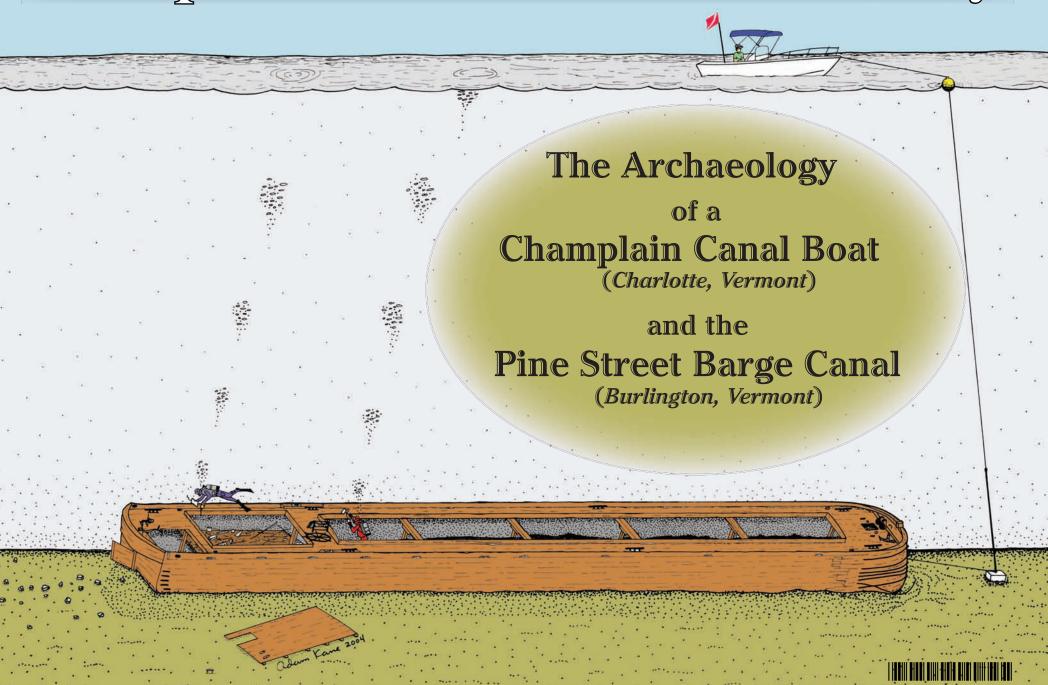
# Sloop Island Canal Boat Study



SDMS DocID 454657

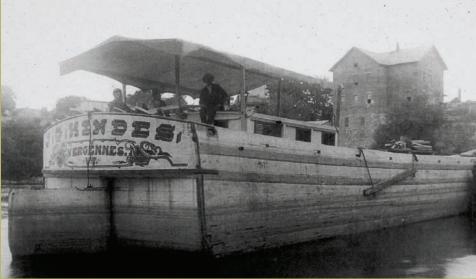
#### **ACKNOWLEDGEMENTS**

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The Sloop Island Canal Boat Study, begun in 2002, was an outstanding success due to the support and dedication of the Lake Champlain Maritime Museum's (LCMM) membership, staff, interns and volunteers. The following people gave LCMM's Maritime Research Institute (MRI) the necessary support to conduct the project, which could not have succeeded without their efforts:

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Burlington Department of Planning and Zoning

Chittenango Landing Canal Boat Museum

Diver's Alert Network

Duofold

Erie Canal Museum

Fort Ticonderoga Association

Hazellet Strip-Casting Corporation

Historical Society of Whitehall

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Waterfront Diving

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Vesta McLaughlin

Rebecca McLaughlin

Charles Mazel

Dan Nord

David Pikul

Craig and Susan Sim

Roy Whitmore

Cover: Conceptual drawing of the Sloop Island Canal Boat (LCMM Collection).

Opposite Page: Canal Boat J.G.. Hindes at the base of the falls in Vergennes, Vermont.

