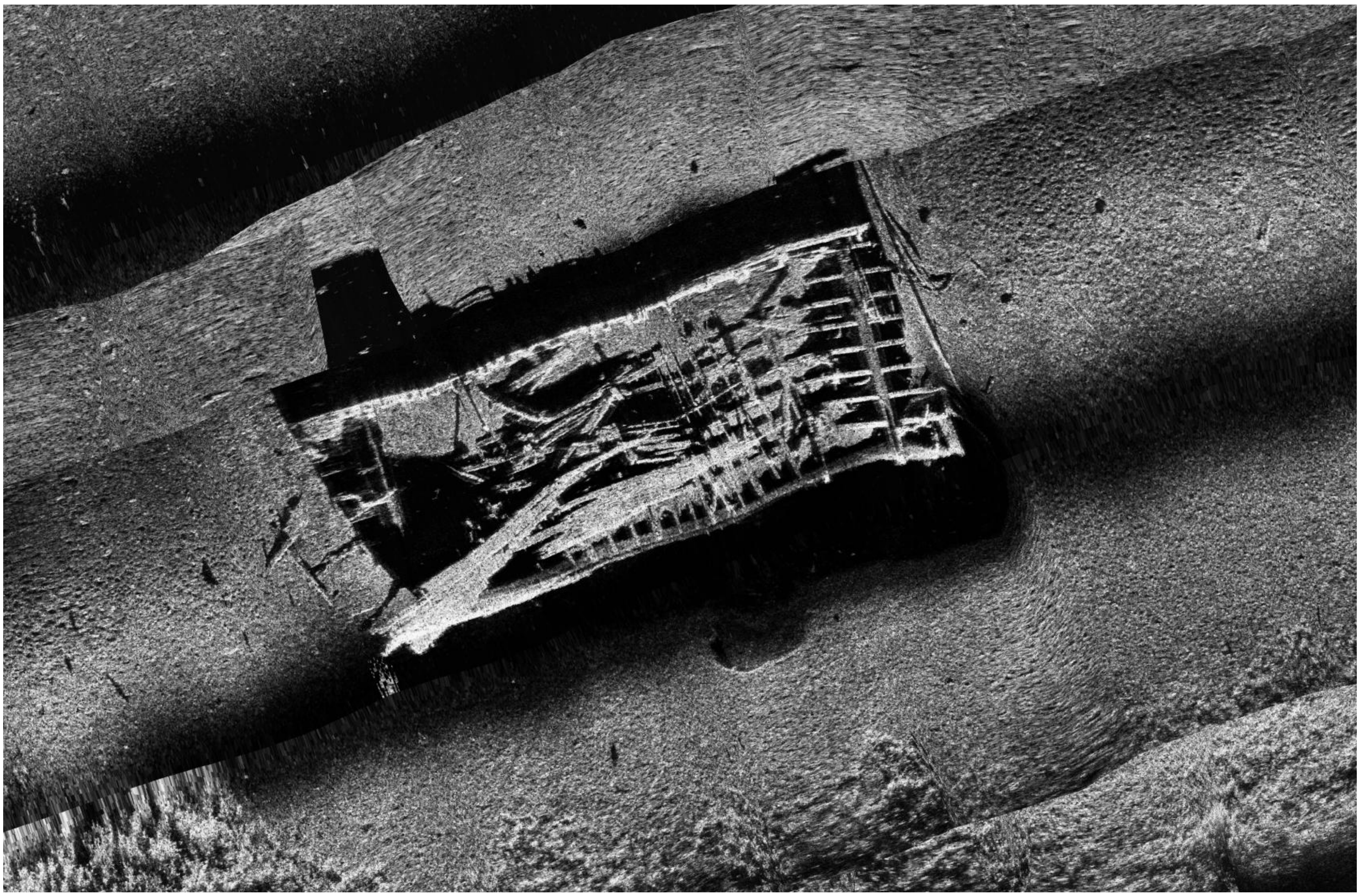
Phase 1B Underwater Archaeological Report for the Onondaga Lake Bottom, Subsite of the Onondaga Lake Superfund Site, Onondaga County, New York



Prepared by:

Lake Champlain Maritime Museum

4472 Basin Harbor Road
Vergennes, Vermont 05491

Submitted to:

PARSONS

301 Plainfield Road
Suite 350
Syracuse, New York 13212

Prepared for:

Honeywell

301 Plainfield Road
Suite 330
Syracuse, NY 13212

Final Report • October 10, 2011

Phase 1B Underwater Archaeological Report for the Onondaga Lake Bottom, Subsite of the Onondaga Lake Superfund Site, Onondaga County, New York

Prepared For:

Honeywell

301 Plainfield Road
Suite 330
Syracuse, NY 13212

Submitted To:

PARSONS

301 Plainfield Road
Suite 350
Syracuse, New York 13212

Prepared By:

Adam I. Kane
Joanne M. Dennis
Sarah L. Tichonuk
Christopher F. Wright

Lake Champlain Maritime Museum

4472 Basin Harbor Road
Vergennes, Vermont 05491

October 10, 2011

EXECUTIVE SUMMARY

Lake Champlain Maritime Museum (LCMM) concluded that the Phase 1B underwater archaeological research undertaken in Onondaga Lake demonstrated that several archaeological remains still lie on the lake bottom. Overall, these properties tend to be well-preserved, although many lie partly or largely buried below the lake bottom. The Phase 1B survey examined 60 anomalies of which 20 are recommended as eligible for the NRHP, while 18 were culturally derived features which are recommended as ineligible for the NRHP. Three of the anomalies were non-cultural, 15 remain unidentified, and four are identified but their NRHP status remains unevaluated.

LCMM recommends the following approach and sequence of activities to comply with Section 106 of the *National Historic Preservation Act*.

1. Develop the remedial design for the sites in the Syracuse Maritime Historic District to minimize adverse effects (Fall 2011).
2. Develop the remedial design for A33 (buried canal boat) to avoid adverse impacts (Fall 2011).
3. Data Recovery on anomalies A1/A2 (Salina Pier), A4-1 (dump scow), A7 (pilings), A12 (spud barge derrick lighter), A45 (concrete breakwater), and A53 (canal boat) (summer 2012).
4. Mark anomalies A22 (Pleasant View Resort pier), A33 (buried canal boat), A20 (rock scow), and A13 (canal boat outside of remediation area) with seasonal float balls to assist in avoiding adverse impacts during the remedial work (prior to start of debris removal).
5. Tailor shoreline stabilization design to avoid adverse impact to A17-1 and A17-2 (spud barges) (Fall 2011).

MANAGEMENT SUMMARY

SHPO Project Review Number:

Involved State and Federal Agencies:
- New York State Department of Environmental Conservation
- New York State Office of Parks Recreation and Historic Preservation
- U.S. Environmental Protection Agency

Phase of Survey:
- 1B

Location Information
- Location: Onondaga Lake
- Minor Civil Division: Towns of Salina and Geddes and City of Syracuse
- County: Onondaga

USGS 7.5 Minute Quadrangle Map:
- Syracuse West

Survey Area
- Number of Acres Survey: 418.7 acres (169.4 hectares)

Archaeological Survey Overview:

This report presents the results of a Phase 1B underwater archaeological investigation of the environmental remediation areas in Onondaga Lake as part of the Onondaga Lake Superfund Site. The fieldwork included side scan sonar, sector scan sonar, videography from a remotely operated vehicle and target verification by archaeological divers. The fieldwork was executed between June 2 to 11, and October 25 to 28, 2010; and June 20 to 29, 2011 by the Lake Champlain Maritime Museum (LCMM) on behalf of Honeywell and under subcontract to Parsons, Inc. LCMM was assisted by CR Environmental (CRE) in the field and data analysis effort.

Results of Archaeological Survey:

Lake Champlain Maritime Museum concluded that the Phase 1B underwater archaeological research undertaken in Onondaga Lake demonstrated that several archaeological remains still lie on the lake bottom. Overall, these properties tend to be well-preserved, although many lie partly or largely buried below the lake bottom. The Phase 1B survey examined 60 anomalies of which 20 are recommended as eligible for the NRHP, while 18 were culturally derived features which are recommended as ineligible for the NRHP. Three of the anomalies were non-cultural, 15 remain unidentified, and four are identified but their NRHP status remains unevaluated.

Report Author(s):

Adam I. Kane (LCMM), Joanne M. Dennis (LCMM), Sarah L. Tichonuk (LCMM), and Christopher F. Wright (CRE)

Date of Report:
October 10, 2011

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

This report presents the results of a Phase 1B underwater archaeological survey, executed under subcontract to Parsons, Inc. and on behalf of Honeywell, for the Onondaga Lake Bottom Subsite of the Onondaga Lake Superfund Site. The survey was undertaken by the Lake Champlain Maritime Museum to document the existence and significance of underwater cultural resources that may be impacted during remedial activities in Onondaga Lake.

This survey facilitates management and assessment of archaeological resources in Onondaga Lake consistent with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended; the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation*;[1] the New York Archaeological Council's *Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State;*[2] and the New York State Historic Preservation Office's *Phase I Archaeological Report Format Requirements*.[3]

The cultural resource assessments included in this report apply only to potential archaeological and architectural resources. LCMM understands that United States Environmental Protection Agency (USEPA) has initiated government-to-government consultations with the Onondaga Nation in compliance with 36 CFR Part 800.4(a)(b) regarding properties of religious and cultural significance. However, at this time, USEPA has not asked Honeywell, Parsons, or LCMM to address the task of identifying religious and cultural properties. Therefore, no analysis has been performed as to whether the remediation of the areas included in this report may have an effect on Properties of Cultural and Religious Significance.

PROJECT LOCATION AND DESCRIPTION

Onondaga Lake is located in Onondaga County, New York and is contained within the City of Syracuse, and the towns of Salina and Geddes (Figure 1 and Figure 2). The lake has an aerial extent of about 4.5 square miles (11.7km^2), with a drainage basin of approximately 233 square miles (603.5km^2).

The Onondaga Lake Superfund Site comprises the Onondaga Lake bottom, seven tributaries, and upland sources of lake contamination. The remedy for the Onondaga Lake bottom subsite was selected in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA) and documented in a Record of Decision.[4]

The archeological fieldwork included side scan sonar, sector scan sonar, videography from a remotely operated vehicle (ROV) and target verification by archaeological divers. The survey area constituted all of the lake bottom remedial areas which total 418.7 acres (169.4 hectares) of bottomlands. The fieldwork was executed between June 2 to 11, and October 25 to 28, 2010; and June 20 to 29, 2011 by LCMM with technical support from CR Environmental (CRE).

PREVIOUS SURVEYS

The basis of this report is found in the previous archaeological and geophysical work undertaken in and around Onondaga Lake, and the work plan specific to this survey. In 2004, the Public Archaeology Facility of SUNY Binghamton carried out a Phase IA cultural resources assessment of the Onondaga Lake Site.[5] This work recommended a Phase IB archaeological survey be executed in Onondaga Lake and along the shoreline due to the high potential that those areas may contain historic cultural resources.[6] In 2005, CR Environmental of Falmouth, Massachusetts, conducted a remote sensing survey of the lake bottom. The effort recorded side scan sonar, magnetometer, bathymetry, and sub-bottom profiler data primarily in support of the remedial design effort. The survey located 755 sonar targets and 1256 magnetic anomalies on the lakebed. In January 2010, the LCMM completed the *Underwater Archaeological Resources Phase 1B Work Plan for the Onondaga Lake Bottom, Subsite of the Onondaga Lake Superfund Site, Onondaga County, New York,* which specifically outlined the potential underwater archaeological sites to be investigated and the methodological approach to the fieldwork.[7]

REPORT ORGANIZATION

This report contains five chapters and eight appendices. The Introduction contains background material pertinent to the project. Chapter 2 presents the maritime context for Onondaga Lake. Chapter 3 contains the methodological approach used to gather the archaeological data. The project's results, including historic context information for specific archaeological properties, the presentation of archaeological data, and an assessment of each property's significance is contained in Chapter 4. Chapter 5 presents LCMM's conclusions, which is followed by the Bibliography. Appendices 1 and 2 contain LCMM's Field Logs and Dive Logs, respectively. A list of the acronyms is included as Appendix 3, while a glossary defining the specialized terms used in the report is found in Appendix 4. The New York State Office of Parks Recreation and Historic Preservation's (NYSOPRHP) Resource Evaluation for the New York State Canal System is attached as Appendix 5. Appendix 6 is a statement by the Onondaga Nation on the spiritual and cultural history of Onondaga Lake. Resumes of key project staff are included as Appendix 7, while the protocol for the discovery of human remains is included as Appendix 8. The Endnotes are found at the end of the report.

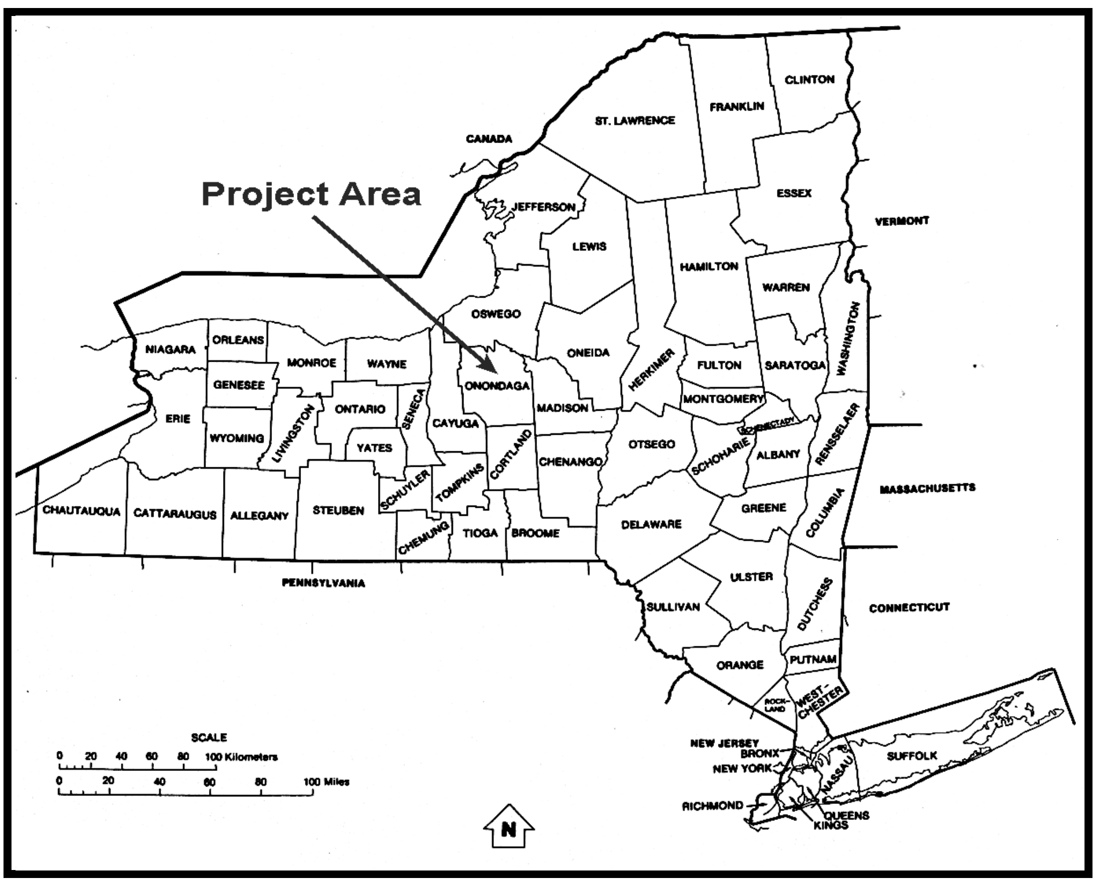


Figure 1. Map of New York State showing the Project Area.

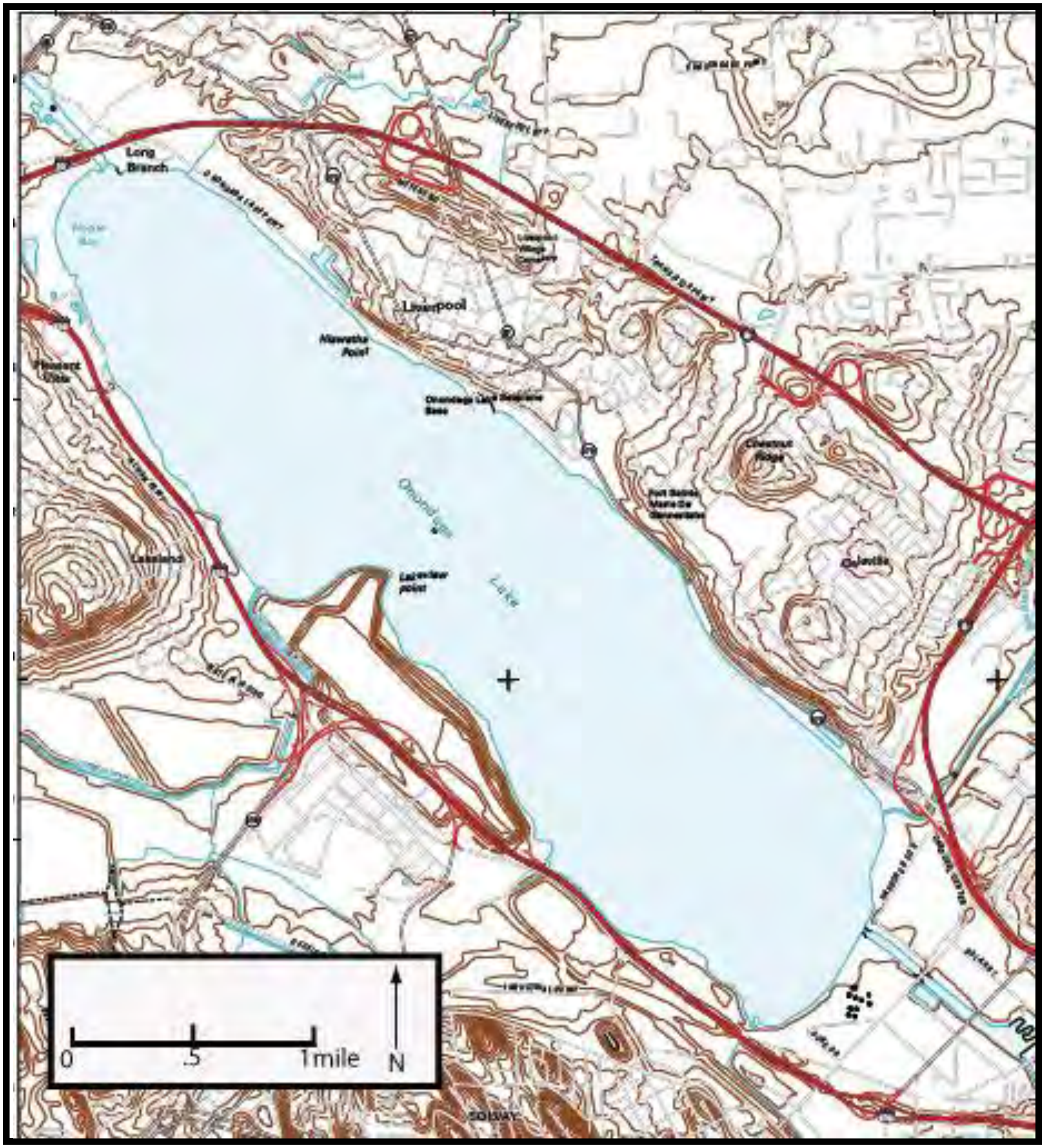


Figure 2. Excerpt from the Syracuse West 7.5 minute Quadrangle showing Onondaga Lake (United States Geological Survey, Syracuse, New York 7.5 Minute Quadrangle, 2010).

ONONDAGA LAKE MARITIME CONTEXT

Onondaga Lake was formed following the retreat of continental glaciers and proglacial Lake Iroquois approximately 10,000 to 8,000 years before present (BP). At a current elevation of 363 feet (110.6 meters [m]) above sea level (ASL) it is part of the Oswego River drainage that flows into Lake Ontario. The lake is currently 4.6 miles (7.4 kilometers [km]) long with a maximum width of one mile (1.6km). Onondaga Lake outflows to the Seneca River, which joins the Oneida River at the Three Rivers junction at Phoenix, New York, to form the Oswego River, a major tributary of Lake Ontario. Onondaga Lake has a surface area of 4.5 square miles (12 square kilometers [km^{2}]), a volume of 35 billion gallons (132.5 billion liters), and a maximum depth of 64 feet (19.5m).[8] The level and shoreline of Onondaga Lake have changed over the past 10,000 to 8,000 years due to climate fluctuations, human modifications and seasonal variations. It is important to understand these changes and how they influenced human habitation around Onondaga Lake in order accurately study the maritime context of this inland lake.

POST-GLACIAL LAKE LEVEL FLUCTUATIONS IN NORTHEASTERN NORTH AMERICA

As part of the larger Great Lakes drainage basin, Onondaga Lake was formed during the deglaciation of northern North America circa 12,000 BP. While similar post-glacial lakes and ponds in the northeastern United States have not been the subject of thorough archaeological study with regards to submerged precontact resources, many have been the subject of paleoenvironmental studies that evaluated the effects of Holocene climatic change on lake levels. These changes in the location and/or presence of shorelines and wetlands influenced precontact human settlement patterns and resource procurement strategies. Studies in the Great Lakes, Finger Lakes and smaller ponds of the northeastern United States and southern Ontario have demonstrated that climate change throughout the early and mid-Holocene (circa 10,000-4,000 BP) had diverse effects on lake level fluctuations in the Northeastern section of the continent, as well as the distribution and formation of wetlands along the margins of these lakes and their tributaries (Figure 3).[9]

Sediment core studies in the Finger Lakes have shown that during the Holocene Hypsithermal climatic period (9000 to 4000 BP) lake levels were relatively high when compared to the drought conditions proposed for the Great Lakes and Mid-West region.[10] This study also indicated that there were a series of low stands during the Hypsithermal in the Finger Lakes region every 1800 to 2200 years (approximately 9,800, 7,800, 6,000, 4,200 and 2,000 BP) with the highest relative lake levels occurring circa 8,800 and 7,000 BP.[11] Sediment core and subbottom profiler data analyses at small closed basin ponds in Maine suggest that there was a 7 to 20 foot (2 to 6m) decline in lake levels during the mid-Holocene, especially circa 6,000 BP.[12] Sediment cores from Crawford Lake in southern Ontario indicate the most significant lake low stand was between 4,800 and 2,000 BP, which is consistent with other sites in southern Michigan and Ontario.[13] Within the Great Lake Basins there were several phases of drier climate and lake low stands, including a major event that spanned ca. 9,000 to 4,000 BP.[14] During the Lake Stanley phase (7,900 BP) water levels in the Lake Huron basin were up to 230 to 328 feet (70 to 100m) *below* present and large areas of lake bed were exposed terrestrial landscapes.[15] While all of these studies demonstrate that lake level changes throughout the early to mid Holocene were prolific in the northeast, they also indicate that the impacts of climate change on lake levels varied depending upon the specific body of water in question.

To date, there has been no in-depth paleo-environmental study of Onondaga Lake to gauge how lake level fluctuation impacted precontact human settlement around the lake. Though the studies highlighted in this section indicate that Onondaga Lake, like other nearby lakes, likely experienced similar changes in lake levels, the timing and extent of these changes remain unclear.

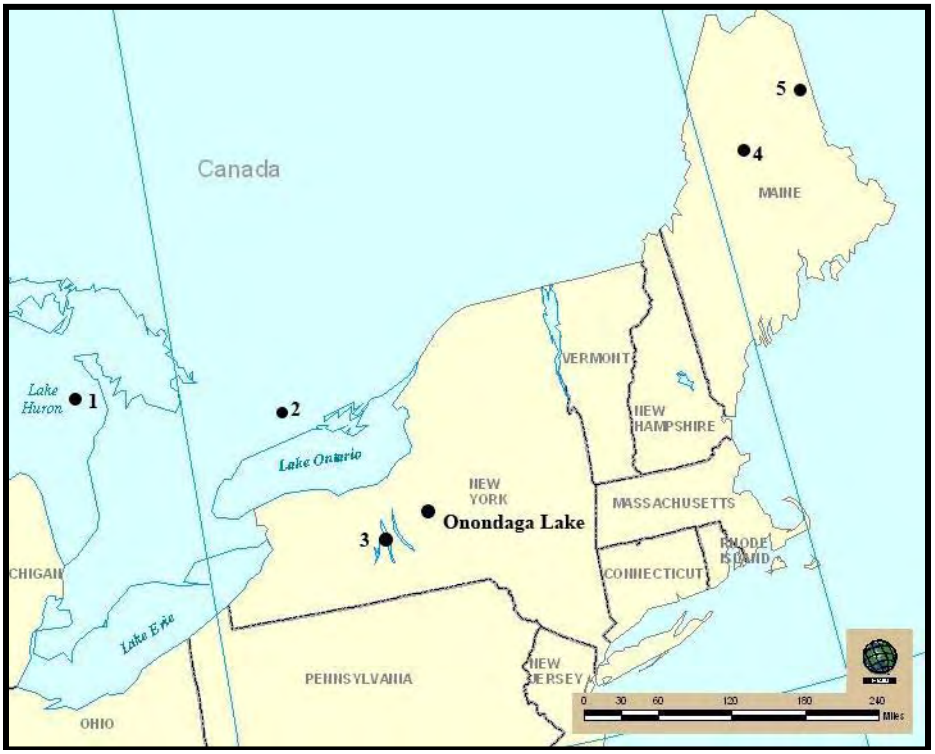


Figure 3. Map of the lakes and ponds discussed in this section: 1-Lake Huron; 2-Crawford Lake; 3-Finger Lakes; 4-Mattews Pond, Maine; 5-Whitehead Lake, Maine (after Environmental Systems Research Institute).

HISTORIC LAKE LEVEL CHANGES

The Phase IA report contained an extensive overview of historical records and maps regarding the changes in Onondaga Lake levels and alterations to the shoreline. The following synopsis is based primarily on those findings.[16]

Historically, Onondaga Lake experienced natural lake level fluctuations during times of spring runoff and dry summer spells, and this was likely true prior to European settlement. Much of the lake shoreline was once composed of soft spongy bog and marshland which was greatly affected by these seasonal lake level fluctuations.[17] When inland water travel became an important component to European expansion west during the early nineteenth century, engineers devised ways to control lake levels to benefit inland water travel. In 1822, Onondaga Lake was lowered approximately two feet (.61m) so that navigation between the lake and the Seneca River would be more easily attained. At the northern end of the lake, an outlet about 3,300 feet (1006m) long and five feet (1.5m) deep was cut, and a reef to the north was dynamited, allowing waters to more easily flow out of Onondaga Lake.[18] This resulted in a nearly 20 percent decrease in lake volume and in the drying up of marshy bogs along the lake shore.[19]

This northern outlet was eventually abandoned, allowing the lake to return to pre-1822 levels; however, in 1841 it was re-cut, and lake levels again may have dropped nearly two feet (.61m).[20] Hohman suggests that the lake may have been approximately 364 feet (111m) ASL at this time (1822 to circa

1898), and that prior to the nineteenth century the lake level may have been approximately 365 to 369 feet (113 to 112.5m) ASL.[21]

Construction of the Oswego Canal in the 1810s and 1820s along the eastern shore of the lake required the marshy shoreline to be reinforced with timber. Various mid-nineteenth and early twentieth century maps indicate that the reclaimed shoreline along the southern and southeastern part of the lake was anywhere from 200 to 3000 feet (61 to 914m) inland from the contemporary shoreline.[22] A 1908 Hopkins map identified areas of "reclaimed land," and the original shoreline of the southern part of the lake as approximately 300 to 1000 feet (91 to 305m) inland of the contemporary shoreline. The 1908 Hopkins map is also the first to indicate that the Solvay Process Company began placing waste into and along the shoreline of Onondaga Lake. Along Lake View Point, the Solvay Company had piled waste over 80 feet (24.4m) high in the mid-twentieth century, greatly altering the shoreline in that area.[23]

Other parts of the Onondaga Lake shoreline were greatly altered during the late nineteenth and early twentieth century. The construction of docks, wharves, roads and railroads, the dredging of basins, alterations made to river courses, and the placing of industrial waste along the shore all contributed to changes in the contours and depth of Onondaga Lake for well over a century. In particular, in 1915 Onondaga Lake level was raised to accommodate the construction of the New York State Barge Canal. In 1929, the mouth of Nine Mile Creek was moved west of Lake View Point. Additionally, in 1977, 3.7 acres (1.5 hectares) of the southwestern part of the lake were filled in by the county. Today, at an elevation of 363 feet (110.6m) ASL, it is proposed that Onondaga Lake is 2 to 3 feet (.61 to .91m) lower than the lake level prior to modifications which began in 1822.[24]

PRE-CONTACT PERIOD MARITIME CONTEXT

The Phase IA Archaeological Report provides an overview of the Pre-contact context for New York State and the primary patterns of pre-contact Native American land-use in the region.[25] The broader pre-contact period is divided into two eras based on subsistence practices: the hunter-gatherer/pre-agricultural subsistence era (12,000 BP to 1100 BP) and the agricultural/hunter-gatherer subsistence era (1100 to 350 BP). These pre-contact eras are further classified based on pre-contact periods established by Ritchie.[26]

Throughout all of the pre-contact eras, waterways of the Northeast were important landscape features in relation to subsistence (fishing and animal migrations), travel (watercraft) and settlement patterns. Native American groups relied on drainages and water courses during the highly mobile Paleoindian and Archaic periods, as well as during the sedentary periods when settlements were established near water courses and lakes or coastlines. What follows is a brief outline of the primary pre-contact periods identified for New York State, with a focus on the maritime context for each period. More specifically, this context will focus on the archaeological evidence for maritime resource procurement and the use of watercraft. For a more in-depth discussion of general material culture and settlement patterns see Hohman.[27]

Paleoindian Period (12,000 to 9,500 BP)

During the Paleoindian Period (12,000 to 9,500 BP) the Onondaga Lake area was submerged below pro-glacial Lake Iroquois. As the continental glaciers receded to the north, and Lake Iroquois drained, smaller lakes, like Onondaga Lake, Oneida Lake and the Finger Lakes were established in small lowland depressions within the Oneida Lake Plain. Throughout this time of major environmental transition, Paleoindian hunter-gatherers adapted their migrations and movements to this evolving landscape.

Fluted points, the most indicative artifact type related to the Paleoindian period have been recorded by Ritchie at numerous locations along the present day Seneca River to the north of Onondaga Lake.[28] This would imply that as Lake Iroquois receded, these river water courses were important travel corridors for both hunter-gatherer groups as well as the animals they hunted. The location of the points may also represent a relict shoreline of Lake Iroquois that was contemporary to the arrival of these groups of people to the region.

Paleoindian groups may have followed large megafauna before they went extinct, and in the later Paleoindain period, when the smaller lakes and ponds were established, they followed migrating elk and caribou herds. While a number of Paleoindian points have been recorded in Onondaga County, a lack of recorded Paleoindian projectile points in the immediate area of Onondaga Lake may be due the marshy nature of the land as Lake Iroquois receded. Also, as Onondaga Lake was established, the lake level may have been either extremely high, or extremely low, during the Paleoindian Period, and contemporaneous sites may now be submerged or many miles away from the present day shoreline. Additionally, historic era activities around the lake may have erased evidence of Paleoindian occupations. It is uncertain if Paleoindian groups used watercraft in the region of Onondaga Lake since the remains of watercraft have yet to be found in the archaeological record.

Early Archaic (9,500 to 5,500 BP)

Ritchie suggests that peoples of the Early Archaic period were still highly mobile, practicing a broad spectrum hunting and gathering strategy as the environment was still in a constant state of flux.[29] There is a lack of archaeological evidence relating to the Early Archaic period in northern New York. This could be a result of archaeological testing bias or Versaggi has suggested this may reflect that the environmental conditions in interior New York could not have supported long-term human occupation at this time.[30] Rather, she believes that smaller groups may have exploited "several small resource-rich zones, such as valley floors and upland bog margins, [that] could have provided the necessary resources for short-term occupations by small hunting and gathering groups migrating north from the warmer coastal regions."[31] Whether Early Archaic groups traveled via foot or in watercraft is still uncertain, but considering the predictability of fish and the numerous rivers, streams and lakes in central New York, it is highly likely that maritime activities played a major role in their subsistence and travel patterns.

The Late Archaic Period (5,500 to 3,500 BP)

The Late Archaic period in the Northeastern United States is characterized by a more hospitable and predictable environment, resulting in the establishment of resource rich deciduous forests and a climate that had annual changes in the form of four seasons.[32] Hunter-gatherer groups continued to follow seasonal migration of land animals and seasonal availability of aquatic resources.

The Lamoka Phase is well established based on archaeological findings as representing a fishing culture in central New York. Ritchie notes that during Lamoka Phase there was a preference for waterside locations, both as temporary and permanent habitation sites, particularly near shallow and weedy sections of larger lakes, small shallow lakes, the margins of large marshes near larger bodies of water, or large streams with weedy sections.[33] Various sites from this phase yielded large assemblages of fishing tools, particularly the Lamoka Lake site, located in Schuyler County, southwest of Onondaga Lake. Nearly 8,000 stone net weights and small projectile points were found, indicating that fishing and hunting of waterfowl were important activities. Additionally, a large collection of un-barbed bone fish hooks were recovered from the site, as well as some evidence that spear fishing may have been common. From this site it can be hypothesized that fishing with nets became prominent, as did the

importance of the resources used to make these nets. A fishnet made of "Indian-hemp fiber" which was woven into a net with about a two inch (5.1cm) mesh, was found at the site.[34]
The Brewerton Phase is best represented by the Brewerton type site located at the outlet of Oneida Lake. People of this phase appear not to have placed as much importance on fishing as they did during the Lamoka Phase. Brewerton sites tend to yield a smaller number of notched sinkers (or stone plummets), barbed fishing hooks and spear fishing devices. The Brewerton site, however, is located near the rifts below Oneida Lake, an optimal location for the seasonal fish runs, where fish can be trapped and speared.[35] Also noteworthy at the Brewerton site was a large number of woodworking tools, such as grooved axes, gouges, and adzes.[36] Ritchie notes that the presence of gouges in site assemblages implies the construction and use of the dugout canoes.[37]

The Frontenac Phase is best represented by the Frontenac Island site located in Cayuga Lake. It is the only island in the Finger Lakes, about an acre (.4 hectare). Excavations unearthed various faunal remains, including birds, reptiles, mammals, mollusks and fish.[38] Fishing gear included notched stone net sinkers, bone fishhooks, bone gorges, fishing spears, and stone plummets. Ritchie suggests that stone plummets were used for line fishing, and to assess water depth. He also notes that unlike the Lamoka sites, there were no tools found that indicate the manufacture of nets.[39] Woodworking tools were also part of the site assemblage, and it can be assumed that some type of boat building was required at this island site.

The Transitional Period (3,500 to 3,000 BP)
The Transitional Period is characterized by hunting and gathering groups with an increased reliance on plant materials. Frost Island Phase sites are more common to the north of the Finger Lakes, such as the type site along the Seneca River. The assemblage from this site yielded notched pebble sinkers, suggesting that fishing with nets was likely.[40]

The Orient Phase appears to be centered on the southeastern part of New York; hence, much of what is known is based on sites near Long Island. However, recent discoveries have shown that this phase may have extended into the northern Hudson region. It appears that shellfish was an important food source, gathered from mudflats and shallow bays.[41]

The Early and Middle Woodland Period (3,000 to 1100 BP)
The Early and Middle Woodland periods are marked by the increased interaction between peoples in north and central New York with groups to the west in Ohio (i.e. Adena, Hopewell) and north and west in the Great Lakes region. The most important cultural factor during this broader period is the sharing and exchange of ideas and cultural materials with neighboring regions. It indicates that although regionally groups of people were becoming more sedentary and establishing permanent settlements, they were also highly mobile with the long distance movement of ideas and materials, most likely making use of canoes for inland waterway travel. Stylistically, material culture distinguishes the Early and Middle Woodland sites from one another, but Hohman notes that their land use patterns were both based on an "organized system where seasonal base camps with as many as 100 individuals were established in major river and lake valleys near streams confluences."[42] With a larger base camp established, daily or even weekly forays for nearby resources were carried out by smaller groups, and this type of logistical subsistence pattern resulted in various site types representing these time periods.[43] It is likely that during this period native peoples used dugout canoes, while innovative methods for constructing lighter craft may have been developed at this time.

The Early Point Peninsula Phase is represented by smaller campsites around the shores of streams and lakes, within coves and islands. These sites had a relative paucity of projectile points, suggesting that hunting was less important when compared to fishing and collecting of freshwater mussels. Additionally, extensive use of wild rice beds is suggested for this phase. Fishing gear found at sites of this phase includes grooved ovate pebbles, net sinkers, fishhook barbs, copper fishhooks and gorges, a conical antler toggle-head harpoon, and barbed bone points. No bone fishhooks, per se, have been identified for this phase. There is a lack of large pottery at sites from this phase, which suggests that bark and wooden artifacts were important for storage. Ritchie points out that people of this phase likely represent "small mobile, probably bark-canoe-traveling fisherman, hunters, wild rice gatherers, with little baggage."[44]

Late Woodland Period (1100 BP to 350 BP*)*

The Late Woodland period marks the transition between the pre-agricultural/hunter-gatherer subsistence and the agricultural/hunter-gatherer subsistence eras.[45] Archaeological evidence from the Late Woodland period clearly shows that maize agriculture was in place and groups of people began to settle down into permanent agricultural settlements. The Late Woodland is divided by two phases: the Owasco Phase and the Iroquois, or Haudenosaunee Phase. Both phases are marked by the establishment of a sedentary/agricultural subsistence base, with hunting and fishing still an important component.

Owasco Phase is the first phase in which corn, beans and squash were cultivated and the use of the bow and arrow became common. Ritchie suggests that fishing during this phase may have been the work of the women, older children or old men, since there appears to be less emphasis on this subsistence practice over time. Fish were captured by spearing with a barbed bone point fixed to a shaft and carried out at rift and rapids of rivers, using nets, or angling with hook and line with barbless and barbed fishhooks.[46] Interestingly, a trot-line was found that dates to this period. It was composed of "two-strand twisted Indian-hemp fiber equipped with nineteen dropper lines, each carrying a compound hook contrived from two hawthorne spines. It was baited, weighted with a flat sinker, and left over night on a favorable bottom."[47] The device could catch a number of fish at once.

By the fourteenth century, the Owasco people had become what we historically know as the Iroquois, or Haudenosaunee. They established large settlements clustered around the inland lakes of New York, and the Mohawk Valley.[48] Villages became large, housing up to 350 people and located along major drainages. The villages had to be moved every two decades due to localized resource depletion. The immense amount of wood used to build the palisaded villages, a sign of tribal warfare, and to support the population meant that wood became scarce over time.

Also during the Late Woodland period, it is supposed that the first bark canoes were constructed, resulting in quicker and easier travel along rivers and streams when compared to the dugout canoe that had been used for many millennia. Information about Haudenosaunee bark canoes comes primarily from early European accounts.

Native American Canoes

The three basic canoe types constructed by Native American groups in the Northeast over 11,000 years are skin boats, dugout canoes and birch bark canoes. Each of these vessels reflected the environmental conditions and technological innovations of its time. Paleoindians were probably the first to use watercraft beginning around 11,000 years ago. These hunter-gatherer groups likely hunted and fished along seashores and presumably built small skin craft to harvest the marine food resources. These forms of boats were popular among Native Americans of the northern latitudes, where the landscape is barren of trees and sea mammals played a major role in subsistence and cultural innovation.

As freshwater inland lakes were established by 10,000 years ago, forests of hard and soft wood species developed around the post-glacial lakes. Native Americans adapted their watercraft design to these environmental changes. The Archaic and Woodland peoples built small craft from tree bark, skins from terrestrial animals, or hollowed-out logs. Unfortunately, few examples of watercraft from these periods have been found, and little is known about their design, appearance, or use. Evidence of bark and skin boats has not been found in the archaeological record, since the organic materials from which they were made are not preserved well in the climate of the area. At least a dozen dugout canoes, however, have been uncovered in lakes and ponds throughout Vermont and Ontario. The archaeological examples of these simple boats probably date between the Late Woodland period (1100 to 400 BP) and the nineteenth century.

Watercraft made of dugout tree trunks, called dugout canoes, were the primary vessel form starting about 10,000 years ago.[49] Dugouts were heavy, weighing between 200 to 300 pounds when wet and were difficult to carry at portages. They therefore were primarily used on larger bodies of water, like lakes and ponds, though smaller, individual dugouts may have functioned well on rivers. Most of dugouts that survived in the archaeological record have been found submerged in ponds. It appears that these vessels were cached, or stowed, over seasons when semi-sedentary groups of hunter-gatherers would travel to their fall/winter camps. The dugouts would then remain protected for when the group returned and the lakes and ponds were no longer iced over.

By approximately 600 years ago bark canoes became the primary vessel type in the Northeast. An average bark canoe was approximately 16 feet (4.9m) long, but others could also be as small as 11 feet (3.4m) or as large as 30 feet (9.1m). Regardless of their size, bark canoes were easier to handle, as they were much lighter than dugouts, yet construction was more complicated and required more specialized tools and construction components. Bark was most easily harvested in the spring, when sap was running. Winter and summer bark was more difficult to harvest and inferior.[50] Gum or tallow was applied as a resin to make the vessels water tight. Unfortunately, the delicate nature of birch bark canoes has prevented any early specimens from surviving in the archaeological record. Anthropologists and archeologists agree that the bark canoe probably evolved out of the late Woodland period some 2000 or more years ago. However, none has survived from before the 1700s.

Haudenosaunee Canoes

Haudenosaunee bark canoes were typically built of elm bark as opposed to birch bark. Birch bark was available, but scattered and therefore elm and other barks were more common on Haudenosaunee canoes.[51] They may have used white cedar for the ribs and roots of the white cedar, tamarack, or eastern larch for sewing the pieces of the bark together.[52] For more temporary canoes, saplings and branches may have served for the ribs. Early accounts note Haudenosaunee canoes as being rather large and primarily labeled as war canoes.[53] The war canoes may have been temporary canoes, constructed hastily for the task at hand and then abandoned. On large bodies of water within their territory, the Haudenosaunee used dugouts, but for navigating streams and for use in raiding their enemies they employed bark canoes (Figure 4).[54]

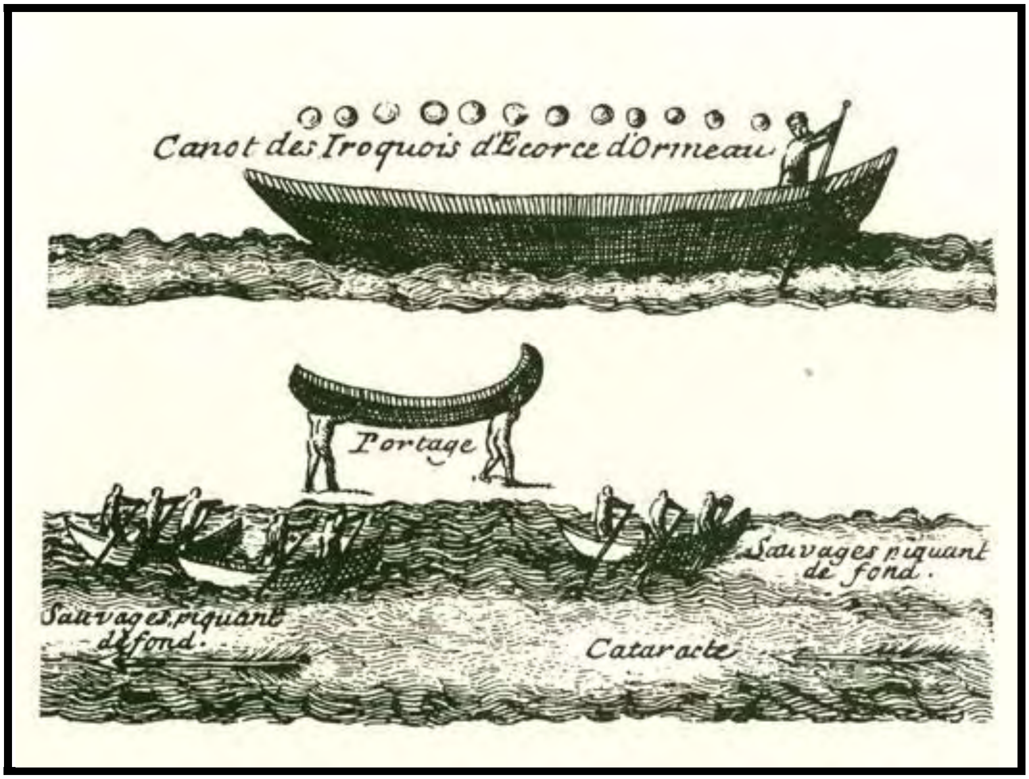


Figure 4. Excerpt of canoe imagery from French explorer LaHontan's notes (from Adney and Chappelle 2007).

Contact Period (350 to 200 BP)

The Owasco are believed to be the antecedents to the Onondaga people who came to call the area of Onondaga Lake home.[55] The Onondaga have long inhabited the area around Onondaga Lake, possibly dating back to the twelfth century. It is believed that the Haudenosaunee (or Iroquois) Confederacy was established at Onondaga Lake, a central location for the joining tribes, as far back at 1000 BP.[56] The Confederacy of the Haudenosaunee was established to bring peace to the region and to unite the native groups. The five original nations of the Haudenosaunee were the Mohawks, Oneidas, Onondagas, Cayugas and Senecas. The Tuscaroras joined the confederacy circa 300 BP. The Onondaga are considered the People of the Hill and the keepers of the fire and wampum.[57]

Archaeological sites affiliated with the Onondaga near Onondaga Lake are all located to the south along tributaries that flow into the lake.[58] Archaeological evidence and historic accounts note that Onondaga fishing villages were located at the mouth of lakes and rivers.[59] The Onondaga village of Kaneeda is said to have been located at the outlet of Onondaga Lake at Onondaga Creek. This fishing village site was recorded by amateur archaeologist Dr. William G. Hinsdale of Syracuse in the 1930s.[60] The site yielded Haudenosaunee pottery dating to the circa 400 BP, along with net sinkers, deer bones and flakes. These fishing villages may have been seasonal, as Snow describes Haudenosaunee fishing during Fishing Moon cycle as seasonal, taking place in the spring and involving the movement of whole families.[61] They would harvest the migrating fish by the thousands as they slowed down at the falls and rapids of rivers, "using cordage twisted from Indian hemp fiber…woven into nets and lines…The hollowed dried galls of goldenrod served as floats, while flat pebbles were notched to make sinkers."[62]

PRECONTACT/CONTACT PERIOD ARCHAEOLOGICAL SENSITIVITY FOR SUBMERGED SITES IN ONONDAGA LAKE

As noted in this section, inland lakes as well as their margins and inlets/outlets, offered diverse resources and areas for habitation for precontact and post-contact Native American groups in the Northeast. Onondaga Lake, one of the smaller Finger Lakes of New York State, was part of an interconnected system of waterways, all rich in aquatic and terrestrial resources. Adjacent dry land near riverine confluences offered ideal locations for short-term seasonal and/or long-term habitation sites. The lake itself and the surrounding environs (i.e. tributaries, wetlands, and forests) would have provided fish, game, wood, and plants that made habitation in close proximity to the lake ideal. Additionally, travel and fishing activities on the lake may have involved the use of dugout and bark canoes.

In support of this potential, there are 29 documented Precontact/Contact period archaeological sites within 1.6 km radius (1 mile) of the shoreline of Onondaga Lake. All of these sites are listed in the New York State SHPO database and are either near Onondaga Lake or along major tributaries that flow into or out of the lake.[63] The known Precontact and Contact era archaeological site types are varied (small campsites, mounds, burial places, contact era villages) and demonstrate that Native American land use around Onondaga Lake was substantial, especially on dry land near confluences or on spits of land jutting into the lake. The presence of ceremonial and spiritual land use shows the importance of the lake for activities other than resource procurement and settlement.

Climate changes may have greatly influenced the way precontact peoples used the land around the lake. Onondaga Lake was formed roughly 10,000 B.P. when glacial lake Iroquois retreated. Since that time, the shoreline of Onondaga Lake may have been altered as lake levels fluctuated due to episodic drought or periods of increased moisture. As discussed previously, it is not currently possible to state exactly how these climatic episodes impacted this particular body of water. However, given the historically known presence of wetland margins along the western shoreline of Onondaga Lake, and the presence of salt springs on the south and east portions of the lake, it is likely that Onondaga Lake was an important resource procurement area throughout the human history of the region.

None of the known Precontact archaeological sites identified in the area are located on the immediate shoreline of Onondaga Lake. An exception may be the Contact period Kaneeda village site on the south shore of the lake near the outlet of Onondaga Creek. The location of the outlet changed over the years and the exact location of the village is not known. The absence of recorded sites adjacent to the shoreline may be a result of the natural configuration of the shoreline. A great majority of the shoreline adjacent to the underwater APE for this project was once wetland and swamp, as noted on 18th and 19th century maps (Figure 5: Late eighteenth century map of Onondaga Lake with the project shoreline APE labeled as swamps and springs.Figure 5). Today, this land is composed of made lands created through the deposition of waste fill (typically Solvay waste) by infilling shallow water areas or marshes. These marshes and wetland were likely attractive for resource procurement by Native American groups, but they were less likely to be habitation areas.

A geomorphological study of the land portion of the APE conducted by Geoarchaeology Research Associates(GRA) indicated that "thick marl deposits (found below fill in Wastebed B) are indicative of basin and subaqueous shoreline deposits, which are neither conducive to prehistoric settlement, nor archaeological preservation."[64] The boring logs along the project APEs support the historic map information which noted a variety of swamps adjacent to the lake. This characterization can be extended to the drowned shoreline where portions of the swamps noted on the late eighteenth century map would have existed prior to the raising of the lake to current levels. Whether these swamp lands existed along the project APE shoreline of Onondaga Lake continuously over the past 10,000 years is, again, uncertain.

