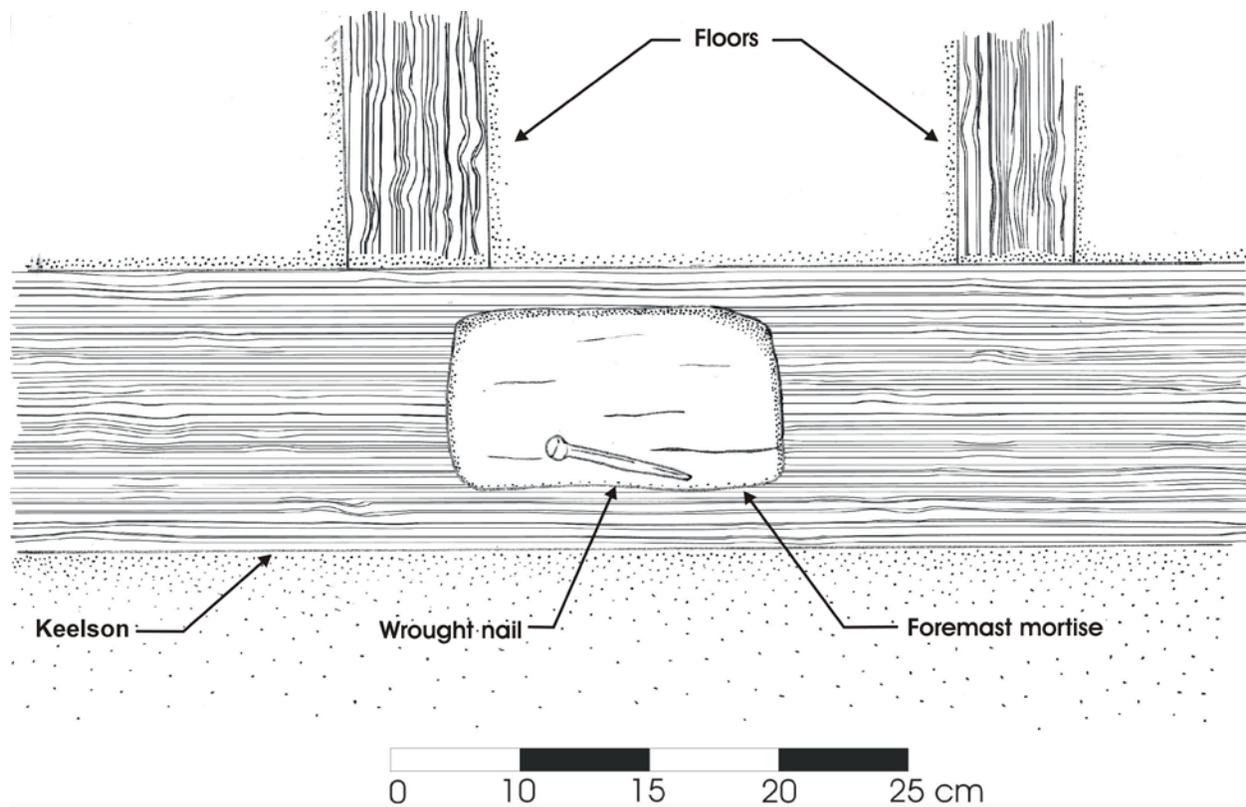


Figure 6-4: Navy Bay Wreck foremast step (Kopp 2011).

Another cut in the keelson is located 5.60 m (18 ft. 4 in.) abaft the forward mast step (Figure 6-5). This one has a square shape and measures 19.8 cm (7.8 in.) wide, 18.2 cm (7.2 in.) long and is 1 cm (0.4 in.) deep forward and 1.5 cm (0.6 in.) deep aft. This was likely the location of a pillar or stanchion for support of the deck. Upon consultation with Dr. Kevin Crisman of Texas A&M University, who has surveyed and excavated War of 1812 ships in Lake Champlain and the Great Lakes, he informed the author that this does not resemble a typical mortise for deck beam stanchions, which tend to be long, narrow, and sloped fore and aft (Kevin Crisman 2009, pers. comm.). Indeed, the US brig *Eagle* had nine rectangular slots along the top of the keelson between frames 1 to 8 for the stanchions posts to support the deck beams. They were between 5.1 cm (2 in.) and 10.2 cm (4 in.) wide, and ranged in length from 15.2 cm (6 in.) to 58.4 cm (23 in.). Each sloped in a forward or aft direction to a depth of about 2.5 cm (1 in.).

Clearly, these do not compare with the Navy Bay example; however, there was another notch located further aft on the keelson that was similar to the Navy Bay example. It measured 10.2 cm (4 in.) square and was very shallow (Crisman 1987: 147). While this notch better resembles the one seen on the Navy Bay Wreck, its purpose remains undetermined. Since it would have been an odd place for a capstan post, that possibility is ruled out although it could have been for a large stanchion at a main hatch opening. Dr. Crisman also suggested that another possibility, although lower probability, is a support stanchion under a pivot gun mounted between the masts (Kevin Crisman 2009, pers. comm.).