## The Canal Boat Era on Lake Champlain

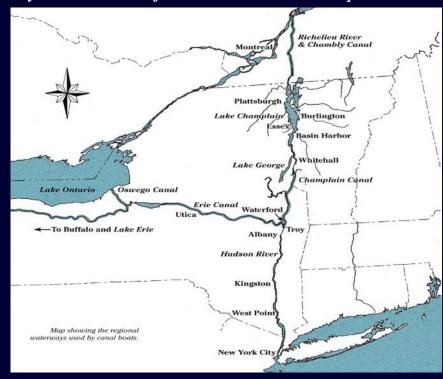
During the nineteenth century, North Americans built some 4,500 miles (7,250 km) of canals. Although the early canals were soon overshadowed by the railroads, the effect canals had on North America's development was profound. Canals were one of the primary means by which North Americans were able to make effective economic use of large portions of the interior continent and allowed national markets to be established and industrial development to take place. The canal boats and canalers were the vehicles and labor force that made this development possible.

Canal boats were highly specialized watercraft and quite different from other river and lake vessels. All canal boats were towed through the canals by teams of horses or mules until the 1910s. The standard and sailing canal boats were predominately freight or cargo carriers and very rarely carried passengers for hire. The type of cargo to be carried determined the design of a canal boat. For example, many of the boats that carried clay, gravel, sand, lumber, coal, and iron ore had open decks to allow easy access to the loose cargo. Boats that carried predominately grain and merchandise had full decks and hatches.

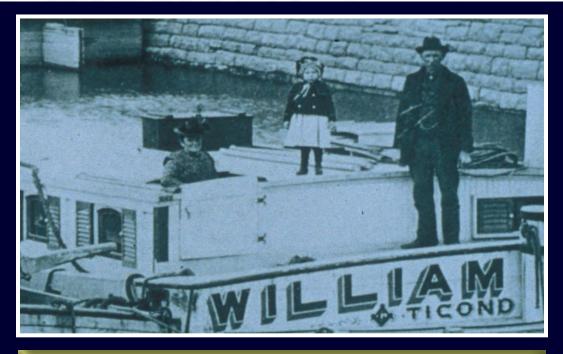
The opening of the Champlain Canal in 1823, connecting Lake Champlain to the Hudson River, had an enormous effect on the economic prosperity of the Champlain Valley; bulky raw materials, which were formerly too costly to ship overland, could now be transported to marketplaces along the Hudson River and beyond. Lake Champlain's enhanced importance as a commercial waterway spurred an economic boom in port towns along its shores. The Champlain Canal was expanded three times during the nineteenth and early twentieth century. Each expansion gave rise to a new larger class of canal boats.



Above: Canal boat squeezing through the canal locks. Below: Map of the Northern Waterway from Canada to New York City. Bottom: A Tow of Canal Boats on Lake Champlain.







#### What Are Canal Boats?

There were two types of wooden canal boats on Lake Champlain during the commercial era: standard, or unrigged, and sailing canal boats. Standard canal boats had no means of propulsion and were towed up and down the lake by steam tugs. Sailing canal boats could sail up and down the lake. Both vessel types were towed through the canal locks.

The smallest lock in the canal network dictated the maximum size that canal boats could be constructed and this changed numerous times during the canal's heyday. It is for this reason that a canal boat shipwreck can be dated based on the size of the boat. Small canal boats date to the earlier era of the canal, while larger boats, like the Sloop Island Canal Boat, date the end of the canal boat era.

Top: Canal boat sizes by year as they expanded with the canal. Left: Canal boat family.

### **Canal Boat Life**

Canalers of the Northern Waterway were "water gypsies" almost constantly moving from New York to Quebec. This lifestyle for families and crew that lived and worked aboard these vessels was certainly one of hardship and dedication: the hardships of physical labor and tight living quarters, and the dedication to a life on the water as boatmen and women.