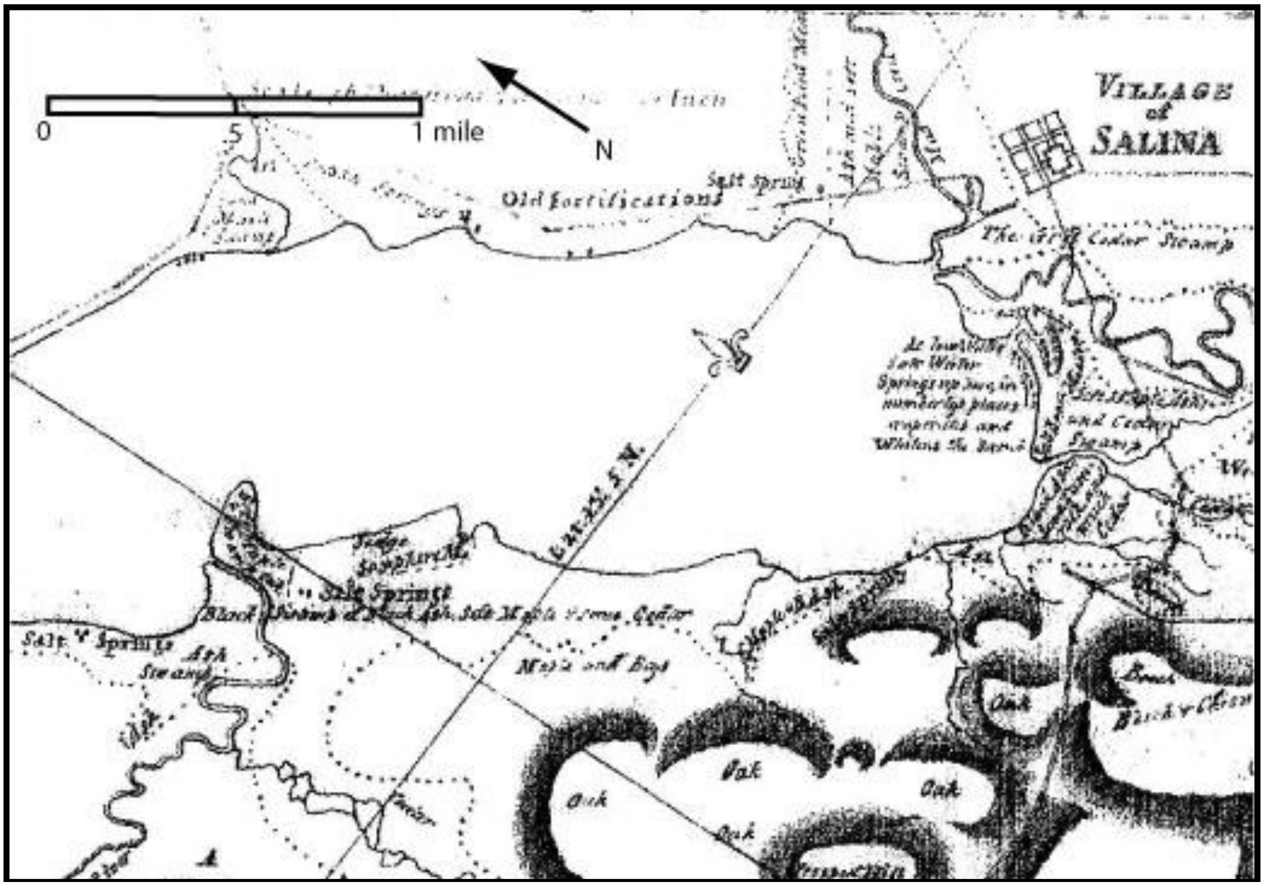


Figure 5: Late eighteenth century map of Onondaga Lake with the project shoreline APE labeled as swamps and springs.

HISTORIC CONTEXT

The arrival of European settlers around Onondaga Lake began in the early 1600s with the appearance of fur trade explorers and Jesuit missionaries to the region. The French adopted the bark canoe early on, realizing that it would be invaluable in the exploration and trade in the interior of the continent. Streams could be navigated and explored, and overland portages could be easily maneuvered. The adoption of the Native American bark canoe allowed the French, and the early fur trade, to quickly penetrate the heavily wooded areas of interior New York and around Onondaga Lake.

The Jesuit priest Simon LeMoyne visited Onondaga Lake and noted the salt springs at the southern end. The salt was recognized as an important resource of the area and Onondaga Lake was identified as "Salt Lake" on eighteenth century maps (Figure 6). The Jesuits established a mission on the east side of the lake in 1656 (Jesuit Mission of Ste. Marie de Ganeentah), which was vacated in 1658. The French presence was welcomed by the Onondaga since they felt in need of an ally, much as the Mohawk had found in the Dutch traders. The disagreements and jealousy between the Mohawk and Onondaga led to a bloody dispute and inter-tribal warfare, much the result of European influence causing uneasiness among the Confederacy.[65] The French returned to Onondaga Lake in 1696 under the orders of the governor of New France, Count de Frontenac. Arriving in nearly four hundred boats via the Oswego River to Onondaga Lake, they established a fortification on the south shore en route to the main village of the Onondaga tribe to the south (Figure 6). According to Thomas, the remains of this 1696 fortification are currently located nearly 1,200 feet (366m) from the present day shoreline, a result of historic lake level changes and the addition of fill along the shoreline.[66]

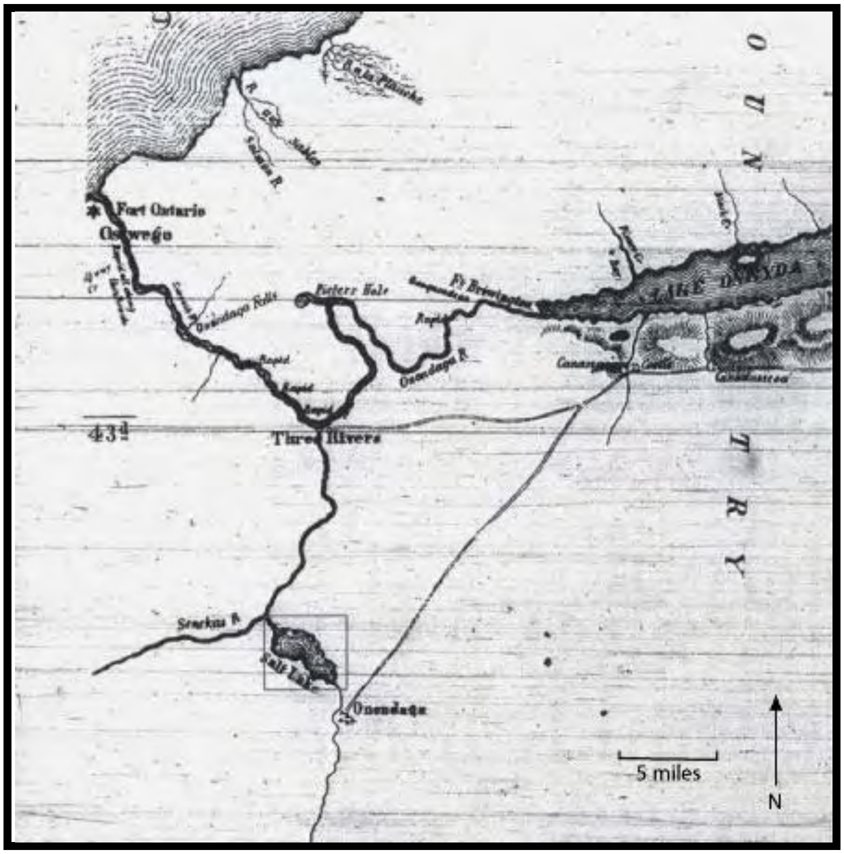


Figure 6. Eighteenth century map of Native American settlements in New York (from Bruce 1896, excerpted from Hohman 2004).

Throughout the 1700s, the Onondaga region, like most of the Northeast, was impacted by the myriad of wars between the French, British, Native Americans, and ultimately Americans. After the Revolution, a slow trickle of European settlers made their way west, some settling in the Onondaga Lake region and establishing the salt industry. At this time, improvements were proposed to inland water way travel, particularly westward to connect Albany with the Great Lakes. Rapids and shallow stretches of rivers and streams meant that boat travel was limited to light and small craft with less than a two foot (.61m) draft that could be lifted and dragged. Canoes were still used and wooden bateaux became the pick-up truck of the period.[67]

In 1786, Ephraim Webster was the first to officially settle on Onondaga Lake, establishing a trading post and camp at the mouth of Onondaga Creek on the east side of the lake. When he died his estate, including the salt springs, became public lands of New York State. Onondaga County was established in 1796 and families began to settle around the lake. The towns of Salina, Geddes and Liverpool were all established prior to 1800. The marshy shorelines of the lake caused outbreaks of cholera and malaria in the region, making the immediate shoreline of Onondaga Lake a relatively inhospitable place.

The Canal Systems and Onondaga Lake
Just before the turn of the nineteenth century the Western Inland Lock and Navigation Company began to construct short canals connecting lakes and rivers, and deepening shallow areas. The New York State Commission also began prospecting for canal routes that would connect Albany to Buffalo, and in effect connect the Hudson River to the Great Lakes. James Geddes, a resident of Salina who lived on Onondaga Lake, was appointed the New York State Surveyor General. Geddes' involvement in the salt industry meant that he lobbied hard, and successfully, for the canal to pass through the village of Syracuse. Construction of the Erie Canal began on July 4, 1817 and it officially opened October 25, 1825. At 343 miles (552km) long, it cost $352 million to build and was completely funded by the State of New York. It was 4 feet (1.2m) deep and 40 feet (12.2m) wide with 15 by 90 foot (4.6 by 27.4m) wide stone locks.

The Erie Canal did not run through Onondaga Lake; the actual canal portion needed to be protected since vessels were towed by mules and horses throughout its course, and a wide lake was not an optimal location logistically. Instead, the narrow canal ran through the center of Syracuse and then to the south of the lake. Extensions to the canal around the lake and into the lake were soon proposed, particularly to benefit the salt industry. In 1819, a law was enacted that authorized a navigable side-cut, approximately one mile long (1.6km), from the Erie Canal to the salt works in Salina.[68] Onondaga Lake at the time was accessible to smaller vessels via the northern and southern outlets at Onondaga Creek and the Seneca River. However, there was no direct route from the Seneca River and Onondaga Lake to the canal system. The salt industry petitioned for permission to connect the Salina side-cut and the Seneca River to lessen the expense of getting wood to the salt works. Areas around Onondaga Lake and the Seneca River were still covered in forested land, and the connection of these water routes made the movement of wood to the salt works more economical.[69]

In 1820, the State of New York sold parts of the land they had acquired from the Webster estate, keeping their claims on the salt springs and appropriated the money to lower the level of Onondaga Lake to that of the Seneca River. By 1822 an outlet about 3,300 feet (1006m) long and five feet (1.5m) deep was cut, reducing the lake level 2 feet (.6m) and causing marshlands along the shoreline to eventually dry up.[70] This allowed good navigation between the Erie Canal and the Seneca River via Onondaga Lake.

This project became the impetus for the development of the Oswego Canal, the first feeder canal constructed, which connected the Erie Canal at Syracuse to Lake Ontario. James Geddes was again the head surveyor for the project. The first section of the Oswego Canal, running along the eastern shore of Onondaga Lake and from the northern outlet to Three-mile rift, was completed in 1826 (Figure 7). On April 28, 1829 the Oswego Canal was opened to navigation throughout its entire extent. The canal bank along the eastern shore of Onondaga Lake was at times problematic. The soil was loose and prone to washing out, and it became necessary to secure it on both sides with a facing of timber.[71] Additionally, once the Liverpool portion of the Oswego Canal was completed, the Salina side cut to Onondaga Lake was abandoned as a navigable channel, as was the Onondaga outlet, causing sediment to build up and block the flow of water. Ultimately, Onondaga Lake attained its former pre-1822 elevation.

Figure 7. 1898 USGS Map of Syracuse showing the Oswego Canal on the east side of the lake (United States Geological Survey, Syracuse, New York 7.5 Minute Quadrangle, 1898).

In 1837, the state of New York took over the abandoned Salina Side-cut and in 1842 the Onondaga outlet was excavated to depth of 5 feet (1.5m) and the lake level dropped to that of the Seneca River once again.[72] This work was repeated in 1856 and the Salina side-cut was extended.[73] To access Onondaga Lake from the Oswego Canal vessels had to travel through Lock #15, or Mud Lock, originally built in 1828 and made of wood, to the Seneca River, and then into the lake via the northern outlet. Due to the unstable soils of the area, Mud Lock had to be completely rebuilt in 1836 of stone. It was then enlarged in 1862 and 1887, allowing larger boats on the Oswego Canal, and in effect into the lake.

The large amount of traffic on the Erie Canal resulted in proposed enlargements and improvements. In 1835, work began on expanding the entire canal route, both locks and prisms, and improving its navigability. It took until 1862 to complete this work, in addition to deepening the Oswego, Seneca and Cayuga, and Champlain Canals. The Erie Canal was straightened and increased in size to 7 by 70 feet (2.1 to 21m) and the locks enlarged to 18 by 110 feet (5.5 to 33.5m).

By the 1860s the railroad had become a major competitor for moving both people and goods west. To keep up with the competition, work began on the second enlargement of the canal system. In 1903, survey work began for a new 1000 ton barge canal. The New York State Barge Canal opened in 1918 and made use of bodies of water like Onondaga Lake and Oneida Lake since the use of steam powered tugboats and steel canal boats lessened the concern for protected water travel and the need for towpaths.[74] The Old Oswego and Old Erie canal systems adjacent to Onondaga Lake were then abandoned. The new Oswego Canal connects with the Erie Barge Canal north of Onondaga Lake at Three Rivers. The Erie Barge Canal system passes through Onondaga Lake as a route to Syracuse, where a southern harbor was constructed past the southern lake outlet (Figure 8, Figure 9 and Figure 10).

Figure 8. 1926 navigational chart showing the northern entrance to Onondaga Lake via the Onondaga Outlet. Barge Canal vessels could access the lake via the Seneca River, part of the Barge Canal, and through the Outlet (U.S. Lake Survey Office, *New York State Canals, Erie Canal, Brewerton to Cross Lake and Syracuse and Oswego Canal, Three River Point to Oswego*, 1926).

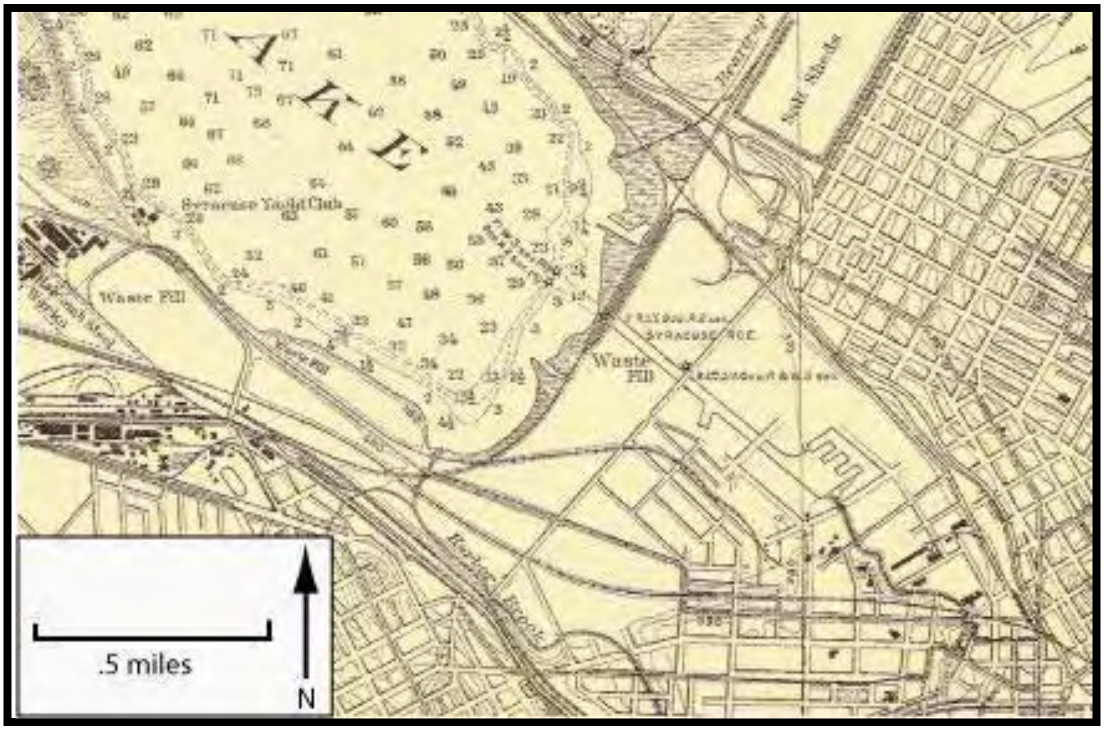


Figure 9. 1926 navigational chart of the southern part of Onondaga Lake, showing access to the harbor at Syracuse (U.S. Lake Survey Office, *New York State Canals, Erie Canal, Brewerton to Cross Lake and Syracuse and Oswego Canal, Three River Point to Oswego*, 1926).

Figure 10. Steel Barge at the southern terminal at Onondaga Lake (courtesy Onondaga Historical Association).

Industries and Pollution

The opening of the Erie Canal brought many immigrants west, and established a workforce in the region of Syracuse for agriculture and manufacturing. By 1784, James Geddes had founded a salt manufactory at the southern part of the lake. The state, however, had retained ownership of the salt springs on the southeastern part of the lake to prevent a monopoly on the salt industry. Instead, it levied taxes on each barrel of salt to pay for the construction of the canals.[75] An 1833 account of Syracuse describes it as a "thriving village [that] owes its importance principally to the immense quantity of salt produced in its neighborhood, the whole adjacent country being impregnated with it, and springs from which immense quantities are manufactured rising in various directions."[76] Syracuse became a city in 1848, and was coined Salt City.

In 1833, there were about 100 salt factories at Salina, 30 at Syracuse, 26 at Liverpool and about 30 at Geddes.[77] The salt was manufactured through a process called solar evaporation, which made use of the sun by laying the salt out in large vats, as well as boiling it (Figure 11). The boiling process burned large amounts of timber which was transported from the Seneca River and Onondaga Lake to the manufactories, first via the Lake and the connecting side-cuts, and then through the Oswego Canal in 1826. The state-owned salt spring in Salina was thought to have "the strongest saline water yet discovered in the world, 40 gallons yielding about a bushel of pure salt."[78] The salt was shipped in barrels on the Oswego and Erie canals and about 1,600,000 bushels were produced in 1833.[79]

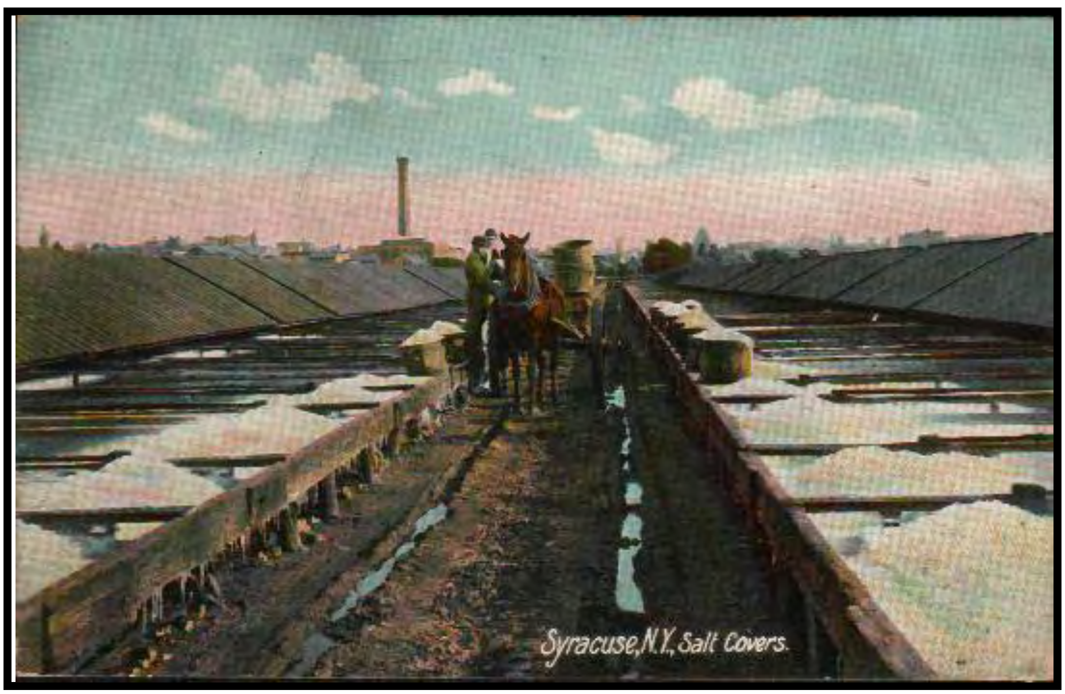


Figure 11. Postcard showing the solar evaporation method in the salt sheds near Syracuse (from www.vintageviews.org, n.d.).

Salt production remained the primary industry in the area until reaching its peak production of over nine million bushels in 1862. The arrival of the railroad to the area added an extra boost to the economy. Beer brewing began to replace salt as main industry around Syracuse as German immigrants arrived in the 1870s.

In 1884, the Solvay Process Company (SPC) came to Onondaga Lake to manufacture soda ash, a product with numerous applications including manufacturing glass and detergents (Figure 12). The area provided the ideal environment and resources needed for the Solvay process of creating soda ash: there was salt water from the nearby springs; calcium carbonate from the surrounding limestone bedrock; and easy disposal of waste product into and around Onondaga Lake. Millions of pounds of chloride, sodium, and calcium, were discharged into Onondaga Lake.[80]

SPC added a new plant in 1918 to produce chlorine and a variety of organic chemicals resulting in hundreds of thousands of pounds of mercury, among other various chemicals, being released into the lake. Between 1900 and 1940, a number of other industries were established in the region, including steel, pottery, pharmaceutical, air conditioning, appliance, and electrical manufacturing facilities, many of which contributed other solvents and organic chemicals such as benzene and polychlorinated biphenyls (PCBs). Allied-Signal (a successor to Solvay Process Company) closed the soda ash production facility in 1986, and the company now exists under Honeywell.

Figure 12. Postcard of the Solvay Process Works (from www.vintageviews.org, n.d.).

As the industrial revolution took hold and populations around the lake grew, the disposal of domestic and municipal waste became common. During the turn of the twentieth century sewage waste was being discharged directly into Onondaga Lake, as well as into Onondaga Creek and Harbor Brook.[81] This issue escalated in the 1920s when the city installed a 1700 foot (518m) outfall sewer in to the lake. The excessive raw sewage in the lake led to increased nitrate and phosphorous concentrations in the water, which in turn led to algae blooms and fish die-offs.[82]

The environmental impact of the pollution was detrimental to other smaller commercial enterprises. In the 1800s a viable commercial cold-water fishery was sustained by the various fish from the lake; whitefish, Atlantic salmon and sturgeon were particularly popular. However, by 1890 the fishery had closed and by 1898 the whitefish population in the lake had disappeared. Ice-harvesting, another profitable business, was banned in 1901 due to impurities in the water; swimming was banned in 1940, and fishing (due to mercury contamination) in 1970.[83]

Recreation on the Lake

Onondaga Lake became a recreational hub beginning in the 1870s, competing with such places as Saratoga, Lake George and the Thousand Islands.[84] Resorts and amusement parks sprung up all over the western and southern shores, offering entertainment, dining, swimming, boating, fishing and carnival like attractions (See Figure 7). The larger of these resorts included: Iron Pier (1890); White City (1906); Lake View Point (1872); Pleasant Beach Resort (1874); Rockaway Beach (1892); Maple Bay (1889); Long Branch Resort (1882); and Manhattan Beach (1880s). Visitors could access the resorts via the Erie Canal, either by taking a packet along the five mile route of the Oswego Canal on the west side of the lake to Mud Lock and then into the lake. Or, piers were constructed at the southern part of the lake (Salina Pier, Geddes Pier, Iron Pier) where steamers and naphtha launches frequently picked up passengers from the canal and the train and took them to the various resorts (Figure 13 and Figure 14). Each resort constructed a landing dock to accommodate the steamers.

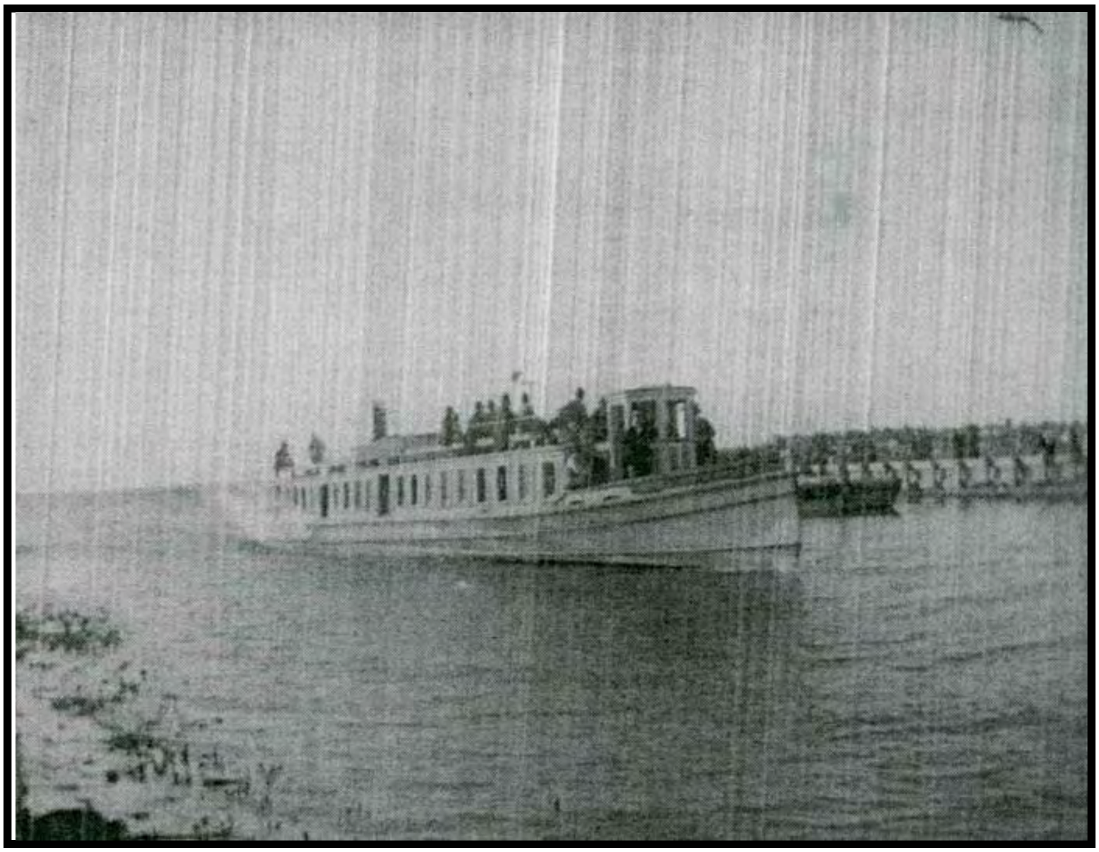


Figure 13. Steamer *Milton S. Price* entering the Iron Pier (courtesy Onondaga Historical Association).

Different access routes to the resorts became available in the 1890s, limiting the importance of the steamboats. The first lake shore boulevard was built in 1894, but was abandoned by 1902 because it was built on unstable ground and flooded annually.[85] A trolley line was built along the western shores of Onondaga Lake in 1899, shuttling visitors from Syracuse to the resorts in a matter of minutes, and making canal passenger travel to the resorts less popular (Figure 15).

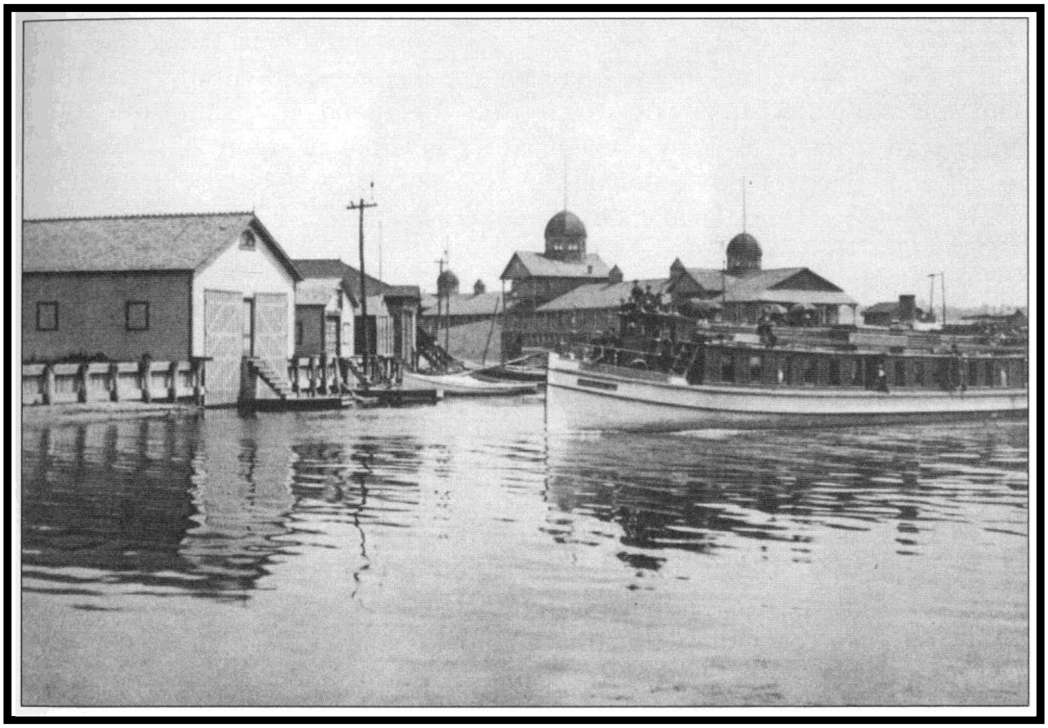


Figure 14. A steamboat loaded with guests approaches Iron Pier (1899, Onondaga Historical Association Collection).

Figure 15. Postcard of the Boulevard with the Syracuse Yacht Club on the right and a trolley on the left (from vintageviews.org, n.d.).

The resorts era, however, was relatively short lived. Annual spring flooding frequently damaged these lake shore properties, and many buildings had to be rebuilt on stilts. Other resorts closed due to growing competition as newer resorts opened. The effects of pollution on the lake also contributed to the decline of Onondaga's vacation status, as swimming and fishing were ultimately outlawed. The lake level was raised three feet (.91m) in 1915 to accommodate the new Barge Canal, and this put many resorts underwater. Later in 1953, the construction of Route 690 along the western shore destroyed the last remaining resort, Pleasant Beach.[86]

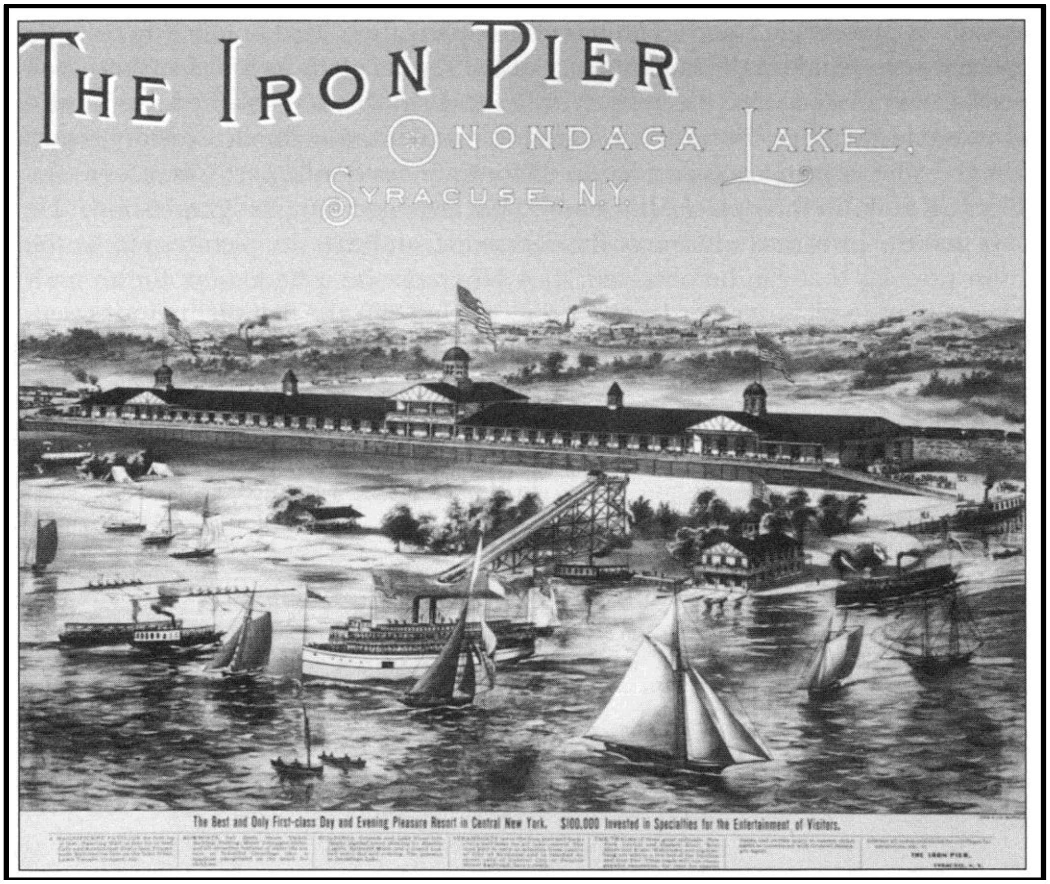


Figure 16. Advertisement for Iron Pier, 1890 (Lithograph by Gies and Co., Buffalo; Original image property of Helen Heid Platner).

Yacht Clubs on Onondaga Lake

The Onondaga Yacht Club, located at the outlet of Ley Creek on the southeastern shores of the lake, was founded in 1883, celebrating shortly thereafter with an Opening Regatta in 1887. Buildings were constructed in 1938, and additions were added in the 1950s. This yacht club has remained in service ever since, hosting annual regattas, and occasional speed boat races.[87]

The Syracuse Yacht Club was built in 1898, just south of Lake View Point. This massive three-story building rested on piers out over the lake and included boathouses on its northern side (Figure 17). It quickly became a popular club, with over 2,000 members and more than 150 launches and sailboats using its facilities on a given day. The club had a fleet of twelve steam-powered yachts when it first opened.[88] The Yacht Club's clubhouse burned down on May 10, 1917, and was never rebuilt.

Figure 17. Postcard showing the Syracuse Yacht Club (from vintageviews.org, n.d.).

Ice Boating

Rockaway Beach became the headquarters of the Onondaga Ice Yacht Club in 1901. Though iceboating began on the lake in the 1890s with roughly 13 ice boats on the lake, by 1901 the number had nearly doubled to 25 vessels.[89] The sport remained popular until the 1920s. Each ice boat was unique: canvas sails varied from 20 to 30 feet (6 to 9m) long, vessel length ranged from 16 to over 35 feet (4 to 11m) (Figure 18). They were constructed of redwood, ash, walnut and various other wood types. The boats traveled at incredibly fast speeds, and spectators loved to come and watch the races on Sundays at Rockaway Beach. While accidents did happen, only one fatal ice boat crash on Onondaga Lake made headlines. On Christmas Day 1904, two ice boats, *Blitz* and *Warner*, collided on the lake. The accident claimed two lives, and *Blitz* was left to sink to the bottom when the lake thawed in April.[90]

Figure 18. Ice boat *Best Girl* at Rockaway Beach circa 1900 (from Thompson, 2002).

1930s East Shore Revival

After the Great Depression, work relief programs were instituted that developed the east shore of the lake for tourism and recreation. Between 1931 and 1933, over one thousand men worked to build Onondaga County Park, which included the restoration of Mud Lock, the filling in of the abandoned Oswego Canal, the building of the Salt Museum and the Ste Marie Jesuit Mission, as well as Danforth Salt Lake where the old salt springs had once been.[91] The Onondaga Lake Marina was constructed at Liverpool in 1940, providing slips for pleasure boats traveling the canals and local residents. Today, Onondaga Lake is once again a popular recreation area. Catch and release fishing is making a comeback and recreation paths lining the lake are very popular with pedestrians and bicycles. While swimming is still not recommended, boaters frequent Onondaga Lake, and lakeside residents enjoy the view from the shoreline.

VESSELS LOST IN ONONDAGA LAKE

Onondaga Lake has claimed numerous watercraft over the last 150 years. The following is a list of the boats known to have been lost in the lake:[92]

- Iceboat *Blitz* 1904 to 1905: This vessel sank in April of 1905. On Christmas Day 1904, *Blitz* crashed into the iceboat *Warner. Blitz* was not recovered and sank when the ice melted the following spring.
- Tug *Stillwater:* Built in 1915, the tugboat *Stillwater* was scuttled in Onondaga Lake in February 1940.
- Unknown Vessel Type: sunk 1857
- Sailboat: sunk 1857
- Unknown Vessel Type: sunk 1858

- Two Canal Boats: A September 1877 *New York Tribune* article notes that "two large canal boats are to be blown up by torpedoes on Onondaga Lake next Monday on the anniversary of Perry's [1813] naval victory."
- Sailboat and/or Yacht: An August 1879 *Watertown Re-Union* article reports that "Dug Remington, book keeper for Warne & Cook, was drowned in Onondaga Lake to-day by the capsizing of a sailing yacht. His companion, Clarence Baumgras, was rescued shortly afterward. John Harwood and a party of three were also sailing in his yacht, and when near the middle of the lake the boat upset and sunk. All were rescued after being in the water an hour."[93]
- Steamboat *Lyttle*: burned 1892 according to a number of newspapers. The *New York Times* writes "The Lake steamer Lyttle was burned to the water's edge on Onondaga Lake Wednesday night. The craft had just been tied up to her dock at the iron pier after discharging a load of excursionists. The boat was worth $3,000."[94]
- Derelict vessels *Maud*, *Silver Cloud*, *Venus*, *Florence* and *Razzle Dazzle,* c. 1889: abandoned in the "graveyard on Bear Creek" which is now known as Ley Creek. The Syracuse Standard writes "The wreck of the Razzle Dazzle early in the season was deplored by all. Her crew shivered her timbers in trying to move Salina pier by running her head on while running before a gale. She has been taken to the grave yard on Bear creek where she lies with the Maud, Silver Cloud, Venus, Florence and a little cutter.[95]
- Steamboat *John Greenway*: Boiler exploded on Onondaga Lake in 1885 (but likely did not sink). The following is an account of the accident:

> Syracuse, May 24. -- The excursion steamer JOHN GREENWAY, which runs on Onondaga Lake and the canal, started yesterday afternoon from its landing in Geddes for a trip across the lake. The steamer had in tow the barge JUDGE RIEGEL, on board of which was about 20 residents of Geddes, who had been invited to take a ride. The steamer was commanded by CHARLES KINNE, the Captain and owner, who has run the boat on the lake for the past 12 years. The boat was to begin its Summer excursion trips today, and the Captain started out yesterday on a preliminary trip to test the machinery. A few minutes before 5 o'clock, when the steamer had reached a point about a mile east of the outlet, two sharp reports were heard, and the steamer was instantly enveloped in clouds of steam. The passengers on the barge heard a shout, and saw a form fling itself out of the cloud into the water. WILLIAM GRAUGH, a deckhand, seized the rope connecting the two boats and pulled them together. Capt. KINNE was found writhing in pain and struggling to get out of the suffocating steam. He was carried into the barge's cabin. ANTONIO KINNE, the engineer, who was picked up from the water into which he had thrown himself, was also taken to the barge. JACOB GRASSMAN, who had been sitting by the railing of the upper deck, had been burned on the hands and arms. Capt. KINNE was scalded from head to foot. In places the skin rolled itself up, and the man looked as if he had been flayed alive. DR. J. R. YOUNG, of Liverpool, and DR. J. W. KNAPP, of Geddes, were called as soon as possible. The helpless steamer and barge had drifted a quarter of a mile down the lake, toward the southern shore. A few rowboats put out from Liverpool and Salina and took away the passengers. Capt. KINNE lingered in great agony until 5 o'clock this morning, when he died. ANTONIO, the engineer, is badly burned, and it is thought

> fatally. The flue plates of the boiler and the steam chimney were blown out. The boiler had been declared to be unsafe a year ago, and was known by competent engineers to be in a bad condition. The Captain had been repeatedly warned that he was risking his own life and those of his passengers in running the boat, but he insisted that she was safe. The boat was run by an utterly incompetent engineer and a stubborn Captain. She had carried thousands of passengers every Summer, and experienced engineers express wonder that her boiler had not exploded long ago.[96]

- Two cabin cruisers: sunk 1971
- Fiberglass Boat: sunk 1985
- Air National Guard Plane: 1955

VESSEL TYPOLOGY

This vessel typology was created to provide a list of boat types that potentially traveled Onondaga Lake during the historic period (1700 to present day). This typology was compiled from two primary sources, unless otherwise noted.[97] A description of Native American watercraft can be found in the section on Native American watercraft.

Batteaux (1600s to 1820s)

These vessels were small, flat bottomed, and pointed at both ends, with a shallow draught. Typically about 30 to 40 feet (9.1 to 12.2m) long, they were rowed, poled or sailed by a crew of 2 to 4 boatmen. Batteaux were typically built without plans. They were able to haul cargo of 1½ to 2 tons (1,361 to 1,814kg).

Durham Boats (1790s to 1850s)

Durham boats were developed at the same time the canal systems were conceptualized around 1790. They had a shallow draft of 2 feet (.61m) but could carry seven times as much cargo as bateaux (Figure 19). They were the "tractor-trailers" of the era. In shallow water they were propelled using long poles with heavy iron tips pushed against the bottom. In deeper water like Onondaga Lake, they were rowed or sailed. Durham boats became the first type of boat used on the Erie Canal when it opened in 1825.[98] They could be as long as 60 feet (18.23m) and as wide as 8 feet (2.44m).

Mohawk River Boats (1700s to 1850s)

These are similar to Durham boats, but were developed on the Mohawk River. They were flat-bottomed with sharp bows, and measured 50 feet (15.2m) or longer, with a breadth of about 8 feet (2.4m). With decks at the bow and stern, they also had walkways along each side so they could be poled by a crew of five to seven boatmen. The boats were fitted with a single mast stepped in a tabernacle for ease of lowering.

Rafts (1700 to 1880s)

Rafts were used in the nineteenth century for timber transport. Crews lived on board in tents or crude cabins. They controlled the rafts with very long sweeps (oars) which also provided some propulsion. The railroad replaced timber rafts in the 1880s.

Canal Boats

Erie Canal boats were built by multiple small operations along the canal, each with its own unique style of vessel. Boatyards would produce just a few boats a year, initially putting a lot of detail into each boat. However, they evolved into "nothing more than floating boxes with square ends to minimize labor and maximize cargo capacity."[99] As the canal and its locks were enlarged, the sizes of canal boat grew to adapt to these changes (Figure 19 and Table 1). Prior to 1860, most canal boats were built plank-on-frame; however, the use of larger, cheaper wood led to the construction of slab sided (edge-fastened) vessels.

Table 1. Vessel dimensions as the canal size changed.

Year	Length (feet)	Width	Draft
durham boat	50 to 60	10 to 8	2
1817 to 1862	78	14.5	3.5
1862 to 1915	97	17.5	6.5
1915	150	25	10

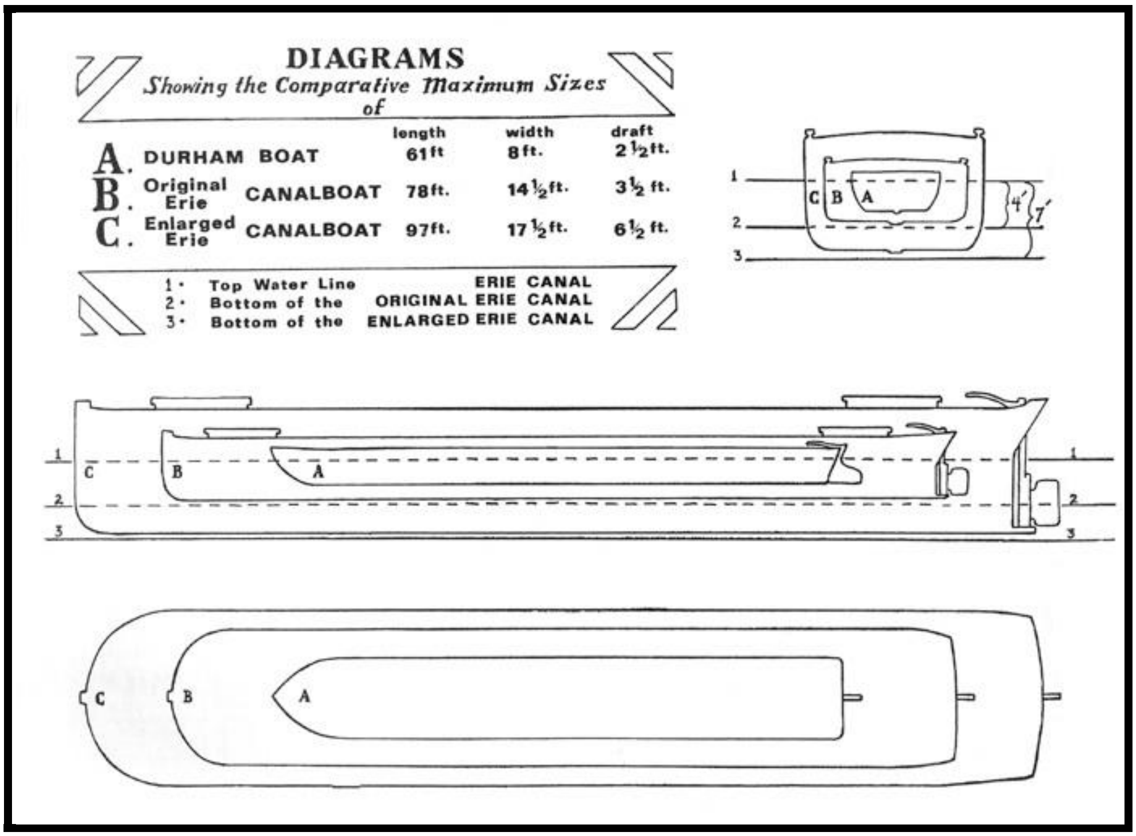


Figure 19. Diagrams showing the comparative maximum sizes of Durham boat [pre-Erie Canal], an original Erie canal boat and an enlarged Erie canal boat (from www.eriecanal.org).

After the completion of the canal expansion in 1862, state law mandated that all canal boats be built with rounded bows to minimize the impacts of accidents on the canal. Prior to this, canal boats were quickly constructed with squared bows and sterns which lead to damage to the canal prism as sharp cornered boats gouged into the canal embankment. Also, the corners were easily sheered-off allowing cargo to be dumped into the canal. In the 1860s quality lumber became scarce along the canal due to nearly 50 years of canal construction and local development. This resulted in many smaller shipyards abandoning boat building and instead focusing on canal boat repairs and maintenance. Places on the western end of the canal, such as Buffalo, Tonawanda and Lockport, became major boatbuilding hubs, since western lumber was more easily shipped to these ports. Along the Oswego Canal communities such as Rochester, Phoenix, Fulton and Syracuse remained viable canal boat building centers with lumber shipped in from Canada. Additionally, yards in Ithaca survived along Cayuga Lake.

The various types of Erie Canalboats reflected the primary cargo or purpose each would serve. Some carried goods; others carried passengers. Most Erie Canal boats contained crew/family quarters, a kitchen, a hold and a stable for horses or mules, and were steered by a large barn door rudder. They were pulled along the canals by teams of two horses or mules, typically housed in the bow (Figure 20). Each team would work six-hour shifts and the "Hoggee" or driver would sleep with his team. At the end of a wooden canal boat's life, it was common to abandon the vessel in a stream or feeder off the main canal.

Figure 20. Horse being taken out of its stable (courtesy Albert R. Stone Negative Collection, Rochester Museum & Science Center).

In the last decade or so of the 1800s, self-propelled canalboats, and tugs towing or pushing barges became more common on the canal. Construction of the New York State Barge Canal was completed in 1918 and steel barges and tugs replaced all older forms of canal boats.

Canal Packets (1819 to 1860)

Packets were boats that traveled the canal and carried passengers and their luggage. They had sharper lines than cargo boats. Average dimension for early packets were 71.9 feet (22m) in length, 12.7 feet (3.9m) in breadth, and a depth of hold of 7.2 feet (2.2m). The passenger berth cabin took up most of the boat. They were replaced by the railroad in the 1850s.

Canal Line Boats (1819 to 1860)

Operated by freight lines, these vessels transported both passengers and freight. In 1833, more than half of the boats on the canal were of this type. These boats had deck houses running their entire length. They were primarily used for carrying general freight, and possibly a few passengers. They had fewer windows than packets and had one or more wide sliding doors on each side of the house for loading and unloading goods.

Lake Boats or Lakers (1820 to 1915)
These vessels had hatches running the entire length of the deck. They were the strongest built so they were sturdy enough to be towed across the lakes in the canal system. They had rounded bows, watertight decks and hatches, and when used on the lakes would be towed in a raft with other boats behind a steamer.

Bullhead Canal Boats (1819 to 1915)
One of the most expensive boats to build, the bullhead canal boat was used for cargoes of flour, grain, and other products requiring an absolutely dry cargo hold. Similar to packet and line boats, these also had full length deckhouses, though even fewer windows. The cargo was loaded through wide doors in the side of the house (as in a line boat). Bullhead boats were strongly built because of their heavy cargos and had holds well lined to prevent damage to the cargo from moisture.

Canal Scows (1819 to 1862)
Scows were primarily used to carry non-perishable cargoes on short trips within the canal system. They were also used as maintenance vessels, carrying building materials or dredge spoil. The scows had less freeboard than canal boats, and had ends with steeply raked or curved athwartship planking. Maintenance scows had cabins at each end that were only sunk 2 or 3 feet (.61 to .9m) into the main deck.

Canal Deck Scows (1819 to 1862)
These square-ended boats had a sloped bow and stern and were the prototype for the State repair scows. They were useful for hauling bulk cargo with minimum protection. They were more strongly built than the open scow and retained their flat square appearance. These vessels drifted out of existence when the state mandated rounded bows in 1862, although state repair deck scows were exempt.[100]

Canal Open Scows (1819 to 1915)
The hull shape was the same as the deck or repair scow, but these were the cheapest vessels to construct. They hauled heavy bulk cargos such as sand, gravel, construction stone, and coal. They were edge fastened with dimensions in 1880 of 98 feet (29.9m) long 17 2/3 feet (5.4m) wide and 9 to 10 feet (2.7 to 3m) depth of hold. The weight varied from 40 to 45 tons (36,287 to 40,823kg). They were originally small and flat but evolved with the enlargements to a more rounded and heavier size.[101]

New York State Repair Scows (1819 to 1918)
The state repair scows remained the same throughout the entire period of the Old Erie Canal; they were constructed under contract with state specifications. They were primarily deck scows, and maintained square bows despite the 1862 ban on this design. Their length remained 70 feet (21.3m) despite enlargements of the canal and in 1875 they were 14½ feet (4.42m) wide. These boats were designed to be fast, with a shallow draft and were always pulled by horses.

Steel Canal Barges (1918 to 1990)
Upon the 1918 enlargement of the Erie Canal, the advent of modern welding techniques prompted new canal boat construction techniques. A new line of 1,000 ton (907,184kg) steel barges and tugs were

designed to make use of the enlarged canal. Some of these steel barges were self propelled; others were towed by steel tugs (Figure 21).