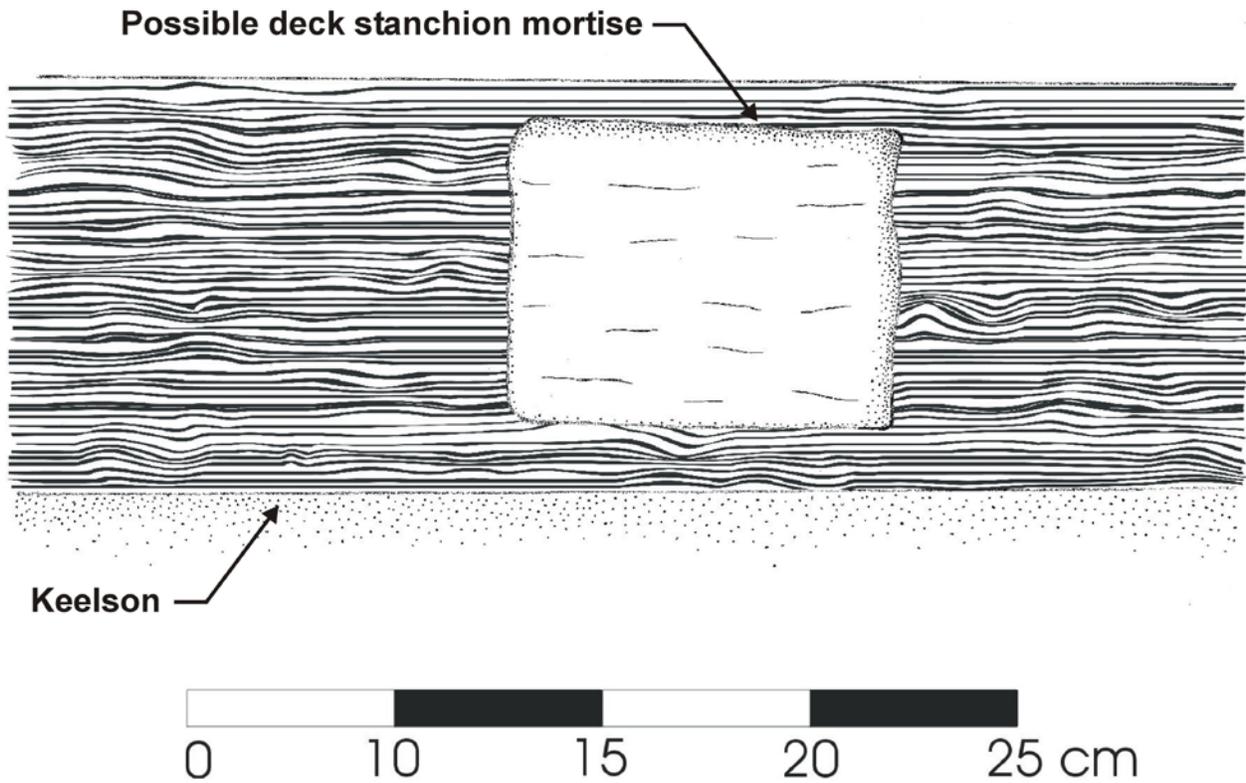


Figure 6-5: Possible deck beam stanchion mortise on the Navy Bay Wreck (Kopp 2011).

The main mast step assembly is positioned immediately forward of the aft keelson scarf. The step assembly consists of two blocks, the forward element measuring 1 ft. 3 in. (40 cm) long

and 7.9 in. (20 cm) wide, and was held in place with four iron bolts (Figure 6-6). This block is badly deteriorated, and the iron bolts are very corroded. The aft block is much smaller and measures only 7.9 in. (20 cm) long and 3.9 in. (10 cm) wide and was held in place with one iron bolt. It is assumed that these blocks would have held in place a saddle mast step similar to the arrangement seen on *General Hunter*. In the case of *General Hunter*, the two blocks were the same dimensions, and were held in place with two round and three square spikes (Cassavoy 2005: 30). The larger forward block on the Navy Bay wreck may have better withstood the strain placed upon it from the forward action of the mast. A small notch carved into the keelson which measures 0.8 in. (2 cm) long, 0.2 in. (0.5 cm) wide and 0.2 in. (0.5 cm) deep is located between these two features and runs along the keelson. The author speculates that this may have been a form of mortise and tenon, employing a biscuit tenon, to place the mast step prior to the two blocks being spiked to the keelson. An auger hole is located on the starboard side of this notch, this may be the location of a drift bolt when the mast step was placed in a different location. A small coin-sized notch is also located in the middle of the two blocks. Evidence of burning was found along the port side in this area, which could possibly indicate the location of the stove, further investigation and possible excavation of the sediment on this side of the wreck would reveal more information. Another wrought spike was discovered on top of the sediment at this location. The evidence for a saddle mast step suggests a late 18th to early 19th century construction date.

Although relatively little remains of the interior structure of the Navy Bay Wreck, two limber boards were still present along the starboard side of the vessel, as well as one portion of ceiling planking. Lower hull planking survives near the stern; however, it is buried by silt. At the bow, some hull planking survives.