The boatman had to work hard when towing in the old Champlain Canal. The hours were long and chances to sleep were short and unpredictable. Most canal boat captains owned their own boats; they went where the railroads did not and where profits were small, picking up cargo wherever they could. Going north the canal boats generally carried coal or manufactured goods and returning south they transported lumber, hay, pulpwood, or paper.

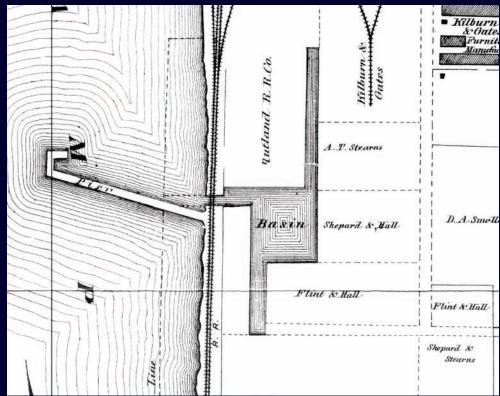
The wife of a canal boat captain cooked, cleaned, and cared for many of the family's needs. They also served as a deckhand when the need arose. Children were expected to help by doing chores around the boat and stay out of the way. The youngest children were tied to a short rope so that if they fell overboard, they could be rescued quickly. By the time children were twelve years old, they were expected to become part of the boat's crew.

# The Pine Street Barge Canal

The Pine Street Barge Canal is located along Burlington, Vermont's southern waterfront. This small canal was built to accommodate easier loading/unloading of canal boats in the 1860s as Burlington's waterfront boomed with the shipment of millions of feet of board lumber. In 1895, a coal gasification plant, which produced manufactured gas from coal and oil, was established next to the canal. In the process of creating manufactured gas, the locally abundant wood chips were used as a filter. Waste products from this process included coal tar, fuel oil, tar-saturated wood chips, cinders and cyanide. These wastes were disposed of in the wetlands around the canal, and the legacy of this contamination remains at the site.

In 1983, the United States Environmental Protection Agency (EPA) placed the Pine Street Canal site on the Superfund National Priorities List. The descendant companies of those that worked along the canal, and the current landowners, were charged with cleaning up the site. As part of this process, an archaeological study of the canal was required. In 2001, an historic resources study of the Pine Street site determined that there were five canal boat wrecks located in the canal that were abandoned in the 1920s or 1930s, all eligible for listing on the National Register of Historic Places.

Overall, the canal boats in the Pine Street Canal are not well-preserved. They are all near the water's surface and have been subjected to damage from ice, periodic exposure to the air, and human vandalism. The canal was drained during the Superfund clean-up, temporarily exposing the canal boats for study before they and the contaminated sediments they rest on were capped with sand. Despite the condition of the vessels, their documentation yielded considerable amounts of important technical information. There were a number of features observed that would likely have gone unrecorded had the Superfund clean-up not taken place.



Historic map of the Burlington Waterfront showing the Barge Canal. From Beers, Ellis and Soule 1869.

#### What is a Superfund Site?

In 1980, Congress enacted the Comprehensive Environmental Response, Compensation and Liability Act that established a fund to address abandoned hazardous waste sites. Superfund is the name given to the environmental program that allows the EPA to clean-up such sites, or to hold accountable parties responsible for such clean-ups. The Superfund clean-up process is complex, and involves several steps, which begins with placing a site on the National Priorities List. As of 2009, there were over 1,000 sites listed. The EPA's Office of Solid Waste and Emergency Response in Washington D.C. oversees the Superfund program.



### The Archaeological Mitigation

The 2001 Historic Resources Study of the Pine Street Canal Superfund Site determined that the five canal boat wrecks were eligible for the National Register of Historic Places. The EPA, in consultation with the Vermont Division for Historic Preservation, made the determination that the clean-up of the canal would adversely affect these canal boats. Regulators and the parties performing the remediation were left in a quandary about how to conduct an economically feasible archaeological study of these contaminated vessels in compliance with Section 106 of the National Historic Preservation Act.