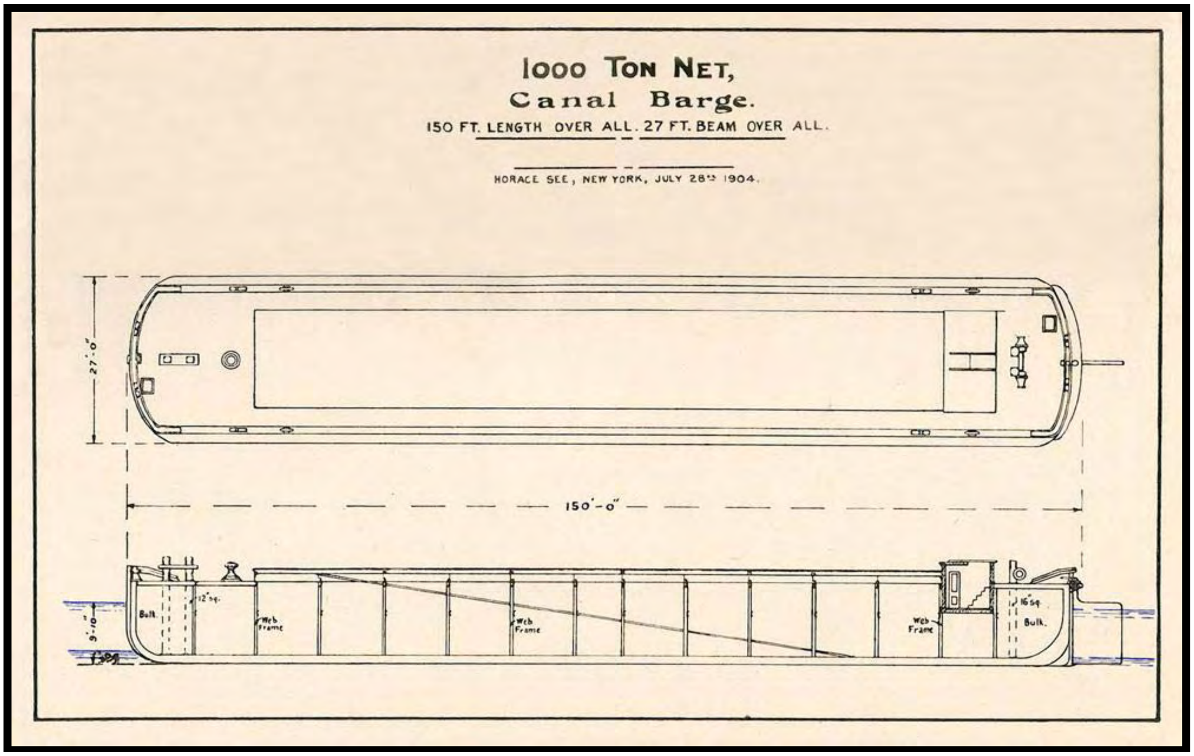


Figure 21. Diagram of a steel canal boat (from *Annual Report of the State Engineer and Surveyor of the State of New York, for the fiscal year ending September 30, 1904*, 1905).

Barges (1820 to present)

Barges, as a general vessel type, had rectangular shaped hulls, and were typically not self-propelled. This class of vessel was used throughout the nineteenth and twentieth centuries in North America for a wide variety of tasks. The number of barge varieties extant during this period was limited only by the different types of cargoes and tasks for which they were required. Currently there is no comprehensive typology for late nineteenth/early twentieth century barges, making their classification difficult. In a 1985 study, Norman Brouwer placed barges into three broad categories: hold barges, deck scows, and covered barges. Hold barges had hatches on the main deck to facilitate the storage of cargo in the hold. The hatches normally had covers so that perishable cargo could be protected from the elements. Deck scows did not have large hatches on the main deck; all of their cargo was stowed on the main deck. Canvas tarps, if necessary, were employed to protect the cargo. Covered barges also stowed their cargo on the main deck, but were fitted with a permanent deck house to shelter the cargo.[102] Within these broad categories there exist numerous subdivisions.[103] The barge categories below are the most common types, however, this list is by no means comprehensive. Other types not described here include, but are not limited to: excursion barges, ice barges, refrigerated and heated barges, concrete barges, floating grain elevators, car floats, livestock barges, piledrivers, and steam winch scows.

Deck Scows (1820 to present)

Open deck scows, also known as flat scows, had an unenclosed deck used to transport non-perishable goods that did not require protection from the weather, such as brick, stone, iron ore or coal. Most of the deck was open for cargo, although a small cabin was often located near the stern.[104] Open deck scows were also used as working platforms. The term scow is frequently used interchangeably with the term barge, but this is not technically correct. "Scow" denotes the shape of a vessel's hull, while "barge" implies that a vessel is not self-propelled. Many scows were also barges, but many barges were not scows. The hull shape of a scow was flat-bottomed with vertical sides, and sloping or raked ends. The ends were normally straight, but angled at about 45 degrees. Most scows were decked, with the hold serving as a buoyant pontoon that supported the cargo on the deck.[105] The hold contained a number of fore-and-aft and transverse structures used to support the deck and cargo above.

Rock Scows (1819 to present)
Rock scows, also known as bulkhead scows, were designed to carry large quantities of crushed stone, sand, and other loose materials. The materials were placed on the main deck and held in place by timber bulkheads at the bow and stern. These timber bulkheads were the defining feature of this vessel type, although they also tended to be built stronger than other scow types because of the heavy loads carried on deck.

Dump Scows (1820 to 1950s)
Various styles of dump scows were designed for the purpose of holding and dumping of fill. A basic description is a vessel with an internal flotation and a trap door bottom used in canal construction. Brouwer describes two primary types: the hopper barge and the side dumping scow. The hopper barge has dimensions of 133 feet (40.5m) long, by 35 feet (10.7m) wide, with a 14 feet (4.3m) depth of hold. The barge had curved ends forming one quarter of a circle from keel to deck. There is a hatch that is closed by a pair of timber doors that are held closed by chain bridles. Once the contents of the hopper were dumped, the doors could then be closed. The side dump scow is described as a standard scow hull with a raked bow and stern. It has three longitudinal bulkheads located at one-quarter, one half and three quarter points of the width of the vessel. The deck was sloped 45 degrees on either side, with four bays separated by bulkheads. Dumping would have been done by opening the bays.[106]

Derrick Lighters (1820 to present)
Derrick Lighters were structurally almost identical to open deck scows, but were fitted with hoisting equipment. This equipment was normally in the form of one or two spars. One spar was mounted in the stern just forward of the cabin, while the second was mounted in the bow. The spars were fitted with booms to facilitate the loading and unloading of cargo.[107]

Dredges
The canal system required continual waterway maintenance and deepening, making dredges a common sight on the canals from the 1820s into the mid-twentieth century (Figure 22). Dredges were typically unpowered vessels with scow-shaped hulls. Many were equipped with spuds, vertical posts which could be raised and lowered to hold a vessel in place. Various dredging mechanisms, typically steam driven, were employed resulting in vessel types such as spoon dredges, wheel dredges, clam shell dredges, bucket dredges, ladder dredges and cutter head dredges.

Figure 22. Photograph showing a bucket dredge with spuds excavating the barge canal in 1906 or 1907 with a dump scow in the foreground (LCMM Collection)

Steamboats

The first steamboat on the canal was launched in 1823. Most canal boats moved throughout the canal with tow-horses or mules; however, on the open water of lakes and rivers, they needed to be towed by steamers. Most steamboats had a deck house and an engine below decks. They were powered by coal, with either a vertical beam engine or a crosshead engine. In the 1880s, propeller driven steamboats became more common than the sidewheelers, allowing more room on board. Also in the 1880s the United States instated a law that required all vessels with a steam engine to have a licensed steam engineer on board. This made it impractical for smaller entrepreneurs and private owners to operate such vessels. Steamboats varied in size from small steam yachts, to smaller day excursion vessels with two decks, to vessels over 100 feet (30.5m) in length.

Steam Towboats (1820 to 1950)

This vessel had a long, narrow, one-story deckhouse which contained crew spaces at both ends and the upper engine room and upper boiler room amidships. The wheel house was at the forward end, raised a few steps above the deck on smaller boats, or placed on top of the deck house. The decks had a noticeable sheer, rising higher at the bow than the stern. Heavy mouldings were placed around the sides at deck level to withstand buffeting by barges.

Excursion Steamboats (1800s)

This includes a wide variety of vessels types and sizes. Some excursion steamers were as large as 200 feet (61m) long, while smaller day trip boats were closer to 60 to 80 feet (18.3 to 24.3m) with a top deck and canopy.

Steam Canal Boats (1880 to 1950)

Similar in construction and size to other canal boats, these vessels were self propelled with a steam engine below deck.

Steam Line Boats (1850s)
Similar to towed line boats, these vessels were some of the first to utilize steam commercially, with over 100 in use by 1862.

Tugboats

Steam Tugs (1820 to 1915)
Steam dugs were designed to pull multiple canalboats through open waters of lake and/or at times through the canal. Various styles developed.

Canal Tugs (1915-present)
These powerful vessels were designed with a low profile. Many were built with hydraulic systems for raising their pilothouses where heights were not restricted. Canal tugs were built with both wood and steel hulls. Originally steam powered, they eventually became gasoline and diesel powered (Figure 23).

Drill Tugs (1915-present)
These smaller tugs were used to shift barges within a terminal area. They averaged around 75 feet (23m) in length and 250 horsepower.

Pleasure Craft
Various forms of pleasure craft existed on Onondaga Lake over the past two centuries. Sailing vessels of all types, and motor boats made of wood and fiberglass. Row boats, canoes and small kayaks were common. In the mid-1800s steam propelled pleasure yachts were replaced by tube boiler engines and then gasoline engines for speed boats. Ice boats became popular in the late 1880s, as did naphtha launches.

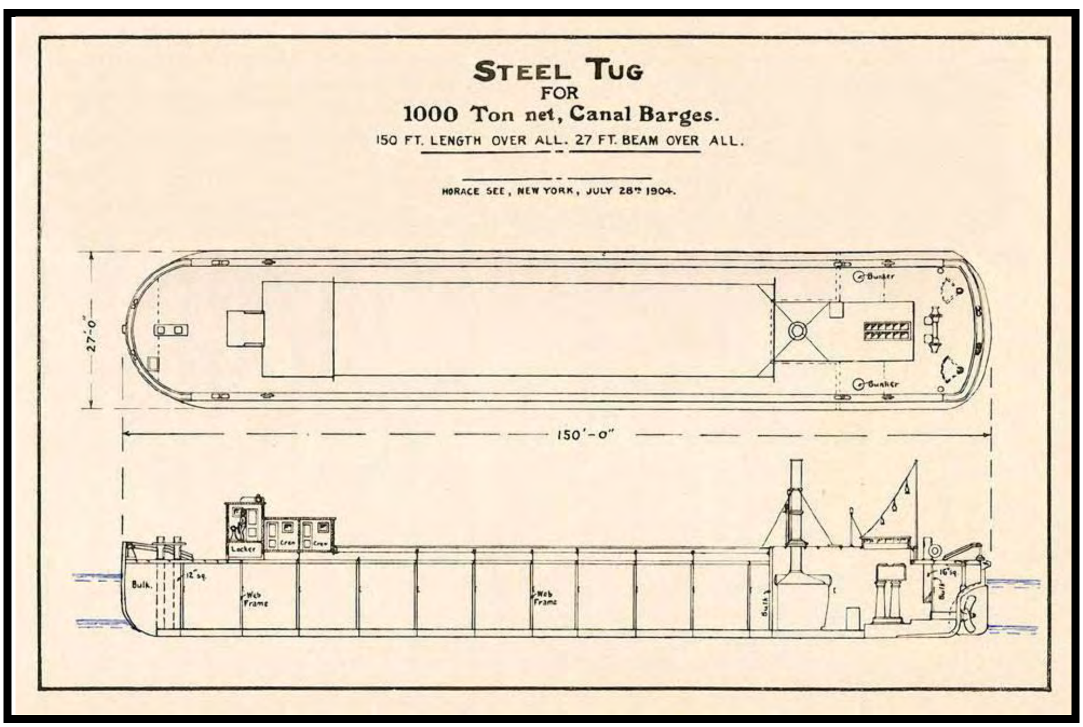


Figure 23. Diagram of a steel tugs (from *Annual Report of the State Engineer and Surveyor of the State of New York, for the fiscal year ending September 30, 1904,* 1905).

METHODOLOGY

PHASE 1B WORK PLAN METHODOLOGY

The Phase 1B archaeological survey was based upon the *Underwater Archaeological Resources Phase 1B Work Plan for the Onondaga Lake Bottom, Subsite of the Onondaga Lake Superfund Site, Onondaga County, New York* (*Underwater Work Plan*), which identified the potential archaeological sites to be investigated and the methodological approach for their study.[108]

In summary, the following methodology was used to arrive at the research universe for the Phase 1B underwater fieldwork.

Datasets

Remote Sensing Data

Remote sensing data for Onondaga Lake was collected by CR Environmental, Inc. in 2005.[109] This survey recorded four datasets: 1) bathymetry to identify the lake bottom surface; 2) side-scan sonar to characterize debris, obstructions and other surficial features of the lake bottom; 3) sub-bottom profiling to supplement the assessment subsurface stratigraphy; and 4) magnetometer data to identify debris and obstructions containing iron within or on top of the lake sediments.

Aerial Surveys

Aerial imagery for Onondaga Lake from Google Earth® and Microsoft® Virtual Earth were examined to identify shoreline and shallow water features.

Previous Archaeological and Historic Research

In 2004, the Public Archaeology Facility conducted a Phase 1A archaeological resource assessment for the Onondaga Lake Superfund Site on the behalf of Honeywell.[110]

Additional Historic Research

Navigational charts of Onondaga Lake from 1915, 1926, 1932, 1937, 1942, and 1947 were examined for the locations of potential cultural resources.[111]

Data Analysis Methodology

The following process was followed to locate potential submerged cultural resources in Onondaga Lake:

1. Using ArcView (a GIS produced by ESRI) a multi-layered file was developed to assess the geo-spatial relationship of the following data sets:
   - Contoured magnetometer data (a geo-referenced .tif file)
   - Side scan sonar anomalies (.shp file marking the location of each sonar anomaly)
   - Individual magnetometer anomalies (.shp files marking the location of each magnetic anomaly)
   - Onondaga shoreline map (.shp file)
   - Outline of the currently anticipated remediation areas (.shp file)

2. All correlations between sonar contacts and magnetometer anomalies revealed in step one above were recorded.

3. All 755 individual sonar contacts images were examined (as individual .tif files).

4. Simultaneous with 3 above, the locations of shallow water sonar anomalies were cross-referenced with those locations on Google Earth® and Microsoft® Virtual Earth to determine if there were visible shoreline or shallow-water features that could identify the contact.

5. Simultaneous to 3 and 4 above, historic navigational charts and maps were examined to determine if there were charted historic features that could yield such an anomaly.

6. The analysis resulting from steps 2-5 was recorded in tabular form and in expanded form and presented in the *Underwater Work Plan*.

The *Underwater Work Plan*, in addition to outlining the locations of potential archaeological sites, also prescribed the tools and methods to be used for the Phase 1B fieldwork.

PHASE 1B REMOTE SENSING METHODOLOGY

The remote sensing fieldwork outlined in the *Underwater Work Plan* was executed from June 2 to 11, 2010. The fieldwork was directed by LCMM, with CRE providing the survey vessel and captain, and the remote sensing equipment and technician. The fieldwork was executed by Adam Kane (LCMM, Archaeological Director), Chip Ryther (CRE, Oceanographic Operations Manager), Shipherd Densmore (CRE Survey Vessel Captain), Eli Perrone (CRE Oceanographic Technician), Bill Campbell (CRE ROV Pilot), and Christopher Wright (CRE Senior Hydrograpaher). Safety oversight was provided by Parsons through Dale Dolph, Kelly Miller and Xiaodong Huang.

The following methodological approach was used to collect side scan sonar, scanning sonar and videographic data sets from each anomaly in or adjacent to a remediation area.

Side Scan Sonar

Side scan sonar data was acquired with an Edgetech Model 4125-P 400/1,250 kHz side scan sonar, and a Hemisphere VS-100 differential Global Positioning System (DPGS) and digital compass (Figure 24). The sonar and differential global positioning system (DGPS) were interfaced to a laptop computer running Edgetech Discover data acquisition software via Ethernet and serial connections, respectively.

HYPACK hydrographic data acquisition and navigation software was used to design a series of survey transects centered on each anomaly. When possible, these transects were extended to expedite insonification of nearby pairs or groups of anomalies. Transect spacing was set to 25 feet (7.6m) to accommodate the short ranges of the high frequency signals while ensuring approximately 200% coverage of each anomaly. A separate navigation computer was set up to provide a steering display for the vessel pilot.

The sonar towfish was deployed from the bow of CRE's 26 foot (7.9m) survey vessel *Lophius*, using the vessel's A-frame and hydraulic winch (Figure 25). Because the majority of the anomalies were located in shallow water (less than 10-feet [3.1m] deep), a minimal length of tow cable was deployed. This short cable length was recorded to facilitate correction of offsets between the DGPS antenna and the towfish.

Side scan sonar data were acquired using a 1,250 kHz signal. Sonar swath width settings (per channel) ranged from 33 to 82 feet (10 to 25m). Digital data were recorded in both Edgetech's .JSF format and standard .XTF format. Data were archived to external hard drives at the end of each survey day. Navigation and data acquisition around many near-shore anomalies were hampered by dense aquatic vegetation. In some instances, this vegetation completely obscured data surrounding the anomaly.

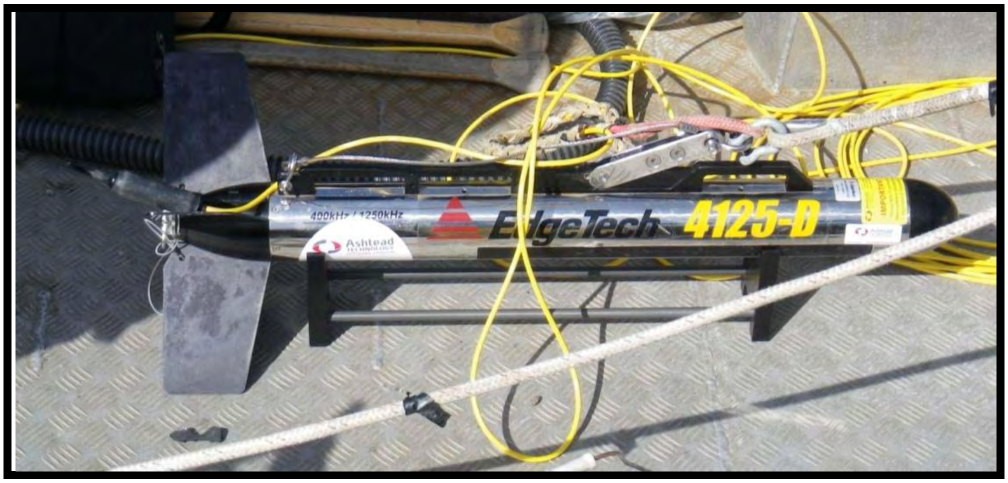


Figure 24. EdgeTech 4125-D sonar towfish (LCMM Collection).

Figure 25. EdgeTech sonar towfish being deployed from the bow of RV *Lophius* (LCMM Collection).

Sonar data were processed using Chesapeake Technology, Inc.'s SonarWiz software to map the locations and dimensions of objects on the bottom and to merge adjacent sonar files into a seamless mosaic of the lakebed (i.e., plan view image of sonar data). Raw side scan sonar data processing consisted of corrections for towfish layback (i.e., the distance between the towfish and the DGPS antenna), data adjustments for signal attenuation, and sonar imagery georeferencing (i.e., projection of the sonar data into real-space coordinates). Water column portions of the acoustic returns were removed through inspection and digitizing the nadir (first surface return from the lakebed) for each channel on a survey transect. The raw data were then position corrected by applying the measured offset between the DGPS antenna and the towfish to each of the data files. Georeferenced transect data and mosaics were created from these processed data (Figure 26).

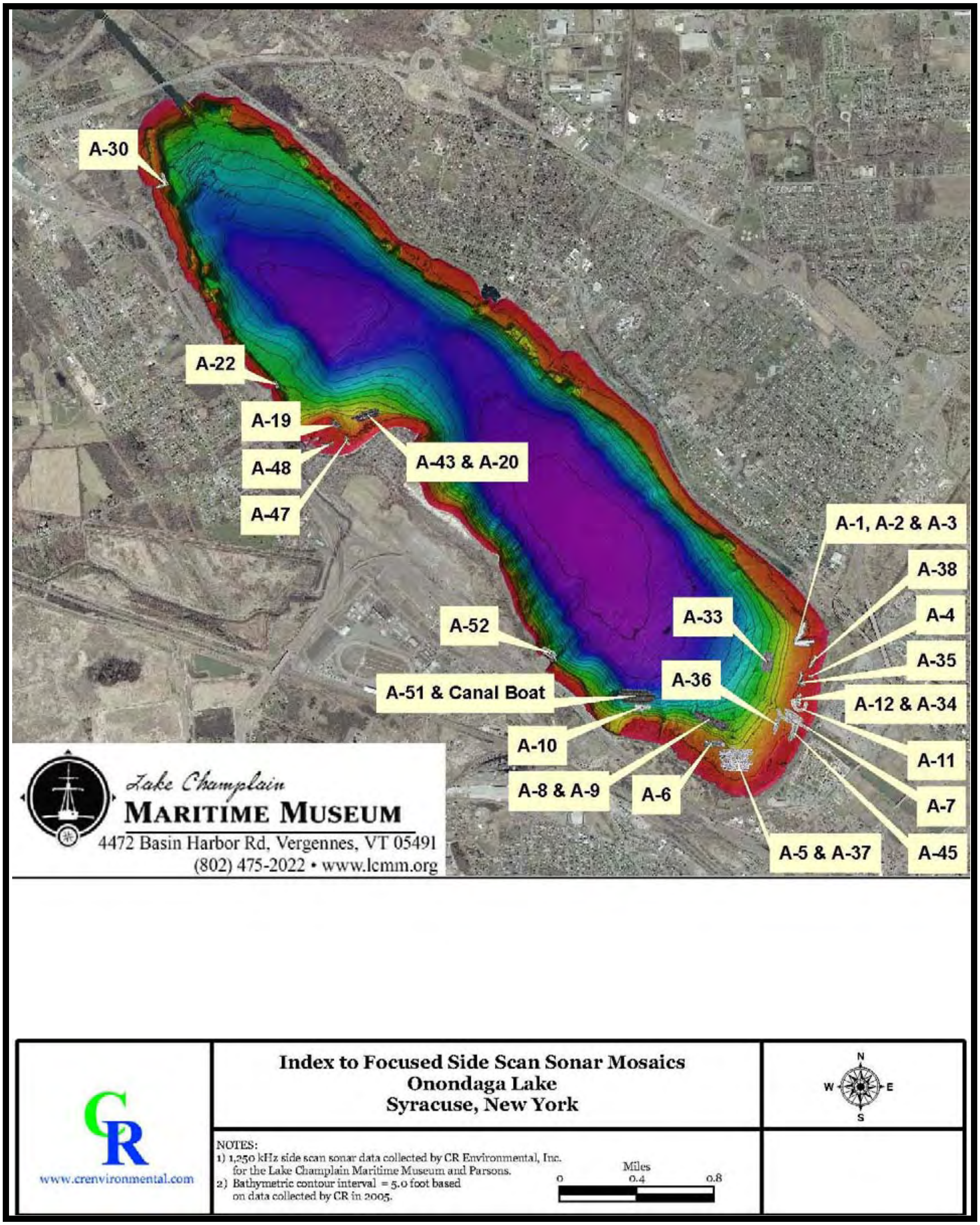


Figure 26. Map of Onondaga Lake showing the areas that were examined using side scan sonar.

Sonar data were next inspected to assess the presence of objects on the bottom near each anomaly. When a bottom feature was observed, the position and dimensions of the feature were recorded and a high-resolution image of the feature was captured. These images and measurements were used to compile a Contact database and report for each anomaly. The databases were exported in SHP format for use with ArcGIS software.

Sonar resolution is defined as the ability of the sonar system to discriminate between two adjacent objects of a particular size and separation. This resolution decreases with increasing range from the sensor due to signal spreading. The theoretical resolution of the side scan sonar data is determined by swath width (range setting), frequency, beam width (0.3-degrees for this system), ping rate, ping duration, and vessel speed. Data collected using a 1,250-kHz signal and 82 feet (25m) range has a minimum resolution of approximately 0.3937in (1cm) across-track and 2.76in (7cm) along-track depending on the distance from the towfish. At a typical range of 30.5 feet (10 meters) (mid-swath) sonar resolution is estimated as 0.18 $inches^2$ ($3cm^2$). Full resolution geo-referenced mosaics were provided digitally to facilitate additional characterization of anomalies.

The resolution of the processed and georeferenced sonar mosaic was set to 1.2 inches (3.048cm) per pixel. These digital side scan mosaics were imported to ArcGIS software along with the locations of the digitized Contacts. Scaled maps of each anomaly were created in GIS.

Scanning Sonar

A high-resolution Kongsberg MS1000 675-kHz sector scanning sonar and a Hemisphere VS-100 DPGS and digital compass were used to collect scanning sonar data from each anomaly (Figure 27). The sonar and DGPS were interfaced to a laptop computer running Kongsberg data acquisition software via USB and serial connections, respectively. HYPACK software was used to navigate R/V *Lophius* to each anomaly.

The sonar system was mounted inside a stainless steel cage with the head oriented downward. This mounting arrangement allowed the system to be deployed by lowering the cage to the lakebed or by securing the cage in a fixed orientation to the bow of R/V *Lophius* (Figure 28). The latter deployment method was preferred for shallow anomalies because it minimized the effects of aquatic vegetation on data quality, optimized beam geometry, and allowed accurate georeferencing of data through interfacing with the Hemisphere digital compass.

Several digital scans were made at each anomaly. Preliminary wide-area scans were made at ranges up to 98.4 feet (30m) to confirm the location of the anomaly and to allow precise repositioning of the vessel for close range scans. High resolution scans were conducted using ranges between 16.4 and 49.2 feet (5 and 15m), with resulting data (image) resolutions of approximately 0.3937in (1cm).

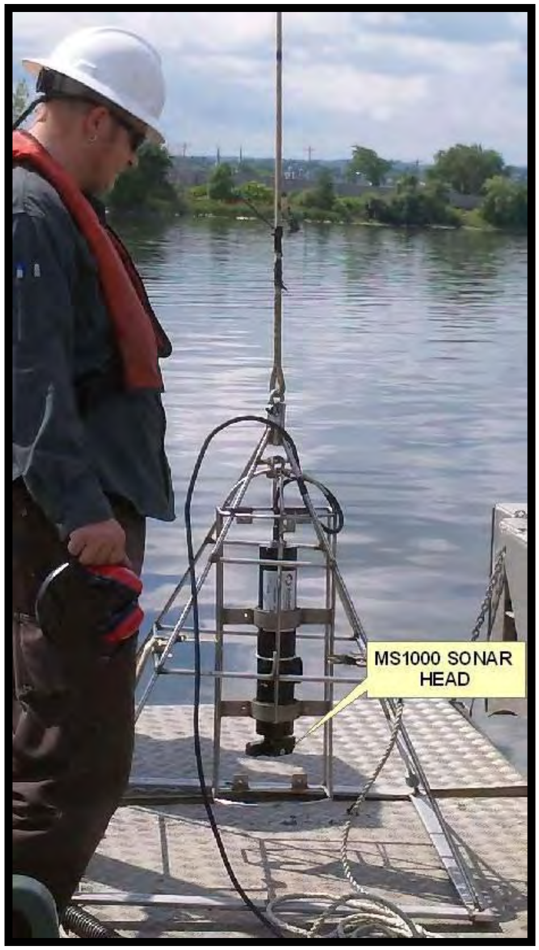


Figure 27. Kongsberg MS1000 sector scanning sonar is stainless steel cage (courtesy CRE).

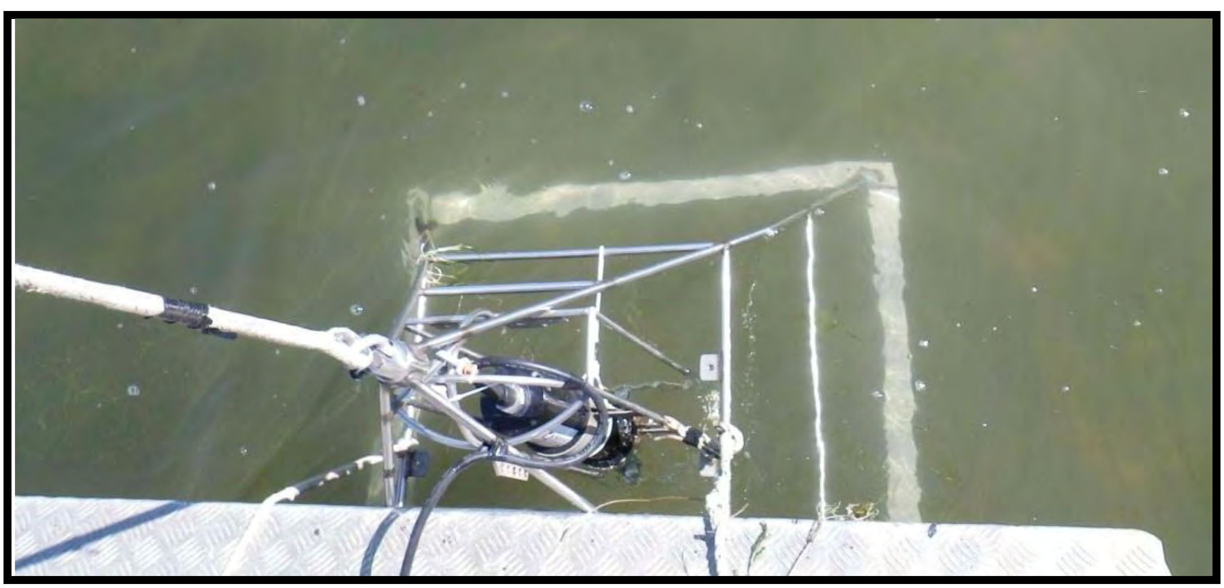


Figure 28. Deployment of scanning sonar using the bow of the boat to secure the cage (LCMM Collection).

Digital data were exported from the Kongsberg MS1000 software in GeoTiff format. Image resolution ranged from approximately 0.3937in (1cm) to 3.9in (10cm) per pixel depending on the sonar range setting of each file. The exported images for each anomaly were imported to ArcGIS and a scaled map of each anomaly was created by selecting the most representative file(s) and adjusting file transparency. Each of the full resolution GeoTiff images and raw data files has been provided to facilitate further characterization of anomalies. Kongsberg MS1000 software has been provided to allow playback of raw data and adjustment of image properties (e.g., color and contrast).

Remotely Operated Vehicle Inspections

Anomalies in the project area were investigated by using a remotely operated vehicle (ROV). CRE personnel navigated the survey vessel *Lophius* to the anomaly using the Hemisphere DGPS, and a laptop computer loaded with the HYPACK navigation software. The laptop displayed the vessel position, steering information to the intended target, as well as georeferenced side scan and scanning sonar images of the targets as background files.

The ROV system used for the anomaly inspection was a Benthos Open Frame Mini-Rover (Figure 29). A backup Outland Technology Model 1000 ROV was also provided. The Benthos ROV was equipped with a high resolution color camera, electronic compass, depth transducer, (2) 250 watt lights, (4) thrusters, and 1,000 feet (304.8m) of neutrally weighted tether. The ROV was also outfitted with a Tritech Micron scanning sonar used to locate anomalies at the deeper stations.

Underwater video footage was displayed on a high resolution monitor and recorded simultaneously on two DVD recorders.

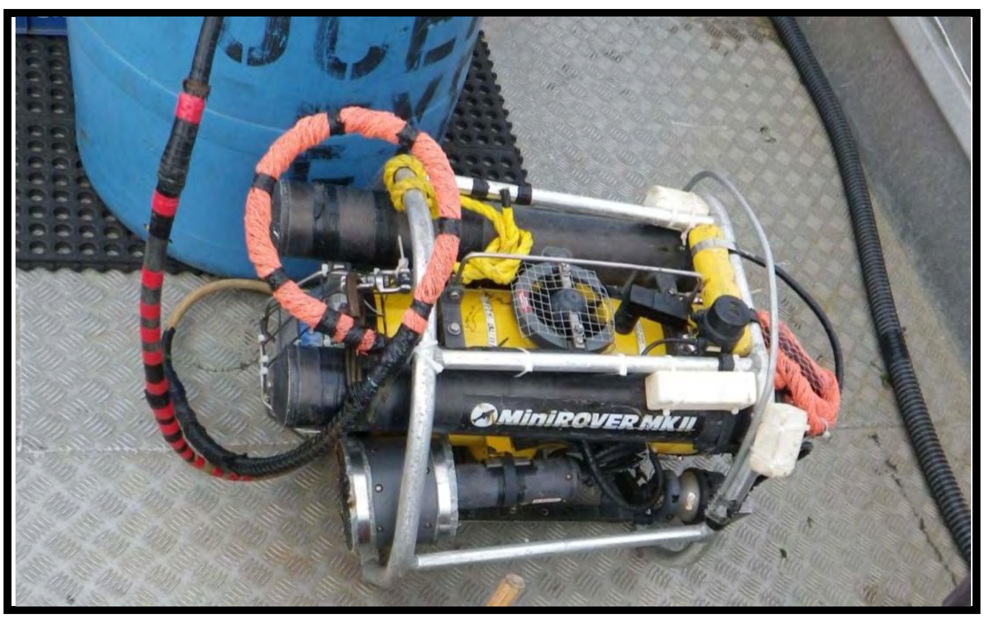


Figure 29. Benthos Open Frame Mini-Rover (LCMM Collection).

DIVING TECHNIQUES

In October 2010 and June 2011, LCMM, under subcontract to Parsons, executed dive verification of selected anomalies in the project area (Figure 30). Dive operations were carried out from October 24 through October 29, 2010, and June 20 through 29, 2011 under the direction of LCMM with dive vessel support provided by CRE. The fieldwork was executed by Arthur Cohn (LCMM Executive Director and Dive Safety Officer), Pierre LaRocque (LCMM Archaeologist and Assistant Dive Safety Officer), Adam Kane (LCMM Archaeological Director), Sarah Tichonuk (LCMM Archaeologist), Christopher Sabick (LCMM Archaeologist), Shipherd Densmore (CRE Survey Vessel Captain), Kenneth Thomson (CRE Oceanographic Technician) and Andrew Spilane (CRE Oceanographic Technician). Safety oversight was provided by Parsons through Kelly Miller.

All dive operations were guided by the *Dive Safety Plan* created by the Lake Champlain Maritime Museum specifically for the work carried out in Onondaga Lake, and by LCMM's *Safe Diving Practices Manual*.[112] These documents detail the specific safety and decontamination procedures that were maintained during all dive operations, and the specialized equipment that was employed to limit direct diver contact with the lake water and sediment. Each team member met the training and qualification requirements established in the U.S. Army Corps of Engineers (USACE) Safety and Health Requirements Manual (EM-385-1-1).[113]

Figure 30. Diver prepares to enter the water from the bow door of R/V *Lophius* (LCMM Collection).

Dive operations were staged out of Onondaga Lake Park Marina. This site was ideal due to its central location to the project area, ample space for equipment preparation and break-down, and access to restroom facilities. All dive operations were performed from the deck of CRE's 26 foot (8m) survey vessel *Lophius*.

Divers were outfitted with dive equipment designed to prevent skin contact with contaminated sediments (Figure 31). All dive equipment had been serviced and was certified at the time of dive operations. This equipment consisted of:

- Full face mask equipped with positive pressure demand regulator
- A primary cylinder (divers used $80ft^3$ aluminum tanks and steel $95ft^3$ tanks) equipped with an octopus and a submersible pressure gauge
- A pony bottle ($30ft^3$ aluminum) with regulator
- Depth gauge
- Bottom timer
- Buoyancy compensator device (BCD)
- Fins
- A dive knife
- Drysuit equipped with dry gloves and latex hoods
- Drysuit undergarments to protect against cold exposure
- Surface-to-diver and diver-to-diver communications
- An inflatable signal device

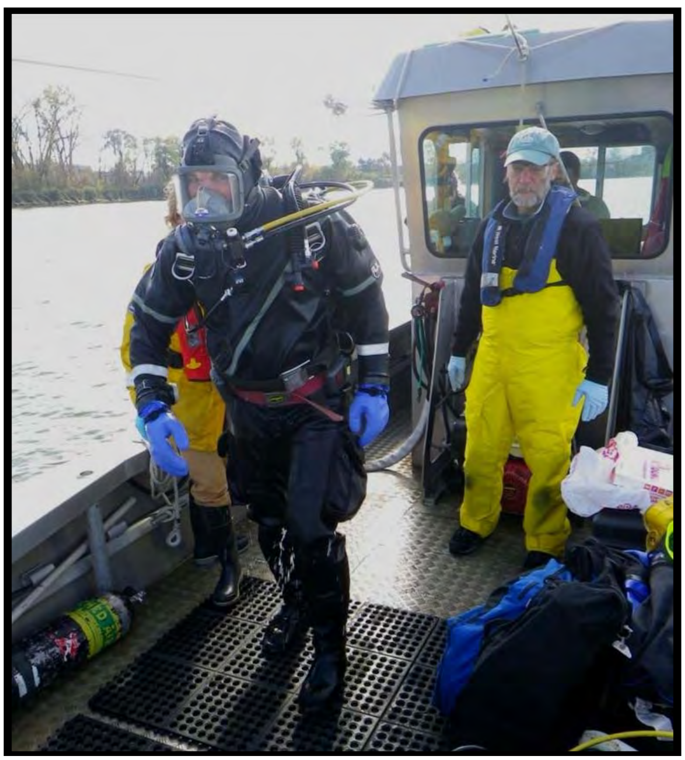


Figure 31. LCMM diver after completing a dive (LCMM Collection).

Additional Safety and Dive Protocols

Extensive dive briefings were held each day before operations commenced which included a discussion of safety aspects, potential hazards, and emergency procedures. A detailed dive log was kept of each day's activities which recorded dive and weather conditions, time (diver in and out), air pressure (diver in and out), and tasks completed. While divers were submerged, an international dive flag (Alpha flag) and a civilian "diver-down" flag (red with diagonal white stripe) were flown from the boat platform, alerting boat traffic to the presence of divers in the water.

Decontamination Procedure
The dive operations required contact with lake water, and some contact with bottom sediment. The following decontamination protocol was performed after each dive (Figure 32). Decontamination assistants wore eye protection and latex gloves:

1. The diver with his gear in place was assisted onto the bow of the R/V *Lophius*.
2. The diver and his gear were rinsed with lake water to remove any bulk sediments.
3. The diver and his gear were sprayed with a solution of Alconox and water; if excess sediments were observed, that area was scrubbed with a brush.
4. The diver and his gear were thoroughly rinsed with clean water. All wash water was allowed to run into the lake via the boat's bow door.

Figure 32. LCMM diver is decontaminated on the bow door of R/V *Lophius* (LCMM Collection).

UNDERWATER ARCHAEOLOGICAL TECHNIQUES
The methods and procedures used during the dive verification fieldwork at the Onondaga Lake Superfund Site were standards in the fields of nautical archaeology. The methods used during the project are discussed in a number of archaeological manuals.[114] Common references to specific archaeological techniques, for example those concerning archaeological illustration, were used to develop standards for the project.[115]

Dive verification was accomplished using two primary methods: visual survey and metal detection. To visually survey an area, the diver employed a survey technique that best addressed the type of anomaly target, and accommodated the specific underwater conditions of the site. For large area searches, the diver swam parallel transects, in a back-and-forth overlapping pattern. For more localized anomalies, or for lower-visibility conditions, the diver used a circle-search survey technique swimming concentric circles, overlapping from a central point. In extremely low or zero visibility conditions, including areas of dense vegetation, the diver swung a 6ft (1.8m) fiberglass rod back and forth while swimming to ensure complete coverage of the survey area. Dive verification was also accomplished with a metal detector. Using a Fisher Pulse 8X underwater metal detector, the diver swam in one of the survey patterns described above. Metallic items exposed above the lakebed were visually examined, while buried targets were probed with a fiberglass rod to determine the size and depth of the source material.

Archaeological documentation of properties dive verified in October 2010 and June 2011 was executed by taking direct measurements from the sites. The primary measuring devices were fiberglass reel tapes positioned in several locations on each site. Using multiple baselines, archaeologists recorded the location of features. Small steel rulers were used to fill in details. Other recording tools included clipboards with drafting film for writing on, staplers and awls for attaching baselines to wooden structures, and probes to determine the depth of buried remains (Figure 33). The archaeological study was non-destructive and no artifacts were recovered.

The field techniques were designed to gather the data necessary to accurately assess the structure exposed above the sediments, and, when necessary, gage the extent of buried remains. Data was gathered in a logical progression from general to more detailed. Documentation initially focused on the structure's overall construction plan, with later dives devoted to filling in specific construction details. The historic period boats and structures found in Onondaga Lake tended to be built using the imperial measurement system, thus all field measurements were recorded in feet and inches.

High-definition video was recorded for many of the dive verified sites. The video system consisted of a Sony HDR-HC3 HDV 1080i Mini DV Handycam in a Light and Motion Blue Fin housing.

The underwater recordation of field measurements and video was only the first step in the documentation process. The fieldnotes were initially recorded on drafting film. After finishing the dive, archaeologists were tasked with recopying their field notes onto graph paper. These recopied notes were used to record observations that were too complex to note while working underwater. Scale drawings were drafted by hand on acid-fee graph paper. Additional project notes were recorded by LCMM's Archaeological Director in the form of a Field Log in a "Rite in the Rain"® all-weather notebook. Those observations are presented as Appendix 1.

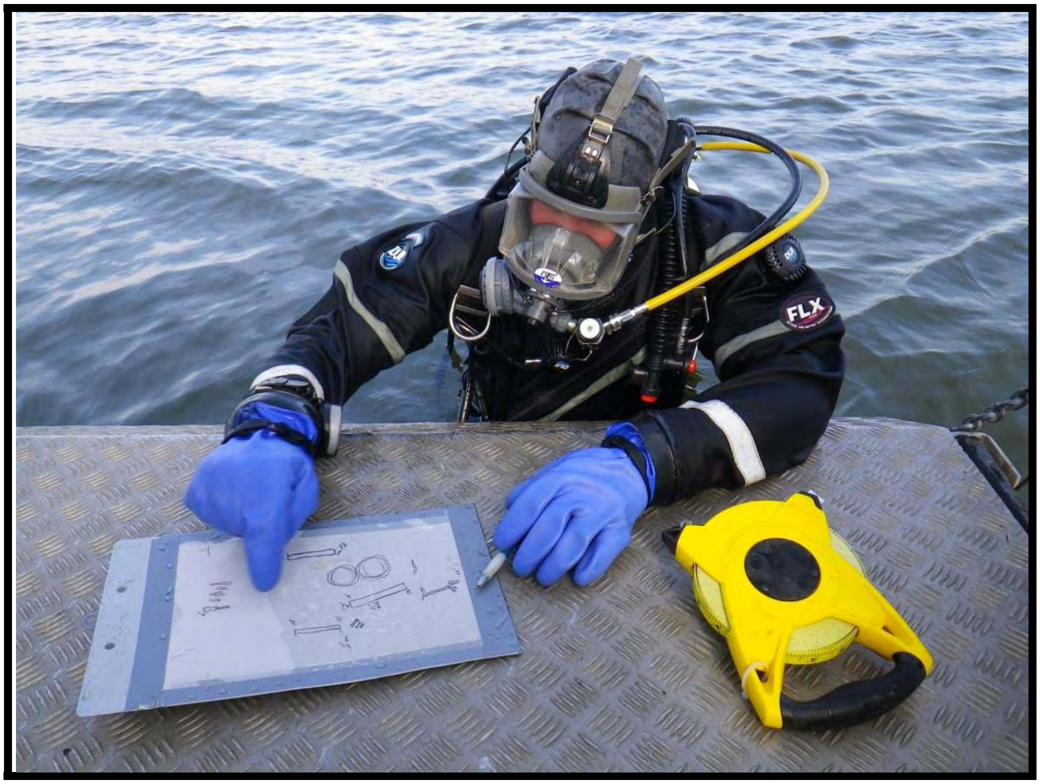


Figure 33. Diver with clipboard and tape measure (LCMM Collection).

EVALUATION OF NATIONAL REGISTER ELIGIBILITY

A key component of this archaeological study is the evaluation of each archaeological site's significance in relation to its eligibility for the National Register of Historic Places. The NRHP is the official list of the Nation's historic places worthy of preservation. The National Park Service provides guidelines for assessing a historic property's NRHP eligibility. A site is recommended as NRHP eligible if it is more than 50 years old, possesses integrity and meets one or more of the criteria considerations.

Integrity is the ability of a property to convey its significance. An evaluation of a property's integrity is assessed based on an analysis of the seven aspects or qualities that define integrity. These concepts are:

- *Location* is the place where the historic property was constructed or the place where the historic event occurred.
- *Design* is the combination of elements that create the form, plan, space, structure, and style of a property.
- *Setting* is the physical environment of a historic property.
- *Material* are the physical elements that were combined or deposited during a particular periods of time and in a particular pattern or configuration to form a historic property.
- *Workmanship* is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.
- *Feeling* is a property's expression of the aesthetic or historic sense of a particular period of time.
- *Association* is the direct link between an important historic event or person and a historic property.[116]

In addition to having integrity, a property must also meet at least one of the NRHP's criteria considerations. The criteria include:

A. Sites that are associated with events that have made a significant contribution to the broad patterns of our history; or
B. that are associated with the lives of persons significant in our past; or
C. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
D. that have yielded, or may be likely to yield, information important in prehistory or history.[117]

The National Park Service has produced numerous bulletins designed to provide technical information on the survey, evaluation, registration and preservation of cultural properties as it pertains to the NRHP. The bulletins used in the evaluation of Onondaga Lake's submerged cultural properties include: *How to Apply the National Register Criteria for Evaluation*,[118] *Guidelines for Evaluation and Registering Archeological Properties*,[119] *Guidelines for Evaluating and Documenting Historic Aids to Navigation*,[120] *Nominating Historic Vessels and Shipwrecks to the National Register of Historic Places*,[121] and *Guidelines for Evaluating and Registering Historical Archaeological Sites and Districts*.[122]

In the *Archaeological Results* chapter, each anomaly identified as being cultural in nature and meeting the minimum 50 year threshold for potential NRHP eligibility is evaluated using the above referenced attributes of integrity and the criteria considerations. The following table is presented for each property to clearly illustrate the evaluation process.

National Register Evaluation		
Integrity of:	Location	
	Design	
	Setting	
	Materials	
	Workmanship	
	Feeling	
	Association	
Criterion:	A: Event	
	B: Person	
	C: Design/Construction	
	D: Information Potential	

ARCHAEOLOGICAL RESULTS

UNDERWATER WORKPLAN

The Phase 1B archaeological survey was based upon the *Underwater Archaeological Resources Phase 1B Work Plan for the Onondaga Lake Bottom, Subsite of the Onondaga Lake Superfund Site, Onondaga County, New York*, which specifically outlined the potential archaeological sites to be investigated and the methodological approach to the fieldwork.[123] The *Underwater Work Plan* noted areas within Onondaga Lake that could potentially represent historic archaeological properties (Figure 34 and Figure 35).

The Phase 1B survey examined 60 anomalies of which 20 are recommended as eligible for the NRHP, while 18 were culturally derived features which are recommended as ineligible for the NRHP. Three of the anomalies were non-cultural, 15 remain unidentified, and four are identified but their NRHP status remains unevaluated.

The goals of the Phase 1B archaeological fieldwork were as follows: 1) determine presence/absence of archaeological sites at the anomalies selected for investigation; 2) collect detailed geophysical, videographic, direct measurement, and/or observational data on the anomalies which are determined to be archaeological sites; 3) to the extent possible, assess the NRHP eligibility of each archaeological site; and 4) make recommendations.

Figure 34. Map of Onondaga Lake in the vicinity of Lake View Point showing the anomalies which were investigated during the Phase IB fieldwork.

Figure 35. Map of the southeastern corner of Onondaga Lake showing the anomalies which were investigated during the Phase IB fieldwork.

Table 2. Table of anomalies in Onondaga Lake investigated during the Phase 1B fieldwork.

Anomaly No.	Sonar Contacts	Magnetometer	Identification
1/2	0345, 0346, 348	1013, 0332, 0535, 0162	Salina Pier
3	343	260	Wooden Barge
4-1	308	743, 777	Dump Scow
4-2	308	743, 777	Dump Scow
5	2-6, 9-16	625, 248, 678, 275	Isolated Debris
6	30	475, 1256	Solvay Waste Shelf
7	130, 169, 150, 191, 202	819, 795, 220, 809, 794, 731	Piling Clumps
8	140	No	Aquatic Vegetation
9	200	No	Tree Branch
10	235	No	Aquatic Vegetation
11	254	776, 786	Pipes
12	255	684, 629, 253, 618, 646, 671, 659, 265	Derrick Lighter Spud Barge
13	264, 269, 267	202, 471, 472, 1232, 76, 477	Canal Boat
17-1	No	No	Spud Barge
17-2	No	No	Spud Barge
19	484	182, 187, 1073, 1078	Unidentified
20	501	170, 178, 1066, 1065	Wooden Rock Scow
22	No	314	Pleasant Beach Resort Pier
33	321, 326	947, 59, 949, 951, 953, 60, 955, 959,	Buried Wooden Canal Boat
34	No	672	Rock Mound
35	No	604, 632, 617, 256, 645, 660	Watercraft of Unknown Type
36	No	552, 73, 1007, 1009	Wire Rope
37	No	499, 500, 276, 502, 503	Unidentified
38	No	781, 747, 780, 779, 745, 778, 761	Iron Pier Marine Infrastructure
43	No	177, 1069	Pipe
45	No	705, 796, 810, 817, 732, 773, 766, 712, 797, 811	Concrete Breakwater
47	No	899, 896, 873, 871, 405, 404, 401, 402	Pipeline
48	No	898, 897, 872, 406, 403	Pipeline
51	278, 275, 280	479, 486, 480, 484, 1233, 200, 483, 201, 468. 459, 101, 99, 407, 412, 413, 419, 420, 465, 463, 433, 432, 428, 203, 434, 449, 204, 205, 450, 844, 843, 842, 841, 837, 836, 834, 835, 838, 839, 840	Solvay Intake
52	333	1139, 285	Syracuse Yacht Club
53	No	No	Canal Boat

54	No	No	Wooden Bulkhead
55	No	781, 747, 780, 779, 745, 778, 761	Canal Scow
56	No	538	Unidentified
57	No	546	Wooden Barrel
58	No	539	55-Gallon Drum
59	No	603	Wire Rope
60	No	251, 628	Unidentified
61	No	270, 683	Unidentified
62	No	683	Unidentified
63	No	619	Unidentified
64	No	584	Unidentified
65	No	713	Unidentified
66	No	254, 630	Unidentified
67	No	575, 1142	Unidentified
69	No	800	Iron Debris – Ladder, Sheet Iron, Slag
70	No	789, 790, 802, 803, 804, 805, 822	Unidentified
72	No	No	Wood Pilings
73	No	No	Bulkhead
74	No	No	Isolated Piling
75	No	No	Rock Pile
76	No	No	Rock Pile
77	No	258	Unidentified
78	No	267	Iron Wire
79	No	634	Unidentified
80	No	984, 992, 1249	Unidentified
81	No	995	Motorcycle
82	No	1012	55-Gallon Drum
83	No	No	Wood and Metal Debris
84	No	239	Paint Cans and Bottles

RECOMMEND REDUCE ADVERSE EFFECTS AND DATA RECOVERY

Syracuse Maritime Historic District

The Syracuse Maritime Historic District is a proposed National Register district comprised of the remains of seven wooden watercraft, six areas of marine infrastructure, and three rock mounds. The 16 contributing properties are listed in the table below.

Table 3. Contributing Properties to the Syracuse Maritime Historic District

Wooden Watercraft	Marine Infrastructure	Rock Mounds
A3 (Barge)	A1/A2 (Salina Pier)	A34 (Rock Mound)
A4-1 (Dump Scow)	A7 (Piling Clumps)	A75 (Rock Pile)
A4-2 (Dump Scow)	A38 (Iron Pier Marine Infrastructure)	A76 (Rock Pile)
A12 (Derrick Lighter Spud Barge)	A45 (Concrete Breakwater)	
A35 (Unknown Boat Type)	A72 (Pilings)	
A53 (Canal Boat)	A73 (Bulkhead)	
A55 (Canal Scow)		

The District is contained in 58 acres (23.9 hectares) of Onondaga Lake bottom lands. The boundaries are delineated by the lake shoreline to the east and Salina Pier remnants to the north. The southern and western boundaries are lines drawn to encompass the extent of the contributing properties (Figure 36).