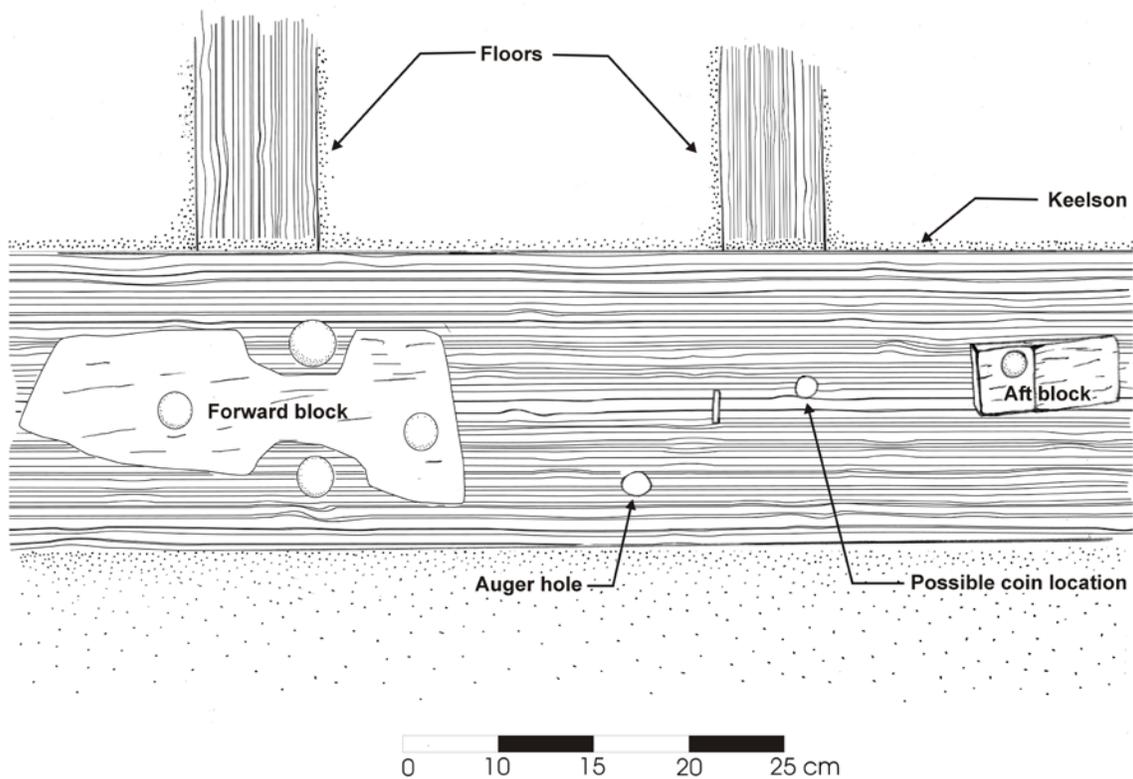


Figure 6-6: Navy Bay Wreck mainmast step (Kopp 2011).

A portion of the vessel's hull also lies along the riprap shore off the port quarter. In this area, there are various timbers and two knees, possibly lodging knees, made from compass timbers. Wood samples were taken from this portion of the wreckage. It is indeed possible that more of the wreck lies buried under adjacent landfill.

Based on the vessel remains alone that have been examined to date, it is very difficult to accurately date this wreck; however, some aspects of its construction suggest that it originates from the pre-War of 1812 period. The vessel was not likely a purpose built warship built during the war since it was not heavily framed. The vessels that were constructed during the war displayed minimal space between the frames in order to construct a solid vessel ready for war. Evidence that the vessel was not constructed after the War of 1812 is the fact that the placement

of the foremast is more indicative of a brig rather than a schooner, which were common after the war. The masts of schooners *Tecumseth* and *Newash* were stepped further forward, presumably to compensate for the steeper rake of the masts, however that of the Navy Bay Wreck is located notably abaft the stem (Dana Ashdown 2011, pers. comm.). However, inconsistent with the other wrecks that were built prior to the war, was the fact that they consistently employed the use of treenails, while the Navy Bay Wreck was iron fastened.

Possible candidates for the identity of this ship based on its length and breadth compared to the historical record include the snow *Duke of Kent* (launched in 1802 at Kingston), the brig *Charwell* (ex-*Earl of Moira*) (launched in 1805 at Kingston) (Figure 6-7), and the schooner *Brock* (launched in 1817 at Kingston) (Moore 2008: 38; Malcomson 2001: 45, 139). The schooner *Brock* can be ruled out based on the above deduction that the Navy Bay Wreck was not constructed following the War of 1812. Both the *Duke of Kent* and *Charwell* are very good candidates for the identity of the wreck. The following chart summarizes the characteristics of these wrecks compared to that of the Navy Bay Wreck (Table 4).