The answer lay on the bottom of the lake some 12 miles south of the Pine Street Canal. The Sloop Island Canal Boat was of the same vintage as those in the Pine Street Canal. However, unlike the canal boats abandoned in the Pine Street Canal, the Sloop Island Canal Boat contained all of the artifacts left onboard when it sank. The study of that artifact collection would be of great value in understanding early twentieth century canal boat culture. Another important factor in conducting an off-site mitigation was cost.

Investigating the Sloop Island Canal Boat in the clean, clear water of the broad lake would cost only a fraction of a comparable project to study the canal boats in the hazmat conditions of the Pine Street Canal. A Memorandum of Agreement and the Scope-of-Work were signed in June 2002, and the Sloop Island Canal Boat Project was formally launched the following month.

Top: Photomosaic showing the port side of one of the canal boats in the barge canal. Below: Hull of a canal boat in the Pine Street Canal.



#### What is Section 106?

Under Section 106 of the National Historic Preservation Act of 1966, Congress established a process that seeks to preserve the historical and cultural foundations of the nation. This process requires that all projects that receive Federal funding must consider impacts on cultural resources in the planning process. Specifically, if the project will affect any cultural resources, such as an archaeological site, an historic building, or a shipwreck, that is deemed eligible for listing on the National Register of Historic Places, the project is encouraged to work at preserving these resources. However, in the case of the Pine Street Barge Canal, the impacts on the canal boats was unavoidable, and a mitigation plan was established that balanced the potential destruction of the cultural resource in question through the study of a similar archaeological site.

# Discovery of the Sloop Island Canal Boat

In 1998 the Lake Champlain Maritime Museum's (LCMM) Lake Survey Project located a canal boat of the same type as the five found in the Pine Street Barge Canal—except this one was in the broad lake of Lake Champlain. Given the designation Wreck Z, because it was the twenty-sixth shipwreck located during the Lake Survey, the significance of this pristine archaeological site was immediately apparent. It was proposed that instead of studying the canal boats in the Superfund site, researchers study this one in the waters off Sloop Island in Charlotte, Vermont.

Study of Wreck Z, which became known as the Sloop Island Canal Boat, was a unique solution, a compromise of sorts, for an otherwise difficult situation. With all the details worked out, LCMM's dive team found itself with the enormous and marvelous task of studying this large, intact shipwreck. The project focused on two main goals: documenting the vessel's structure and recovering the artifacts from the cabin.

A team of seven LCMM archaeologists from their Maritime Research Institute (MRI) spent ten weeks capturing every last scrap of information.

The archaeological study was conducted during two field seasons and approximately 400 dives. The number of archaeologists working on the site per day ranged between four and seven. The site lies in 85 feet of water and water temperatures during the fieldwork varied widely between 40 and 60°F. Although the depth of the site limited the amount of ambient light, the visibility when aided by underwater lights was generally good, ranging from 10 to 25 feet. The breathing gas used for the project was NITROX 36, an enriched air blend with 36% oxygen (normal atmospheric air has 21% oxygen). This gas mixture allowed for longer dive times and shorter surface intervals between dives.



Steering wheel onboard the Sloop Island Canal Boat



LCMM dive team discusses a dive and logistics.



LCMM divers follow a lead line that guides them to the wreck.

#### How Do Archaeologists Work Underwater?

Nautical archaeologists use special methods and tools to carry out archaeological studies underwater. SCUBA gear allows them to breath underwater, while special dry suits protect them from the cold water. Waterproof flashlights and strobe lights illuminate the deep, dark water, allowing close observations of the vessel and its contents. Nautical archaeologists cannot talk to one another while working underwater because of their SCUBA gear. Instead they must establish a dive plan prior to submerging, and then they rely on hand signals to communicate while exploring and documenting the shipwreck.

Documentation of a shipwreck can be carried out using measuring tapes, rulers, and other specialized tools. Mylar paper and

pencils allow nautical archaeologists to take notes underwater, while waterproof film, digital and video cameras make a visual record of the site that can be reviewed after the dive.