The 2010 remote sensing and dive verification efforts in the Syracuse Maritime Historic District located eleven archaeological sites. Upon completion of the 2010 field campaign there was concern that given the density of sites, there was the possibility that additional undiscovered sites could still remain within the District. Therefore, a methodological approach designed specifically for the District, comprising a re-examination and dive verification of magnetic anomalies, and systematic diver survey in waters within 200ft (61m) of the shoreline, was executed in 2011. Twenty two additional magnetic targets were identified from the extant geophysical data. None of these targets was identified as an archaeological site, 13 remain unidentified and nine were determined to be modern debris. The systematic shallow water survey located four previously unknown archaeological sites.

The Syracuse Maritime Historic District's development can be tracked on mid-twentieth century navigational charts. Charts from the U.S. Lake Survey Office from 1915, 1926, 1932 and 1937 show no wrecks or derelict vessels in this area.[124] However, the 1942 edition shows derelict vessels in the approximate locations of A3, A12, A4-1 and A4-2 (Figure 37).[125]

The formation of the Syracuse Maritime Historic District is linked to the development of the Syracuse Inner Harbor and the New York State Barge Canal system. Prior to the establishment of the Barge Canal, the Oswego Canal paralleled the northeastern lakeshore with access to Onondaga Lake provided from the canal's "Mud Lock" on the Seneca River. From the river, the Onondaga Lake Outlet provided access to the lake. The 1915 barge canal expansion abandoned the canal adjacent to the lake in favor of a navigable channel through Oneida Lake and the Seneca River. With the re-routing, access to Syracuse was provided through the Seneca River into Onondaga Lake. A new inner harbor into Syracuse was constructed with an outlet into the southeastern corner of Onondaga Lake. With increased navigation on Onondaga Lake it became a convenient location to dispose of unwanted vessels. The State's Canal Laws had specific provisions designed to prevent obstructions to navigation in the canal. A person who obstructed canal navigation through any number of actions including "sinking a vessel" was fined a sum of $25 per obstruction, and the boat was subject to seizure and sale by the canal system.[126] However, the disposal of a boat in the open waters of Onondaga Lake yielded no such punitive actions.

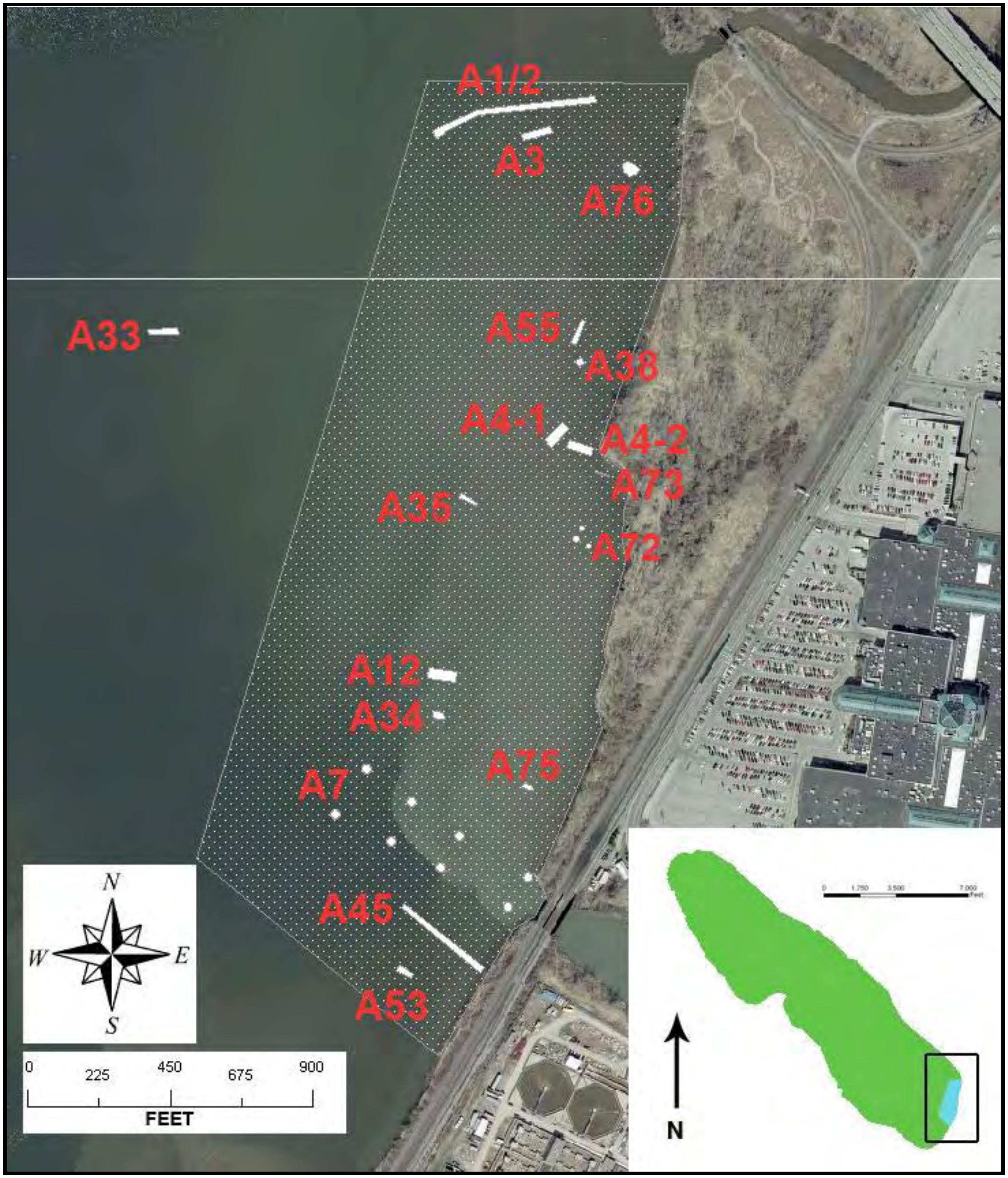


Figure 36. Map of the southeastern portion of Onondaga Lake showing the Syracuse Maritime Historic District.

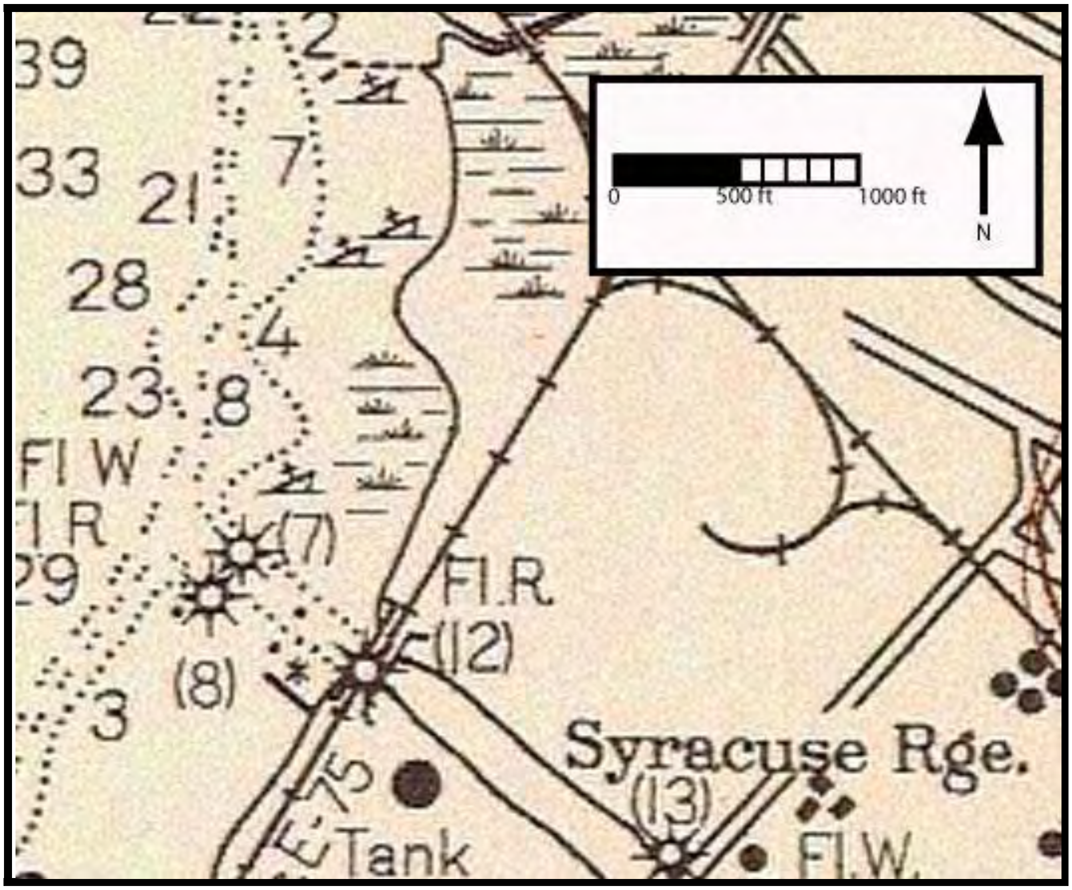


Figure 37. 1942 navigational chart showing derelict vessels at the approximate locations of A3, A4-1, A4-2 and A12, and the abandoned concrete breakwater (A45) and Salina Pier (A1 and A2) (U.S. Lake Survey Office, *New York State Canals, Chart No. 185, 1942*).

The rerouting of the canal and canal laws provided an important foundation for the District's origin, but other economic and cultural factors were also at work. From an economic point of view, the Syracuse Maritime Historic District's formation during and just after the Great Depression is not a coincidence. The 1930s were an era of declining commerce on New York State Barge Canal System. As demand declined, many wooden vessels were abandoned rather than being kept in service. Secondly, the establishment of the Barge Canal and its vastly increased lock size signaled the end of wooden canal boats. With the replacement of wooden boats with steel-hulled vessels, the unwanted watercraft were disposed of in backwater areas all along the canal route.

The final causal factor in the establishment of the Syracuse Maritime Historic District was the decline of Salina Pier and Iron Pier Resorts. Although the active use of the resorts predates the District (Salina Pier, 1870s to 1910s and Iron Pier, 1890 to 1906), their decline and abandonment were an important pre-requisite for the disposal of boats in this part of the lake. The disappearance of these resorts created an area of existing neglected marine infrastructure in a shallow water area abutting vacant lands. The disposal of watercraft in this ignored, swampy area was unlikely to warrant any demands for their removal.

The following description of the Syracuse Maritime Historic District contains descriptions of each of the contributing properties, followed by an assessment of the historic significance of the district.

Anomaly 1/2: Salina Pier

Anomaly 1/2 Summary Table	
Anomaly Identification	Salina Pier; NY Site Number 06740.012292
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Eligible as a Contributing Property to the Syracuse Maritime Historic District
Anomaly Dataset	
Side Scan (2005)	0345, 0346
Magnetometer (2005)	1013
Side Scan (2010)	6/3/10
Sector Scan (2010)	6/4/10
ROV Video Footage (2010)	6/9/10
Diver Observations	No
Diver Videography	No
Maps/Charts	Yes
Aerial Imagery	Yes
Historic Accounts	Yes

Salina Pier Historic Context[127]

The Salina Pier was initially constructed in the 1870s or 1880 at the mouth of Bear Trap Creek (now known as Ley Creek).[128] In 1881, the Central City Street Railroad Company built a hotel and car depot on the banks of the lake on the Salina side. The structures were constructed approximately 100 feet (30m) west of the present railroad terminus. The hotel was two stories high.[129] These structures may not be present on any of the historic maps, as it is noted that in the beginning of 1890, a windstorm destroyed Salina Pier and a saloon house at the end of it.[130] The pier is identified on the 1889 Sweet map. It was noted in the summer of 1890 that the water table was still high and that none of the pier was visible, suggesting that the pier was not being used for a lengthy portion of that year. In an attempt to compete with the Iron Pier resort, the Salina Pier company constructed a two-story pavilion, which also contained a concert hall and dining room, in 1890 south of the existing pier and north of the Iron Pier resort. By the late 1890s, the Salina Pier resort had closed, probably due to the greater number of attractions at the Iron Pier. In 1899, the Iron Pier resort purchased the land of the Salina Pier pavilion and had Solvay soda ash refuse placed up to 4 feet (1.22m) in depth to build up the land in front of the Iron Pier.[131] The pier remained intact through 1898 and served boats that ran regularly to all lakeside resorts.[132] Because of the construction of a trolley line on the west side of the lake in 1899, and the earlier construction of railroads on the east and west sides of the lake, Salina Pier may have fallen out of use by the early twentieth century. By 1908, the Salina Pier was replaced by "Breakwater," which may have been some sort of barrier created for the Iron Pier or for navigation purposes on the lake.[133] By 1924, the Breakwater was abandoned and flooded over by the raising of the lake for the Barge Canal.

Research Results

Anomalies A1 and A2 are parts of the remnants of the Salina Pier. The pier lies immediately north of A3, a barge wreck. The pier's location was known from historic accounts and charts, aerial images, and was located during CRE's 2005 remote sensing survey (Figure 38, Figure 39, and Figure 40). In the *Underwater Work Plan* two separate anomalies were identified for the pier location, but the fieldwork showed that they were separate parts of the larger pier structure. Salina Pier was a difficult site for recording good acoustic or visual imagery. The site is covered in a dense growth of aquatic vegetation, especially Eurasian milfoil, which obscured much of the structure.

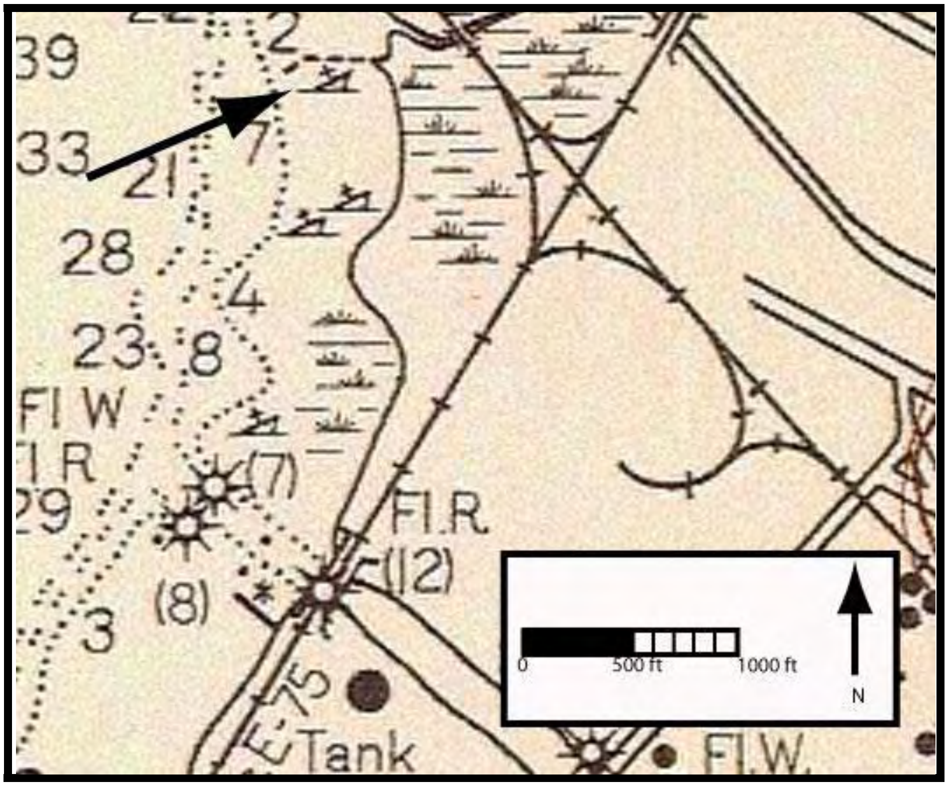


Figure 38. 1942 navigational chart showing the remnants of Salina Pier (U.S. Lake Survey Office, *New York State Canals, Chart No. 185, 1942*).

Figure 39. Underwater structure faintly visible at the location of Anomalies 1 and 2 with Anomaly 3 in the foreground (courtesy Microsoft® Virtual Earth).

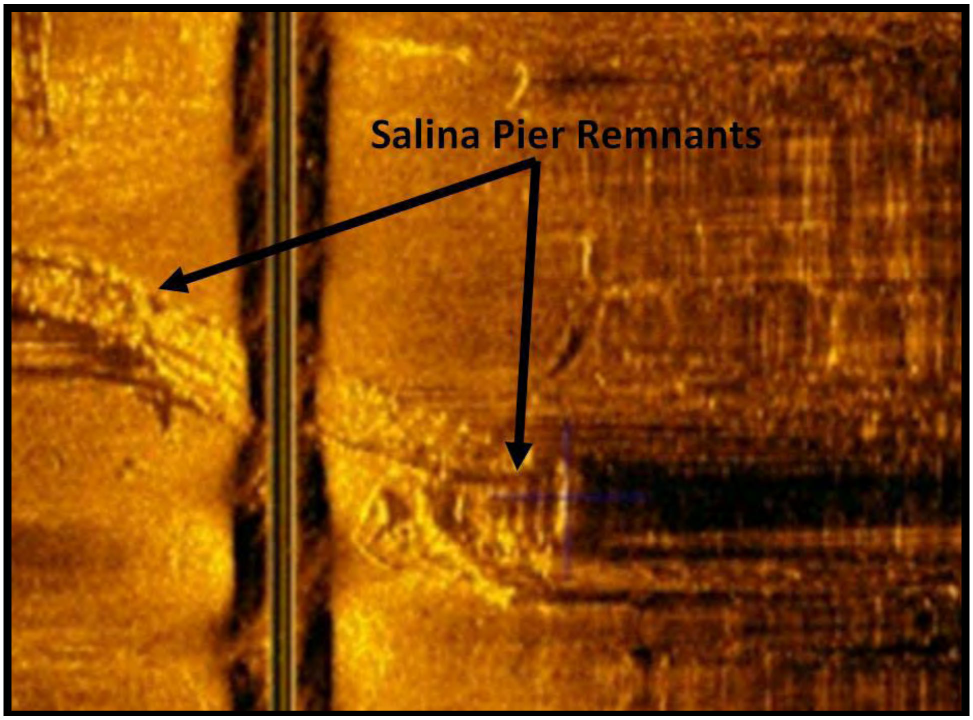


Figure 40. 2005 Sonar image of A1 and A2 (courtesy CRE).

At the shore side (eastern) end to the pier, the pier remnants were clearly visible in shallow water. The site consisted of two parallel vertical planking walls approximately 30 feet (9.14m) apart. The area between the walls was filled with stone. The area inspected was approximately 200 feet (61m) from shore, with 1 to 2 feet (.30m to .61m) of water on top of the pier and 5 to 6 feet (1.52m to 1.83m) of water next to the pier. The northwestern end of the pier was constructed out of stone blocks with some wooden structure of undetermined nature. In one location at least four vertical posts were viewed in a row.

Due to the difficulties encountered in the effort to collect acoustic and video imagery from Salina Pier, these targets were included in the scope of work for dive verification portion of the fieldwork. However, sediment discharge from adjacent Ley Creek during the diving operation created a zero visibility environment around the entire pier structure; therefore, the site was not documented by archaeological divers.

Salina Pier forms the northern boundary of the Syracuse Maritime Historic District and is considered a contributing property because of its causal relationship with the District. The abandonment of Salina Pier is important in the foundation of the District because that action (or lack thereof) created an environment without active human stewardship. Had Salina Pier (or Iron Pier) still been in active use, it is highly unlikely that watercraft would have been abandoned in this area of the lake.

Anomaly A3: Wooden Barge

Anomaly 3 Summary Table	
Anomaly Identification	Wooden Scow Barge; NY Site Number 06740.012293
Remedial Impact	Outside of remedial area, no adverse impact.
NRHP Eligibility Recommendation	Eligible as Contributing Property to Syracuse Maritime Historic District
Anomaly Dataset	
Side Scan (2005)	0343
Magnetometer (2005)	260
Side Scan (2010)	6/3/10
Sector Scan (2010)	6/4/10
ROV Video Footage (2010)	6/8/10
Diver Observations	No
Diver Videography	No
Maps/Charts	Yes
Aerial Imagery	Yes
Historic Accounts	No

Research Results

A3 is an edge-fastened, scow-ended wooden barge which is preserved up to deck level, although the deck is no longer present. The vessel is 94 feet (28.65m) long by 22 feet (6.71m) wide. A3 first appears on the 1942 navigational chart, and Phase 1B data suggests the barge's build date is in the early twentieth century. The vessel rests in shallow water immediately south of Salina Pier. The uppermost portions of the wreck are just above the water's surface (see Figure 39). The barge is heavily built with its construction pattern suggesting a scow barge designed to carry heavy bulk cargoes on deck.

During the Phase 1B fieldwork, excellent surface visibility conditions allowed for a detailed visual inspection of the barge's interior structure. The barge's principal extant members are its vertical, edge-fastened sides, scow ends, longitudinal solid-wall bulkheads, stringers and transverse beams. The interior is divided by two longitudinal bulkheads which run the length of the barge, compartmentalizing the hull into three long sections (see Figure 41 and Figure 42). The hull's interior is further reinforced by two longitudinal stringers in each hull-compartment, which are in turn overlaid by transverse beams spanning the breadth of the hull. The internal structures are so robust as to suggest that the interior of the hull had no use other than supporting the heavily loaded deck. The internal partitions would have precluded any type of cargo being loaded below deck.

A3's construction technique suggests a use such as carrying bulk heavy deck cargoes which would necessitate such a heavily-built structure. The vessel's bulkhead arrangement is similar to that of dump scows A4-1 and A4-2, however, no evidence of a dump door was seen inside the hull.

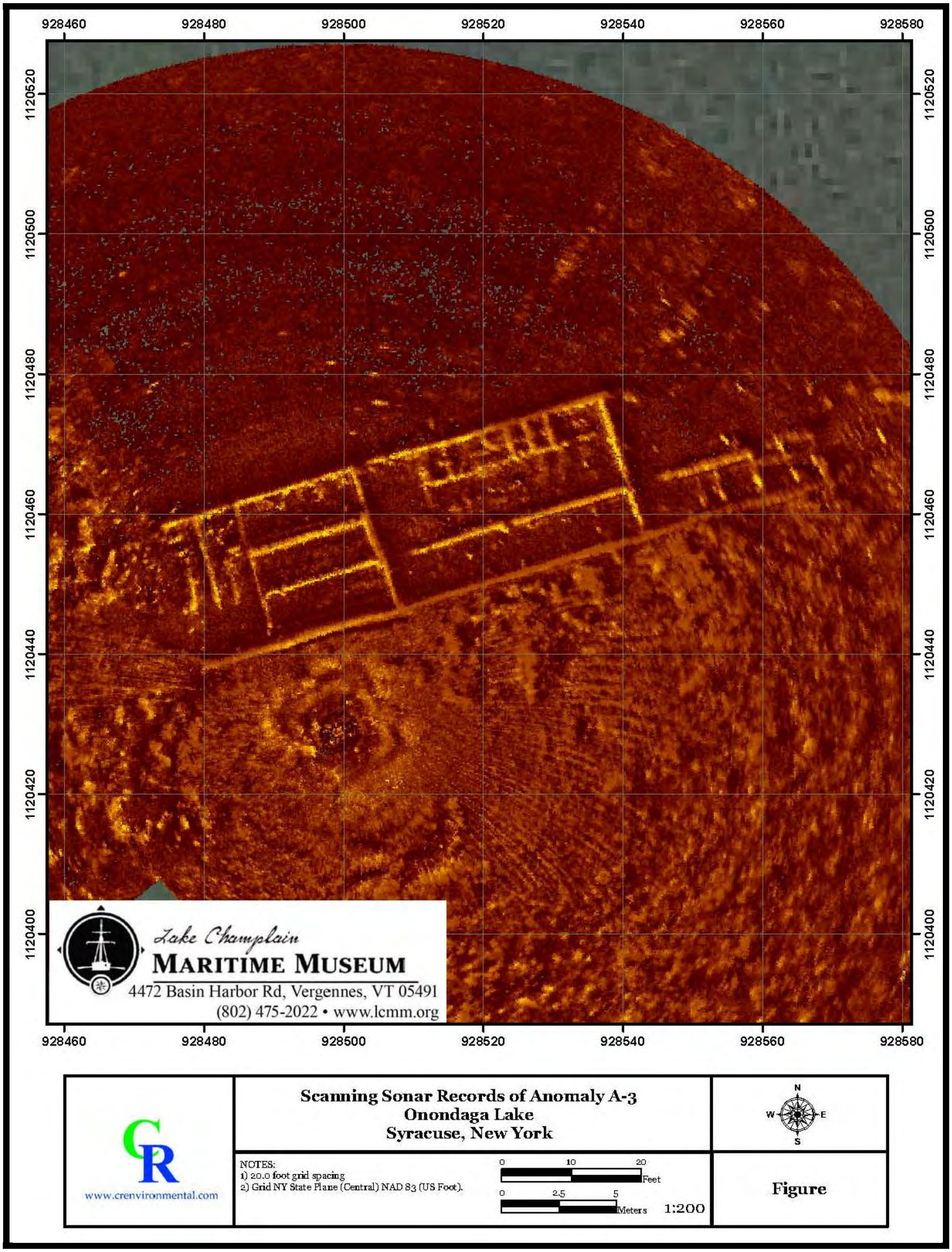


Figure 41. Scanning sonar image of A3.

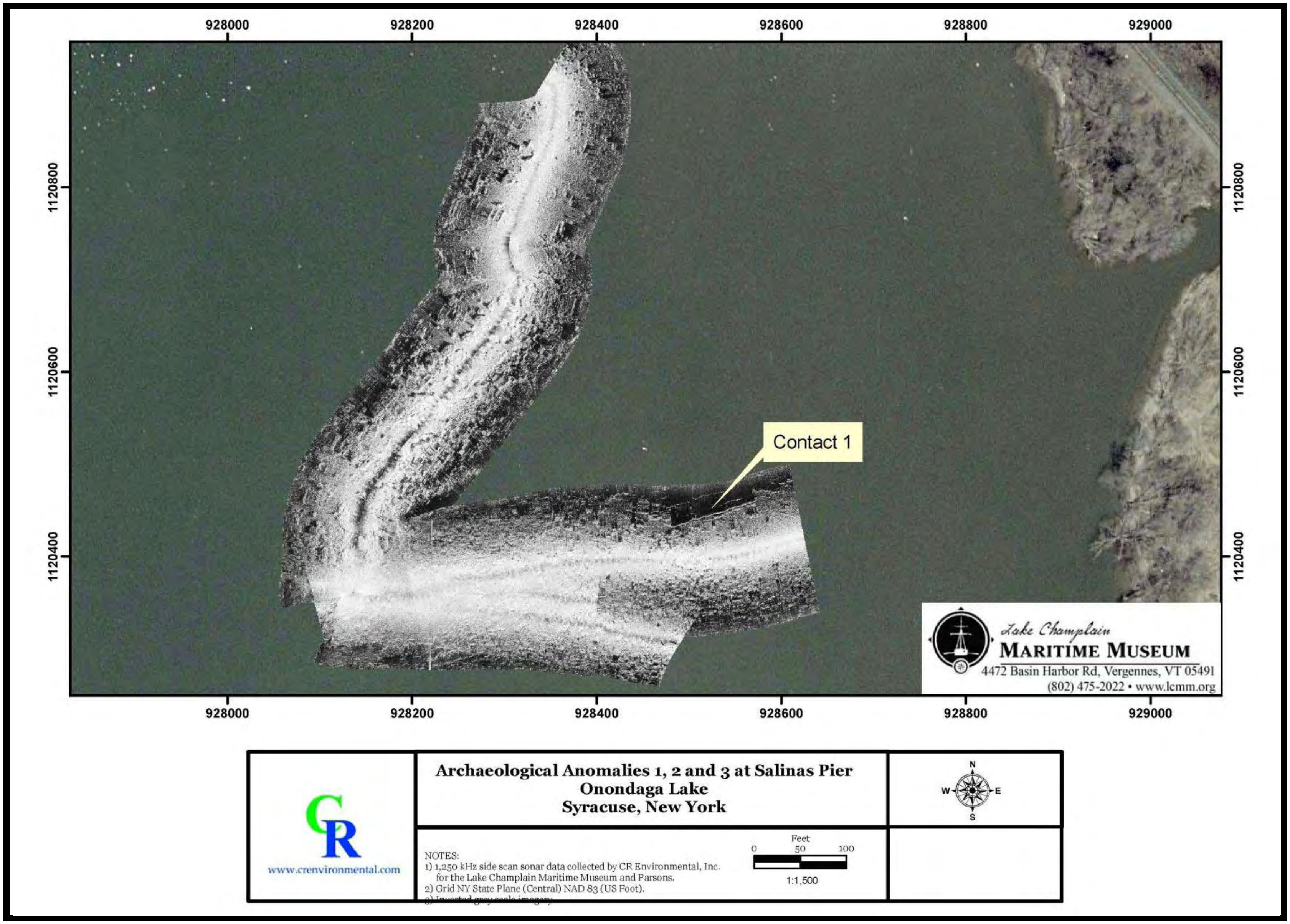


Figure 42. Side scan sonar mosaic showing Anomaly A3 (Contact 1).

Anomaly 4-1: Dump Scow

Anomaly 4-1 Summary Table	
Anomaly Identification	Wooden Dump Scow; NY Site Number 06740.012294
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Eligible as Contributing Property to Syracuse Maritime Historic District
Anomaly Dataset	
Side Scan (2005)	0308
Magnetometer (2005)	743, 777
Side Scan (2010)	6/3/10
Sector Scan (2010)	6/4/10
ROV Video Footage (2010)	6/9/10
Diver Observations	No
Diver Videography	No
Maps/Charts	Yes
Aerial Imagery	Yes
Historic Accounts	No

Research Results

A4-1 is an edge-fastened scow barge which is preserved up to the deck level, although the deck is no longer present. The vessel is 78 feet (23.77m) long and 27 feet (8.23m) wide. A wreck marker appears in the vicinity of A4-1 on a 1942 navigational chart (see Figure 37). The barge rests in shallow water just off shore, and adjacent to another barge, A4-2 (Figure 43, Figure 44 and Figure 45). The archaeological data suggests that the barge's build date is in the early twentieth century. The uppermost portions of the vessel are just below the water's surface. The vessel's hull structure suggests that it is a dump scow.

During the Phase 1B fieldwork, excellent surface visibility conditions allowed a detailed visual inspection of the barge's interior structure. The barge's principal extant members are its vertical, edge-fastened sides; longitudinal bulkheads; scow ends; transverse bulkheads; and framing. The barge's interior is divided by two longitudinal bulkheads which run the length of the barge, compartmentalizing the vessel in to three sections. The hull is further split up by three transverse bulkheads which span the breadth of the hull. Three shorter transverse bulkheads which span only the outboard longitudinal compartment were also noted. Framing is placed every +/- 4 feet (1.22m) with futtocks approximately 6 inches (15.24cm) moulded and sided. The two longitudinal bulkheads are about 8 inches (20.32cm) thick, the transverse bulkheads are 6 inches (15.24cm) thick, while the sides are only 4 inches (10.16cm) thick. The discrepancy between the thickness of the sides and bulkheads suggests there was considerable stress in the middle of hull and less at the sides.

The original function of the barge could be deduced based on an examination of the structural components found in its middle longitudinal compartment. The compartment is bounded by longitudinal bulkheads, and the interior of each bulkhead has horizontally oriented cylinder shaped timbers paralleling the interior sides of each bulkhead. The cylinder shaped timbers have round sheaves attached to them. One compartment also has an angled timber wall running parallel to the bulkhead. These features suggest the barge is a dump scow with the central longitudinal compartment serving as an opening to the waters below. The angled wall is a dump door with the sheaves and cylinder shaped timbers used to control the opening and closing of the door. Dump scows were used to dump cargoes into water bodies. They commonly carried stone, garbage or dredge spoil. The adjacent barge (A4-2) and a barge to the north (A3) also appear to be dump scows, although the construction techniques of the sites differ modestly. The presence of two dump scows (A4-1 and A4-2) next to each other suggests that they were abandoned here contemporaneously by the same owner.

Figure 43. Aerial view showing barges A4-1 (left) and A4-2 (right). (courtesy Microsoft® Virtual Earth).

Figure 44. Photograph of Anomaly A4-1 during a period of excellent underwater visibility (LCMM Collection).

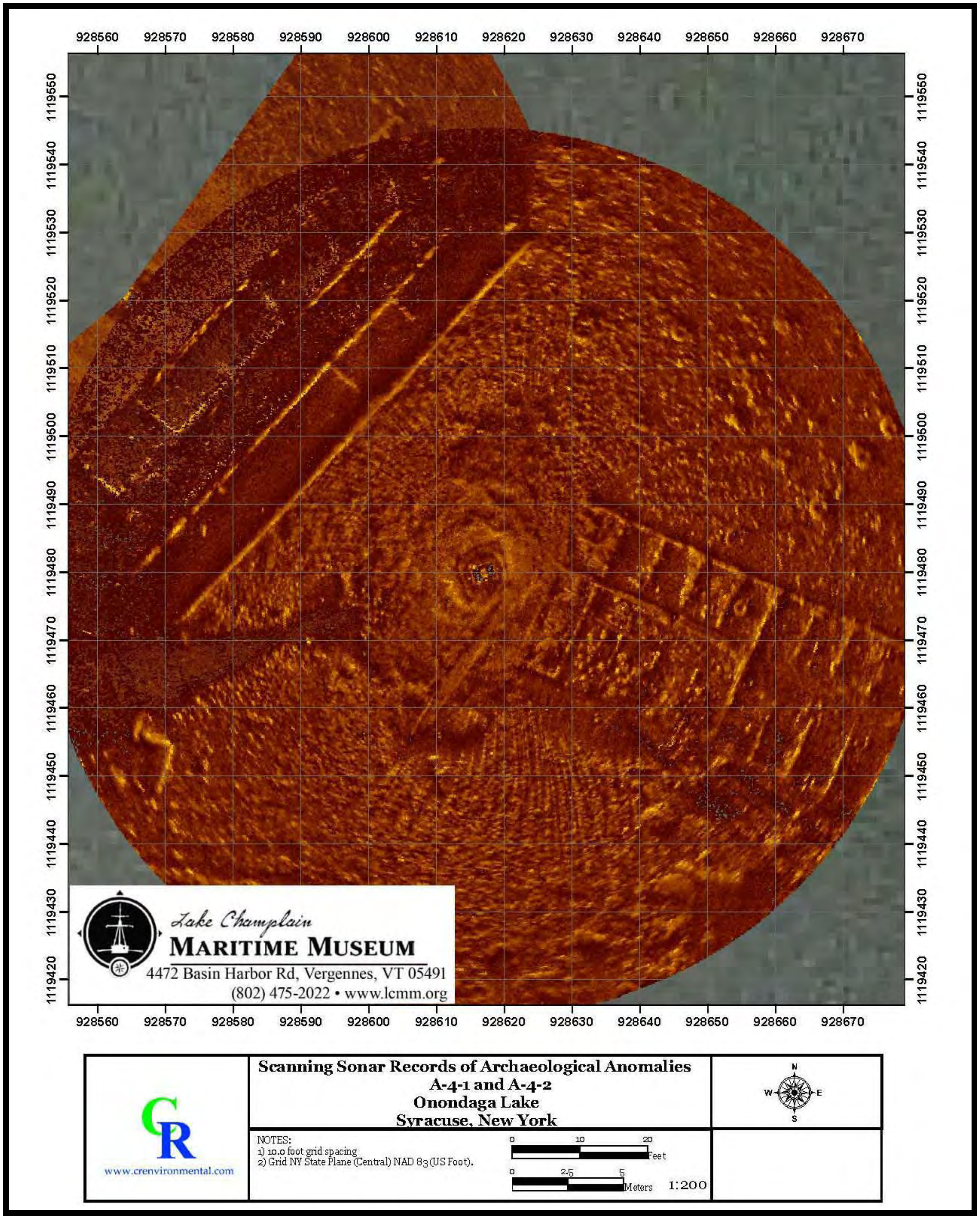


Figure 45. Scanning sonar image showing Anomaly A4-1 (left) and A4-2 (right).

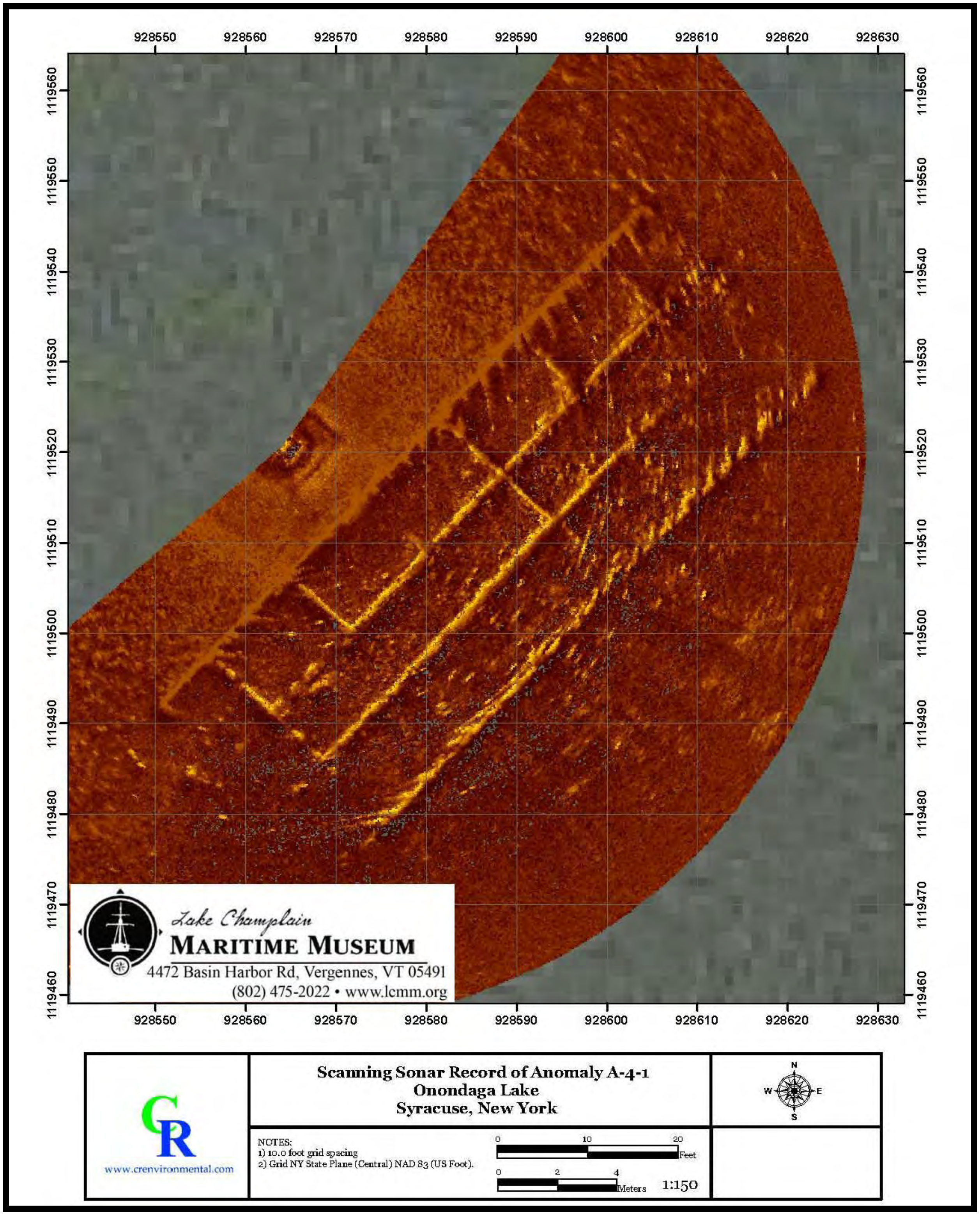


Figure 46. Scanning sonar image showing Anomaly A4-1.

Anomaly 4-2: Dump Scow

Anomaly 4-2 Summary Table	
Anomaly Identification	Wooden Dump Scow; NY Site Number 06740.012294
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Eligible as Contributing Property to Syracuse Maritime Historic District
Anomaly Dataset	
Side Scan (2005)	0308
Magnetometer (2005)	743, 777
Side Scan (2010)	6/3/10
Sector Scan (2010)	6/4/10
ROV Video Footage (2010)	6/9/10
Diver Observations	No
Diver Videography	No
Maps/Charts	Yes
Aerial Imagery	Yes
Historic Accounts	No

Research Results

A4-2 is a scow barge with its eastern (shore) end partially broken up, but the remainder of the structure is preserved to just below deck level. The uppermost portions of the vessel are just below the water's surface, and the remains are largely buried. The vessel is 73 feet (22.25m) long and 25 feet (7.62m) wide (Figure 47). A wreck marker appears in the vicinity of A4-2 on a 1942 navigational chart (see Figure 37). The barge rests in shallow water abutting the shoreline and adjacent another barge, A4-1 (see Figure 43 and Figure 45). The archaeological data suggests that the barge's build date is in the early twentieth century. The arrangement of longitudinal and transverse bulkheads resembles that of the adjacent barge (A4-1), suggesting that A4-2 may also be a dump scow.

During the Phase 1B fieldwork, excellent surface visibility conditions allowed for a detailed visual and videographic inspection of the barge's interior structure. However, the lower two thirds of the vessel is buried, limiting the extent to which the site could be evaluated. The barge has two longitudinal bulkheads which divide the hull into three longitudinal compartments. Three transverse bulkheads which span the entire breadth of the vessel were recorded, and at least 11 smaller transverse bulkheads which span only the outboard longitudinal compartments were noted. With the exception of the bulkhead arrangement, the barge lacked diagnostic features. The bulkheads were similar in their arrangement to the adjacent barge (A4-1), which was identified as a dump scow. Although not conclusive, it is likely that A4-2 is also a dump scow. The proximity of such similar vessels suggests that they were deposited contemporaneously.

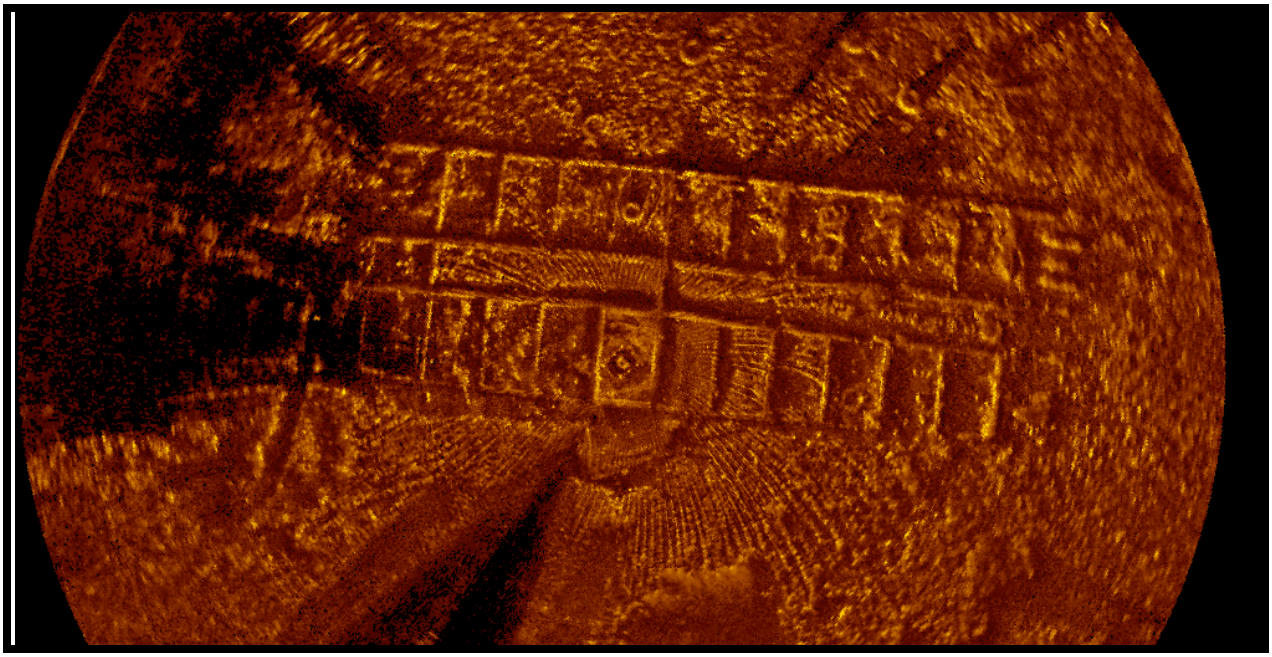


Figure 47. Sector scan image of Anomaly A4-2.

Anomaly 7: Piling Clumps

Anomaly 7 Summary Table	
Anomaly Identification	Piling Clumps; NY Site Number 06740.012295
Remedial Impact	Dredging and Capping
NRHP Eligibility Recommendation	Eligible as Contributing Property to Syracuse Maritime Historic District
Anomaly Dataset	
Side Scan (2005)	130, 169, 150, 191, 202
Magnetometer (2005)	819, 795, 220, 809, 794, 731
Side Scan (2010)	6/3/10
Sector Scan (2010)	6/5/10
ROV Video Footage (2010)	None
Diver Observations	No
Diver Videography	No
Maps/Charts	Yes
Aerial Imagery	Yes
Historic Accounts	No

Research Results

Anomaly A7 was identified from aerial images and the 2005 remote sensing survey (Figure 48). The anomaly is a series of six piling clumps marking the entrance into Syracuse's inner harbor. The clumps consist of between three and ten pilings driven into the lakebed and held together with cables and/or iron bands. The clumps are visible above the surface, and were documented with side scan sonar, sector scan sonar and photographs (Figure 49 and Figure 50).

Analysis of historic navigational charts suggests that this channel was first marked with two lighted aids to navigation between 1915 and 1926, and an additional set of piling clumps was installed between 1937 and 1942.[134] The 1952 navigational chart continues to show four piling clumps; however, modern charts show the six that currently exist.

Statement of Significance

In 1993, the New York State Office of Parks, Recreation and Historic Preservation evaluated the New York State Canal System and found it to be eligible for the NRHP (see Appendix 5).[135] This resource evaluation found the New York State Canal System to be the most extensive canal system in North America. It is of national significance for the roles it played in the growth and development of New York State, the upper Midwest, and the nation. Contributing properties (assuming adequate integrity) include any canal-related feature including, but not limited to, built engineering features, navigational aids, maintenance fleets, boat wrecks, and terminals and/or structures associated with the canal whether publicly or privately constructed or owned.

Although it is unlikely that anomaly A7 meets the minimum 50 year threshold for a contributing property to the NHRP, these pilings are a contemporary extension of historic transportation facilities and aides to navigation which were routinely replaced. This taken into account with A7's location within the Syracuse Maritime Historic District, LCMM recommends that A7 is a contributing property to this District.

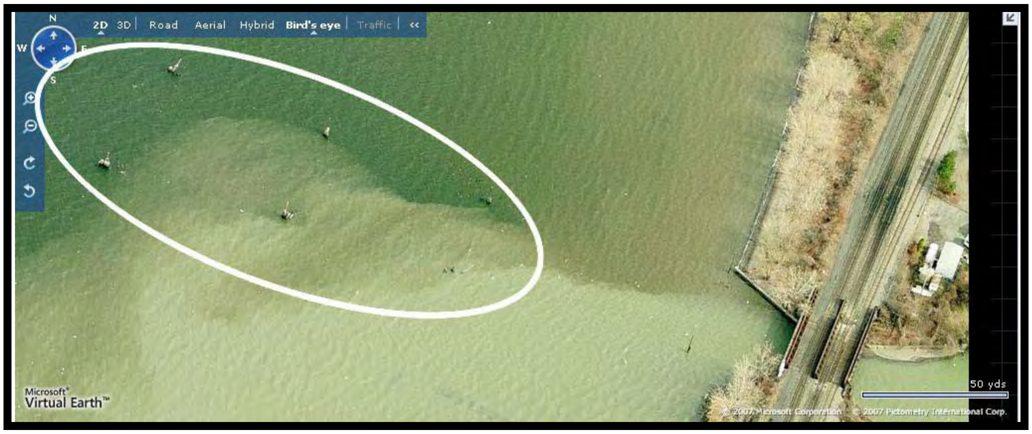


Figure 48. Canal entrance related structures creating Anomaly 7 (courtesy Microsoft® Virtual Earth).

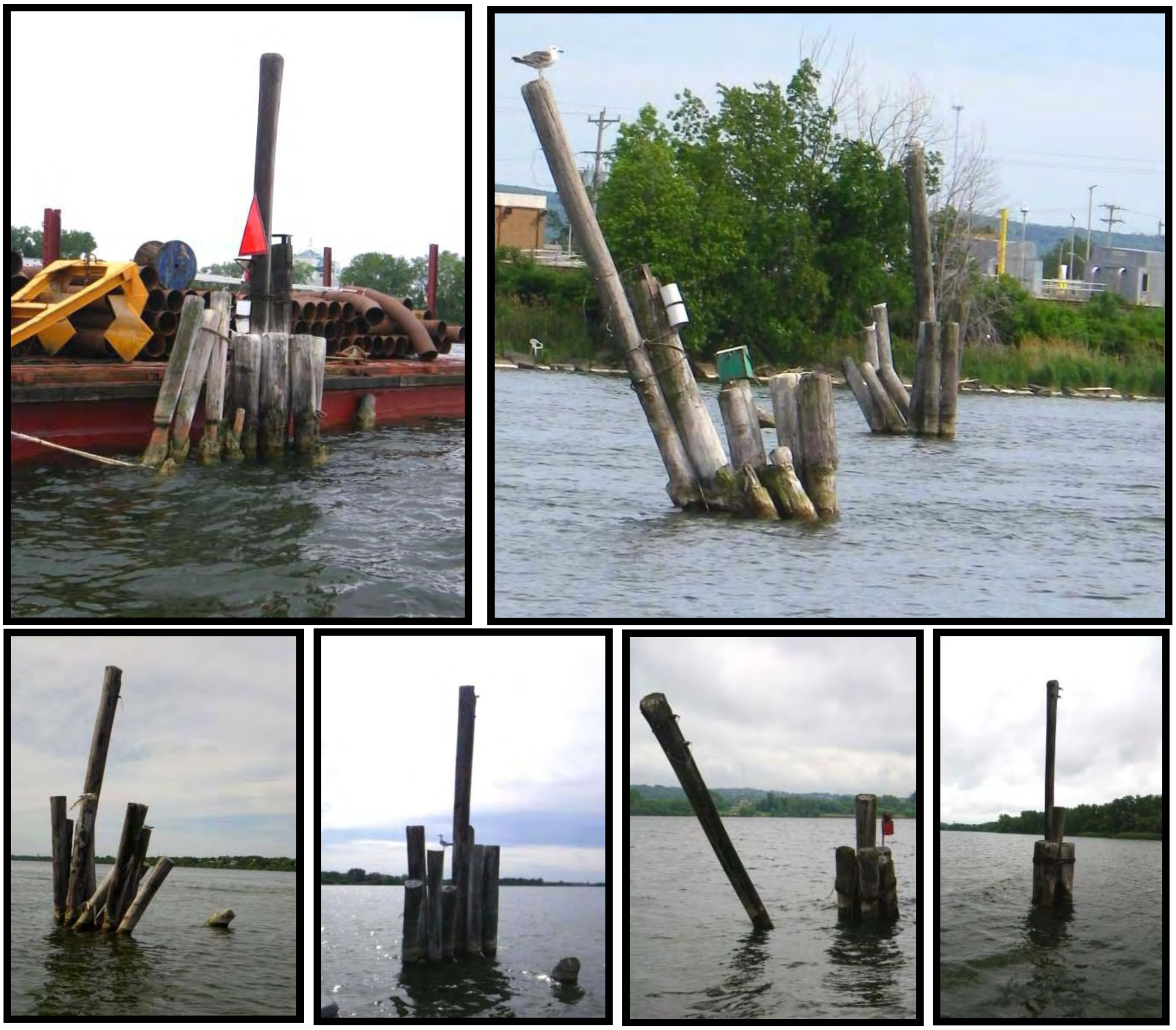


Figure 49. Photographs showing the piling clumps which comprise A7 (LCMM Collection).