Table 4: List of characteristics of possible identities of the Navy Bay Wreck (from Moore 2006: 87)

Vessel	Length	Breadth	Depth	Draught	Masts
Navy Bay Wreck	61 ft.	21 ft. 11 in.			2
<i>Duke of Kent</i>	unknown	unknown	unknown	unknown	2
<i>Charwell</i> (ex- <i>Earl of Moira</i>)	70 ft. 6 in.	23 ft. 8 in.	7 ft.	8 ft. 6 in.	2 (previously 3)
Brock	69 ft. 6 in.	22 ft. 3 in.	10 ft.	9 ft.	2

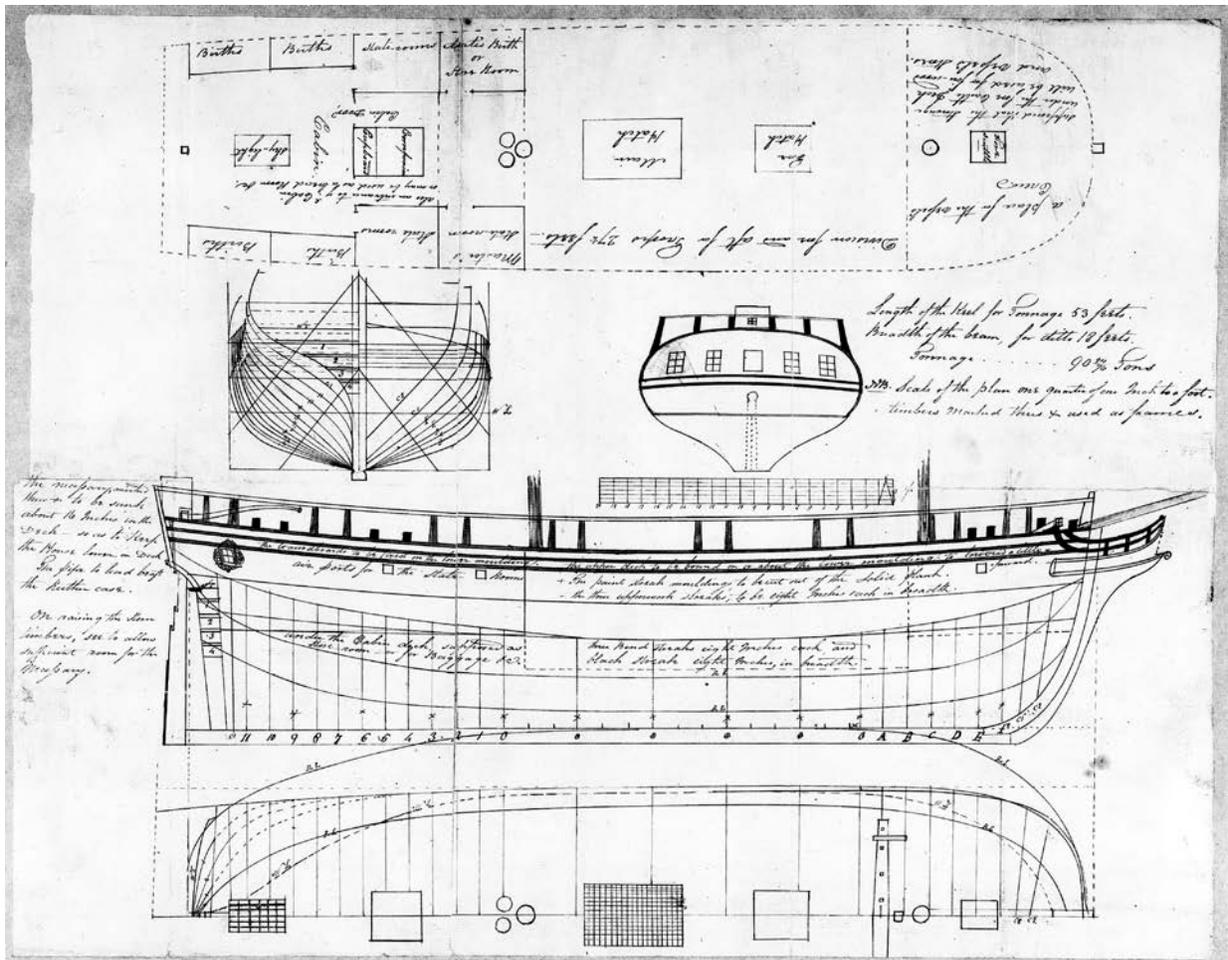


Figure 6-7: Lines plan of *Earl of Moira* (Library and Archives Canada, Ottawa, Ontario, LAC 0018023).

Historical maps of the dockyard on Point Frederick that postdate the War of 1812 indicate where the vessels were moored or at anchor following the peace. An 1815 plan of the dockyard indicates that *Charwell* (ex-*Earl of Moira*) was anchored in the middle of Navy Bay to the south of the wharf and to the north of the slipways. The hulk of the *Duke of Kent* was moored adjacent to the spit of land that projected from the point, at the approximate current location of the Navy Bay Wreck. Today, the spit of land no longer exists as this part of the bay was filled in and is the current location of sports fields. By superimposing a map of the location of the Navy Bay Wreck onto the 1815 plan of the dockyard it is evident that the *Duke of Kent* is very close to the current location of the wreck (Figure 6-8).