Nautical archaeologists will document and map artifacts and other features onboard or surrounding the vessel in place and in relation to what is around them, recording their provenience. Since it is difficult to actually excavate underwater, a dredge is used to remove sediment from the vessel in a controlled manner, and a bag at the end of the dredge hose captures artifacts that get sucked into the hose. Any artifacts that are recovered are kept wet in water-filled bags or buckets until they can be evaluated and conserved in a lab.

# Vessel Description

The Sloop Island Canal Boat rests below 85 feet of cold water and is in excellent condition. Its hull, with one single, large open cargo hatch, rises about 10 feet off the bottom, presenting an impressive structure. The vessel's hull, like that of nearly all canal boats, is box-shaped with vertical sides, a flat bottom and blunt ends - a shape designed to carry as much cargo as possible within the confines of the size allowed by the canal locks. The boat is 97 feet  $3\frac{1}{2}$  inches long, 17 feet 10 inches wide, and is approximately 9 feet 10 inches high.

The dimensions of the Sloop Island Canal Boat are consistent with canal boats built after the 1873 expansion of the Champlain Canal locks. These 1873-class canal boats were built until the

1915 New York State Barge Canal expansion; however, this vessel type continued to operate on Lake Champlain into the 1930s.

The Sloop Island Canal Boat wreck still contains its last cargo, a load of coal, below deck in its vast cargo hold. At the stern of the vessel is the most interesting feature: the cabin and living quarters. The cabin interior contained all of the items that a family of canalers needed as they made their way from port to port, all tucked into a tiny space with a kitchen and bedroom. The presence of cargo and numerous artifacts found on board indicates that the vessel sank unintentionally. With everything left on board, a complete look into the lives of a nearly forgotten group of people was captured, that of the Canalers of Lake Champlain.



Anchor on the deck of the vessel

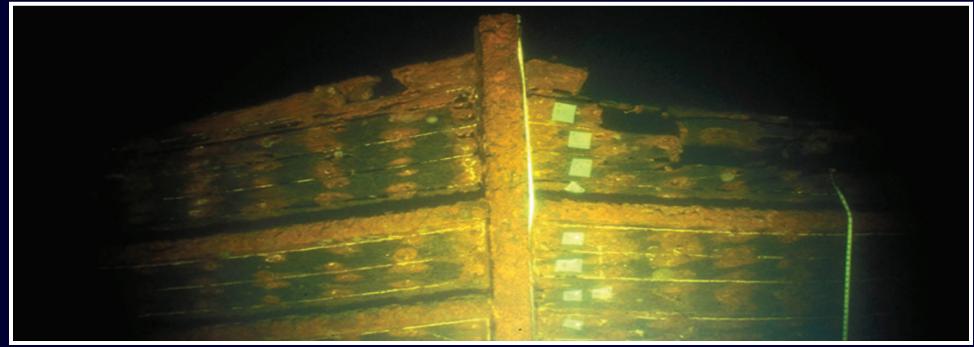


Steering mechanism located near the steering wheel





Bow Windlass Stern Windlass



Bow and Stem of the vessel

### The Archaeology of the Sloop Island Canal Boat

The archaeological investigations of the Sloop Island Canal Boat wreck confirmed that it is a well-preserved unrigged Lake Champlain canal boat of the 1873 class, built after the second enlargement of the Champlain Canal and before the opening of the Champlain Barge Canal in 1915. Due to the stable environment on the bottom of Lake Champlain, the canal boat's upright orientation, and the presence of cargo and sediment inside the hull, the timbers and associated artifacts were well preserved despite more than 90 years on the bottom of Lake Champlain. Approximately ninety percent of the site remains intact, retaining its historic integrity.