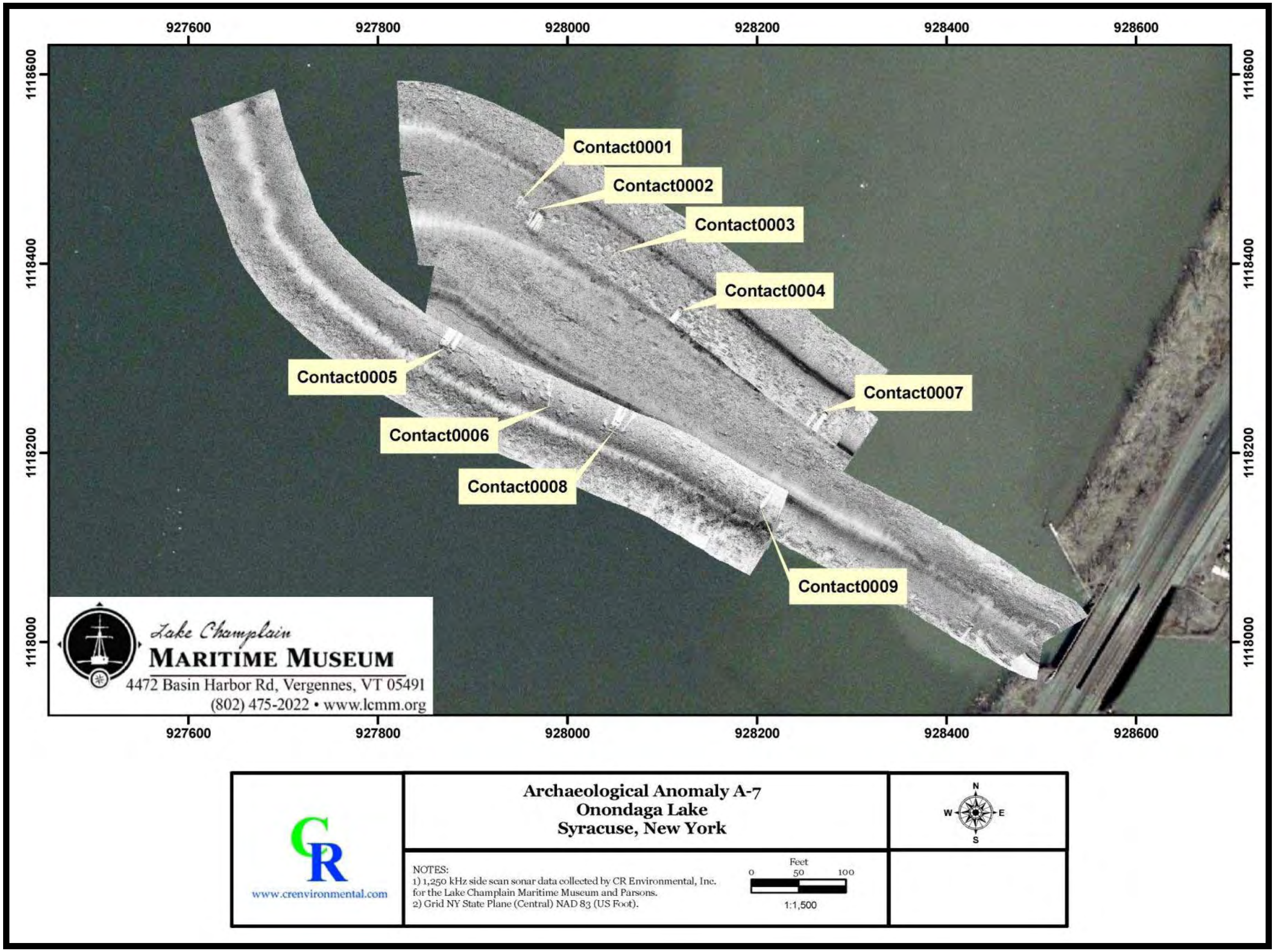


Figure 50. Side scan sonar mosaic of A7.

Anomaly 12: Derrick Lighter Spud Barge

Anomaly 12 Summary Table	
Anomaly Identification	Derrick Lighter Spud Barge; NY Site Number 06740.012296
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Eligible as Contributing Property to Syracuse Maritime Historic District
Anomaly Dataset	
Side Scan (2005)	255
Magnetometer (2005)	684, 629, 253, 618, 646, 671, 659, 265
Side Scan (2010)	6/3/10
Sector Scan (2010)	6/4/10
ROV Video Footage (2010)	6/9/10
Diver Observations	No
Diver Videography	No
Maps/Charts	Yes
Aerial Imagery	Yes
Historic Accounts	No

Research Results

A12 is an edge-fastened, wooden derrick lighter spud barge. The barge is preserved up to the deck level, although the deck is no longer present. A wreck marker appears in the vicinity of A12 on a 1942 navigational chart (see Figure 37), and the site is clearly visible on modern aerial photographs (Figure 51). The mechanisms for holding the spuds are exposed above water, with the remainder of the barge is just below the water's surface.

During the Phase 1B fieldwork, site conditions were ideal for recording sector scan (Figure 52) and side scan imagery (Figure 53), as well as a detailed visual inspection due to excellent water clarity. The barge's principal extant members are its vertical edge-fastened sides, vertical ends, four longitudinal bulkheads, floors, framing, spud holders, and mast step. The vessel is 88 feet (26.82m) long and 32 feet (9.75m) wide. A12 is edge-fastened every +/- 18 inches (45.72cm) along the 4in (10.16cm) thick sides with framing every 3 to 4 feet (.91m to 1.22m). There are 4 bulkheads, also edge-fastened (Figure 54). The framing system consists of futtocks with a clamp holding the joint between futtock/floor. The original use of the barge as a derrick lighter spud barge is defined by the spud holders and mast step.

The spud holders are located on both sides of the vessel on the eastern end of the barge (Figure 55). Spuds are vertical posts which could be raised and lowered to hold a vessel in place, and were commonly used on barges that required maintaining a stationary position in shallow water such as pile drivers, crane barges, derrick lighters and dredge barges. The spud holder is composed of two iron horizontal knees which reinforced a vertical wooden channel in which the spud was housed. The side of the hull around the spud holder was protected with sheet iron and framed more heavily than the rest of the hull. Iron chain plates were noted along the sides of the barge adjacent to the spud holder. Chainplates, straps used to hold rigging to the boat's side, secured the cable used to raise and lower the spuds.

The barge is believed to be a derrick lighter based on the presence of a mast step and the construction of the barge's end. The mast step, which is located between the spud holders, indicates A12 had a vertical spar, or mast, stepped in the bottom of the hull. The mast may have held a derrick which is a pivoting spar attached to a mast used like a crane to hoist cargo and other heavy weights. Barges equipped with derricks were known as derrick lighters, and were commonplace during the nineteenth and twentieth centuries (Figure 56). The vertical end of the barge closest to the spud holders and step is covered in sheet iron, suggesting a use which created wear on that end of the barge. The lack of other distinguishing features on the vertical end is not consistent with the features expected of pile drivers and dredges, leaving derrick lighter as the most logical identification for A12.

Figure 51. Anomaly A12 visible from aerial photography (courtesy Microsoft® Virtual Earth).

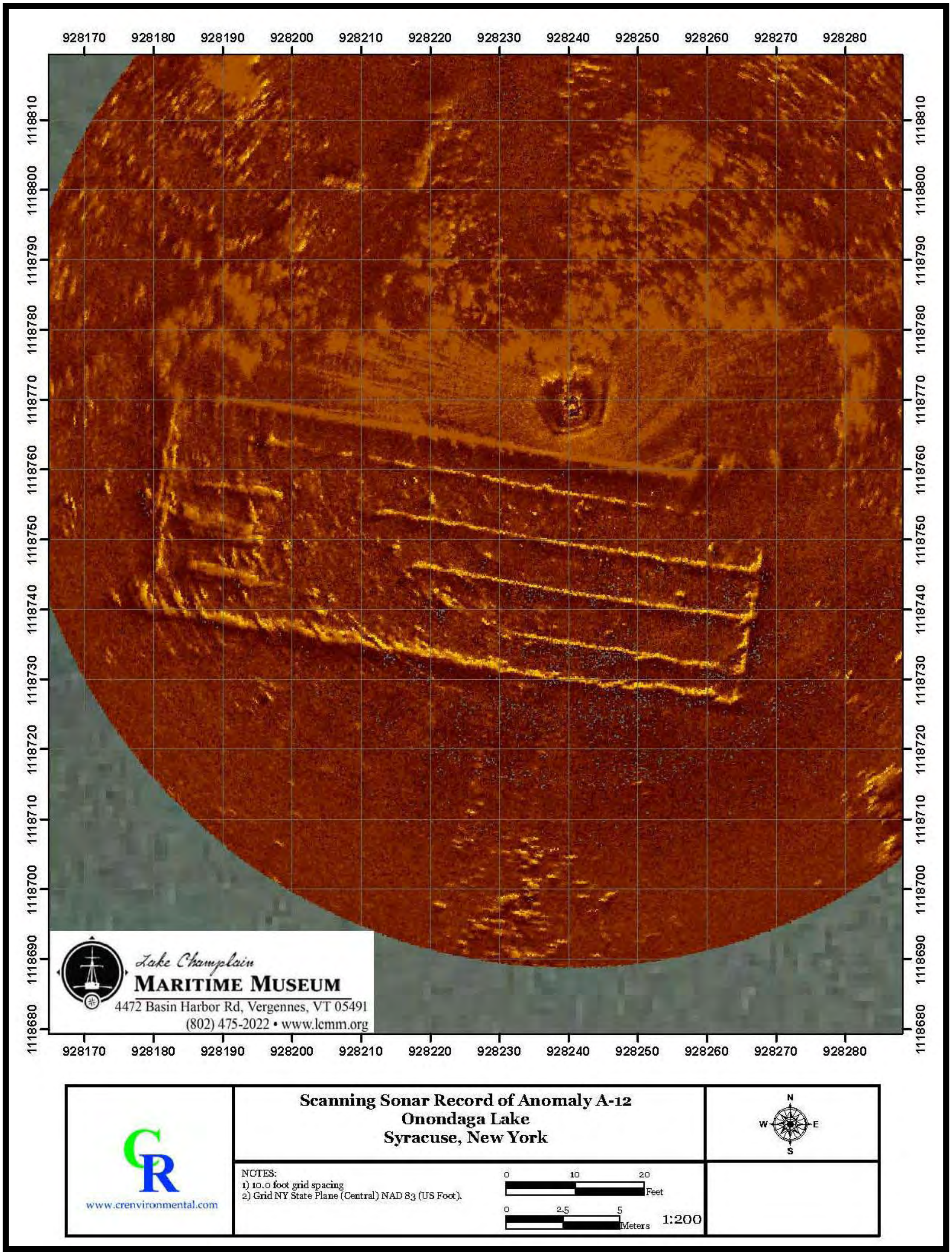


Figure 52. Scanning sonar image of A12.

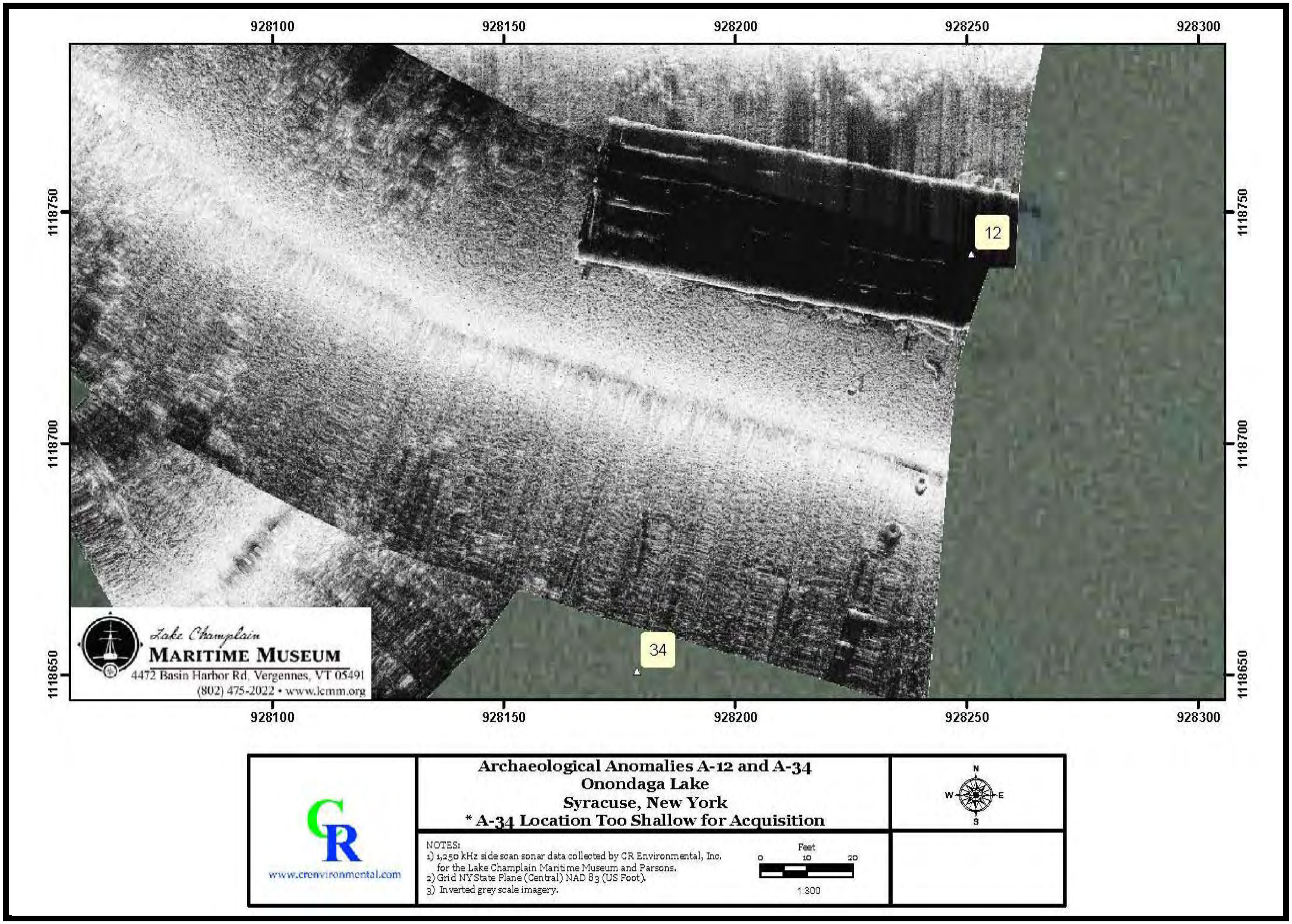


Figure 53. Side scan sonar mosaic of Anomaly A12.

Figure 54. Photograph showing Anomaly A12's longitudinal bulkheads with the spud holder in the background (LCMM Collection).

Figure 55. Photograph showing the inboard side of Anomaly A12's spud holder (LCMM Collection).

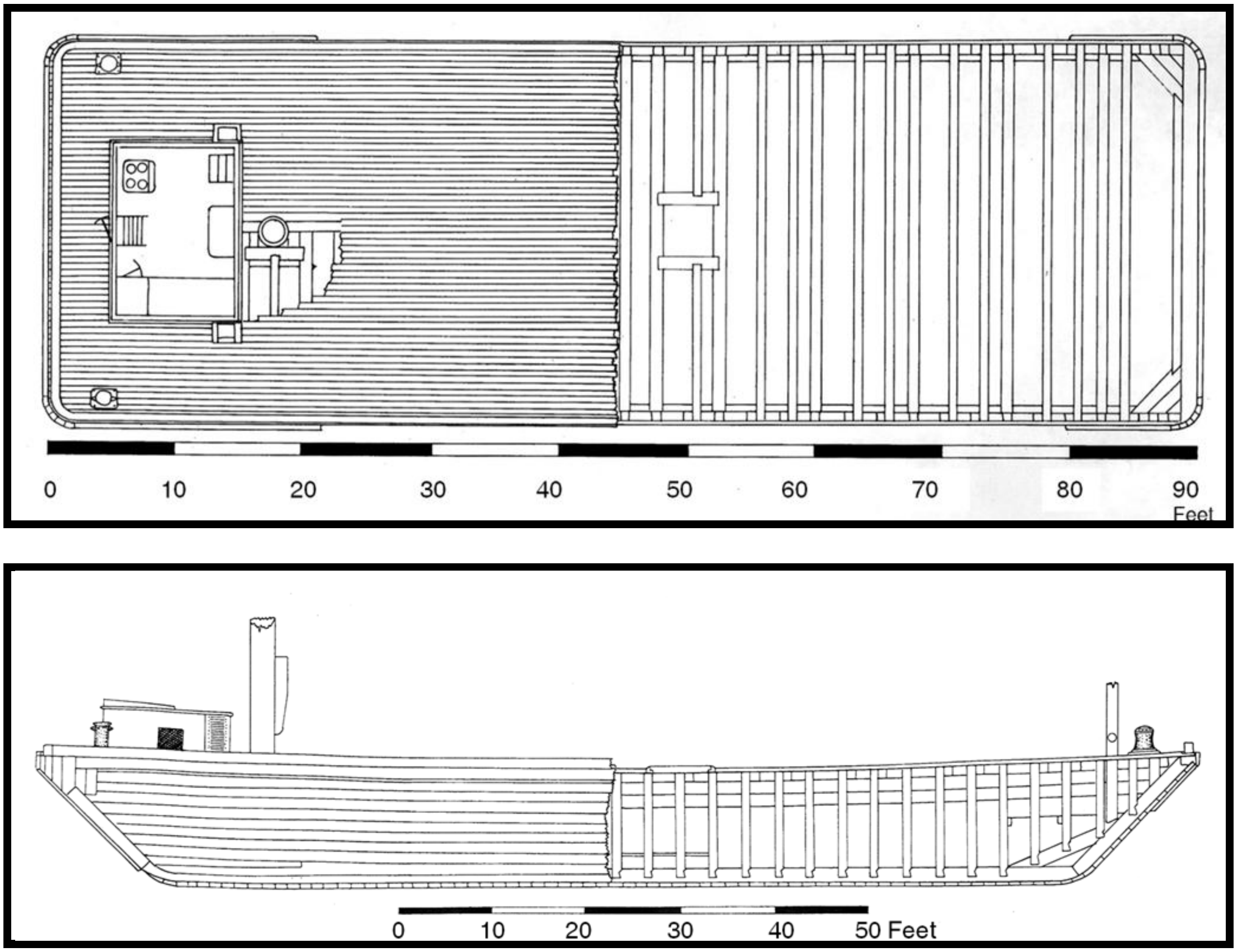


Figure 56. Plan view and profile of a derrick lighter (from the Feeney Collection at the Hudson River Maritime Museum in Kingston, New York).[136]

Anomaly 34: Rock Mound

Anomaly 34 Summary Table	
Anomaly Identification	Rock Mound; NY Site Number 06740.012301
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	672
Side Scan (2010)	6/3/10
Sector Scan (2010)	6/4/10
ROV (2010)	6/9/10
Diver Observations (2011)	6/21/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

A34 is a magnetic anomaly discovered during the 2005 remote sensing survey (Figure 57). The anomaly was investigated using side scan sonar, sector scan sonar and ROV in 2010, with all results being negative. A34 was dive verified in June 2011, and determined to be a pile of stones varying sizes from 3in to 9in (8cm to 23cm). In the middle, the mound stood 12in (30cm) to 18in (46cm) above the surrounding bottom tapering at the edges, with an overall size of 42ft by 23ft (12.8m by 7.0m). Metal detecting in the mound located several iron artifacts including a 24in (61cm) long section of iron railroad rail and an unidentified iron circular object. Their location within the mound indicates a contemporaneous deposition. Extensive visual survey of the surrounding area produced no evidence for an underlying wreck or associated pier. The mound is clearly cultural in origin, most likely the result of a barge disposing of a load of stone and other debris.

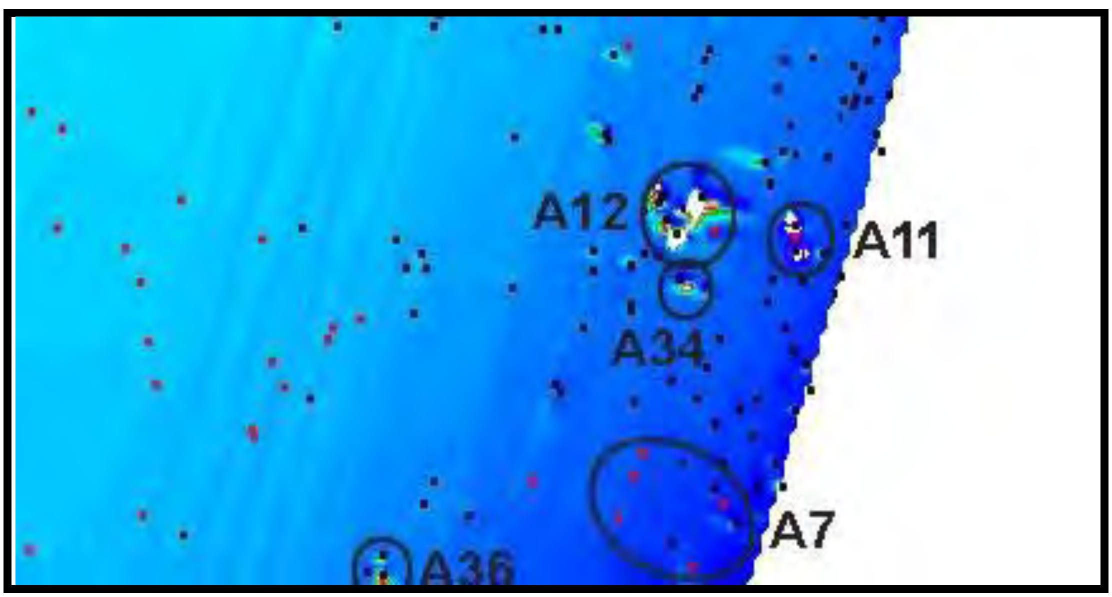


Figure 57. Magnetic intensity map of Onondaga Lake showing A34 adjacent to a barge (A12).

Anomaly 35: Unidentified Watercraft

Anomaly 35 Summary Table	
Anomaly Identification	Unidentified Watercraft; NY Site Number 06740.012302
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Eligible as Contributing Property to Syracuse Maritime Historic District
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	604, 632, 617, 256, 645, 660
Side Scan (2010)	6/3/10
Sector Scan (2010)	6/7/10
ROV Video Footage (2010)	6/10/10
Diver Observations	Yes
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly A35 represents the remains of a watercraft that could not be conclusively identified due to its buried condition (Figure 58). The site was examined in June 2010 with sector scan and side scan sonar which yielded no returns suggesting the presence of a submerged cultural resource. The underwater videography recorded by the ROV showed a scatter of timbers which LCMM staff were unable to conclusively identify. Due to the lack of sufficient data to assess the nature and potential significance of the site, the anomaly was investigated by archaeological divers in October 2010. This inspection revealed the site to be the largely buried remains of a watercraft of unknown origin.

The site lies in approximately 4 feet (1.22m) of water, with an extant length and beam of 64 feet (19.51m) and approximately 14½ feet (4.42m), respectively. Very little of the site is exposed; however, the visible remains suggest that the bottom 2 to 4 feet (.61 - 1.22m) of the vessel is preserved under the lake bottom. The principal visible features include stern framing and planking, deadwood, keelson, sternpost, and a wooden hogging truss. The vessel's stern is the most exposed portion of the remains consisting of a sternpost, frames, planking and deadwood. An iron rub rail was noted on the exterior of the port side at the stern. The planking goes from outboard of the frames to on top (interior) of the sternpost, which suggests that the sternpost is preserved to its original height. The stern post is vertical with an iron plate on the side and a gudgeon for securing the rudder. The sternpost is reinforced on its interior side with deadwood. The port side of the stern has five frames while the starboard side does not have any. The framing is light with moulded and sided dimensions of 3 inches (7.62cm). The form of the stern was difficult to determine given the paucity of exposed timbers, however, the shape is believed to be scow-like. The boat amidships had two 10 foot (3m) long longitudinal beams which were angled downward toward the stern with the bow end about 1 foot (.3m) above the lake bottom. These beams are believed to be the remains of a wooden hogging truss. The exposed remains at the bow consist of a 20 foot (6.1m) run of the keelson and the top of one frame. Probing in the bow showed the remains to be buried below only 6 to 12 inches (15 to 30cm) of sediment. The maximum length of the remains was 64 feet (19.51m); however, the stem was not located thus the true length of the boat is unknown. There is a large coil of wire rope amidships.

The paucity of exposed remains do not allow for a conclusive identification of the vessel type. The two candidate boat types are a small steamer (with machinery removed) or a canal boat. The beam dimension of 14½ feet (4.42m), as measured between the two hogging truss timbers is suggestive of a boat designed to fit inside the Erie Canal locks between 1825 and 1862. LCMM researchers, however, do not have confidence that the distance between the hogging trusses represents the vessel's true beam since the sides of the hull were not located. The length of the remains are not reflective of the boat type since the bow is not preserved, and thus the true length is unknown.

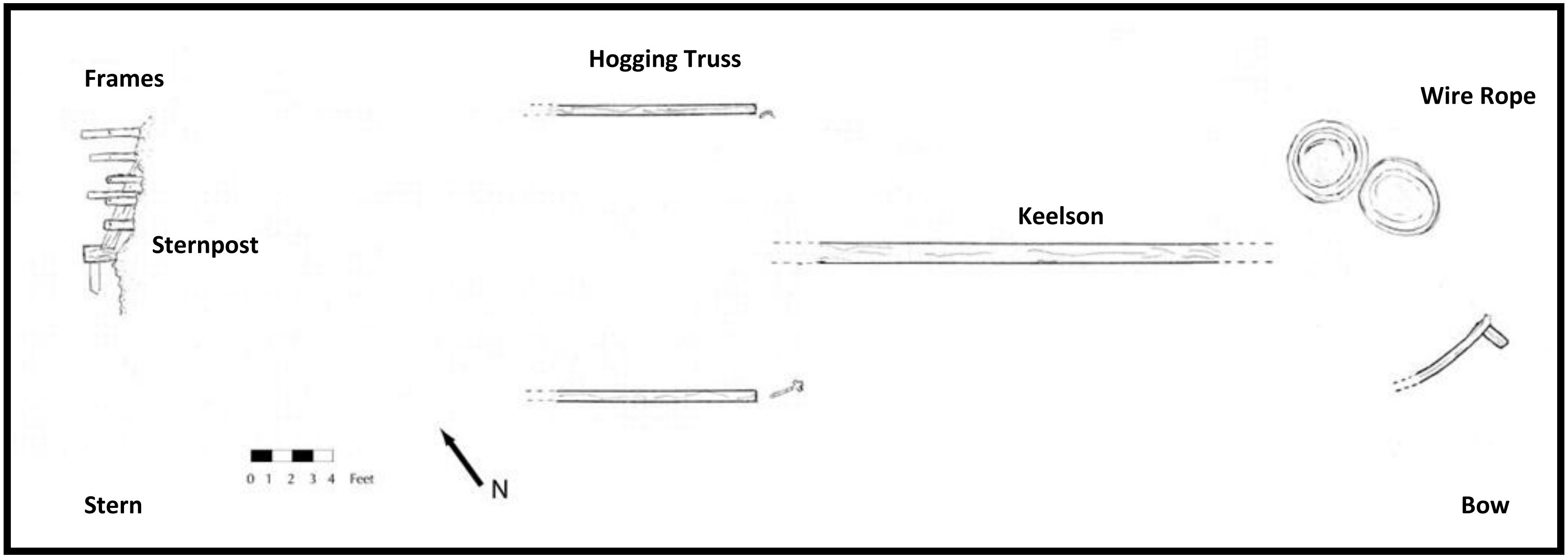


Figure 58. Preliminary scale drawing of A35 showing the scarcity of exposed vessel structure (Sarah Tichonuk, LCMM Collection).

Anomaly 38: Iron Pier Marine Infrastructure

Anomaly 38 Summary Table	
Anomaly Identification	Iron Pier Marine Infrastructure; NY Site Number 06740.012303
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Eligible as a Contributing Property to the Syracuse Maritime Historic District
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	781, 747, 780, 779, 745, 778, 761
Side Scan (2010)	6/3/10
Sector Scan (2010)	6/7/10
ROV (2010)	6/9/10
Diver Observations	Yes
Diver Videography	Yes
Maps/Charts	Yes
Aerial Imagery	No
Historic Accounts	Yes

Historic Context[137]

The Iron Pier was an amusement area. It had a public wooden pier that was constructed in 1890 by the People's Railway Company. The resort consisted of a long narrow wooden pavilion that was 50 by 600 feet (15.2 by 183m).[138] The pier was located just west of the People's Railway (Northern) Railroad, on the south shore of Onondaga Lake. This was situated just northwest of many of the solar salt vats, and workers' housing. On the east end of the pier were bowling alleys; on the west end was a concert hall. Besides shops, restaurants, and amusements, the Iron Pier hosted a variety of activities including baseball games, concerts, boat rentals, a large toboggan water slide, swimming and fishing. Alcohol was also consumed at the pier; a temperance movement at the end of the nineteenth century prompted the manager in 1899 to halt the sale of liquor.[139] In 1899, a trolley line was constructed along the west side of Onondaga Lake. The line, along with the other railway lines around the lake, led to the demise of boat traffic, and made access easier and cheaper for many of the local residents of Salina, Syracuse and Geddes. By the end of 1906, Iron Pier closed. On March 16, 1907, the Iron Pier was demolished.[140] By 1908, the area of the Iron Pier had been covered with Solvay soda ash and refuse, and a park had been created on top of the wastes adjacent to the original mouth of Onondaga Creek.[141] A channel basin was constructed up to the Syracuse Junction Railway. By 1924, the area was noted as being covered with Solvay waste, and there was no longer any park situated there.[142]

Research Results

A38 was examined with side scan sonar, sector scan sonar and remotely operated vehicle with inconclusive results. The anomaly was selected for dive verification, which was undertaken on October 26 and 27, 2010. The site was identified as dock or pier remains based on archaeological and map data. The site consists of a 20 by 17 foot (6.1 by 5.2m) timber frame structure (Figure 59). The exterior walls are constructed of edge fastened planks reinforced with framing members every 3 to 5 feet (.91 to 1.5m). The remains appear to be preserved up to their original height based on the presence of four timbers forming a deck with a large mortice for the foot of a vertical timber. The pier has two box-like features constructed out of two layers of vertically oriented planking. The boxes are 2 feet by 2 feet (.61 by .61m) and stand 1½ feet (.46m) above the bottom. The function of the box features is unknown.

Overlays of historic maps and charts suggests that A38 is near the former location of the western end of the Iron Pier basin (Figure 60).

A38 lies immediately between anomalies A4-1 and A4-2 to the south and A55 to the north. The derelict marine infrastructure related to the Iron Pier Resort is considered a contributing property because of its causal relationship with the District. The abandonment of the Iron Pier Resort and its associated lake side structures is important in the foundation of the District because that action (or lack thereof) created an environment without active human stewardship. Had Iron Pier (or Salina Pier) still been in active use, it is highly unlikely that watercraft would have been abandoned in this area of the lake.

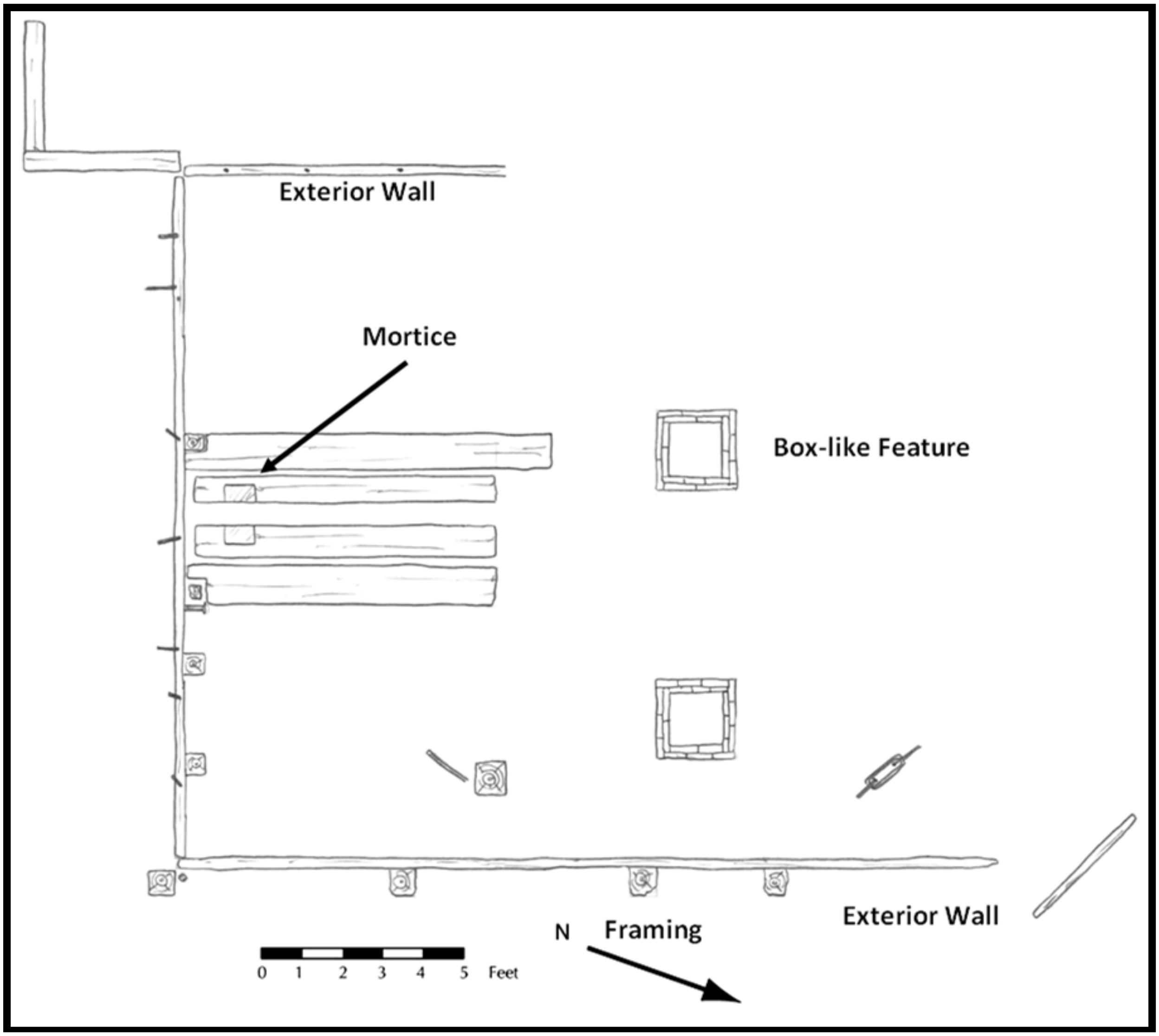


Figure 59. Plan view drawing of A38 (Sarah Tichonuk, LCMM Collection).

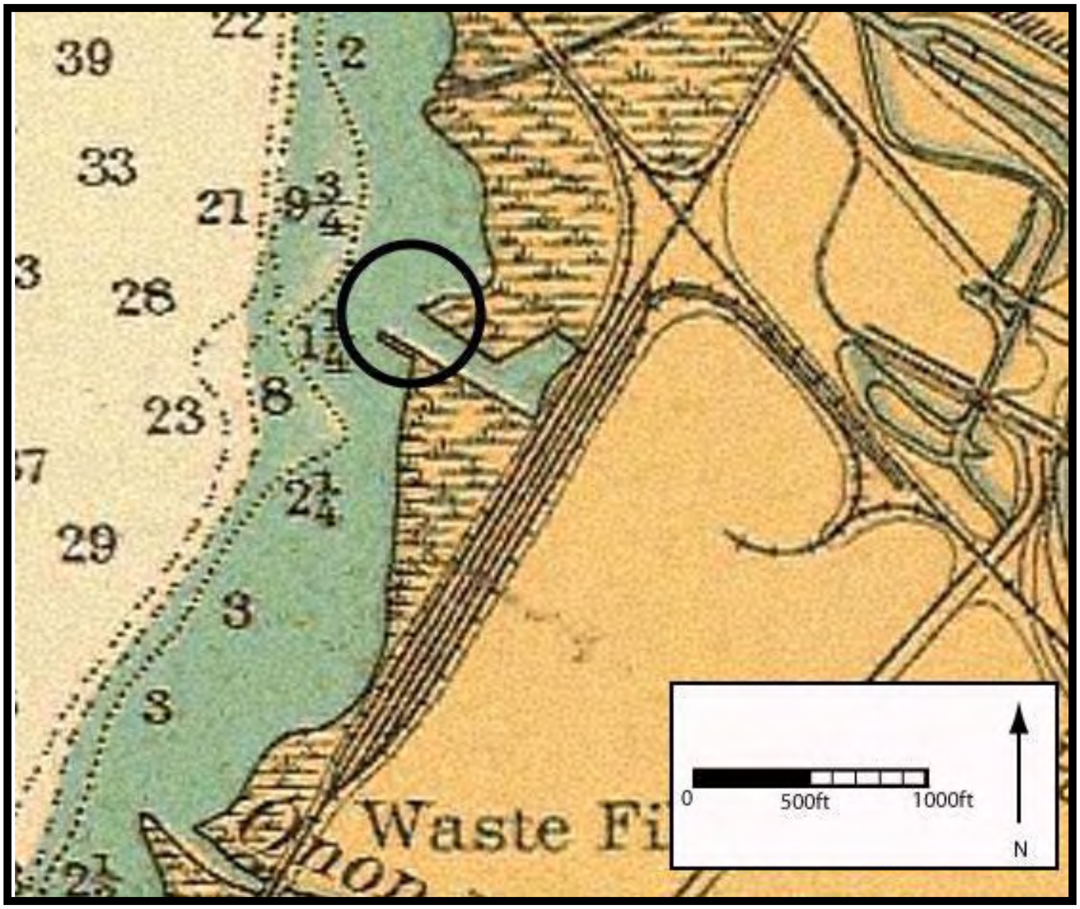


Figure 60. 1915 navigation chart of Onondaga Lake showing the location of A38 (U.S. Lake Survey Office, *Chart No. 5, New York State Canals, Brewerton to Cross Lake and Syracuse to Oswego*, 1915).

Anomaly 45: Concrete Breakwater

Anomaly 45 Summary Table	
Anomaly Identification	Breakwater of Concrete Bags; NY Site Number 06740.012304
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Eligible as Contributing Property to Syracuse Maritime Historic District
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	705, 796, 810, 817, 732, 773, 766, 712, 797, 811
Side Scan (2010)	6/2/10
Sector Scan (2010)	6/7/10
ROV (2010)	6/10/10
Diver Observations	6/26/11
Diver Videography	No
Maps/Charts	Yes
Aerial Imagery	Yes
Historic Accounts	No

Research Results

A45 is a breakwater situated southeast of the entrance to the Syracuse Inner Harbor. Analysis of navigational charts suggests that the structure was installed between 1937 and 1942 (Figure 62), and was abandoned/partially submerged by 1947. The breakwater is 20 feet wide (6.1m) and extends 250 feet (76.2m) from the shoreline (Figure 61). Dive verification in 2011 showed the site to be made of concrete bags, likely constructed by placing bags of concrete in the water. Each concrete block was pillow-shaped with two indentations from circular bands. Given the breakwater's location, its intended purpose was likely to dampen wave action at the harbor entrance for entering and exiting boats. The structure is densely packed along the exterior walls of the breakwater with an open gap containing only sporadic concrete bags in between (Figure 63 and Figure 64). Only one tier is visible. The site lies in 2 to 3 feet (.61 to .91m) of water. No timber crib or other wooden structures were noted, suggesting that the site is a breakwater and not a pier.

Figure 61. Aerial view showing A45 (courtesy Microsoft® Virtual Earth).

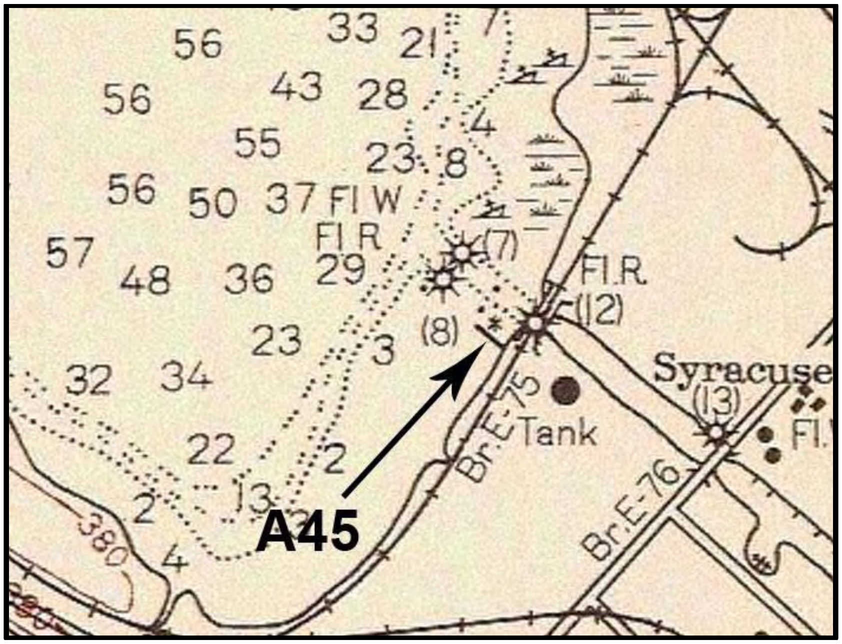


Figure 62. 1942 navigational chart of Onondaga Lake showing A45 (*New York State Canals, Chart No. 185,* 1942 (Detroit: U.S. Lake Survey Office, 1942).

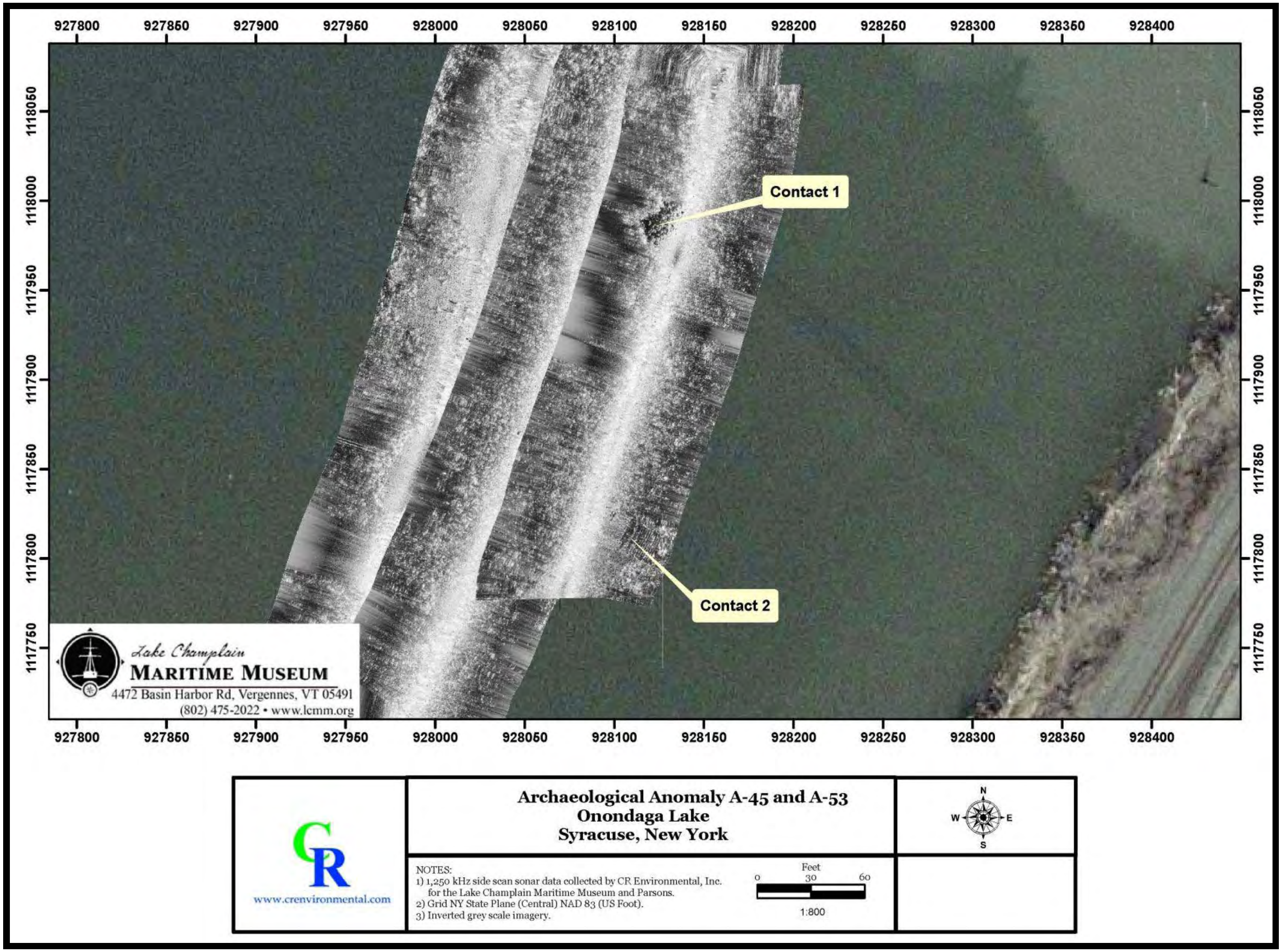


Figure 63. Side scan sonar mosaic showing A45 (Contact 1) and A53 (Contact 2).

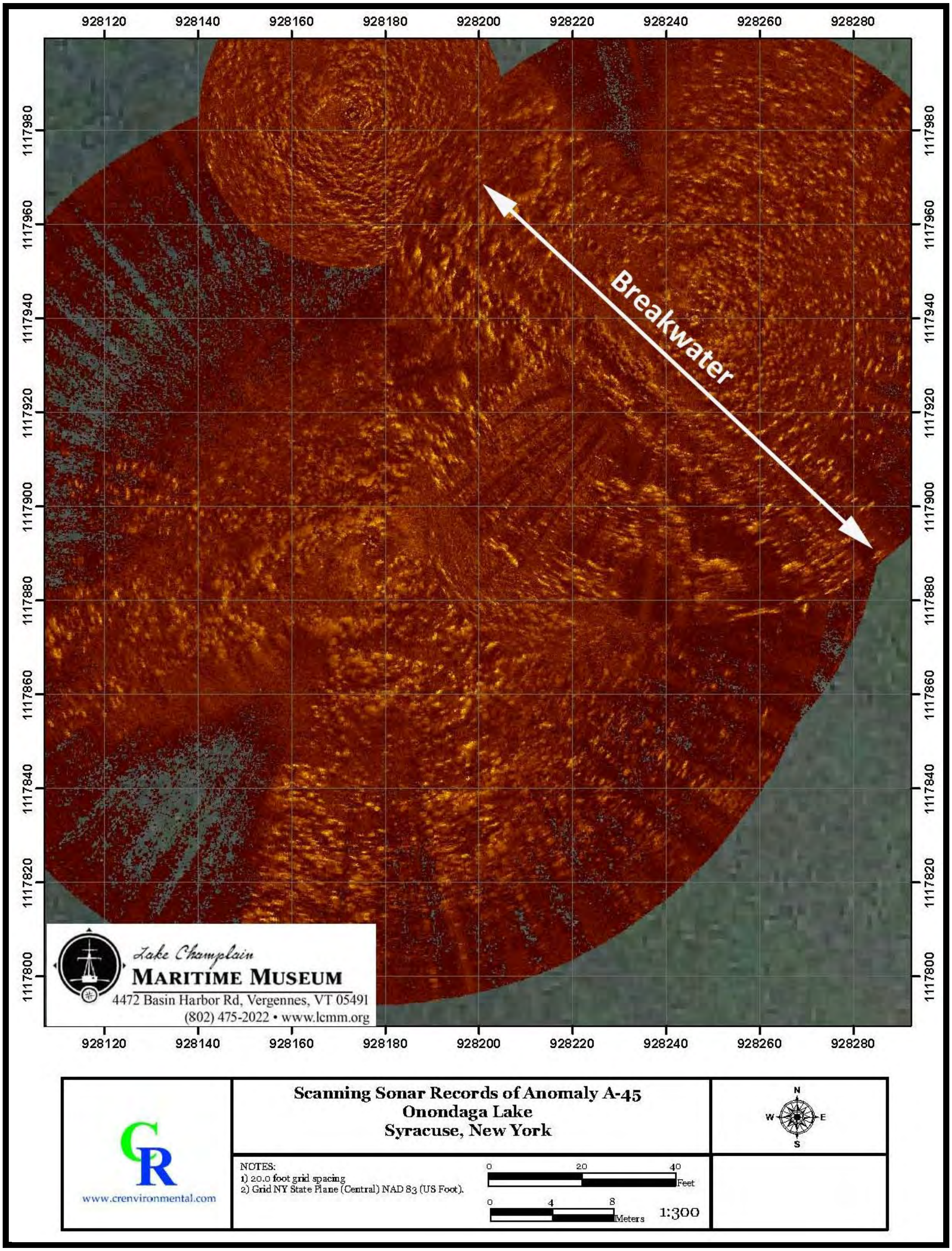


Figure 64. Scanning sonar image of A45.

Anomaly 53: Canal Boat

Anomaly 53 Summary Table	
Anomaly Identification	Canal Boat; NY Site Number 06740.012305
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Eligible as Contributing Property to Syracuse Maritime Historic District
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	No
Side Scan (2010)	6/2/10
Sector Scan (2010)	6/4/10
ROV Video Footage (2010)	6/10/10
Diver Observations	6/26/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly A53 is a canal boat that was located during the Phase 1B underwater archaeological fieldwork in June 2010. The site was found visually from the survey vessel during the investigation of A45, and was not part of the original *Underwater Work Plan*. The site rests in such shallow water (1 to 2 feet [.3 to .61m]), that the 2005 remote sensing survey of Onondaga Lake did not locate the site.