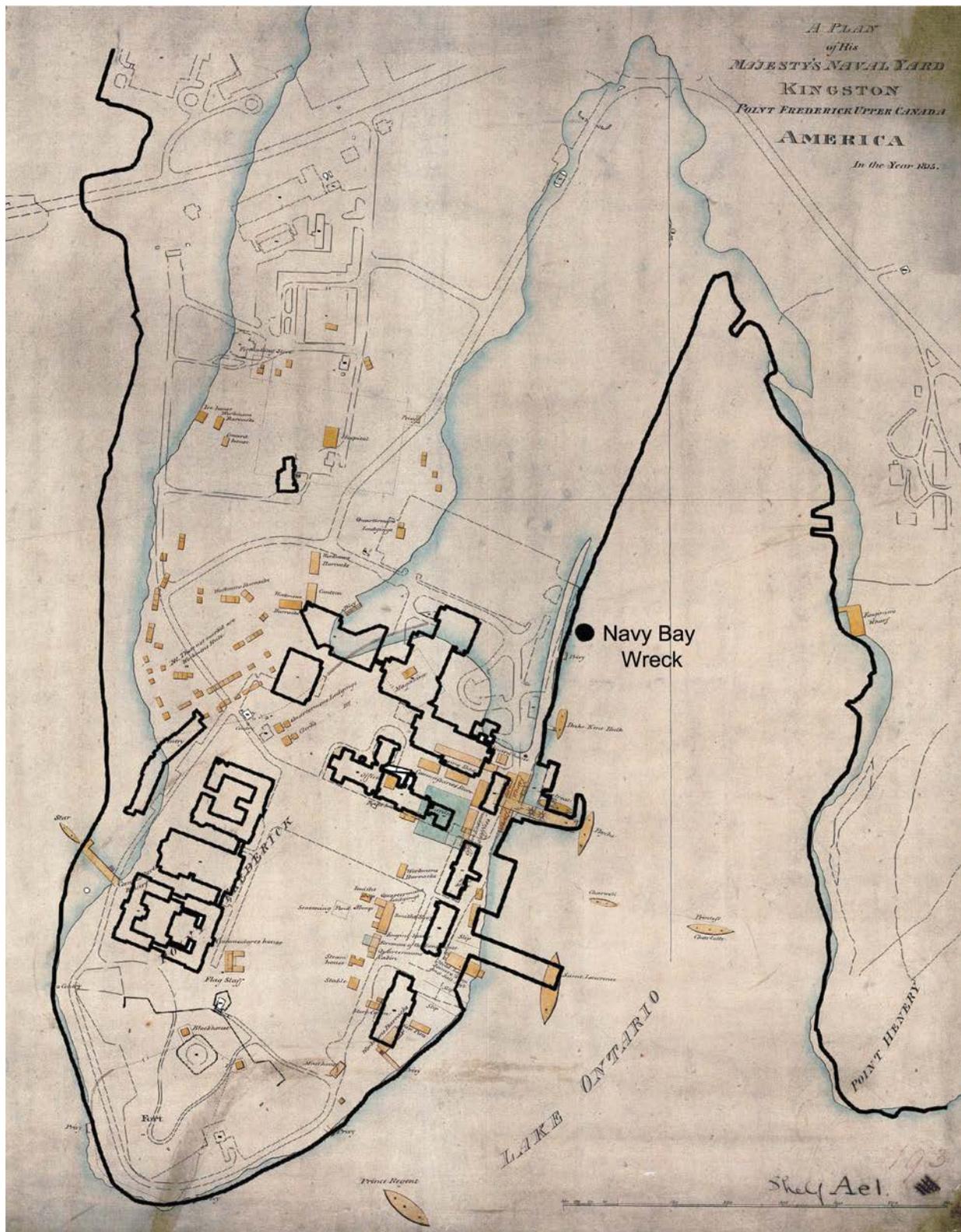


Figure 6-8: Current location of the Navy Bay Wreck superimposed on the 1815 plan of the dockyard (United Kingdom Hydrographic Office, Taunton, England, 193 Ael in Moore 2006: 17, modified by N. Kopp 2012).

By the summer of 1815 the majority of these vessels had been laid up. A June 1816 plan of the dockyard shows the *Duke of Kent* resting in the same location, although *Charwell* was laid up in ordinary in the summer of 1815, there no indication of the location of *Charwell* on this plan as it was “hailed up in the mud, condemned” (Preston 1952: 90) (Figure 6-9). *St. Lawrence*, *Princess Charlotte*, and *Psyche* are all laid up in ordinary alongside the ‘wharf for heaving down ships’. At the time, *Prince Regent* operated with a smaller crew and is depicted moored alongside the other wharf with the smaller vessels *Netley*, *Niagara*, and *Star*. *Montreal* is shown moored in the bay (Malcomson 2001: 136; United Kingdom Hydrographic Office, Taunton, England, 193 Ael in Moore 2006: 17).