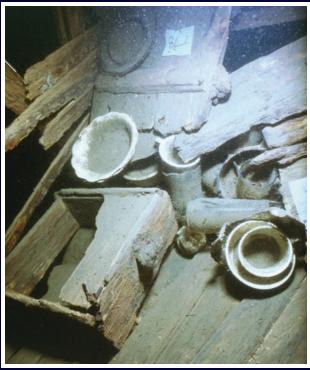
During the ten weeks of fieldwork carried out at the Sloop Island Canal Boat site in 2002 and 2003, an impressive artifact collection was recovered from the wreck. These items provide a glimpse into the vessel's use life and the lifeways of those who lived and worked aboard.

Life onboard a boat of this type was further detailed through the historical investigations which made use of archaeological, documentary, pictorial, and oral history records. While an absolute date indicating when the vessel sank could not be established, nor could the true identity of the wreck be ascertained,

the archaeological and historical information gained from this investigation has refined our knowledge of this well preserved archaeological site and canal boat life in general.

The cabin trunk, cabin roof, and booby hatch cover of the Sloop Island Canal Boat were ripped off at the time of the vessel's sinking. Work in the cabin and booby was made easier without these overhead obstructions. However, documentation was complicated by the large number of jumbled timbers from the floor, ceiling, and bulkhead planks, and fragments of the cabin trunk and cabin furniture.

The fasteners that once held the wooden elements of the cabin and booby in place had long since rusted away, allowing the timbers to collapse into the vessel. Through careful documentation, the original location of many of the timbers could be identified, permitting the reconstruction of the original layout of the cabin and booby. Layer by layer the timbers and artifacts were removed and video and photographs were used to record the process. All of the artifacts from the cabin and booby were recovered and brought to the LCMM's conservation facility for stabilization and documentation.



Above: Artifacts scattered in the cabin of the wreck. Below: LCMM archaeologist prepares to dive.







#### **Further Reading:**

Cohn, Arthur B.

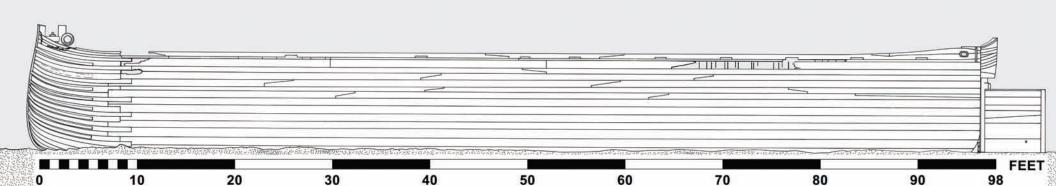
"Preliminary Results of an Archaeological Assessment within the Pine Street Barge Canal." Lake Champlain Maritime Museum, Ferrisburgh, Vermont. 2001.

Cohn, Arthur B.

Lake Champlain's Sailing Canal Boats: An Illustrated Journey from Burlington Bay to the Hudson River, Lake Champlain Maritime Museum, Ferrisburgh, Vermont. 2003.

Kane, Adam I., Joanne M. DellaSalla, Scott A. McLaughlin and Christopher R. Sabick, "Sloop Island Canal Boat Study: Phase III Archaeological Investigation in Connection with the Environmental Remediation of the Pine Street Canal Superfund Site" Ferrisburgh, VT: Lake Champlain Maritime Museum, 2008.

Above left: Artifacts jumbled in the vessel interior. Above Right: LCMM archaeologist records artifacts on the vessel's deck. Below: Drawing of the Sloop Island Canal boat based on archaeological documentation.