A53 was examined with side scan sonar, scanning sonar, visually from the surface and with the remotely operated vehicle (Figure 65) and verified with a diver. The site is the bottom of a canal boat with elements visually noted including floors, bow frames, stem and cocked hats. The vessel has a beam of approximately 17½ feet (5.33m) and an extant length of approximately 60 feet (18.29m). The boat's stern is buried, but the overall length is likely 97 to 98 feet (29.57 to 29.87m) in accordance with the dimensions of the canal locks. These dimensions place the build date for the vessel between 1862 and 1915. The canal boat's most interesting feature is the cocked hat construction technique used to tie the sides of the hull to the bottom. The vessel has flat floors with trapezoidal timbers (cocked hats) which connect the floors to the futtocks. This is a construction technique that has been documented on steamboats; however, LCMM researchers do not know of any canal boats that were built using this technique. The floors are completely flat with room and space of about 1 foot (30.5cm) with floors about 3 inches (7.6cm) sided. The vessel's bow is located to the east and consists of a typical rounded canal boat bow as outlined by sporadic framing protruding six inches to one foot (15 to 30.5cm) above the bottom. The remains of the stem were noted standing approximately 1 foot (30.5cm) above the bottom. Numerous disarticulated pieces of A53 were located around the wreck, particularly to the southeast. These included several frame sections which were of cocked hat construction like the wreck itself; each disarticulated piece was examined in detail to make sure it was not a larger section or a new wreck.

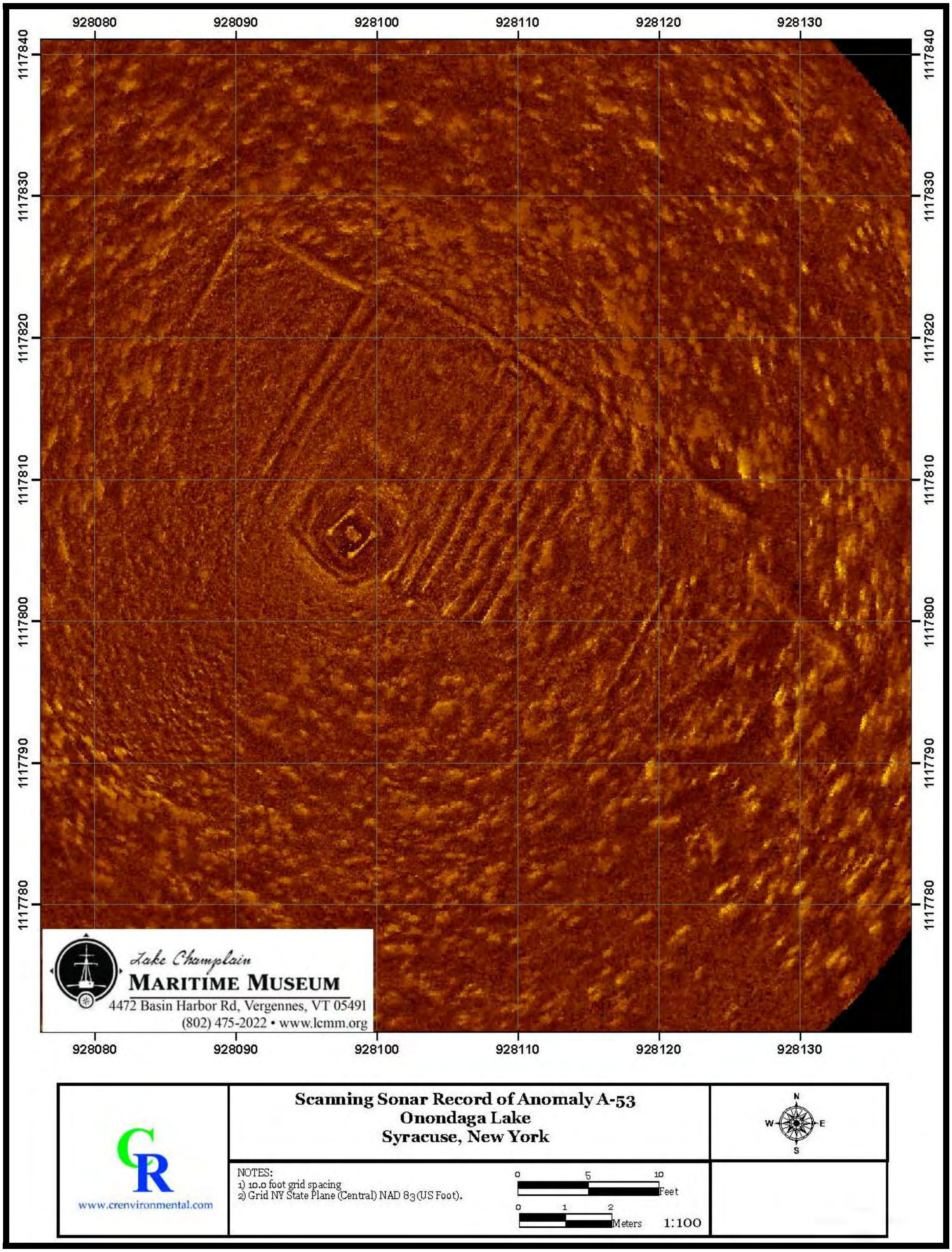


Figure 65. Scanning sonar image of A53.

Anomaly 55: Canal Scow

Anomaly 55 Summary Table	
Anomaly Identification	Canal Scow; NY Site Number 06740.012306
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Eligible as Contributing Property to Syracuse Maritime Historic District
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	781, 747, 780, 779, 745, 778, 761
Side Scan (2010)	Na
Sector Scan (2010)	Na
ROV Video Footage (2010)	Na
Diver Observations	Yes
Diver Videography	Yes
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly A55 is a canal scow with a length of 83 feet (25.3m) and a beam of 17½ feet (5.33m) (Figure 66). The site was located during dive verification work on an adjacent target A38 (Iron Pier Marine Infrastructure). The site was documented by an archaeological diver using direct measurements and underwater videography. The remains rest in shallow water offshore of the former location of the Iron Pier Resort. The archaeological data suggests that A55 is an Erie Canal maintenance scow.

Documentation conditions were poor on the site with underwater visibilities between 2 to 3 feet (.61 to .91m). The site's principal exposed structures are its scow ends and fasteners from its edge-fastened sides. The site consists of a poorly preserved scow end at the southern terminus of the site. The outboard faces of the planking were protected by iron rubwales running perpendicular to the planking. Very few structural remains were visible along the middle of the vessel due to the buried nature of the remains. The ends of the hull were visually connected only by occasional edge fasteners found protruding from the lake bottom. Interestingly, vertically oriented pieces of angle iron were attached to the sides of the hull. The function of these features is unknown. The northern end of the vessel was well preserved, although substantially buried. The scow end was preserved up to the deck level; extant deck hardware included two cleats and a fairlead.

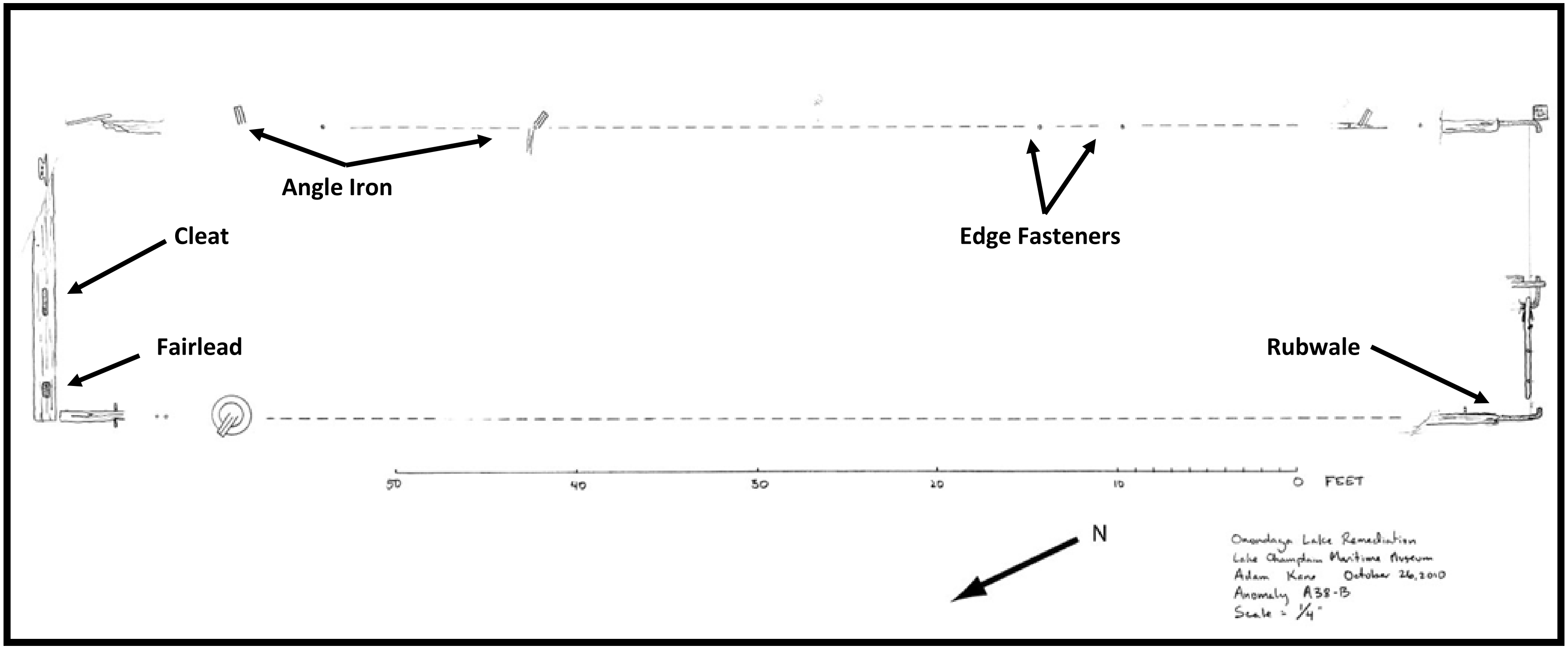


Figure 66. Plan view drawing of A55, a canal scow (Adam Kane, LCMM Collection).

Anomaly 72: Wood Pilings

Anomaly 72 Summary Table	
Anomaly Identification	Wood Pilings; NY Site Number 06740.012310
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Eligible as Contributing Property to Syracuse Maritime Historic District
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	No
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/25/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 72 was located in 2011 and determined to be a series of six wooden pilings, each cut off 6in (15cm) above the bottom, and spread over an area 9ft (3m) by 17ft (5m). Five of the pilings are round, varying in diameter from 0.75in to 5in (2cm to 13cm); the inshore piling is 4in (10cm) square. This feature's location close to shore and in shallow water indicates that it was a small pier or boathouse likely related to the Iron Pier. This area also contained scattered trash and tires.

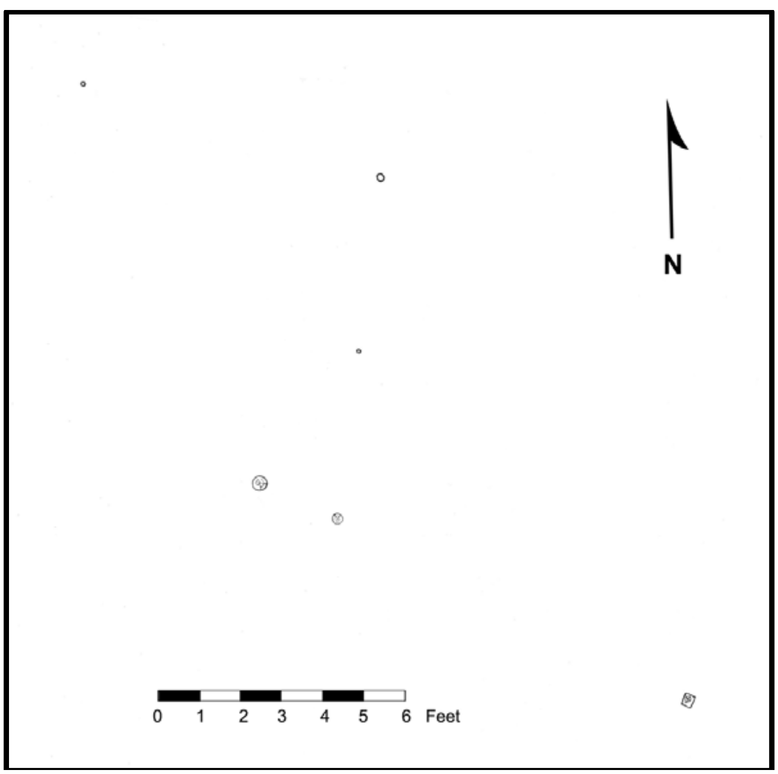


Figure 67. Plan drawing of A72 Pilings (Sarah L. Tichonuk, LCMM Collection).

Anomaly 73: Bulkhead

Anomaly 73 Summary Table	
Anomaly Identification	Bulkhead; NY Site Number 06740.012307
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Eligible as Contributing Property to Syracuse Maritime Historic District
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	No
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/25/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

A bulkhead feature, Anomaly 73, was located in the northern corner of the survey area during dive verification in 2011. The pier consists of seven pilings each standing approximately 6in (15cm) above the bottom (Figure 68). The tops of the pilings were cut flat indicating that the upper surfaces are the tops of the pilings as exposed during its use life. There is a linear arrangement of vertically oriented planks paralleling the pilings, located 4in (10cm) south of the line of pilings. Probing indicated that stones fill the interior of the pilings behind the bulkhead. The structures (pilings and bulkhead) stand 2in to 8in (5 to 20cm) above the bottom. This feature is likely part of the shoreline stabilization infrastructure necessary for the basin shown in Figure 60, adjacent or related to the Iron Pier.

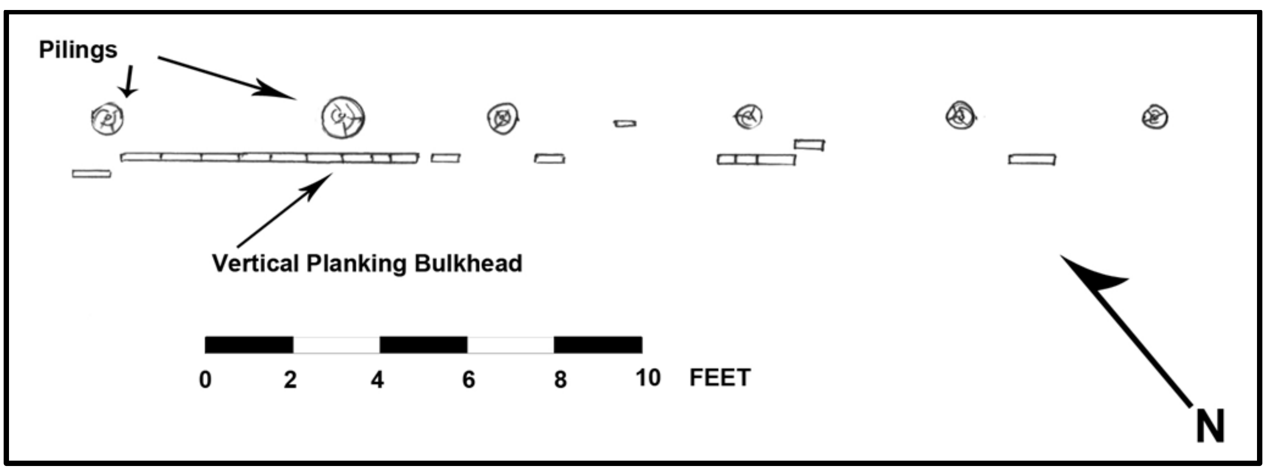


Figure 68. Plan drawing of A73 Pier (Sarah L. Tichonuk, LCMM Collection).

Anomaly 75: Rock Pile

Anomaly 75 Summary Table	
Anomaly Identification	Rock Pile; NY Site Number 06740.012308
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Eligible as Contributing Property to Syracuse Maritime Historic District
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	No
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/26/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 75 was located by a diver in 2011 and determined to be a pile of limestone rocks (rock size approximately 10in [25cm]) one layer deep; the pile is approximately 10ft (3m) long. No evidence of underlying wooden structure was noted.

Anomaly 76: Rock Pile

Anomaly 76 Summary Table	
Anomaly Identification	Rock Pile; NY Site Number 06740.012309
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Eligible as Contributing Property to Syracuse Maritime Historic District
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	No
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/27/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 76 was located by a diver in 2011 and determined to be a pile of small (8in [20cm] typical diameter) limestone rocks 41ft (12.5m) long by 24ft (7.3m) wide. The diver could not probe through the pile suggesting it is deeper than one layer. The pile stands approximately 12in (30cm) above the lake bottom. No evidence of underlying wooden structure was noted.

One isolated piling was found near A76, although it is not clearly associated with the rock pile. The piling is a single square timber angled from the bottom, about 10in (25cm) square.

This area has a high density of woody debris, tires and trash.

Syracuse Maritime Historic District Significance Evaluation

National Register Evaluation		
Integrity of:	Location	The Syracuse Maritime Historic District remains at its original location, thus LCMM recommends it retains integrity of location.
	Design	The distribution of sites in the District lacks purposeful design. However, the individual contributing properties retain design elements such as spatial organization, technology and materials that are reflective of the builders' original activities. LCMM recommends that the Syracuse Maritime Historic District retains integrity of design.
	Setting	In the 80 years since boat disposal activities began at the site, the surrounding area retains a similar wetland/backwater setting which was one component of its formation. Additionally, the entrance to the adjacent Syracuse Inner Harbor and the Salina Pier and Iron Pier in-water remnants, both of which were causal factors in the district's formation, remain in place. LCMM recommends that the Syracuse Maritime Historic District retains integrity of setting.
	Materials	Significant portions of the sites in the Syracuse Maritime Historic District are buried beneath the lake bed. Although this makes the assessment of the configuration of those materials difficult, if not impossible, it is safe to conclude that those materials remain intact. Moreover, those buried materials will be in a better state of preservation than those exposed above the lakebed. The fabric of the barges can reveal the boatbuilders' construction preferences and (potentially) regional boat building traditions. LCMM recommends that the Syracuse Maritime Historic District retains integrity of materials.
	Workmanship	The sites in the proposed district have significant potential to yield information about the boatbuilders' skill and techniques. LCMM recommends that the Syracuse Maritime Historic District retains integrity of workmanship.
	Feeling	The District's feeling, or combination of its features with its setting, is conveyed by the sites which remain exposed above the lake's surface (A3, A4-1, A7 and A12) and the undeveloped shoreline. The district also has a similar veiwshed to that of 50 to 80 years ago. LCMM recommends that the Syracuse Maritime Historic District retains integrity of feeling.
	Association	The contributing properties are sufficiently intact to convey to an observer that this is the area of the lake where boat disposal activities occurred. LCMM recommends that the Syracuse Maritime Historic District retains integrity of association.
Criterion:	A: Event	The Syracuse Maritime Historic District has a clear association with a pattern of events comprising the commercial use of the New York State Barge Canal. Areas of significance include commerce (all), transportation (all), engineering (dump scows A4-1 and A4-2), and government (canal scow A55). LCMM recommends that the Syracuse Maritime Historic District is eligible under Criterion A.
	B: Person	No known individually significant persons are associated with the Syracuse Maritime Historic District. LCMM recommends that the Syracuse Maritime Historic District is ineligible under Criterion B.

	C: Design/ Construction	The properties in the Syracuse Maritime Historic District represent a significant and distinguishable entity with features that both lack individual distinction and individually distinctive features. Contributing properties A3, A4-1, A7 and A12 because of their partial exposure serve as focal points for the district. They embody the distinctive characteristics of twentieth century barge construction (which include edge-fastening construction and longitudinal bulkheads); and marine infrastructure. LCMM recommends that the Syracuse Maritime Historic District is eligible under Criterion C.
	D: Information Potential	The sites in the Syracuse Maritime Historic District are likely to yield information about early twentieth century boatbuilding techniques and their operational history. The contributing properties are each likely to answer specific research questions that are not addressed in the archival record. What are the structural and mechanical requirements for wooden dump scows (A 3, A4-1 and A4-2)? What does the scatter of artifacts presumed to existing in proximity to Salina Pier and Iron Pier reveal about their use? What are the design and engineering considerations for the construction of spud holders (A12)? LCMM recommends that the Syracuse Maritime Historic District is eligible under Criterion D.

Recommendations
LCMM's analysis suggests that the Syracuse Maritime Historic District retains integrity and is eligible for the National Register of Historic Places under Criteria A, C and D. The remedial design for the area of the Syracuse Maritime Historic District calls for dredging and capping, which would potentially impact 14 sites. A3 and A76 lie outside of the remedial areas.

As per the Section 106 process, LCMM recommends minimizing adverse effects to the above referenced archaeological sites. LCMM recommends dredging around each feature using a setback sufficient to not destabilize the feature. The historic property and setback would be capped consistent with surrounding area.

Although the archaeological sites will be preserved in place with this proposed approach to the remedial design, adverse effects will not be eliminated. For any or all of the Syracuse Maritime Historic District properties, the proposed remedial approach may: remove through dredging related artifact collections associated with the uselife, disposal or decay of each property; adversely affect the sites' structure through the deposition of capping material; and effectively limit the accessibly of the sites to future archaeological study.

Syracuse Maritime Historic District Data Recovery
Based on the recommended remedial approach, LCMM recommends mitigating the adverse effects to the Syracuse Maritime Historic District through a data recovery effort on the exposed portions of selected sites. The contaminated nature of the sediments overlying the sites makes mitigation through further on-site data recovery from some of the sites impractical. The archaeological excavation of sites such as A55, A35, A4-2, and A38 where most of the remains are buried would require extensive excavation which could potentially disperse contaminants outside of the remediation areas, and expose researchers to potentially hazardous conditions.

Archaeological data recovery without any excavation is feasible and will yield potentially significant information from the exposed portions of A1/A2 (Salina Pier), A4-1 (Dump Scow), A53 (Canal Boat), A12 (Derrick Lighter Spud Barge) and A45 (Concrete breakwater). Photographic documentation of A7 (Pilings) will be implemented in accordance with the National Register of Historic Places Photo Policy (http://www.nps.gov/nr/publications/guidance/Photo_Policy_final.pdf) and will be sufficient to document this architectural feature. Anomalies A35 (unknown vessel type), A4-2 (dump scow), A38 (Iron Pier Marine Infrastructure), A55 (canal scow), and A73 (bulkhead) are largely buried, and have little research potential without significant excavation.

Additionally, no further work is recommended for the three rock piles A34, A75, and A76 because they appear to lack intentional design and have limited research potential.

Data recovery on A1/A2, A4-1, A12, A45, and A53 would include scale drawings and underwater video and photography. Because of the environmental concerns regarding archaeological excavation, only the exposed remains will be subject to data recovery.

RECOMMEND NO FURTHER WORK

Anomaly 5: Isolated Debris

Anomaly 5 Summary Table	
Anomaly Identification	Modern Isolated Debris
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	2-6, 9-16
Magnetometer (2005)	625, 248, 678, 275
Side Scan (2010)	6/5/10
Sector Scan (2010)	6/7/10
ROV Video Footage (2010)	6/10/10
Diver Observations	No
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly A5 is a collection of small sonar and magnetometer targets that was selected for investigation based upon its offshore proximity to the former location of Geddes Pier. The anomaly area was investigated with sector scan sonar, side scan sonar, and the ROV. All of these methodologies were hampered by dense aquatic vegetation in the research area. Additional consultation with Parsons' staff revealed that the acoustic anomaly located by CRE in 2005 was buoyant piping associated with water monitoring activities (Figure 69). The limited data from the inspection and the low intensity distantly distributed sonar and magnetometer anomalies from the 2005 CRE fieldwork suggest that the anomaly sources are isolated modern debris (Figure 70 and Figure 71). Map analysis also suggests that this location is too far out into the lake to be the remnants of Geddes Pier.

Recommendations

LCMM recommends no further work for A5.

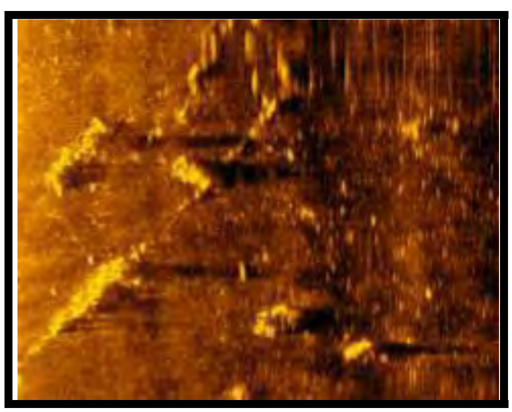


Figure 69. A5 sonar images showing linear acoustic anomalies which were identified as piping associated with water monitoring (courtesy CRE).

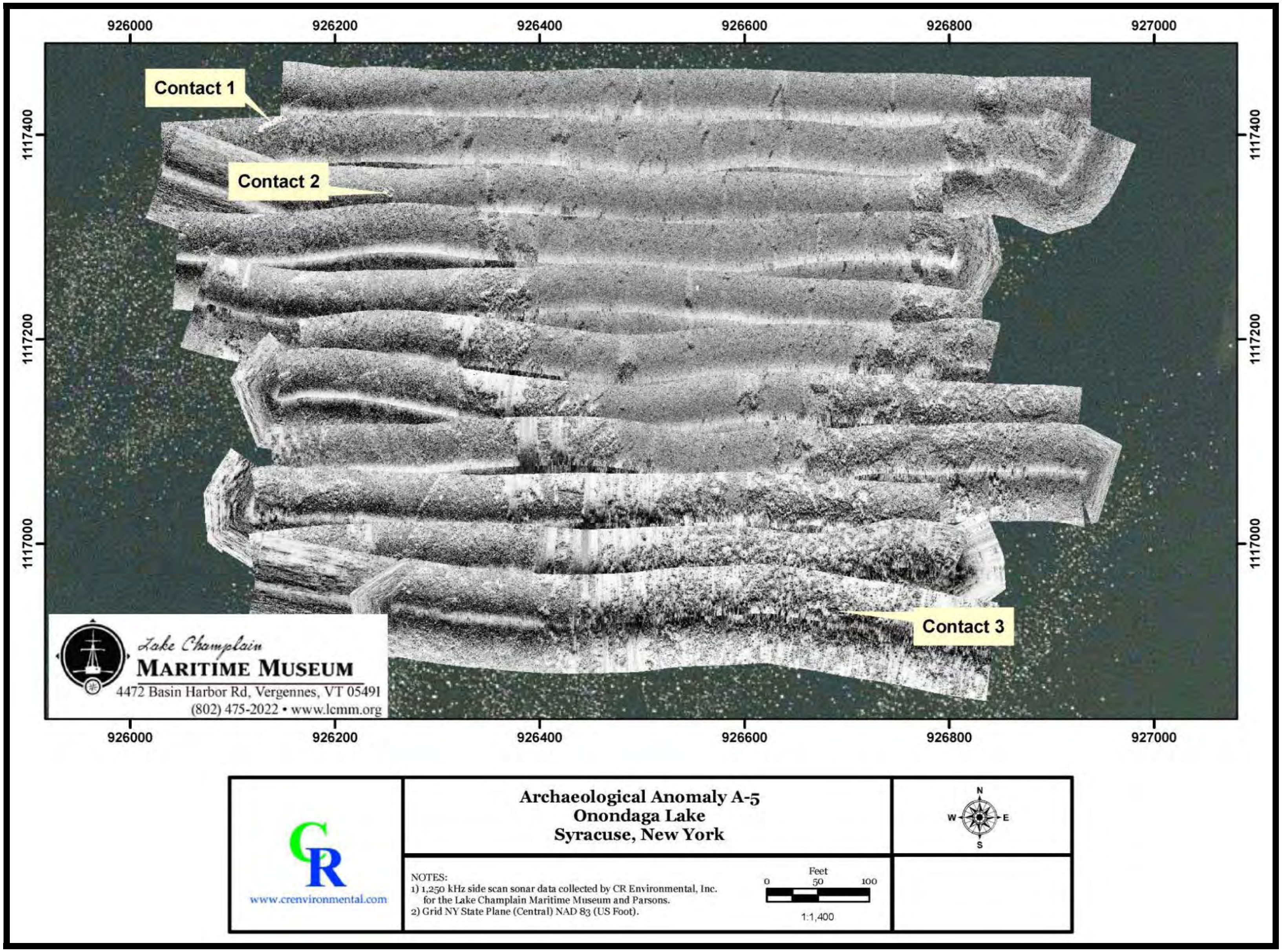


Figure 70. Side scan sonar mosaic of A5.

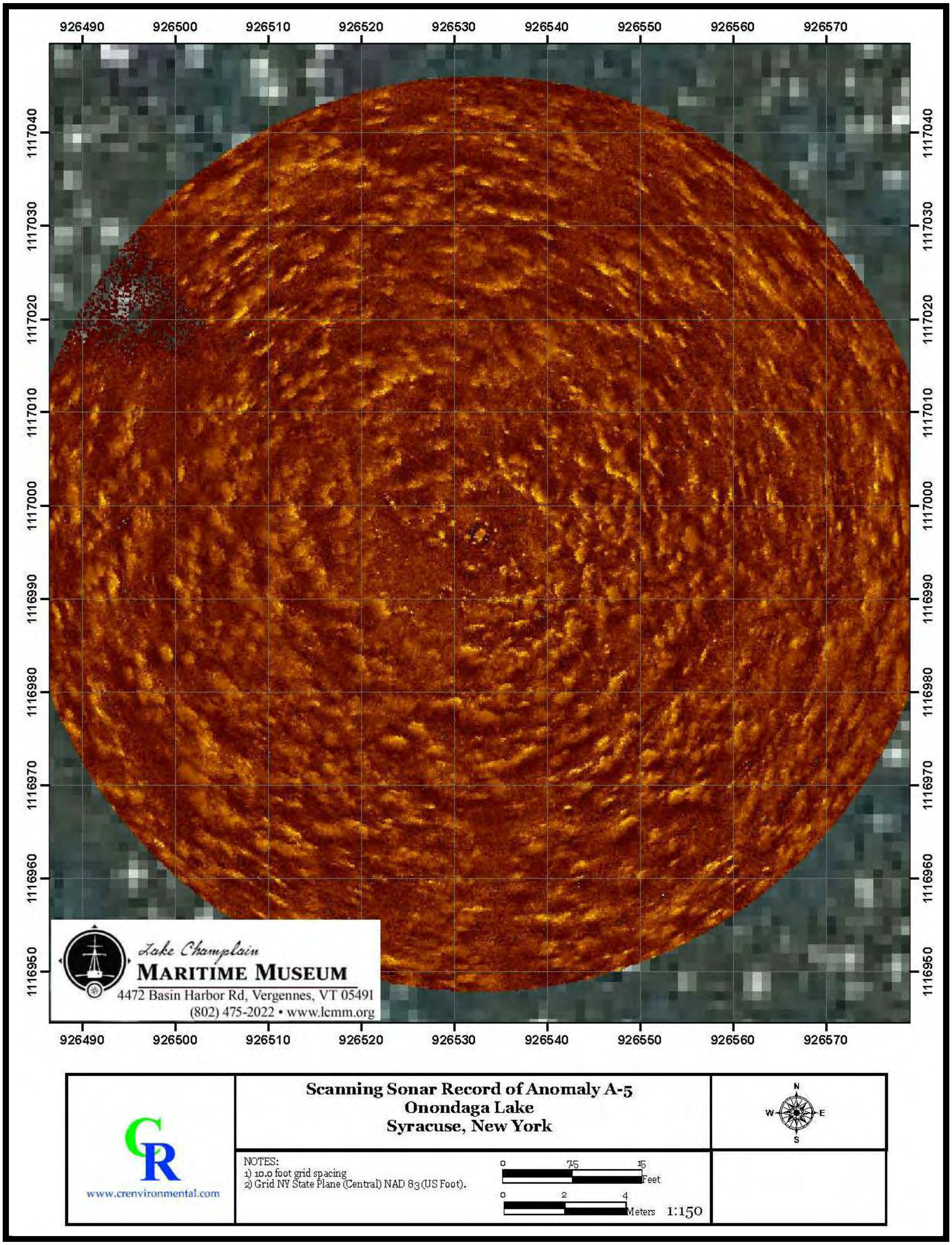


Figure 71. Scanning sonar record of A5.

Anomaly 6: Solvay Waste Shelf

Anomaly 6 Summary Table	
Anomaly Identification	Solvay Waste Shelf
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	30
Magnetometer (2005)	1256, 475
Side Scan (2010)	6/2/10
Sector Scan (2010)	6/6/10
ROV Video Footage (2010)	6/9/10
Diver Observations (2011)	6/21/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

A6 is co-located with CRE's 2005 digitized magnetic anomalies #475 and #1256 which were observed on parallel survey transects spaced 25ft (8m) apart at a depth of approximately 8ft (2m). The magnitude of these anomalies was approximately 10-15nT. Assuming a distance (range) of 7-16 ft (2-5 m), the ferrous mass of this anomaly might be 4.4 to 84lb (2 to 38kg). High resolution side scan sonar data collected in the vicinity of these anomalies in 2010 showed some isolated debris, but nothing characteristic of a cultural resource (Figure 72 and Figure 73). The ROV revealed the area to be flat bottomed with no vegetation and a layer of easily disturbed fine silt and green algae. The ROV did not locate the source of the anomaly. The area has dense aquatic vegetation with open areas of solvay waste. Diver verification in 2011, which included visual examination and metal detecting, did not locate any cultural material.

The cumulative geophysical and observational data suggests that the original side scan anomaly was likely a result of the solvay waste shelf. The magnetic target is buried and remains unresolved, however, its low magnetic amplitude and limited spatial extent suggests that the target is the result of isolated ferrous debris rather than a larger, more complex archaeological property.

Recommendations

LCMM recommends no further work for A6.

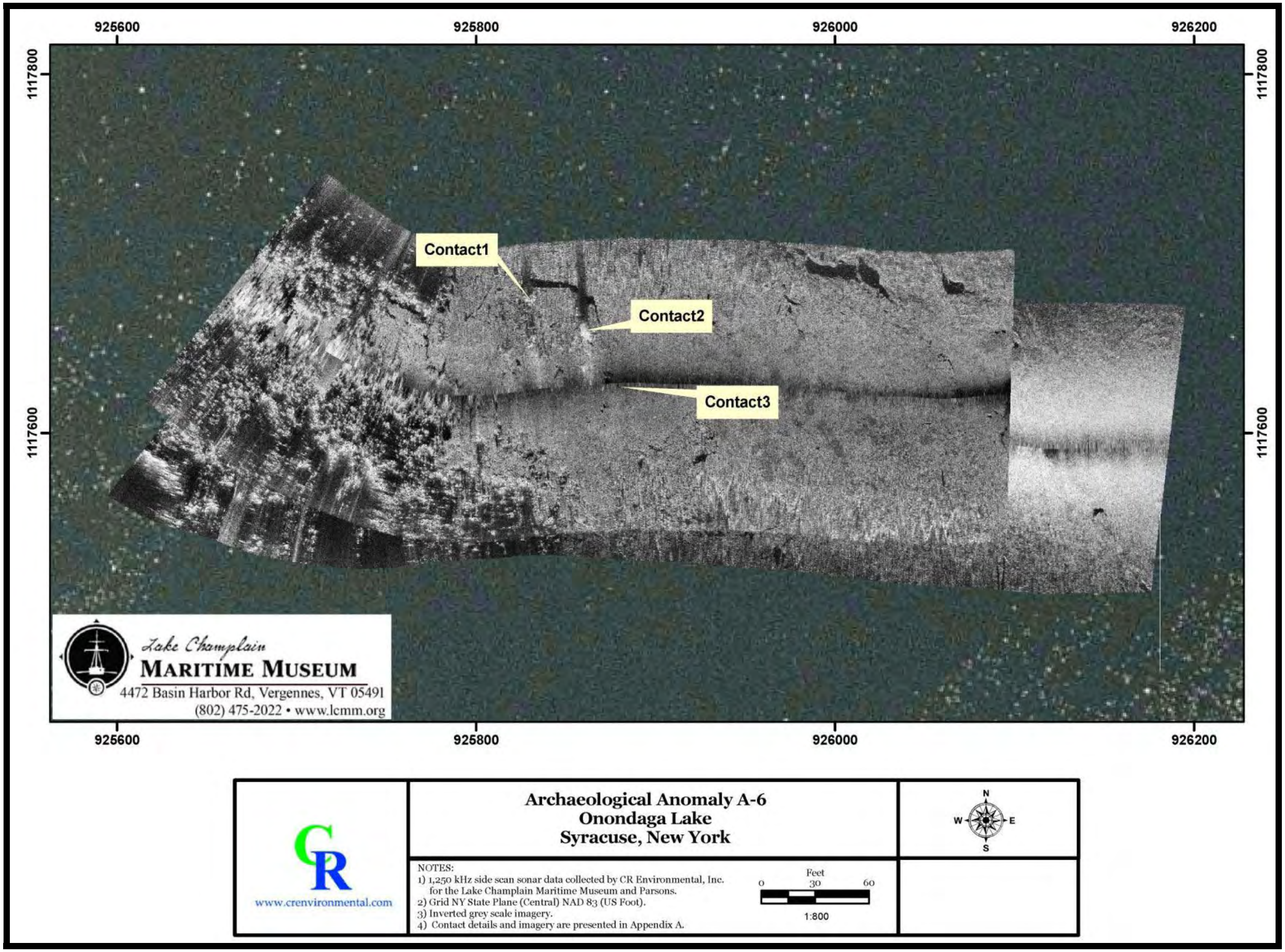


Figure 72. Side scan sonar mosaic of A6

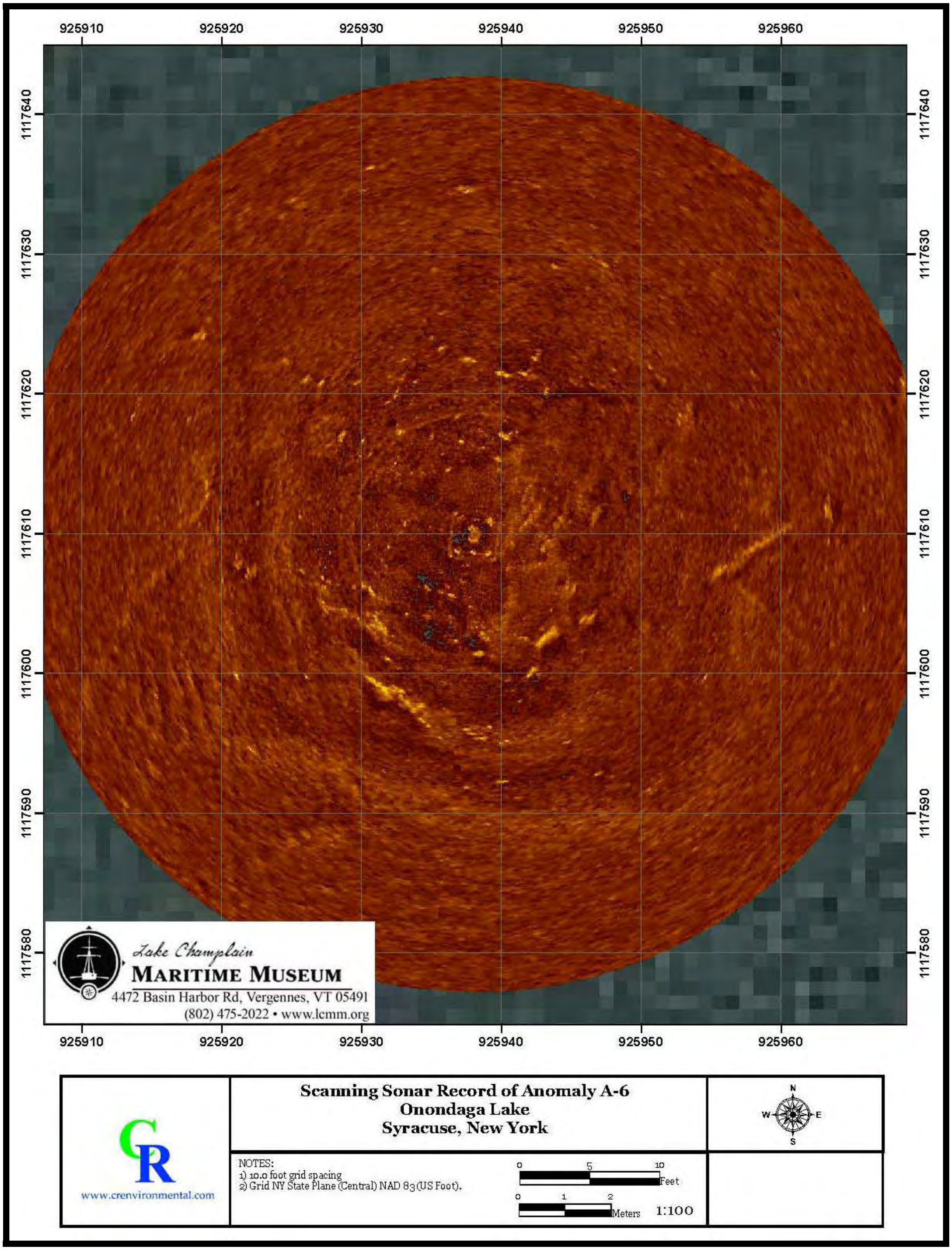


Figure 73. Scanning sonar image of A6.

Anomaly 8: Aquatic Vegetation

Anomaly 8 Summary Table	
Anomaly Identification	None
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	140
Magnetometer (2005)	No
Side Scan (2010)	6/2/10
Sector Scan (2010)	6/5/10
ROV Video Footage (2010)	6/9/10
Diver Observations	No
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly A8 was identified based on a sonar target from the 2005 remote sensing survey (Figure 74). In 2010, the area was investigated with side scan sonar, sector scan sonar and ROV. None of the investigations showed any source for this anomaly. The area has dense aquatic vegetation and a silty bottom. Review of the original sonar data and the absence of an associated magnetometer anomaly suggest that the original anomaly was aquatic vegetation.

Recommendations

LCMM recommends no further work for A8.

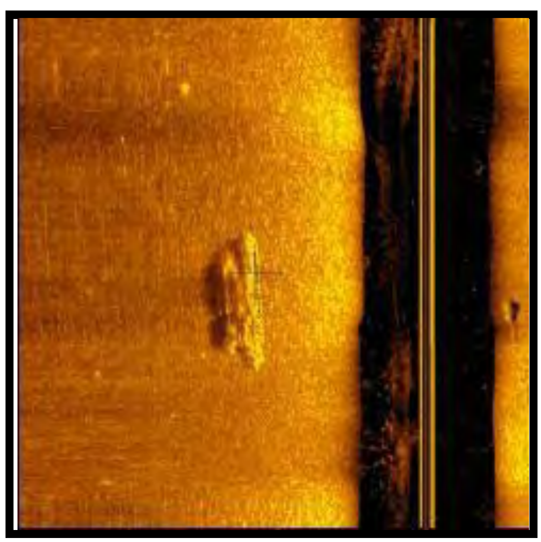


Figure 74. Side scan sonar image from 2005 showing A8 (courtesy CRE).

Anomaly 9: Tree Branch

Anomaly 9 Summary Table	
Anomaly Identification	Tree Branch
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	200
Magnetometer (2005)	No
Side Scan (2010)	6/2/10
Sector Scan (2010)	6/5/10
ROV Video Footage (2010)	6/9/10
Diver Observations	No
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly A9 was identified based on a sonar target from the 2005 remote sensing survey (Figure 75). In 2010, the area was investigated with side scan sonar, sector scan sonar and ROV. One tree branch with vegetation hung up on it was located. The area has a silty bottom with minimal vegetation. Review of the original sonar data and the absence of an associated magnetometer anomaly suggest that the original anomaly was this tree branch.

Recommendations

LCMM recommends no further work for A9.

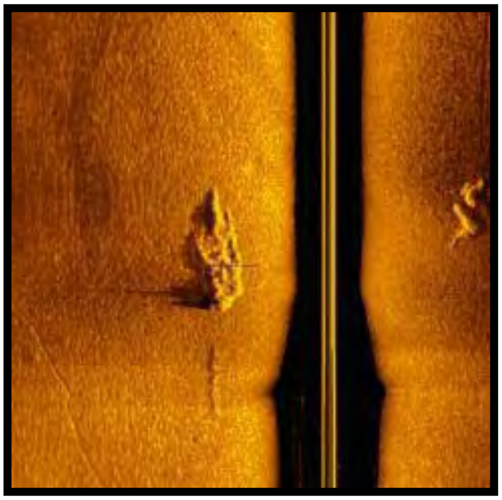


Figure 75. Sonar image from 2005 showing Anomaly 9 (courtesy CRE).

Anomaly 10: Aquatic Vegetation

Anomaly 10 Summary Table	
Anomaly Identification	Aquatic Vegetation
Remedial Impact	Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	235
Magnetometer (2005)	No
Side Scan (2010)	6/2/10
Sector Scan (2010)	NA
ROV Video Footage (2010)	NA
Diver Observations	No
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly A10 was identified based on a sonar target from the 2005 remote sensing survey (Figure 76). In 2010, the area was investigated with side scan sonar. No anomaly was present in proximity to A10 during the side scan sonar work. Due to lack of associated magnetometer anomaly, the source can confidently be characterized as aquatic vegetation.

Recommendations

LCMM recommends no further work for A10.

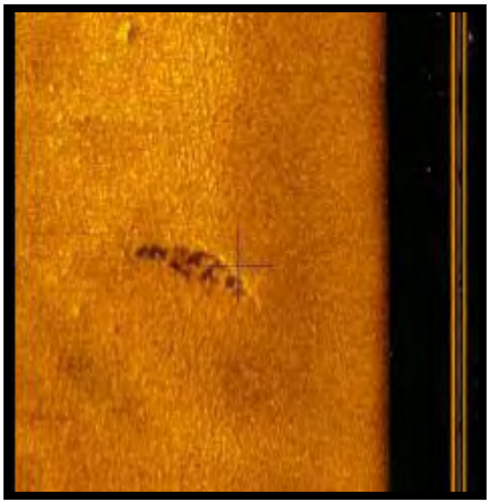


Figure 76. Sonar image from 2005 showing Anomaly 10 (courtesy CRE).

Anomaly 11: Pipes

Anomaly 11 Summary Table	
Anomaly Identification	Modern Pipes
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	254
Magnetometer (2005)	776, 786
Side Scan (2010)	6/3/10
Sector Scan (2010)	6/7/10
ROV Video Footage (2010)	NA
Diver Observations	6/24/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly A11 was identified based on a sonar and magnetometer targets from the 2005 remote sensing survey. In 2010, the area was investigated with side scan sonar, scanning sonar and visually from the lake surface (Figure 77 and Figure 78). In 2011, diver verification conclusively identified Anomaly A11 as a series of modern pipes or conduits which had been discarded on the lake bottom.

Recommendations

LCMM recommends no further work for A11.

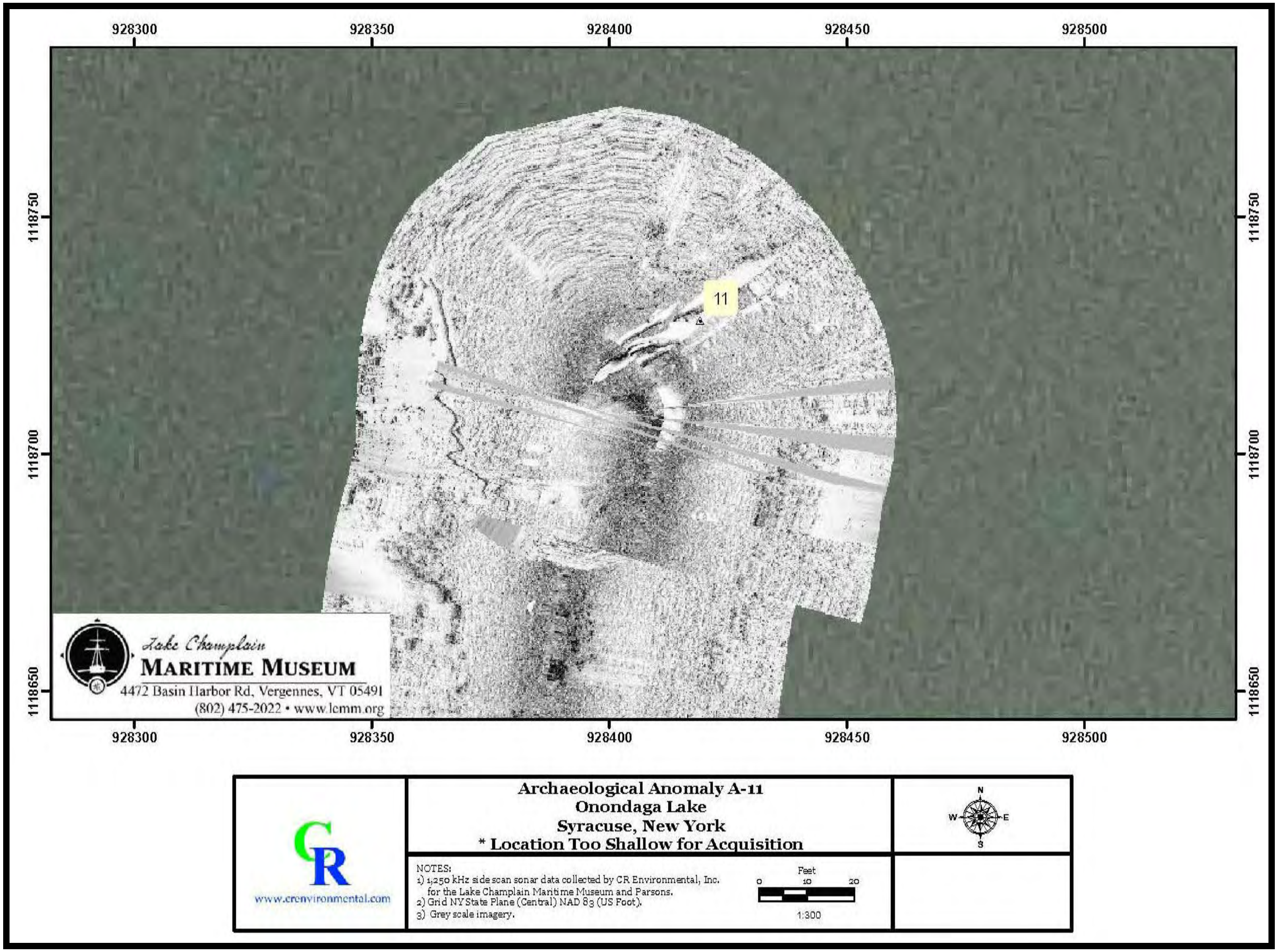


Figure 77. Side scan sonar mosaic showing A11.