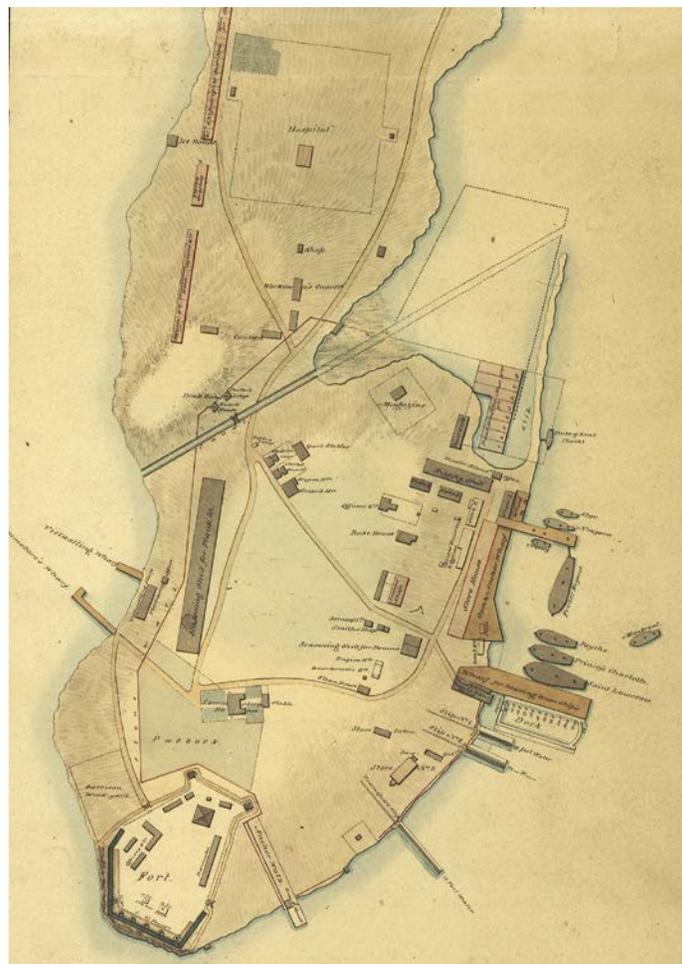


Figure 6-9: "Plan of Point Frederick with the Proposed Alterations for the Dock-Yard Establishment", Jun 1816 (United Kingdom Hydrographic Office, Taunton, England, B718 in Moore 2006: 18).

Interestingly, when the wreck plan for the Navy Bay Wreck is superimposed on the lines plans for the potential 285-ton brigs that were to be constructed on Lake Champlain in 1815, a marked similarity becomes apparent. Both the mast steps correlate, as well as the waterlines. A difference exists in that the Lake Champlain brigs had their masts stepped directly into their keelsons, whereas the *Earl of Moira* employed saddle mast steps (Dana Ashdown 2011, pers. comm.). Likewise, by superimposing the 1802 plan for the *Earl of Moira* on the plan of the Navy Bay Wreck, both the masts and the waterlines coincide (Figure 6-7).

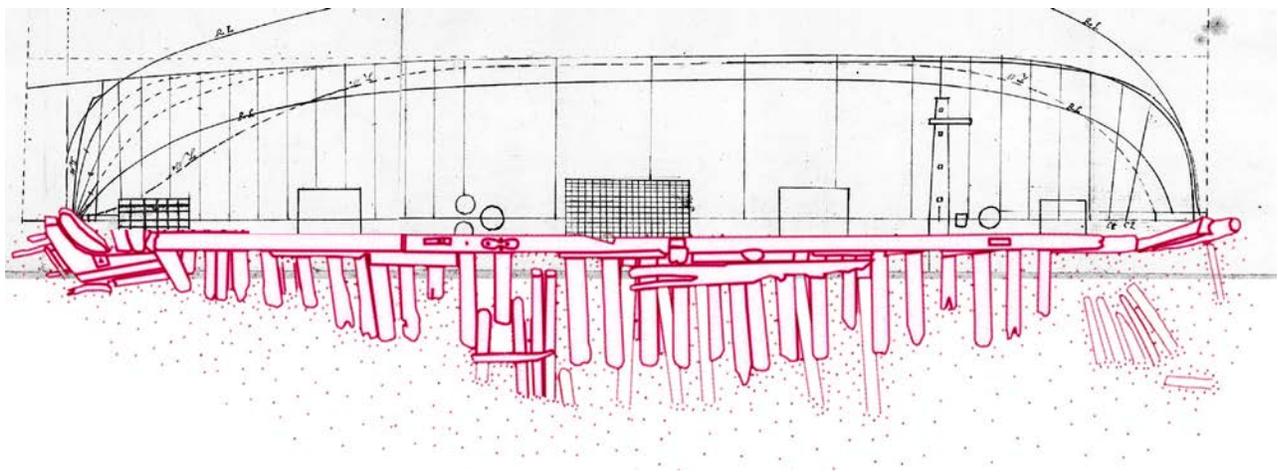


Figure 6-10: Wreck plan of the Navy Bay Wreck superimposed on the lines plan for *Earl of Moira* (Library and Archives Canada, Ottawa, Ontario, LAC 0018023 modified by N. Kopp 2012).

This indicates that *Earl of Moira* is the most likely candidate for the Navy Bay Wreck. The original plans for *Earl of Moira* by Alexander Munn indicate that the vessel was originally intended to be set as a brig; however, the vessel's dimensions were increased and it was given three masts when it was launched on 28 May 1805 (Malcomson 2001: 51). In March 1813, the vessel was rebuilt after several seasons of use and re-rigged as a brig (Malcomson: 2001: 70). The placement of the auger hole in the center of the mainmast step may be an indication of the 1813 reconstruction. This may be the location of a drift bolt that previously secured a block for one of the three mast steps when *Earl of Moira* was rigged as a ship. The brig was renamed

Charwell on 22 January 1814, and was used from the end of the war until 1816 as a powder hulk, and was eventually sold for £21 in 1837 although the vessel was “rotten to the water edge” (Malcomson 2001: 136; Preston 1952: 98).