### The Artifact Collection

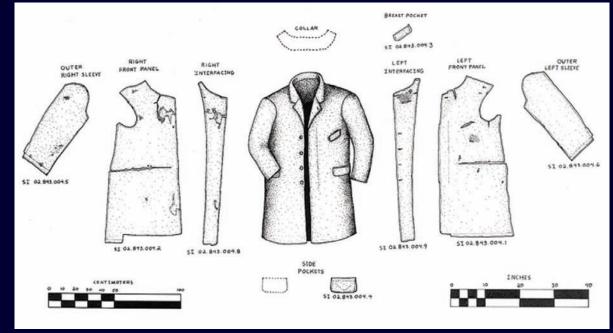
The artifact collection recovered from the Sloop Island Canal Boat include such items as vessel rigging, cooking utensils, crocks, tools, bottles, canning jars, clothing, and jugs. Some of the jugs and crocks contained small fish bones (possibly the remains of pickled fish), grapes seeds (i.e., fresh grapes) and pig bones (i.e., salt pork). The bottles once contained root beer, beer, and wine. Other items located on board included a folding iron bed, a caned armed rocking chair, a cast iron double bed and a stool, and a large cast iron cook range, which was separated from the rest of the cabin by a panel wall and linoleum flooring. The artifacts found within the cabin and booby suggest that the vessel's crew consisted of a small family with a father, mother, and possibly one child. The continued analysis of the artifacts and their location on board the wreck have helped researchers in determining the organization, layout, and functions of the cabin and booby.

The artifacts also have the potential to help us better understand the economic and physical well-being of the canal boat household, their access and preference to goods, their needs, and the crew's activities within the cabin and booby. All of the recovered artifacts were analyzed, photographed, drawn and conserved at LCMM's Conservation Laboratory. Many items from the collection can be viewed in the Sloop Island Canal Boat exhibit at the museum.





Left: LCMM staff conserves a section of wool coat (drawing below) recovered from the vessel. Above: Tea cup, saucer and spoon recovered from the vessel and conserved by LCMM.







Above: LCMM archaeologist drafting an image of the wreck. Left to Right: Pretreatment, post-treatment and inking images of a cast iron stove leg recovered from the wreck and conserved by LCMM.

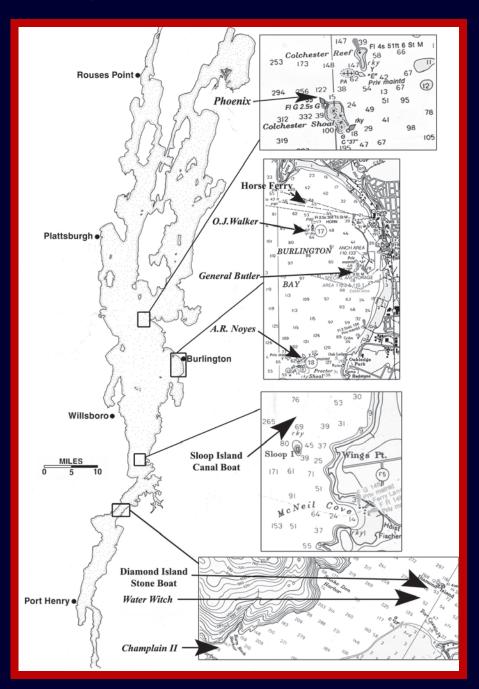
#### What is Artifact Conservation?

When an artifact is recovered from a shipwreck, it is removed from the stable environment it has rested in for many years. It is exposed to oxygen and to the changes in temperature, light and moisture that we experience everyday. Iron artifacts will rust, cupreous artifacts will corrode, wooden artifacts will dry out and shrink. Every material type will begin to change and break down in different ways. That is why it is important to conserve each and every artifact that is recovered from underwater sites before they become damaged or disintegrate.

The process of artifact conservation begins with pre-treatment photographs, drawings, measurements and an assessment of each artifact. The artifacts are then stabilized using a procedure appropriate for its material type. For example, iron would be treated by removing any surficial rust, then sealing the artifact with tannic acid and wax. Wood, however, would be treated with either pine rosin or polyethylene glycol (PEG), a process that can either take months or even years depending on the size of the artifact.

A detailed record is kept of every treatment employed to conserve each artifact. Once an artifact is stable, post-treatment drawings, photographs and measurement are taken and the artifact is either archivally packaged for storage or put on display in an exhibit.

### Lake Champlain's Underwater Historic Preserves





The Sloop Island Canal Boat is part of

Lake Champlain's

Underwater Historic Preserves and is open to the public.

For more information visit www.lcmm.org

www.historicvermont.org

or call 802-475-2022