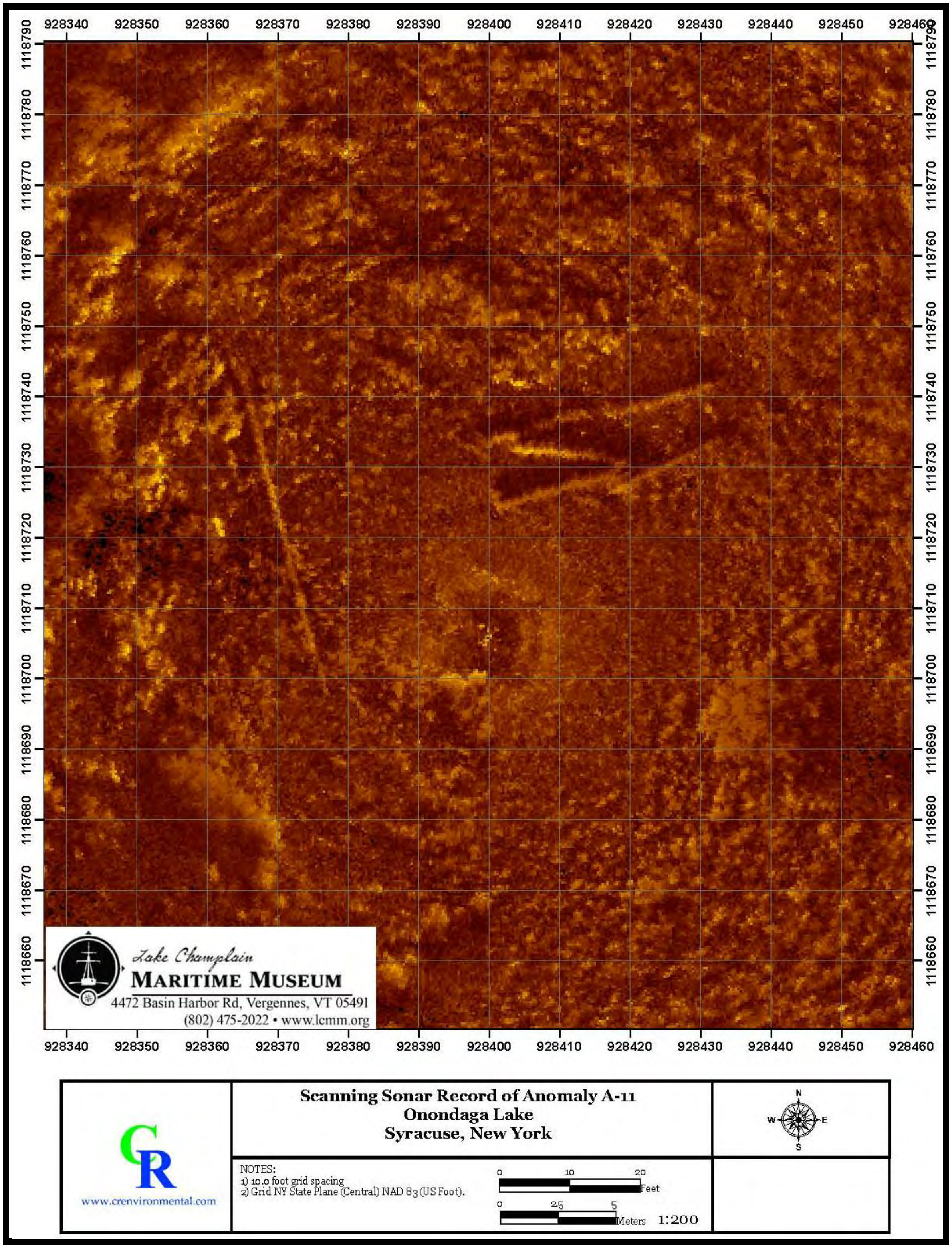


Figure 78. Scanning sonar image showing A11.

Anomaly 19: Unidentified

Anomaly 19 Summary Table	
Anomaly Identification	Unknown
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	484
Magnetometer (2005)	182, 187, 1073, 1078
Side Scan (2010)	No
Sector Scan (2010)	6/7/10
Surface Inspection (2010)	6/2, 3, 7/10
Diver Observations (2011)	6/28/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

A19 is co-located with four magnetic anomalies digitized from CRE's 2005 data: #182; #187; #1073; and #1078 (Figure 79). These anomalies were observed on four parallel survey transects spaced 25ft (8m) apart at a depth of approximately 3 to 6ft (1 to 2m). The magnitude of these anomalies was as high as approximately 100nT (Figure 80). Assuming a distance (range) of 7 to 16ft (2 to 5 m), the ferrous mass of this anomaly might be 35 to 551lb (16 to 250 kg).

The anomaly was searched for on four different occasions during the 2010 fieldwork. The depth of the site and generally clear water allowed for a topside visual search for the anomaly. Despite three different visual survey efforts and excellent water clarity, the anomaly could not be located. A19 was dive verified in 2011 and after extensive metal detecting, no cultural materials were identified. The anomaly is in an area where the lake bottom drops off steeply suggesting that the linear sonar anomaly may have been a shelf.

The cumulative geophysical and observational data suggests that the original side scan anomaly was likely a topographic feature related to the sloping lake bottom. The magnetic target is buried and remains unresolved. The spatial extent of the magnetic anomaly, which covers an area of approximately 120 by 120ft (37 by 37m), is consistent with the spatial extent of other vessels located in Onondaga Lake. However, the magnetic intensity is considerably lower and lacks the complexity of other vessel sites. Although, the specific origin of the magnetic anomaly is unknown, LCMM believes the collective data suggests that it is unlikely to represent a cultural resource.

Recommendations

LCMM recommends no further work for A19.

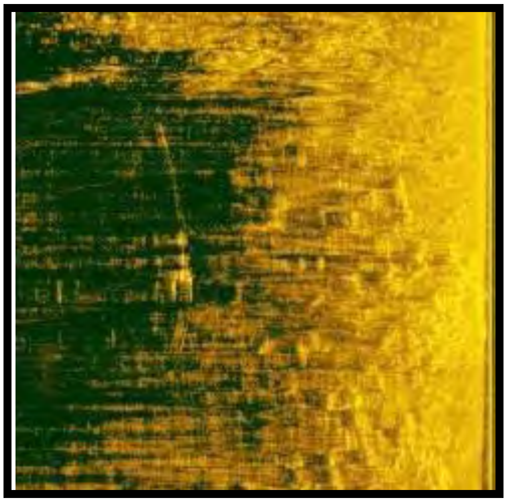


Figure 79. Sonar image from 2005 showing Anomaly 19 (courtesy CRE).

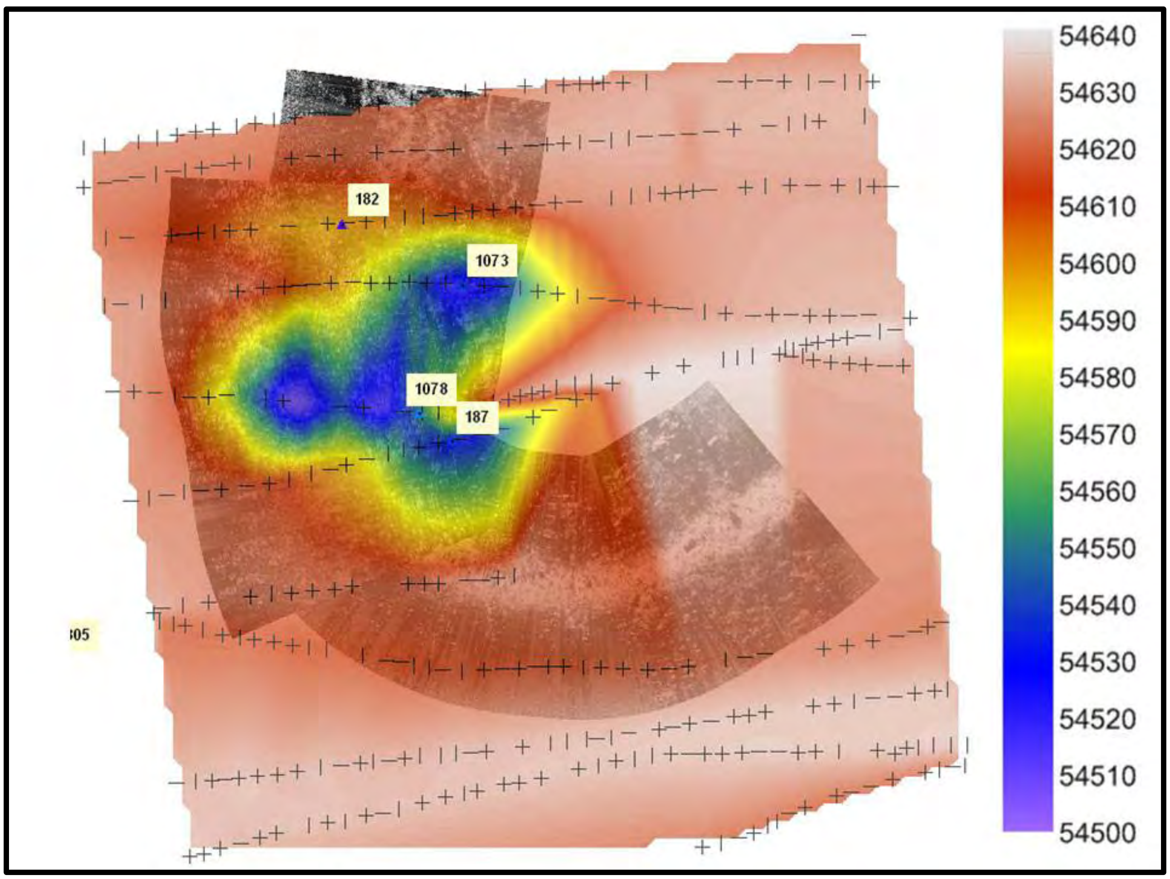


Figure 80. Graphical overlay of fine-scale magnetism and side scan data on A19 (courtesy CRE).

Anomaly 36: Wire Rope

Anomaly 36 Summary Table	
Anomaly Identification	Wire Rope
Remedial Impact	Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	552, 73, 1007, 1009
Side Scan (2010)	6/2/10
Sector Scan (2010)	No
ROV (2010)	6/10/10
Diver Observations	6/21/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

A36 is a magnetic anomaly discovered during the 2005 remote sensing survey (Figure 81). The anomaly was investigated using side scan sonar and ROV in 2010, with all results being inconclusive. Diver verification in 2011 revealed the target to be a 10ft (3m) coil of wire rope.

Recommendations

LCMM recommends no further work for A36.

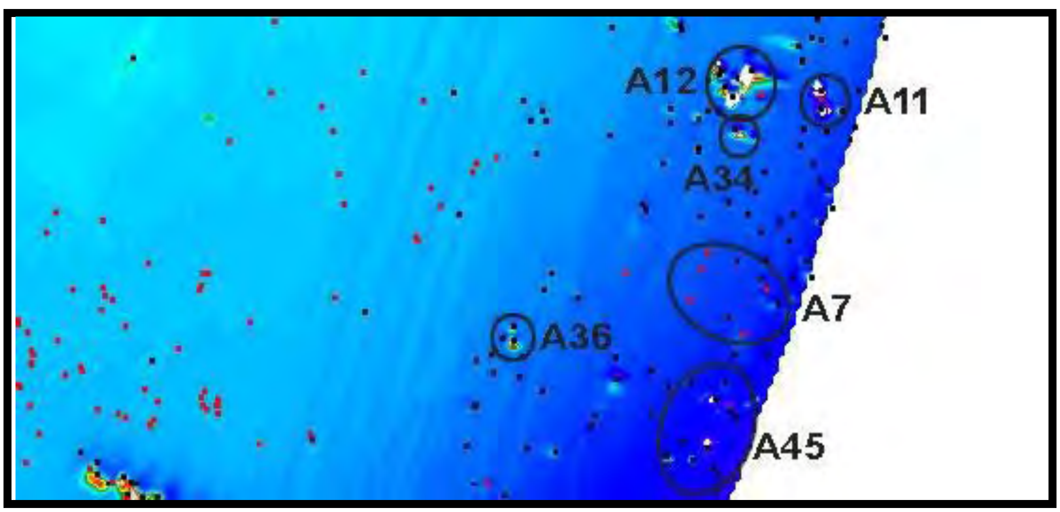


Figure 81. Magnetic intensity map of Onondaga Lake showing A36.

Anomaly 37: Unidentified

Anomaly 37 Summary Table	
Anomaly Identification	Unidentified
Remedial Impact	Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	499, 500, 276, 502, 503
Side Scan (2010)	6/2/10
Sector Scan (2010)	6/5/10
ROV (2010)	6/9/10
Diver Observations	6/28/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

A37 is co-located with five magnetic anomalies digitized from CRE's 2005 data: #276; #499; #500; #502; and #503 (Figure 82). These anomalies were observed on five parallel survey transects spaced 25 ft (8m) apart at a depth of approximately 10 to 12ft (3 to 4m). The magnitude of these anomalies was as high as approximately 400nT at the central dipolar anomaly #276 (Figure 83). Assuming a distance (range) of 7 to 16ft (2 to 5 m), the ferrous mass of this anomaly might be 141 to 2204lb (64 to 1000kg). Side scan sonar data collected in the vicinity of these anomalies in 2010 did not suggest the presence of surficial contacts (debris or structures). The anomaly was investigated using side scan sonar, sector scan sonar and ROV in 2010, and dive verification in 2011, with all results being inconclusive.

The cumulative geophysical and observational data suggests that the magnetic target is buried. The spatial extent of the magnetic anomaly, which covers an area of approximately 200 by 100ft (61 by 30.5m), is consistent with the spatial extent of the barge and canal boat wrecks in Onondaga Lake. However, the magnetic intensity is lower and lacks the complexity of other vessel sites. Although, the specific origin of the magnetic anomaly is unknown, LCMM believes the collective data suggests that it is unlikely to represent a cultural resource.

Recommendations

LCMM recommends no further work for A37.

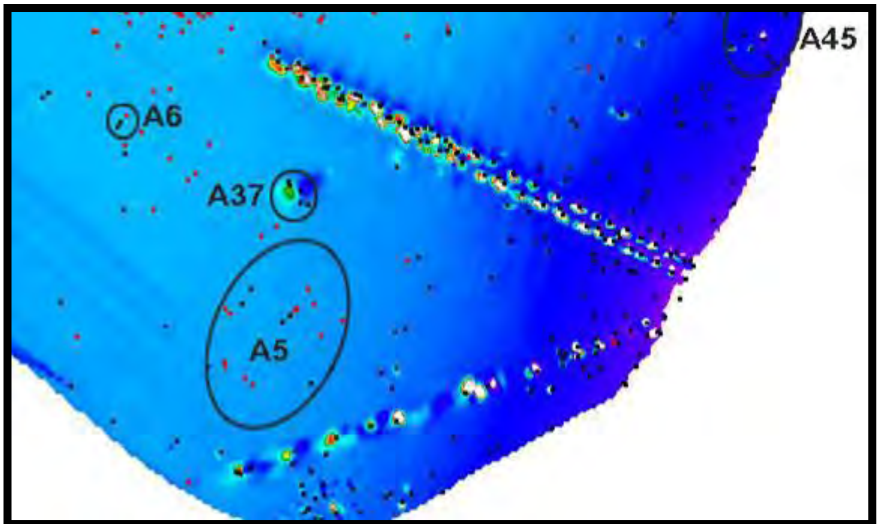


Figure 82. Magnetic intensity map of Onondaga Lake showing A37.

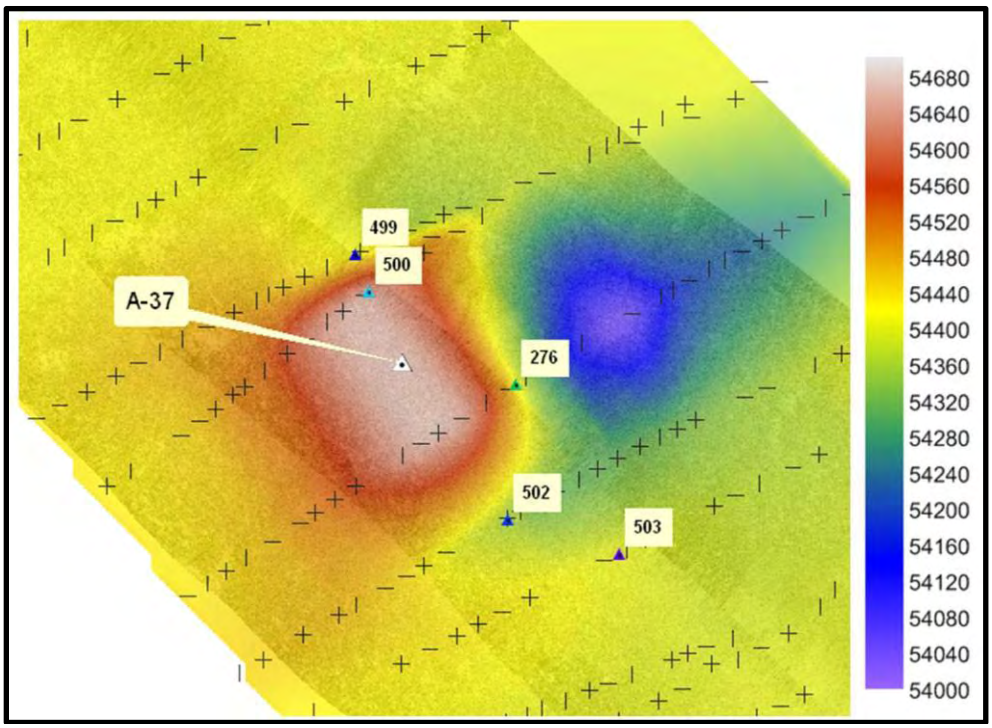


Figure 83. Graphical overlay of fine-scale magnetism and side scan data on A37 (courtesy CRE).

Anomaly 43: Iron Pipe

Anomaly 43 Summary Table	
Anomaly Identification	Iron Pipe
Remedial Impact	Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	177, 1069
Side Scan (2010)	6/2/10
Sector Scan (2010)	6/5/10
ROV (2010)	6/10/10
Diver Observations	No
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

A43 is a magnetic anomaly discovered during the 2005 remote sensing survey in proximity to A20, the rock scow (Figure 84). The anomaly was investigated using side scan sonar, sector scan sonar and ROV in 2010. The ROV survey conclusively showed that the source of the anomaly was a 20 foot (6.1m) long section of iron pipe.

Recommendations

LCMM recommends no further work at A43.

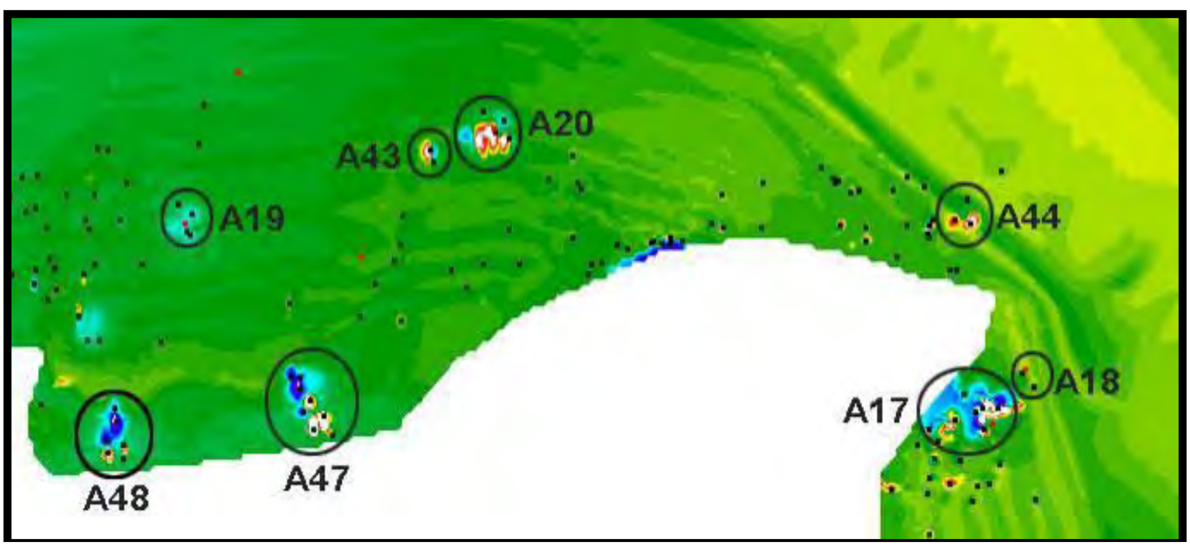


Figure 84. Magnetic intensity map of Onondaga Lake showing A43.

Anomaly 47: Pipeline

Anomaly 47 Summary Table	
Anomaly Identification	Pipeline
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	899, 896, 873, 871, 405, 404, 401, 402
Side Scan (2010)	6/2/10
Sector Scan (2010)	6/7/10
ROV (2010)	6/10/10
Diver Observations	No
Diver Videography	No
Maps/Charts	Yes
Aerial Imagery	Yes
Historic Accounts	No

Research Results

A47 was confirmed visually to be a 12 inch (30.5cm) diameter cast iron pipe running perpendicular to shore. The pipe is likely for draining leachate out of the onshore waste deposit.

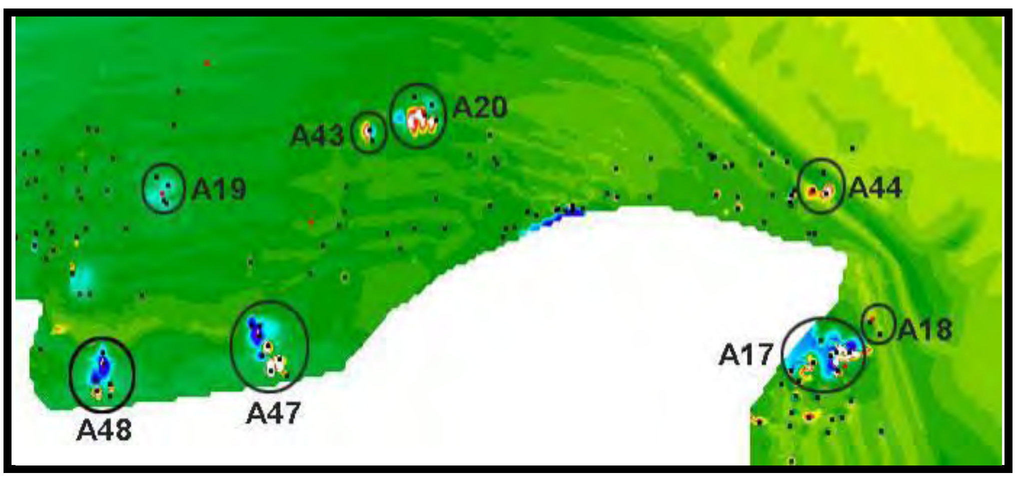


Figure 85. Magnetic intensity map of Onondaga Lake showing A47.

Recommendations

LCMM recommends no further work for A47.

Anomaly 48: Pipeline

Anomaly 48 Summary Table	
Anomaly Location	
Anomaly Identification	Pipeline
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	898, 897, 872, 406, 403
Side Scan (2010)	6/2 and 3/10
Sector Scan (2010)	No
ROV (2010)	6/11/10
Diver Observations	No
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

A48 is a linear magnetic anomaly located in 2005 with a signature similar to A47 (Figure 86). The source of the anomaly was searched for using side scan sonar and visually from the survey vessel. The source could not be located, however, A48's proximity and similarity to the pipeline at A47, strongly suggest that A48 is also a buried iron pipeline.

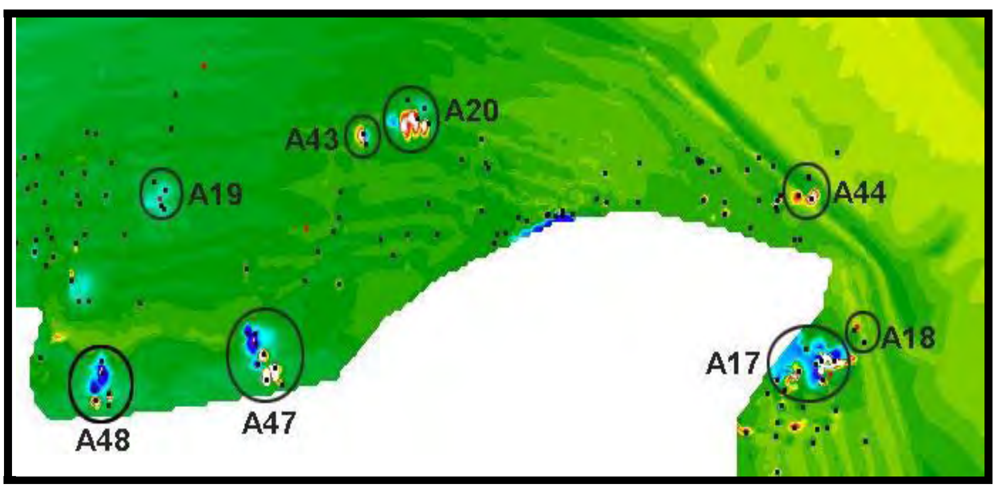


Figure 86. Magnetic intensity map of Onondaga Lake showing A48.

Recommendations

LCMM recommends no further work for A48.

Anomaly 51: Solvay Water Intake

Anomaly 51 Summary Table	
Anomaly Identification	Water Intake
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Not Eligible
Anomaly Dataset	
Side Scan (2005)	579
Magnetometer (2005)	479, 486, 480, 484, 1233, 200, 483, 201, 468. 459, 101, 99, 407, 412, 413, 419, 420, 465, 463, 433, 432, 428, 203, 434, 449, 204, 205, 450, 844, 843, 842, 841, 837, 836, 834, 835, 838, 839, 840
Side Scan (2010)	6/2/10
Sector Scan (2010)	No
ROV (2010)	6/9/10
Diver Observations	No
Diver Videography	No
Maps/Charts	Yes
Aerial Imagery	No
Historic Accounts	Yes

Research Results

A51 is an early to mid-twentieth century pipeline and water intake for the Solvay Process Company. The anomaly was located in 2005 based on a linear magnetic signature and sonar signature for the intake structure.

Sonar and ROV work showed that there is only one visible intake at this location, although earlier magnetometer work indicates that there are several buried suction pipes in this area. The intake structure is a heavily corroded cast iron cylinder standing approximately 8 feet (2.4m) off the bottom. There is a large lifting loop on the top which was used for its installation. The pipeline associated with the intake is buried and could not be inspected. The engineering plans for the intake exist and are presented (in part) as Figure 87 and Figure 88.

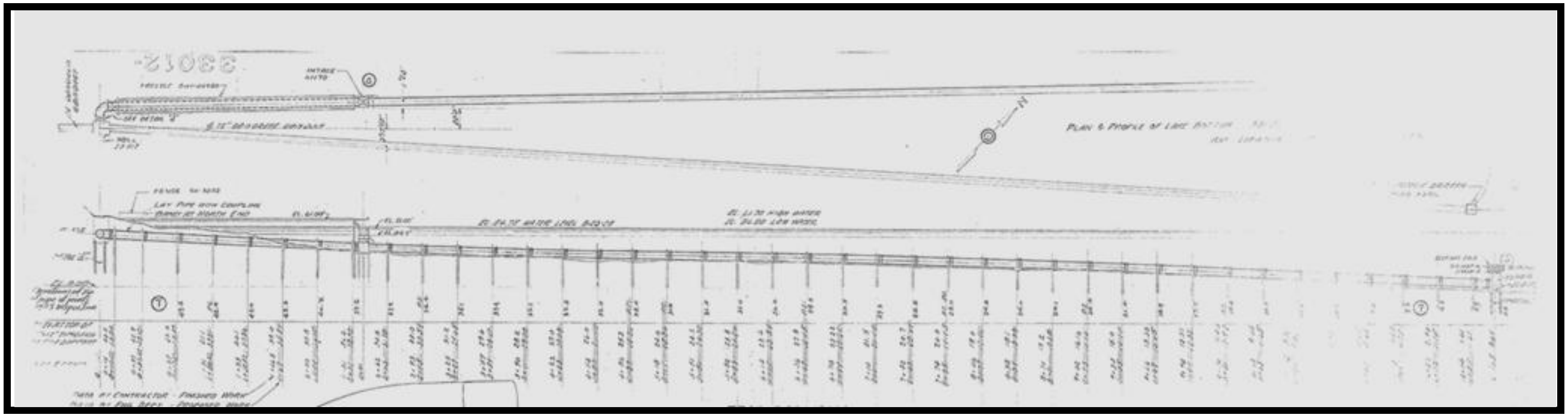


Figure 87. Profile and plan view of the engineering drawings of the Solvay Process 84 inch (213cm) suction intake (courtesy Parsons, Inc).

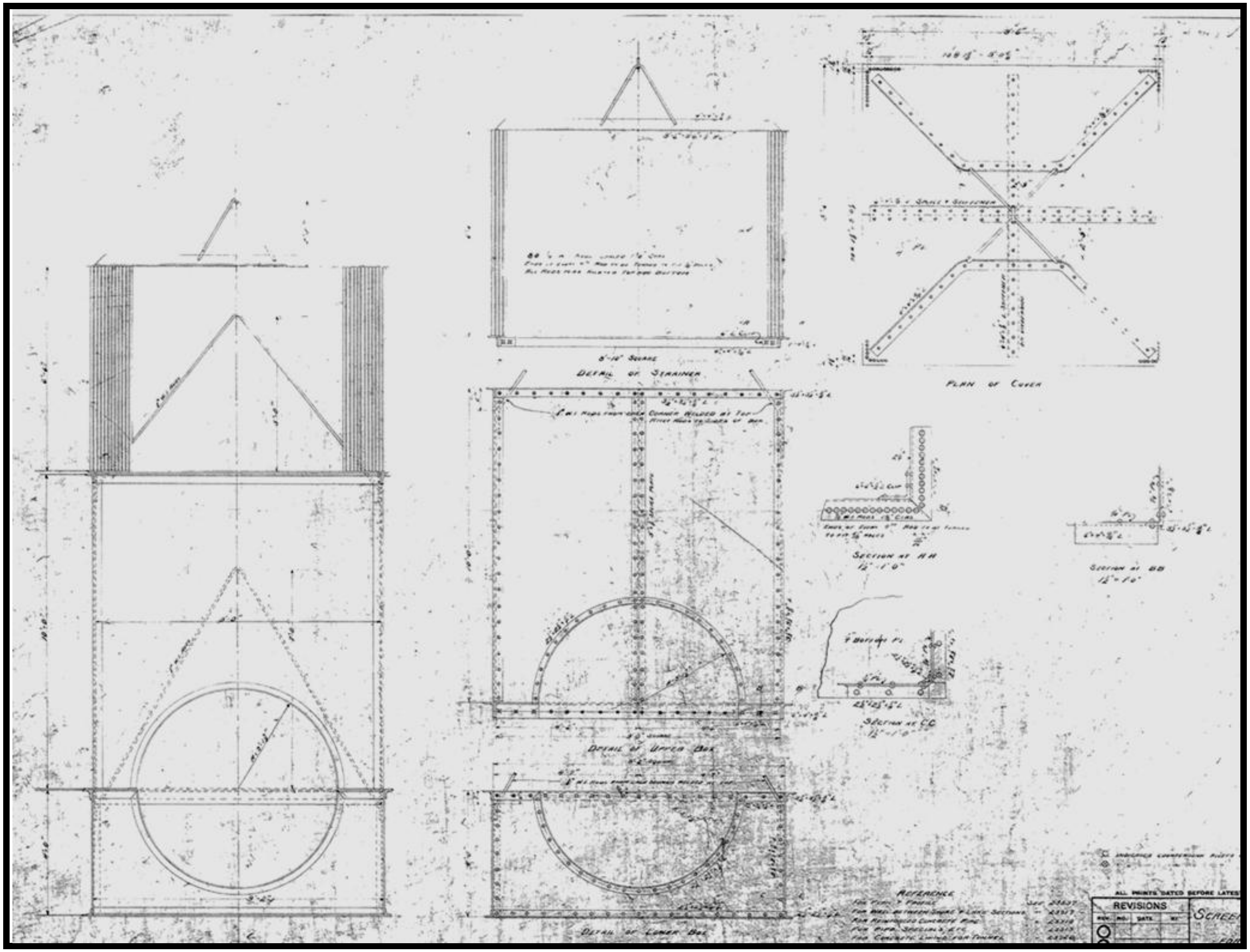


Figure 88. Engineering drawings of the intake structure for Solvay Process Company's 84 inch (213cm) intake (courtesy Parsons, Inc).

Significance Evaluation

National Register Evaluation		
Integrity of:	Location	A51 remains at its original location, thus LCMM recommends that it retains integrity of location.
	Design	The Solvay Process Company's intake is intact retaining a combination of elements that demonstrate the site's form, plan, structure and style. LCMM recommends that A51 retains integrity of design.
	Setting	The underwater setting of A51 has changed little since its installation. LCMM recommends that A51 retains integrity of setting.
	Materials	The materials comprising the intake appear complete, thus LCMM recommends that A51 retains integrity of materials.
	Workmanship	Evidence of workmanship was not apparent on the intake structure due its heavy layer of corrosion, however (based on the plans), that workmanship is presumed to still exist. LCMM recommends that A51 retains integrity of workmanship.
	Feeling	The historic sense of the property is conveyed by the extant industrial, sheet iron nature of the intake. LCMM recommends that A51 retains integrity of feeling.
	Association	A51 remains in the place where it was originally installed, and an underwater inspection of the site indicates that the intake structure has the ability to convey is historic use and association with the industrial past. LCMM recommends that A51 retains integrity of association
Criterion:	A: Event	A51 has an association with the industrial era on Onondaga Lake, however, it lacks any specific association with an important event. LCMM recommends that A51 is not eligible under criterion A.
	B: Person	No important persons are known to be associated with A51. LCMM recommends that A51 is not eligible under criterion B.
	C: Design/ Construction	A51, for which engineering plans exist, does not have characteristics that are sufficiently distinctive to render it eligible under Criterion C. LCMM recommends that A51 is not eligible under criterion C.
	D: Information Potential	With the existence of the construction plans for the structure, it is unlikely that documentation of the structural remains will yield information that is important to history. LCMM recommends that A51 is not eligible under criterion D.

Statement of Significance

LCMM's analysis suggests that A51 retains integrity, but fails to meet any of the four criteria considerations for listing on the NRHP.

Recommendations

LCMM recommends no further work for A51.

Anomaly 52: Syracuse Yacht Club

Anomaly 52 Summary Table	
Anomaly Identification	Syracuse Yacht Club
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Not eligible
Anomaly Dataset	
Side Scan (2005)	333
Magnetometer (2005)	1139, 285
Side Scan (2010)	6/2/10
Sector Scan (2010)	No
ROV (2010)	6/9/10
Diver Observations	No
Diver Videography	No
Maps/Charts	Yes
Aerial Imagery	Yes
Historic Accounts	Yes

Historic Context[143]

The Syracuse Yacht Club was constructed between 1898 and 1899 on the western shore of Onondaga Lake, south of Lake View Point (Figure 89). The yacht club consisted of a large clubhouse and several boat houses; all were built on wooden piers driven into the lake bottom. At a cost of $30,000, the clubhouse was a massive wooden structure (more than two stories in height), which became one of the area's leading social centers. Luncheons and dinners were served daily to a membership that reached 2,000 at one time. By the 1910s, the yacht club also served as a boarding house. On May 10, 1917, a fire destroyed the clubhouse, reducing the large structure to ashes on top of the wooden piers. Nothing was salvageable within the clubhouse. At that time, there were up to 25 boarders. The boathouses, which did not burn during the fire, were used for several more years by owners who joined the Onondaga Yacht Club.[144] Although it is not known how long these boathouses were used and what became of them, it is likely that they fell into disrepair and could have collapsed into the lake.

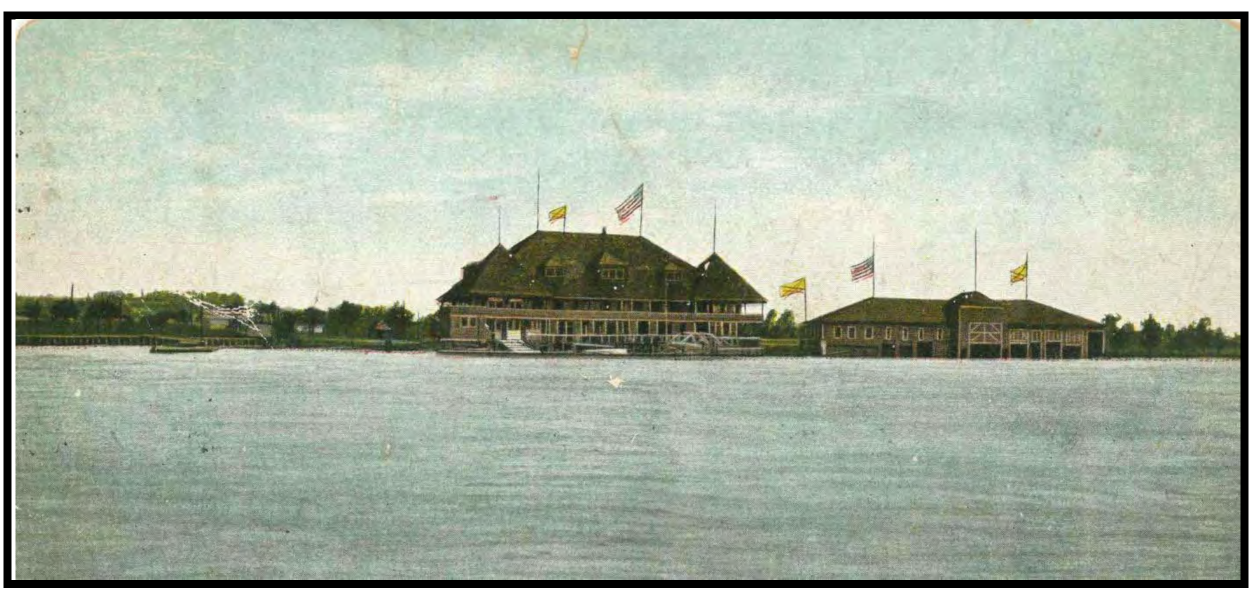


Figure 89. Postcard of the Syracuse Yacht Club facing south, circa 1901 (LCMM Collection).

Research Results

The former location of the Syracuse Yacht Club was investigated using side scan sonar and a remotely operated vehicle. The investigations were hampered by dense aquatic vegetation surrounding the site. Investigations focused on the northern half of the site where water depths greater than two feet (.61m) permitted access for the research vessel. In these areas no evidence of any wooden structures (pilings, docks, piers) were seen in any of the sonar or ROV work. However, an area of pilings does still exist in the southeast corner of the peninsula. The pilings could be seen from a distance, but extremely shallow water and dense aquatic vegetation prevented a close-up inspection (Figure 90).

Analysis of lake charts suggests that the actual location of most of the Syracuse Yacht Club is below the peninsula which juts out into the lake (Figure 91). The shoreline is composed of slag fill likely from the adjacent Crucible Steel. Map overlays indicate that the boathouses are completely buried under fill, while the area of pilings on the southeastern edge of the peninsula is likely part of the clubhouse.

A sunken car is located off the northeastern side of the peninsula in approximately 30 feet (91.m) of water. The vehicle, which is heavily covered in zebra mussels, appears to be a 1970s vintage sedan (Figure 93).

Figure 90. Aerial view of A52 showing the area of investigation and an area where pilings are known to exist (courtesy Google Maps®).

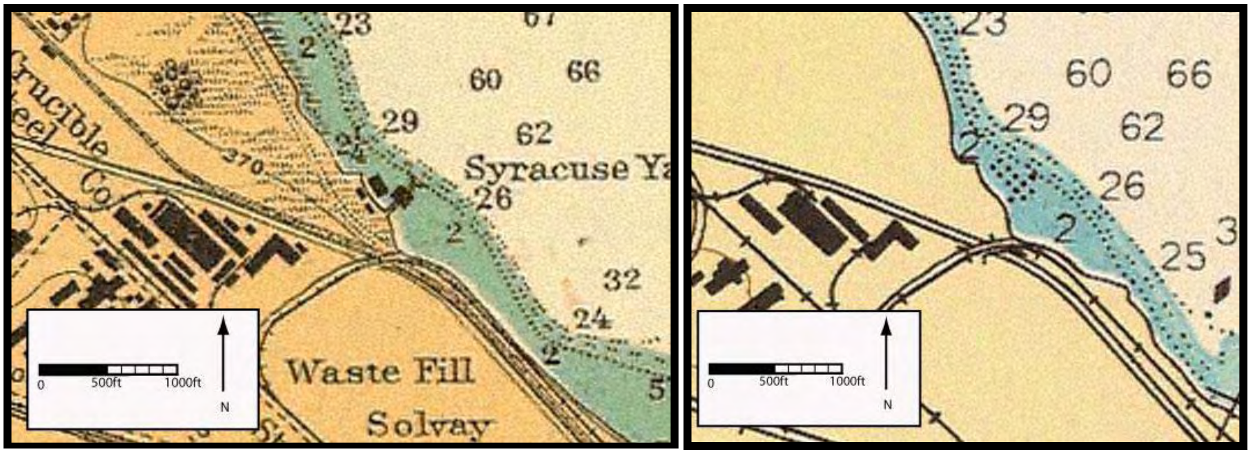


Figure 91. 1915 (left) and 1947 (right) navigational charts showing the location of the Syracuse Yacht Club (U.S. Lake Survey Office, *Chart No. 5, New York State Canals, Brewerton to Cross Lake and Syracuse to Oswego*, 1915; and U.S. Lake Survey Office, *New York State Canals, Chart No. 185,* 1947).

Figure 92. Photograph of the shoreline at A52 showing the slag fill (LCMM Collection).

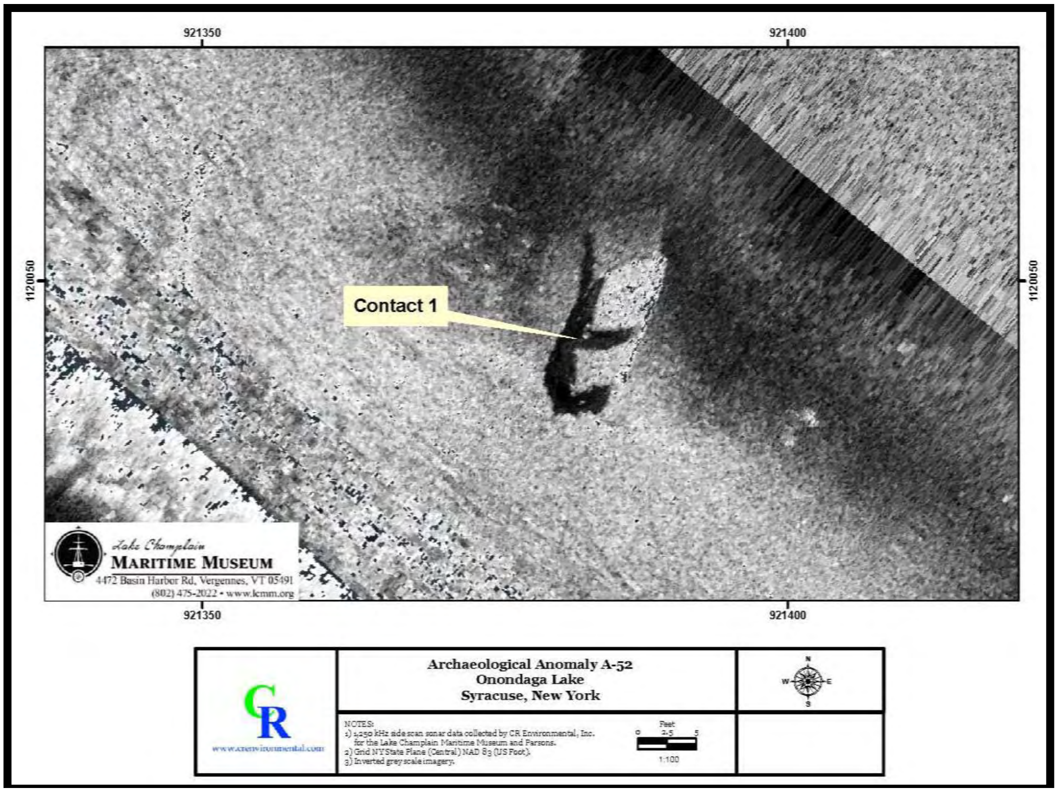


Figure 93. Sonar mosaic from A52 showing a sunken car.

Significance Evaluation

National Register Evaluation		
Integrity of:	Location	A52 remains at its original location, thus LCMM recommends that A52 retains integrity of location.
	Design	The Syracuse Yacht Club in its burned and infilled state does not appear to retain the combination of elements which would demonstrate the site's form, plan, structure or style. LCMM recommends that A52 does not retain integrity of design.
	Setting	The area surrounding A52 has changed significantly with the infilling on top of the site and the construction of I690 adjacent to the location. LCMM recommends that A52 does not retain integrity of setting.
	Materials	The Syracuse Yacht Club was a series of structures built on top of pilings. The pilings still exist in the southeastern corner of the site and may still exist buried under the parking lot. Archaeological deposits associated with the use of the structures may also exist buried under and/or mixed with fill. The widespread disturbances to the site (burning and infilling) indicate the extensive presence of intrusive features and suggest that the artifact/feature assemblage associated with the property, although likely still present, lacks integrity. LCMM recommends that A52 does not retain integrity of materials.
	Workmanship	Evidence of workmanship was certain to have existed in the clubhouse and boat houses, but it is unlikely the remnants of pilings contain any evidence of an artisan's labor or skill in constructing the site. LCMM recommends that A52 does not have integrity of workmanship.

	Feeling	The former site of the Yacht Club is now filled with slag, and none of the structures remain standing. The area retains a similar viewshed to that of the original property, however, this aspect is outweighed by the absence of other features that evoke the historic sense of the property. LCMM recommends that A52 does not retain integrity of feeling.
	Association	A52 remains in its original location, however, its overlying fill and absence of standing structures limits its ability to convey its former importance and grandeur. From an information potential perspective, integrity of association is measured in terms of the strength of the relationship between the site's data and important research questions. The archaeological data gathered from A52 indicates the site's historic burning and subsequent infilling have impaired its ability to answer any research questions which are important to history. LCMM recommends that A52 does not retain integrity of association.
Criterion:	A: Event	Na
	B: Person	Na
	C: Design/ Construction	Na
	D: Information Potential	Na

Statement of Significance

LCMM's research suggests that A52, the former location of the Syracuse Yacht Club, lacks integrity, and is ineligible for the National Register of Historic Places

Recommendations

LCMM recommends no further work for A52.

Anomaly 56: Unidentified

Anomaly 56 Summary Table	
Anomaly Identification	Unidentified
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	538
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/23/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 56 was a low amplitude magnetic anomaly. A-56 is co-located with CRE's 2005 digitized magnetic anomaly #538 which possessed a 60nT dipolar signature. Assuming a distance (range) of 7 to 16ft (2 to 5m), the ferrous mass of this anomaly might be 22 to 551lb (10 to 250 kg). There were no side scan sonar contacts in the vicinity of this anomaly. Diver verification in 2011 produced small pieces of modern garbage and several buried anomalies, but nothing that could be conclusively identified. The buried metallic anomalies could not be found with modest hand probing, so they were left unresolved. The magnetic and dive verification data suggest that A56 is likely isolated ferrous debris.

Recommendations

LCMM recommends no further work for A56.

Anomaly 57: Wooden Barrel with Iron Hoops

Anomaly 57 Summary Table	
Anomaly Identification	Wooden Barrel with Iron Hoops
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	546
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/23/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 57 was diver verified in 2011 and is a wooden barrel with iron hoops (Figure 94). The barrel lid was brought to the surface for documentation and re-deposited.

Recommendations

LCMM recommends no further work on A57.

Figure 94. Anomaly 57, wooden barrel lid (LCMM Collection).

Anomaly 58: 55-Gallon Drum

Anomaly 58 Summary Table	
Anomaly Identification	55-Gallon Drum
Remedial Impact	Cap and Dredge
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	539
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/23/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 58 was investigated by a diver in 2011. A58 is a broken-up 55-gallon drum (Figure 95).

Recommendations

LCMM recommends no further work on A58.

Figure 95. Anomaly 58, a fragmentary 55-gallon drum (LCMM Collection).

Anomaly 59: Wire Rope

Anomaly 59 Summary Table	
Anomaly Identification	Wire Rope
Remedial Impact	Cap and Dredge
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	603
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/23/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 59 was investigated by a diver in 2011. A59 is a long coil of wire rope.

Recommendations

LCMM recommends no further work on A59.

Anomaly 60: Unidentified

Anomaly 60 Summary Table	
Anomaly Identification	Unidentified
Remedial Impact	Cap and Dredge
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	251, 628
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/23/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 60 is approximately co-located with two anomalies digitized from CRE's 2005 magnetic data. The separation between these two anomalies was approximately 13ft (4m). Anomaly #251 possessed a 120nT dipolar signature. Assuming a distance (range) of 7 to 16ft (2 to 5m), the ferrous mass of this anomaly might be 42 to 661lb (19 to 300kg). Anomaly #628 possessed a 100nT dipolar signature. Assuming a distance (range) of 7 to 16ft (2 to 5m), the ferrous mass of this anomaly might be 35 to 551lb (16 to 250kg). There were no side scan sonar contacts in the vicinity of this anomaly. Anomaly 60 was investigated by a diver in 2011. A ferrous target with a signature of approximately 3ft (1 m) in diameter was located. Probing into the sediment indicated the object was buried approximately 4ft (1.2m) below the lake bottom. Due to its depth in the sediment, Anomaly 60 could not be conclusively identified.

Although the specific origin of the magnetic anomaly is unknown, its signature lacks the complexity and intensity expected of a larger cultural resource. LCMM believes the collective data suggests that it is unlikely to represent a cultural resource.

Recommendations

LCMM recommends no further work for A60.

Anomaly 61: Unidentified

Anomaly 61 Summary Table	
Anomaly Identification	Unidentified
Remedial Impact	Cap and Dredge
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	270, 683
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/24/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 61 was approximately co-located with anomaly #270 digitized from CRE's 2005 data (Figure 96). Water depth was approximately 4 to 6 ft (1 to 2m) (Figure 96). The magnetic anomaly nearest A61 (#270) was characterized as a 200nT monopole. Assuming a distance (range) of 7 to 16ft (2 to 5 m), the ferrous mass of the A61 anomaly might be 71 to 1102lb (32 to 500kg). Side scan sonar data collected in the vicinity of these anomalies in 2005 did not suggest the presence of surficial contacts (debris or structures). In 2011, anomaly 61 was not located despite extensive visual diver examination and metal detecting.

Although the specific origin of the magnetic anomaly is unknown, its signature lacks the complexity, intensity and spatial extent expected of a larger cultural resource. LCMM believes the collective data suggests that it is unlikely to represent a cultural resource.

Recommendations

LCMM recommends no further work on A61.

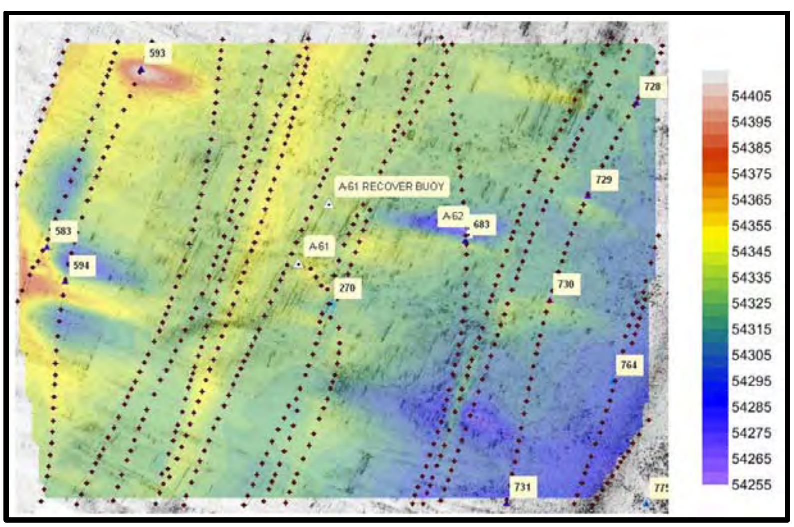


Figure 96. Graphical overlay of fine-scale magnetism and side scan data on A61 and A62 (courtesy CRE).

Anomaly 62: Unidentified

Anomaly 62 Summary Table	
Anomaly Identification	Unidentified
Remedial Impact	Cap and Dredge
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	683
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/24/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 62 was approximately co-located with anomaly #683 digitized from CRE's 2005 data (see Figure 96). Water depth was approximately 4 to 6 ft (1 to 2m). The anomaly nearest A62 (#683) was characterized as a 71nT dipole. Assuming a distance (range) of 7 to 16ft (2 to 5m), the ferrous mass of the A62 anomaly might be 24 to 397lb (11 to 180 kg). Side scan sonar data collected in the vicinity of these anomalies in 2005 did not suggest the presence of surficial contacts (debris or structures). Anomaly 62 was not located despite extensive visual diver examination and metal detecting.