This study demonstrates that tentative conclusions can be drawn about the differences between ship construction techniques over time. Applying these characteristics to an unknown vessel with the hopes of determining its origin is difficult without the aid of historical research. Comparison of the Navy Bay Wreck with the diagnostic shipbuilding characteristics from the three outlined periods did, however, allow for a tentative dating of the wreck. Likely more characteristics of the wreck could be compared after the excavation and recording of the portside of the vessel that is currently buried in sediment. Through this method of comparison, it was possible to eliminate the post-War of 1812 era for its construction period based on the features of the vessel that were observed, likewise that the vessel was likely not built during the War of 1812. Some evidence exists for refitting or reconstruction of the vessel, which was known to have taken place on *Earl of Moira*. This historical research of the vessels that were launched and scuttled in this area greatly helped in confirming to which period the Navy Bay Wreck belonged, and the most probably identity of the wreck, attesting to the importance of historical research in any archaeological investigation.

CHAPTER 7 : CONCLUSIONS

The main purpose of this study was to determine whether the War of 1812 lastingly influenced ship construction on the Great Lakes. With a limited number of archaeologically excavated shipwrecks examined from the three periods of before the War of 1812, during the war, and after the war, only tentative conclusions can be drawn about the impact that the War of 1812 had on ship construction techniques on the Great Lakes.

Pre-War of 1812 ship construction is characterized by deliberate craftsmanship as evidenced by the use of trenails throughout construction which were time consuming to form, but created a tighter join. However, this may have also been indicative of a scarcity of iron in these frontier regions (Rodgers 2011 pers. comm.). The majority of the vessels were carefully fashioned, with a high degree of skill, that maintain their tight fitting joints to this day. Good quality timber, mainly white oak predominates the timbers used for the construction of these vessels as this species was still readily available in the North American forests before the shipbuilding boom of the War of 1812 and later merchant sail period. Attention to detail in construction was viewed as important by the shipwrights. While not all followed Sutherland's 1711 treatise (Sutherland 1711: 26) for ship construction that indicated the keelson should be notched over the floors, notching of the keel or floors was also used, making it apparent that creating a stiffly constructed vessel was imperative. From the examples in this study, it is evident that shipwrights took great care in the vessels that they produced, intending them to be used for many sailing seasons.

Furthermore, the great care in craftsmanship employed in the construction of these vessels is evidenced by the use of ornamental decorations, which were not essential to the sailing abilities of the vessel but contributed to the aesthetics of the vessel and the pride of the owners

and sailors, demonstrated a great deal of workmanship. Historical and archaeological evidence indicates that *Nancy*, *Lord Nelson*, *Diana*, and *Earl of Moira* all carried elaborate figureheads that announced the vessel's name as it entered a port. The privateer *Defence* also demonstrated additional scrollwork that elaborated the appearance of the vessel.

With the outbreak of war in 1812, both the Americans and British realized that gaining the upper hand in the conflict depended upon control of the Great Lakes, which depended upon a powerful inland navy. These purpose built warships were of a unique design as they were to sail on the Great Lakes during war, requiring the ships to be heavily armed yet possess shallow drafts for navigating the shoals. The necessity of war required that the vessels were launched quickly, resulting in a disregard for traditional shipbuilding methods and lack of concern with the type of woods that were employed. The British were able to locate more stores of oak in the scarcely populated region along the north shore of the Great Lakes, while the Americans were required to settle for whatever species of wood was available. The American shipwright Noah Brown exemplified this haste as he sacrificed the aesthetics of a fine vessel for the practicality of a warship. To the complaint of a craftsman, he allegedly replied “we want no extras – plain work is all that is required; they will only be wanted for one battle; if we win, that is all that is wanted of them; if the enemy are victorious, the work is good enough to be captured” (Malcomson 2001: 90). It was possible that the vessels constructed during this period would be lost in battle; as such, the shipwrights were only required to meet the most basic requirements of standard ship construction. If the vessels were captured, there was no sense in supplying the enemy with a well-constructed vessel. Shortcuts aided in launching vessels faster in order to gain supremacy on the lakes.

As warships, these vessels demonstrated specific features. They were constructed with large timbers and substantial framing with little spacing. This was necessary for these vessels to be sturdy enough to carry heavy armaments, carronades or long guns. As materials were lacking such as naturally shaped compass timbers, shipwrights employed other techniques for strengthening these vessels. The lack of knees on *St. Lawrence* was corrected with the use of carlines bolted to the frames. While this shortcut alleviated the shortage in materials, care was taken to ensure the vessel was battle worthy. Iron fasteners were employed throughout the majority of the War of 1812 examples, indicating a lack of time for manufacturing treenails. However, this indicates that there were sufficient supplies of iron to forge nails, spikes and drift bolts for the vessels. The majority of the mast steps on these vessels were the saddle-type mast step. This type of step had three main advantages: it did not weaken the keelson by cutting a mortise into the timber; it was very strong as the wood grain ran perpendicular to the force that was enacted upon it; and it could be easily repositioned to alter the rake of the mast or its location.

After the War of 1812, shipbuilding moved away from the naval yards as passenger and cargo vessels soon outnumbered military vessels. It was determined that schooners were better suited to the lakes than the typically square rigged naval vessels. The advantages of the fore and aft rig of the schooner allowed for better headway into the wind, as a square rigged vessel would have greater trouble sailing against the wind. The fore and aft rig also allowed for the vessel to easily maneuver in restricted areas, which is important as the lakes geography presents several restricted spaces where a captain's ability to tack may be limited. While schooners existed on the lakes before the War of 1812, vessels that were constructed after the war indicate that the war did indeed directly influence ship construction techniques on the Great Lakes, however, minutely.

Vessels constructed after the war contrasted sharply from the purpose built warships; however their construction design did not simply return to that of the merchant vessels of the pre-War of 1812 period. No longer were heavily built ships necessary, as these were a hindrance to speed, and frames returned to a modest size with comparatively wide spaced frames. After the war, vessels were built to be simple and utilitarian and did not demonstrate the ornamentation seen prior to the war. Both treenails and iron fasteners were employed in the construction of vessels during this time period, as the peace allowed the shipwrights more time to carefully manufacture treenails. Green timber and the lack of compass timbers or knees were employed in ship construction, as stores of wood were exhausted after the shipbuilding race of the War of 1812, and since experience gained during the war indicated that green timber and lack of compass timbers did not weaken the vessels. Had the war not taken place, shipwrights may have adhered more strongly to construction treatises such as that by Sutherland (1711). Shipwrights gained a great deal of knowledge from the many vessels that were constructed quickly during the war, and found that these shortcuts did not harm the sailing qualities of the vessels.

The second aim of this thesis was to compare these diagnostic attributes with the Navy Bay Wreck, located in Kingston, Ontario, to attempt to determine when it was constructed and to explore its original function. Tentative conclusions were drawn about the differences between ship construction techniques over time, which determined that the Navy Bay Wreck most likely was constructed in the period prior to the War of 1812. The vessel was not likely a purpose built warship built during the war since it was not heavily framed. Likewise, the placement of the foremast is more indicative of a brig rather than a schooner, which were common after the war. As the masts of schooners were stepped further forward, presumably to compensate for the steeper rake of the masts, however that of the Navy Bay Wreck is located notably abaft the stem .

Historical research alongside the archaeological analysis aided in determining the *Earl of Moira* as the most likely candidate for this vessel from a selection of three vessels based on analogous length and breadth measurements. When the wreck plan for the Navy Bay Wreck is superimposed on the 1802 plan for the *Earl of Moira*, both the masts and the waterlines coincide. The original plans for *Earl of Moira* indicate that the vessel was originally intended to be set as a brig; however, the vessel's dimensions were increased and it was given three masts when it was launched. The vessel was later rebuilt after several seasons of use and re-rigged as a brig. Placement of an auger hole in the center of the mainmast step of the Navy Bay Wreck may be an indication of this 1813 reconstruction. This may be the location of a drift bolt that previously secured a block for one of the three mast steps when *Earl of Moira* was rigged as a ship. The possibility for the excavation of the portside of the Navy Bay Wreck in the future would greatly assist in the positive identification of the Navy Bay Wreck as *Earl of Moira*.

While the War of 1812 had significant political and social implications, the impact on ship construction on the Great Lakes was not as substantial. The War of 1812 did not completely revolutionize ship construction on the Great Lakes, as did the introduction of the steam engine; nor did it change the size or shape of vessels that were built, as did the construction of the Welland Canal. The war's impact on ship construction was much smaller than those influential events; however, it created a ripple of change in ship construction techniques in the early 19th century.

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APPENDIX A: NAVY BAY WRECK WOOD SAMPLES REPORT

SHORT ANALYTICAL REPORT SHEET

ANALYTICAL SECTION ONTARIO SERVICE CENTRE PARKS CANADA

CLIENT: Jonathan Moore

LAB. NO. 2008-540 to 547

PROV. NO. 66M14A1-1 to 8

QUESTION: Wood identification

ANSWER:

All the samples were identified as white oak (*Quercus* spp). There are many species in this group which cannot be differentiated anatomically. Identification was done with a transmitted light microscope. It was not possible to determine whether the wood is of North American or European origin.

Provenience No	Lab No	Description	Slide no
66M14A1-1	2008-540	Stem	21089
66M14A1-2	2008-541	Sternpost	21091
66M14A1-3	2008-542	Keel	21093
66M14A1-4	2008-543	Keelson	21095
66M14A1-5	2008-544	Frame, Floor	21098
66M14A1-6	2008-545	Frame, Futtock	21100
66M14A1-7	2008-546	Ceiling Plank	21102
66M14A1-8	2008-547	Hull Plank	21104

Analyst: Louis Laflèche

DATE: October 2, 2008

If you receive this via electronic mail, the hard copy will follow by the normal route.
If you would like to discuss this report, please call the author or John Stewart
at (613) 993-2125.