Although the specific origin of the magnetic anomaly is unknown, its signature lacks the complexity, intensity and spatial extent expected of a larger cultural resource. LCMM believes the collective data suggests that it is unlikely to represent a cultural resource.

Recommendations

LCMM recommends no further work on A62.

Anomaly 63: Unidentified

Anomaly 63 Summary Table	
Anomaly Identification	Unidentified
Remedial Impact	Cap and Dredge
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	619
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/24/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 63 was identified by CRE's 2005 magnetic anomaly #619, which possessed a 318nT dipolar signature. Assuming a distance (range) of 7 to 16ft (2 to 5 meters), the ferrous mass of this anomaly might be 112 to 1763lb (51 to 800kg). There were no side scan sonar contacts in the vicinity of this anomaly. Anomaly 63 was investigated by a diver in 2011. A large metal detector signature was located, and probing suggested that its source was buried 3ft (1m) below the lake bed. A63 was not conclusively identified.

Although the specific origin of the magnetic anomaly is unknown, its signature lacks the complexity, intensity and spatial extent expected of a larger cultural resource. LCMM believes the collective data suggests that it is likely isolated ferrous debris.

Recommendations

LCMM recommends no further work for A63.

Anomaly 64: Unidentified

Anomaly 64 Summary Table	
Anomaly Identification	Unidentified
Remedial Impact	Cap and Dredge
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	584
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/24/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 64 was co-located with 2005 magnetic anomaly #584, characterized as a 289nT dipole (Figure 97). It was located in 2-5ft (1-2m) of water. Assuming a distance (range) of 7 to 16ft (2 to 5 m), the ferrous mass of the A64 anomaly might be 101 to 1593lb (46 to 723kg). Side scan sonar contacts were not observed in 2005 data collected at this location. Anomaly 64 was not located despite extensive visual diver examination and metal detecting in 2011.

Although the specific origin of the magnetic anomaly is unknown, its signature lacks the complexity, intensity and spatial extent expected of a larger cultural resource. LCMM believes the collective data suggests that it is likely isolated ferrous debris.

Recommendations

LCMM recommends no further work on A64.

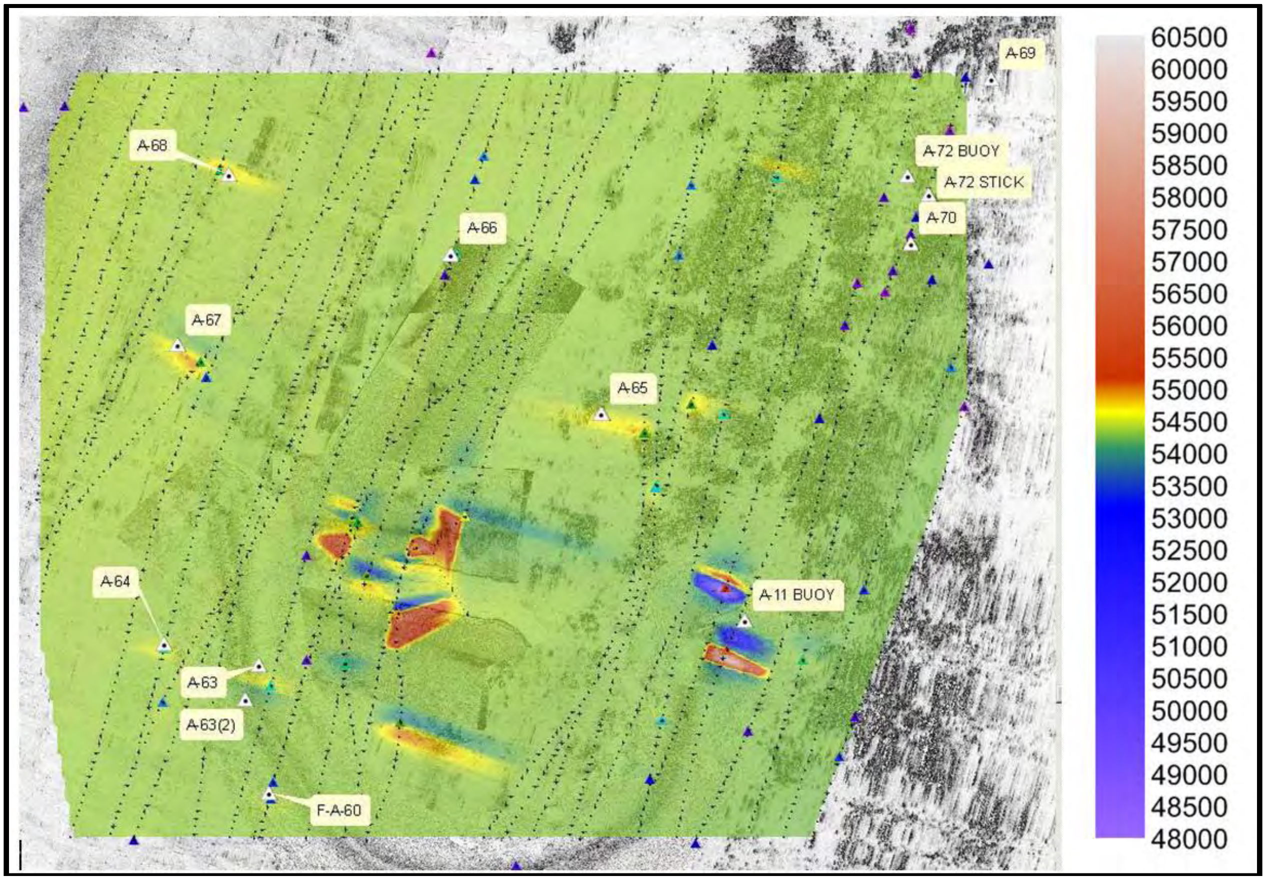


Figure 97. Graphical overlay of fine-scale magnetism and side scan data for A64, A65, A66, A67, and A70 (courtesy CRE).

Anomaly 65: Unidentified

Anomaly 65 Summary Table	
Anomaly Identification	Unidentified
Remedial Impact	Cap and Dredge
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	713
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/24/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly A65 was co-located with 2005 magnetic anomaly #713, characterized as an 873nT monopole (see Figure 97). It was located in 2 to 5ft (1 of 2m) of water. Assuming a distance (range) of 7 to 16ft (2 to 5m), the ferrous mass of the A64 anomaly might be 309 to 4850lb (140 to 2200kg). The lakebed at this location was obscured by aquatic vegetation in 2005 side scan sonar data. Anomaly 65 was not located despite extensive visual diver examination and metal detecting in 2011.

Although the specific origin of the magnetic anomaly is unknown, its signature lacks the complexity, intensity and spatial extent expected of a larger cultural resource. LCMM believes the collective data suggests that it is likely isolated ferrous debris.

Recommendations

LCMM recommends no further work on A65.

Anomaly 66: Unidentified

Anomaly 66 Summary Table	
Anomaly Identification	Unidentified
Remedial Impact	Cap and Dredge
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	254, 630
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/24/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly A66 was co-located with 2005 magnetic anomalies #254 and #630 (see Figure 97). Anomaly #254 was characterized as a 24nT dipole. The ferrous mass estimate for this feature would range from 6.6 to 132lb (3 to 60kg) at an assumed range of 7 to 16ft (2 to 5m). Anomaly #630 was characterized as a 395nT dipole. The ferrous mass estimate for this feature would range from 139 to 2182lb (63 to 990kg) at an assumed range of 7 to 16ft (2 to 5 m). The lakebed at this location was obscured by aquatic vegetation in 2005 side scan sonar data. Anomaly 66 was not located despite extensive visual diver examination and metal detecting in 2011.

Although the specific origin of the magnetic anomaly is unknown, its signature lacks the complexity, intensity and spatial extent expected of a larger cultural resource. LCMM believes the collective data suggests that it is likely isolated ferrous debris.

Recommendations

LCMM recommends no further work on A66.

Anomaly 67: Unidentified

Anomaly 67 Summary Table	
Anomaly Identification	Unidentified
Remedial Impact	Cap and Dredge
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	575, 1142
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/24/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 67 was co-located with 2005 magnetic anomalies #575 and #1142 (see Figure 97). Anomaly #575 was characterized as a 93nT dipole. The ferrous mass estimate for this feature would range from 33 to 507lb (15 to 230kg) at an assumed range of 7 to 16ft (2 to 5m). Anomaly #1142 was characterized as a 630nT dipole. The ferrous mass estimate for this feature would range from 220 to 3527lb (100 to 1600kg) at an assumed range of 7 to 16ft (2 to 5m). The lakebed at this location was obscured by aquatic vegetation in 2005 side scan sonar data. Anomaly 67 was not located despite extensive visual diver examination and metal detecting in 2011.

Although the specific origin of the magnetic anomaly is unknown, its signature lacks the complexity, intensity and spatial extent expected of a larger cultural resource. LCMM believes the collective data suggests that it is likely isolated ferrous debris.

Recommendations

LCMM recommends no further work on A67.

Anomaly 69: Miscellaneous Metal Debris

Anomaly 69 Summary Table	
Anomaly Identification	Miscellaneous Metal Debris: Iron Ladder, Sheet Iron, Slag
Remedial Impact	
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	800
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/25/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 69 was investigated by a diver in 2011. It is miscellaneous metal debris including an iron step ladder, several pieces of sheet iron and fragments of slag.

Recommendations

LCMM recommends no further work on A69.

Anomaly 70: Unidentified

Anomaly 70 Summary Table	
Anomaly Identification	Unidentified
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	789, 790, 802, 803, 804, 805, 822
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/25/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 70 was surrounded by seven magnetic anomalies digitized from three parallel transects of 2005 magnetic data (see Figure 97):

- #789, a 10nT dipole (~ 4.4 to 55lb [2 to 25kg] ferrous mass)
- #790, a 42nT negative monopole (~18 to 220lb [8 to 100kg] ferrous mass)
- #802, a 77nT dipole (~26 to 419lb [12 to 190kg] ferrous mass)
- #803, a 24nT dipole (~9 to 132lb [4 to 60kg] ferrous mass)
- #804, a 25nT negative monopole (~9 to 138lb [4 to 63kg] ferrous mass)
- #805, an 18nT dipole (~7 to 99lb [3 to 45kg] ferrous mass)
- #822, a 55nT dipole (~20 to 309lb [9 to 140kg] ferrous mass)

The lakebed at this location was obscured by aquatic vegetation in 2005 side scan sonar data. Anomaly 70 was not located despite extensive visual diver examination and metal detecting in 2011.

Although the specific origin of the magnetic anomaly is unknown, its signature lacks the complexity and intensity expected of a larger cultural resource. LCMM believes the collective data suggests that it is likely isolated ferrous debris.

Recommendations

LCMM recommends no further work on A70.

Anomaly 74: Isolated Piling

Anomaly 74 Summary Table	
Anomaly Identification	Isolated Piling
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	No
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/26/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 74 was located by a diver in 2011. This isolated piling approximately 12in (30cm) in diameter stands 12in (30cm) off the bottom at a 45 degree angle. It is likely a piling from one of the adjacent dolphins that has torn loose.

Recommendations

LCMM recommends no further work for A74.

Anomaly 77: Unidentified

Anomaly 77 Summary Table	
Anomaly Identification	Unidentified
Remedial Impact	Cap and Dredge
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	258
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/27/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 77 was co-located with 2005 magnetic anomaly #258, a 98nT dipole at a depth of approximately 5ft (2m) (Figure 98). The ferrous mass estimate for this feature would range from 35 to 540lb (16 to 245kg) at an assumed range of 7 to 16ft (2 to 5 m). The lakebed was obscured by aquatic vegetation in 2005 side scan sonar data. A77 was investigated by a diver in 2011. The area is filled with metallic trash including a tin can, zinc attachment for a boat and a small metal fragment. Despite extensive visual survey and metal detection, no features were found that were the likely source of the original magnetic anomaly, and therefore the results are inconclusive.

Although the specific origin of the magnetic anomaly is unknown, its signature lacks the complexity and intensity expected of a larger cultural resource. LCMM believes the collective data suggests that it is likely isolated ferrous debris.

Recommendations

LCMM recommends no further work for A77.

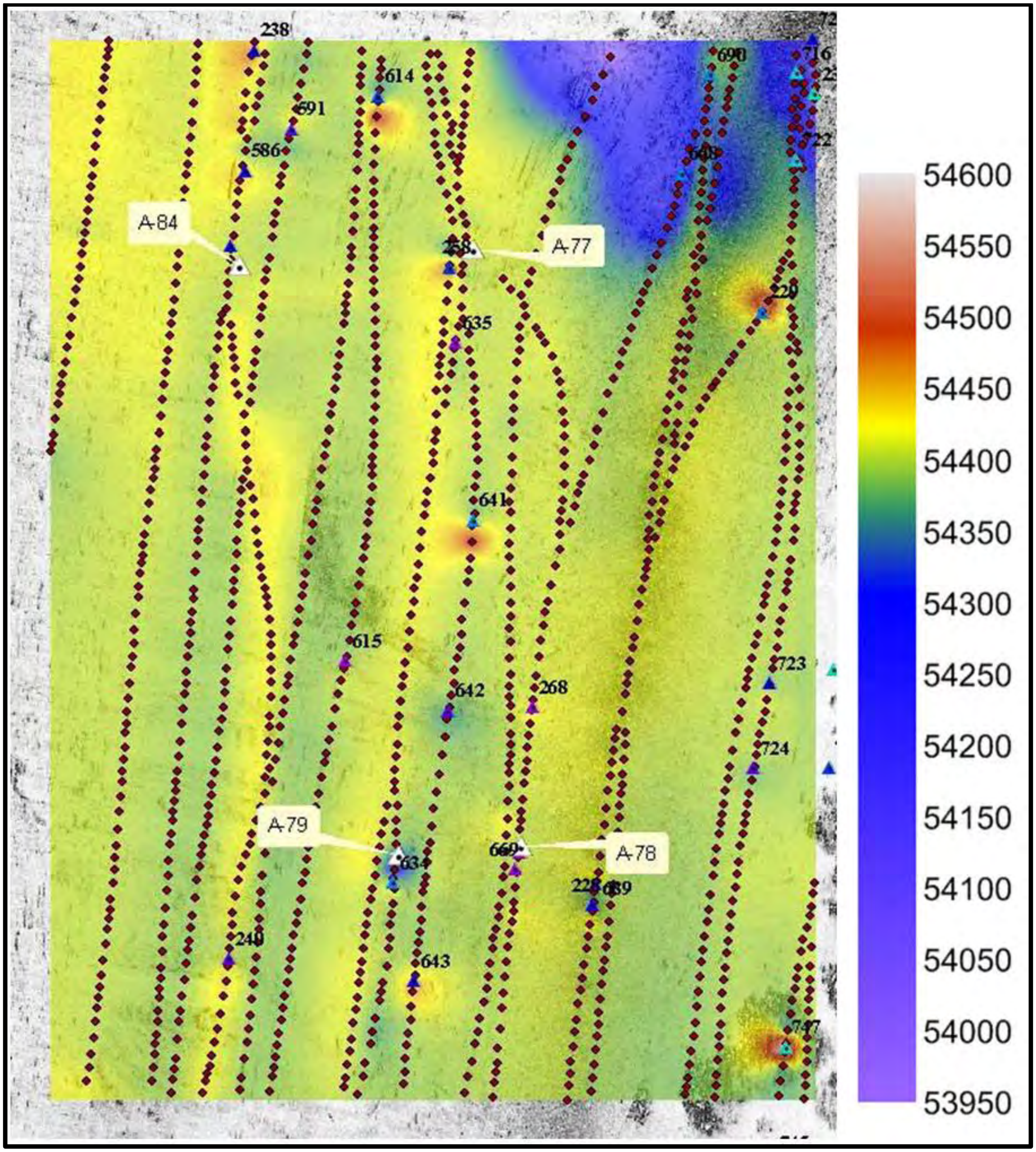


Figure 98. Graphical overlay of fine-scale magnetism and side scan data on A77 and A79 (courtesy CRE).

Anomaly 78: Iron Wire

Anomaly 78 Summary Table	
Anomaly Identification	Iron Wire
Remedial Impact	Cap and Dredge
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	267
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/27/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 78 was investigated by a diver in 2011 and determined to be several feet (approximately 1m) of corroded iron wire, similar to fence wire.

Recommendations

LCMM recommends no further work for A78.

Anomaly 79: Unidentified

Anomaly 79 Summary Table	
Anomaly Identification	Unidentified
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	634
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/27/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 79 was co-located with 2005 magnetic anomaly #634, a 144nT dipole at a depth of approximately 5ft (2m) (see Figure 98). The ferrous mass estimate for this feature would range from 50 to 793lb (23 to 360kg) at an assumed range of 7 to 16ft (2 to 5m). The lakebed was obscured by aquatic vegetation in 2005 side scan sonar data. Anomaly 79 was not located despite extensive visual diver examination and metal detecting in 2011.

Although the specific origin of the magnetic anomaly is unknown, its signature lacks the complexity, intensity and spatial extent expected of a larger cultural resource. LCMM believes the collective data suggests that it is likely isolated ferrous debris.

Recommendations

LCMM recommends no further work for A79.

Anomaly 80: Unidentified

Anomaly 80 Summary Table	
Anomaly Identification	Unidentified
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	984, 992, 1249
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/28/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 80 was investigated by a diver in 2011. The area is filled with metallic trash which hindered the diver's ability to pinpoint the original anomaly. There is a clear depression in the lake bottom. This location is in the approach to the Syracuse Inner Harbor, and is likely a place where navigation aids would be placed. It is very likely that the bottom depression was caused by a mooring from a former navigational marker. The metallic signature is likely from debris associated with the marker.

Recommendations

LCMM recommends no further work for A80.

Anomaly 81: Motorcycle

Anomaly 81 Summary Table	
Anomaly Identification	Motorcycle
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	995
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/28/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 81 was investigated by a diver in 2011 and found to be heavily corroded fragments of a motorcycle. The seat was recovered, photographed and re-deposited (Figure 99).

Recommendations

LCMM recommends no further work for A81.

Figure 99. Seat from a motorcycle - Anomaly 81 (LCMM Collection).

Anomaly 82: 55-Gallon Drum

Anomaly 82 Summary Table	
Anomaly Identification	55-Gallon Drum
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	1012
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/28/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 82 was investigated by a diver in 2011. A82 is a 55-gallon drum.

Recommendations

LCMM recommends no further work on A82.

Anomaly 83: Wood and Metal Debris

Anomaly 83 Summary Table	
Anomaly Identification	Wood and Metal Debris
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	No
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/28/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 83 was investigated by a diver in 2011. The anomaly consists of a series of disarticulated wood and metal debris. A section of wooden debris was recovered and documented. It consisted of an 8ft (2.4m) sheet of plywood, one side of which has paint on it. There were many fasteners, including two ringbolts and two pipe fittings; it was fastened to adjacent pieces with sheetrock screws. It is likely a fragment from an ice shanty or shed.

Figure 100. LCMM archaeologist documents Anomaly 83 (left). Detail of Anomaly 83 showing a pipe fitting and a ring bolt (LCMM Collection) (right).

A second smaller, stout piece of wood was recovered, containing three fasteners. This timber is 37in (94cm) long and 3in (8cm) in width and thickness, and probably oak. This timber appears historic in nature, but is an isolated find.

Recommendations

LCMM recommends no further work on A83.

Anomaly 84: Paint Cans and Bottles

Anomaly 84 Summary Table	
Anomaly Identification	Paint Cans and Bottles
Remedial Impact	Dredge and Cap
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	239
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/28/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly 84 was dive verified in 2011 to be a pile of paint cans and bottles.

Recommendations

LCMM recommends no further work on A84.

RECOMMEND AVOIDANCE

Anomaly 17-1 and 17-2: Spud Barges

Anomaly 54 Summary Table	
Anomaly Identification	Spud Barges; NY Site Number 06740.012297
Remedial Impact	Shoreline riprap installation
NRHP Eligibility Recommendation	Eligible
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	No
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	6/27/11
Diver Videography	No
Maps/Charts	No
Aerial Imagery	Yes
Historic Accounts	No

Historic Context[145]

Lake View Point was long a popular vantage point on Onondaga Lake, the scene for chowder parties after the Civil War. The land was acquired by Fred Ganier who immediately began running a small steamer and providing temporary accommodations in 1871. That winter he used a pile driver to erect a pier and constructed an ice house and the two-story Lake View Hotel. By July 1872, the steamer *Sperry* began running regularly to Lake View Point from Clinton Square and Geddes Pier. Lake View Point was the first resort along Onondaga Lake.

In addition to the hotel, the resort included an icehouse, bar, casino, shooting gallery, and a pier and landing. The resort's low terrain was regularly inundated during high lake levels, particularly in the spring (*Post Standard* 8/18/1899) By 1874, Ganier's developing physical problems led him to sell the lease to the hotel, which then transferred to several others. The resort and grounds were popular among tourists through the 1880s and 1890s. The 1892 Sanborn map identifies the resort buildings as located within 250ft (75m) of the shore. By the 1890s, the resort was accessible by boat, an access road from the State Fair Boulevard, and from the DL&W Railroad.

In 1899, the resort was sold to Frank Heberle, who transformed it into a private family resort. However, this proved unprofitable, and upon Heberle's death in 1916, the resort closed and the City of Syracuse acquired the property for a proposed sewage disposal plant. When the city plans changed, the city made an agreement with the Solvay Process Company to allow the company to place its wastes on Lake View Point. The point was partially covered by 1929 (*Post Standard* 9/29/29) and fully covered by 1938; placement continued until 1943. Much of the former resort area was covered with 20-80ft (6-24m) of waste.

The historic maps show that the resort was located near the shore of Lake View Point. The surrounding land has been inundated with up to 80 feet (24 m) of waste. In addition, a pier may have been built along the shoreline or perpendicular to it. It was noted that a pier had been visible approximately 0.25mi (0.4km) north of the present boat launch near the area to the south of Lake View Point.[146]

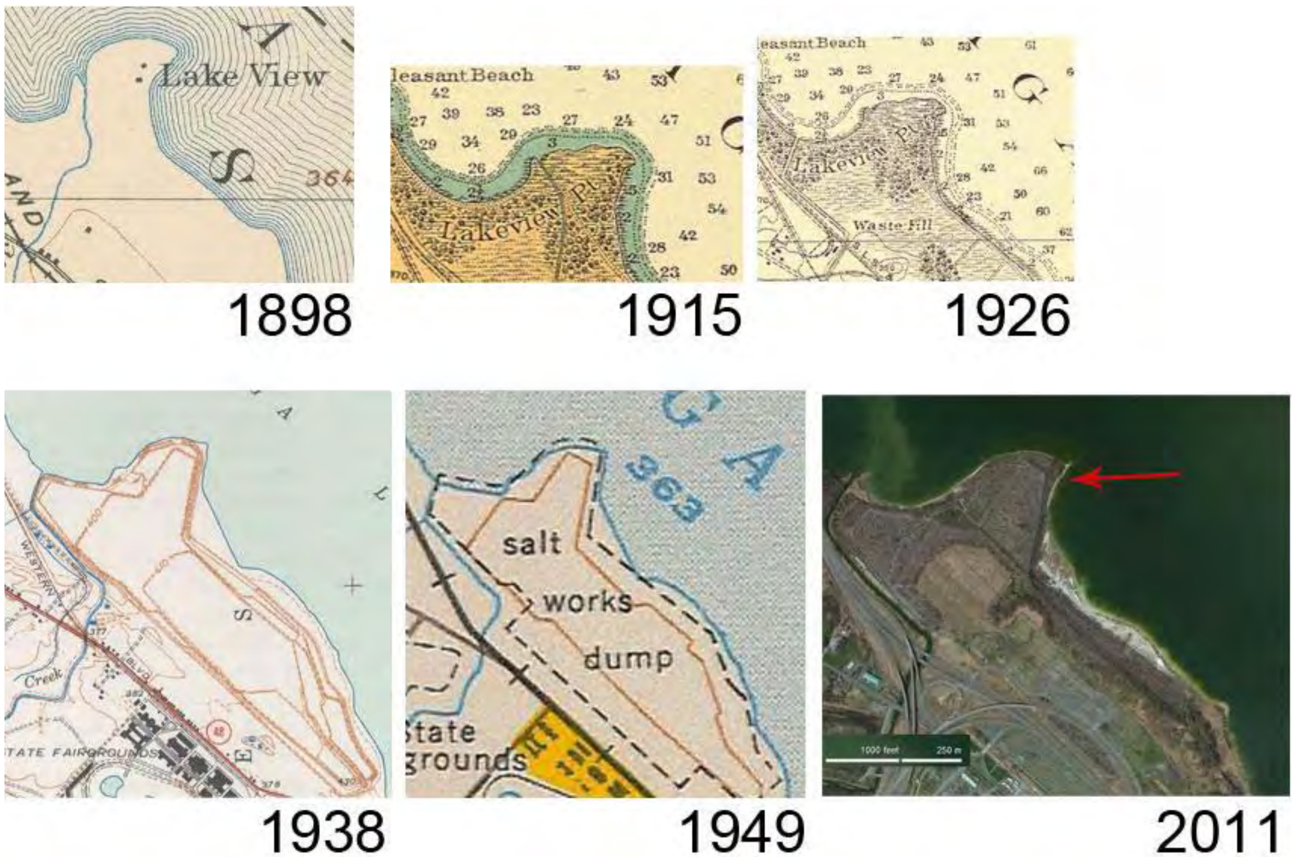


Figure 101. Lake View Point on selected maps from 1898, 1915, 1926, 1938, 1949, and 2011[147] with the latter showing the location of A17.

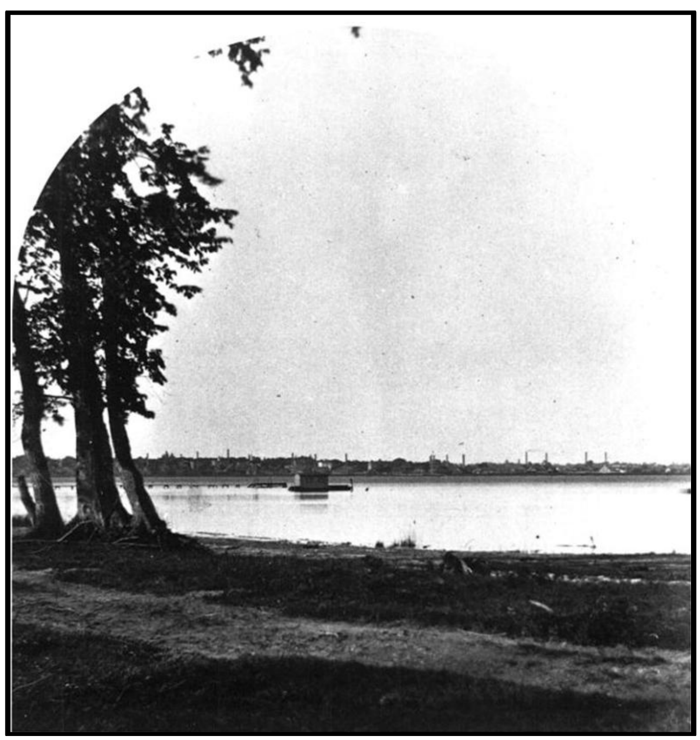


Figure 102. Lake View Point in 1878 (Smith, *Syracuse and Its Surroundings*, p115).

Research Results

A17-2 (inshore) and A17-1 (outer) are two identical spud barges in 1 to 3 ft (0.3 to 0.9m) of water. The barges' sides, ends, bottom and internal structural members are present, while its deck and deck features are no longer extant. Approximately eighty percent of the original fabric of the barges remains. Plans for shoreline improvement include placing riprap in the area of A17-2.

The focus of the field work at the A17 barges was on A17-2 because the plans for shoreline stabilization had the most potential to adversely impact that resource. Approximately one half of the barge could be examined in shallow water; the western half is buried under the shoreline and covered with phragmites. A17-1 was also photo-documented during this investigation; its identical construction to A17-1 and complete exposure allows for data extrapolation.

A17-1 is 97ft (29.6m) in length and 34ft (10.4m) in beam. The length on A17-2 is also 97ft (29.6m), and the beam is assumed to be identical to A17-1 at 34ft (10.4m). Each vessel contains two outboard spud holders opposite one another, approximately 36in (91cm) square (Figure 105). The eastern ends of the barges are vertical with vertical planking. The sides are vertical, built plank-on-frame. The western end, opposite the spud holders, is raked with transverse planking. The hull structures consisted of planking, floors, and stringers; these three, all connected, made up the entire depth of hull. The flywheel and other machinery are evident in A17-1, and the mounting brackets for the flywheel are visible on A17-2 (Figure 104).

The western end of A17-1 had a mound of concrete immediately adjacent to it (Figure 106). Inspection of the concrete suggested that it was formed by pouring it into that end of the barge as a counterweight for the spuds and machinery on the other end. It was likely pulled out and dumped so that the vessel could be pulled into shallow water next to A17-2.

The two barges at A17 are part of a larger, more complex site. Immediately north and east of A17-1 and A17-2 there are at minimum two additional sunken barges. These sites are almost entirely obscured by extremely dense aquatic vegetation. Additionally, there are a series of pilings located offshore to the east of A17-1 and A17-2. It remains unclear whether the deposition of the offshore barges and A17 correspond to the pilings, or if they are related to one another.

There is no evidence to suggest that spud barges of this type were constructed on Onondaga Lake; the barges were likely constructed elsewhere and brought to the lake. No boat of this size could get to Onondaga Lake until the opening of the enlarged Barge Canal in 1918. With the closure of the Lake View Point resort two years' prior in 1916, it is improbable that the barges were connected to the resort.

It is unclear the purpose of these barges' deposition, though we know that they were intentionally run into shallow water at the end of their working life. Although there is no historical information to confirm it, the barges may have been brought to this area to aid in the solvay waste deposition on shore, perhaps to provide structural support for the material placement. What is certain is that since A17-2 is buried in the material, the barge deposition occurred before the end of the solvay waste deposits in 1943. This limits the barges' sinking to between 1918 and 1943.

Significance Evaluation for A17

National Register Evaluation		
Integrity of:	Location	The two spud barges comprising A17 remain their original location, thus LCMM recommends that they retain integrity of location.
	Design	A17 retains design elements such as spatial organization, technology and materials that are reflective of the boatbuilders' original activities. LCMM recommends that A17 retains integrity of design.
	Setting	Although A17's location in Onondaga Lake remains the same as when it was intentionally sunk, its specific surroundings have changed significantly. Sedimentation around and over the site has changed the adjacent lake bottom, vegetation and topography. LCMM recommends that A17 does not retain integrity of setting.
	Materials	Most of the barges' structure is present. LCMM recommends that A17 retains integrity of materials.
	Workmanship	A17 has potential to yield information about the boatbuilders' skill and techniques. LCMM recommends that A17 has integrity of workmanship.
	Feeling	A17 retains significant physical characteristics, particularly the spud holders and raked ends, that convey her historic qualities. LCMM recommends that A17 retains integrity of feeling.
	Association	A17 remains in the place where the sinking occurred and it is sufficiently intact to convey its nature as a spud barge. From an information potential perspective, integrity of association is measured in terms of the strength of the relationship between the site's data and important research questions. The site could answer important questions about spud barge construction materials and techniques. LCMM recommends that A17 retains integrity of association.
Criterion:	A: Event	A17 has an association with pattern of events comprising the commercial use of the New York State Barge Canal. Areas of significance include commerce and transportation. LCMM recommends that A17 is eligible under Criterion A.
	B: Person	No known individually significant persons are associated with the A17. LCMM recommends that A17 is ineligible under Criterion B.
	C: Design/ Construction	Although the upper portions of the wreck are deteriorated, the bottom hull of A17 displays the details of the spud barge's method of construction and design. LCMM recommends that A17 is eligible under Criterion C.
	D: Information Potential	The study of A17 is likely to yield information about spud barge construction techniques. LCMM recommends that A17 is eligible under Criterion D.

Recommendations

LCMM recommends that the shoreline stabilization plan be revised to avoid any adverse effect to the spud barges A17-1 and A17-2.

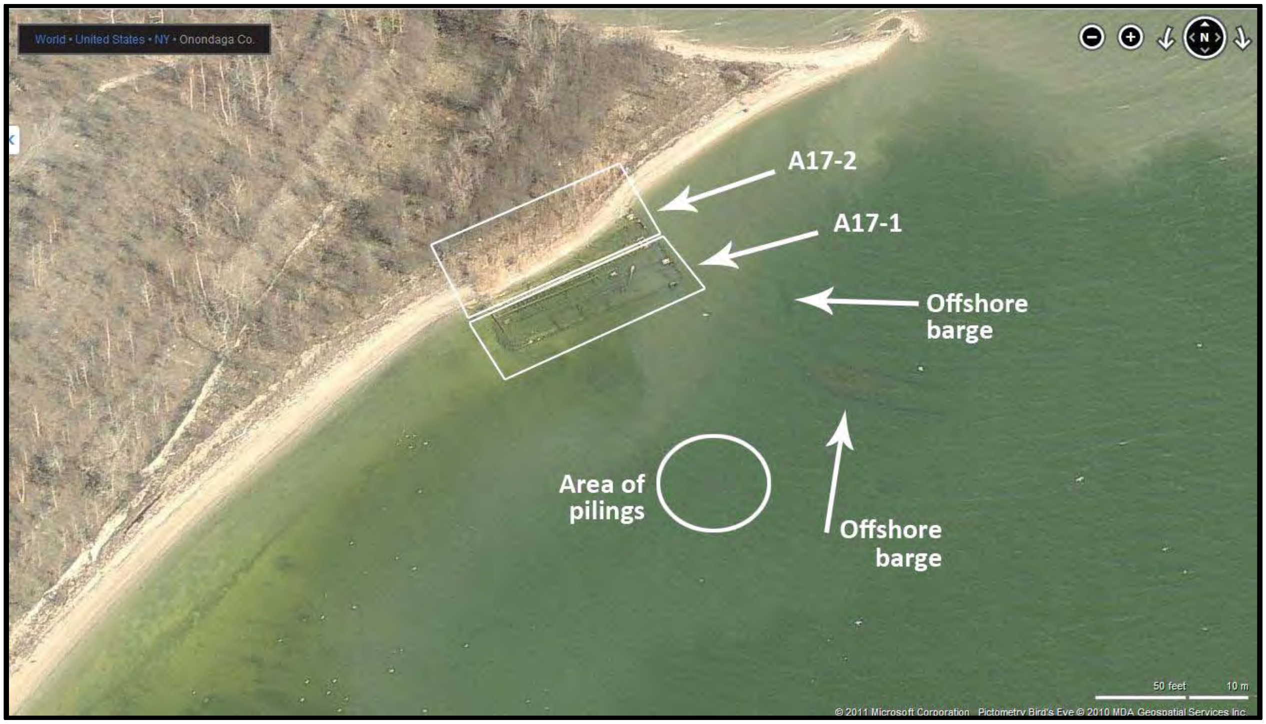


Figure 103. Aerial photograph of A17 spud barges (courtesy Microsoft® Virtual Earth).

Figure 104. Flywheel mounting brackets from spud barge A17-2 (LCMM Collection).

Figure 105. Spud holders on barge A17-2 (LCMM Collection).

Figure 106. LCMM archaeologist wears waders to document the shallow site A17. Note the pile of concrete blocks outside A17-2 (LCMM Collection).

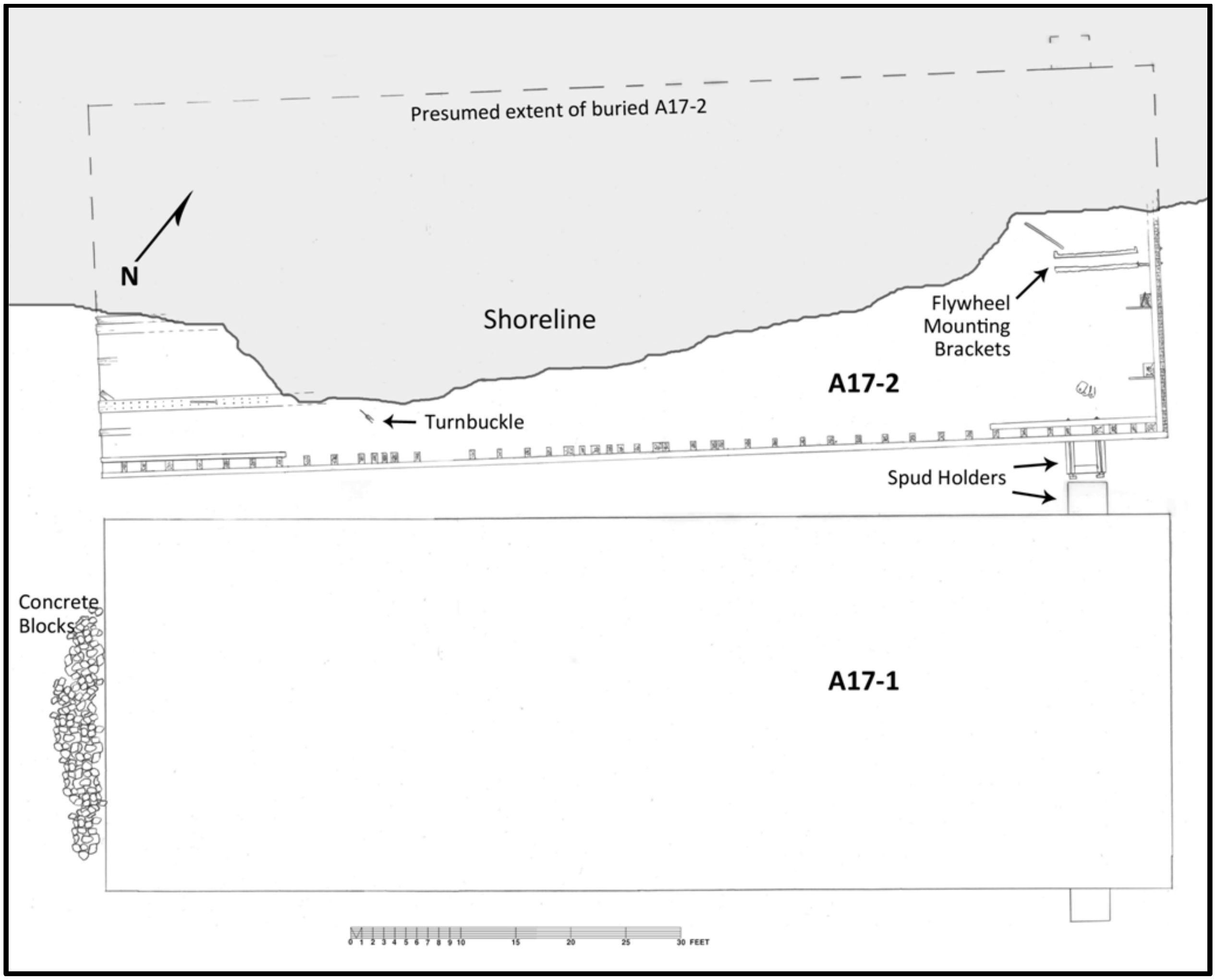


Figure 107. Scale drawing of spud barges A17-1 and A17-2 (Sarah L. Tichonuk, LCMM Collection).

Anomaly 20: Rock Scow

Anomaly 20 Summary Table	
Anomaly Identification	Wooden Rock Scow; NY Site Number 06740.012298
Remedial Impact	None
NRHP Eligibility Recommendation	Eligible, Criteria C and D
Anomaly Dataset	
Side Scan (2005)	501
Magnetometer (2005)	170, 178, 1066, 1065
Side Scan (2010)	6/2/10
Sector Scan (2010)	6/4/10
ROV (2010)	6/11/10
Diver Observations	No
Diver Videography	No
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

A20 is a well-preserved early twentieth century wooden rock scow resting in approximately 20 feet (6.1m) of water on a hard bottom, with nearly the entire structure exposed above the lake bed. The site was examined with side scan sonar, sector scan sonar and ROV (Figure 108 and Figure 109). The archaeological data, although not conclusive, suggests that A20 is a rock scow. This once commonplace vessel type was used to transport stone and sand throughout the canal system and beyond (Figure 110). Rock scows were similar to flat deck scows; however, the vessels were equipped with high-deck end bulkheads at the bow and stern, and lower longitudinal bulkheads along the side of the hull. The bulkheads served to retain the deck-loaded cargo.

A20 is 91½ feet (27.89m) long by 32½ feet (9.91m) wide, with most of its principal members still extant including the sides, ends, deck beams, hanging and standing knees, stringers, and framing. The vessel also retains some decking and the high deck-end bulkheads and longitudinal retaining bulkheads are displaced, but lying near or on the wreck. The hull is characterized by vertical edge-fastened sides and scow ends. The ends are framed with rake timbers. Most of A20's deck beams are still in place with most still retaining vertical knees at the outboard ends for longitudinal retaining bulkheads. The high deck-end bulkheads are believed to be lying against the side of the hull at the scow's eastern end and on the bottom adjacent to the western end (Figure 111). A20 has a small section of intact decking amidships along its southern side. Overall the site retains approximately 90% of the vessel's original structure.

The circumstances of A20's loss are unclear. Unlike the vessels in the Syracuse Maritime Historic District, which circumstantial evidence strongly suggests were abandoned, A20's location north of Lakeview Point does not provide any such compelling evidence. Scuttled vessels tend to be let go at the nearest possible point where they can be left without any hindrance to navigation. A20's mid-lake location suggests the possibility that the scow was lost in distress. Additional archaeological study would be needed to clarify the circumstances of its loss.

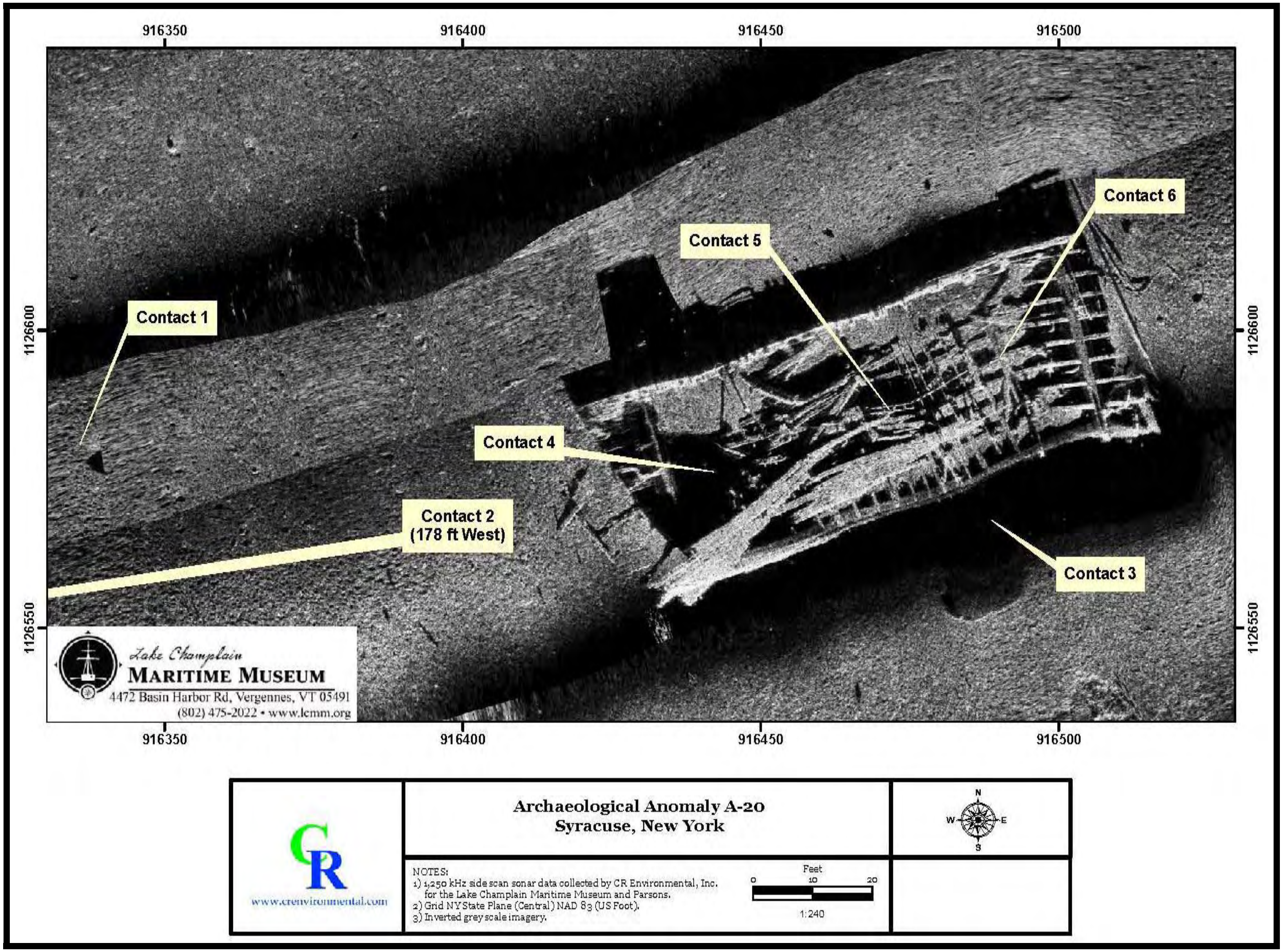


Figure 108. Side scan sonar mosaic showing A20.

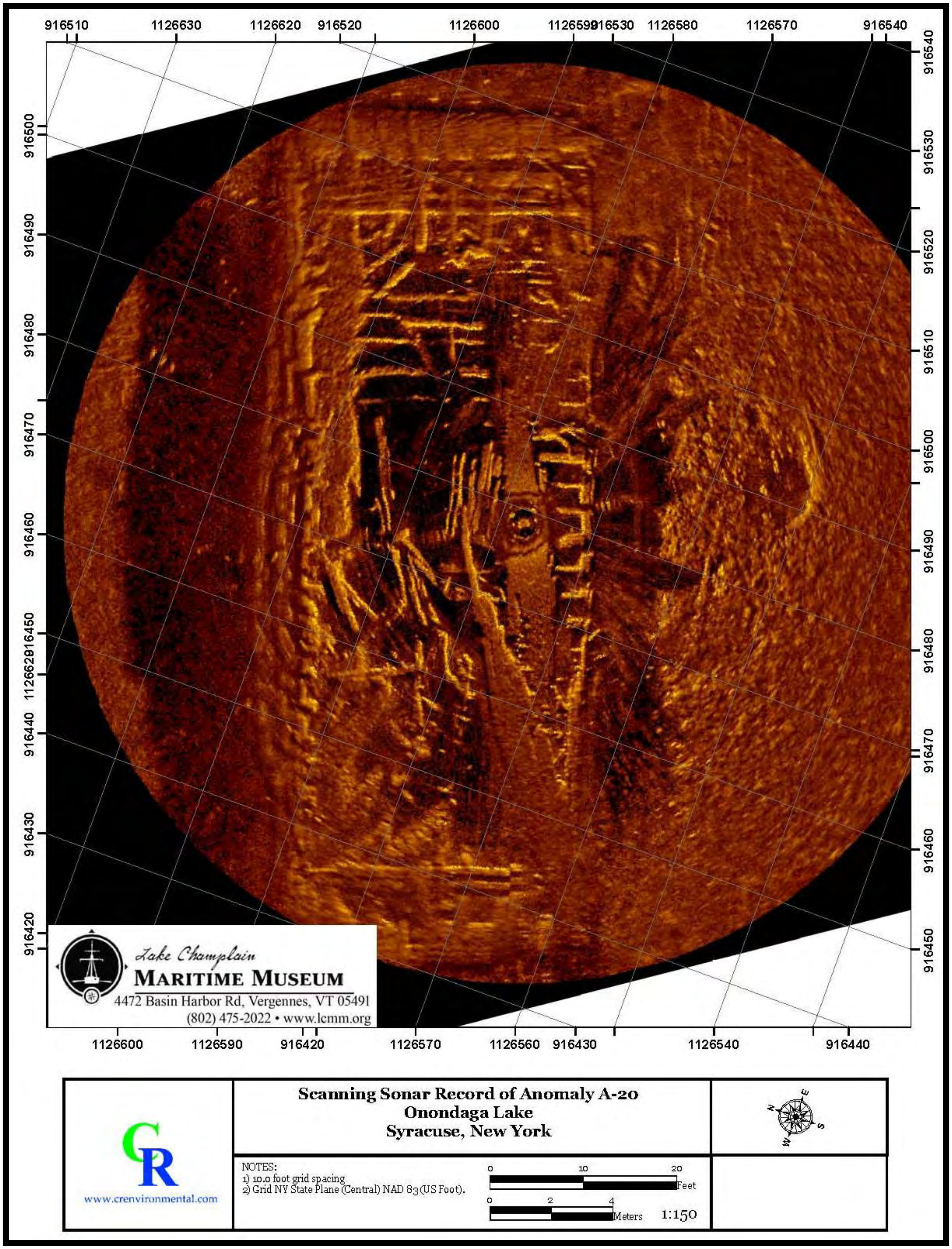


Figure 109. Scanning sonar image of A20.

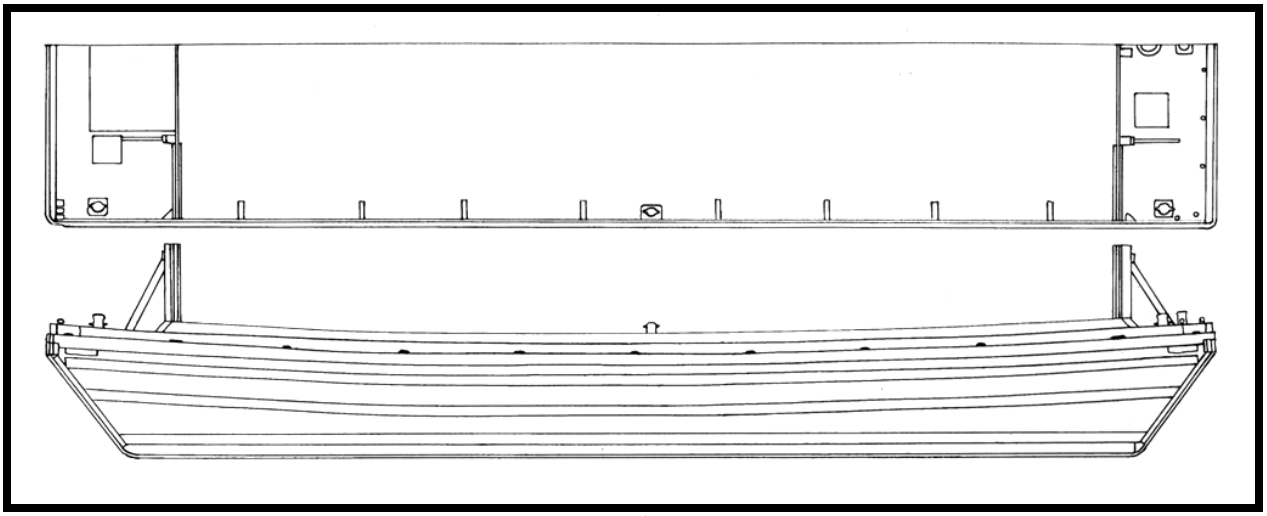


Figure 110. Plan view and profile of a rock scow (from the Feeney Collection at the Hudson River Maritime Museum in Kingston, New York, inked by Adam Kane).[148]

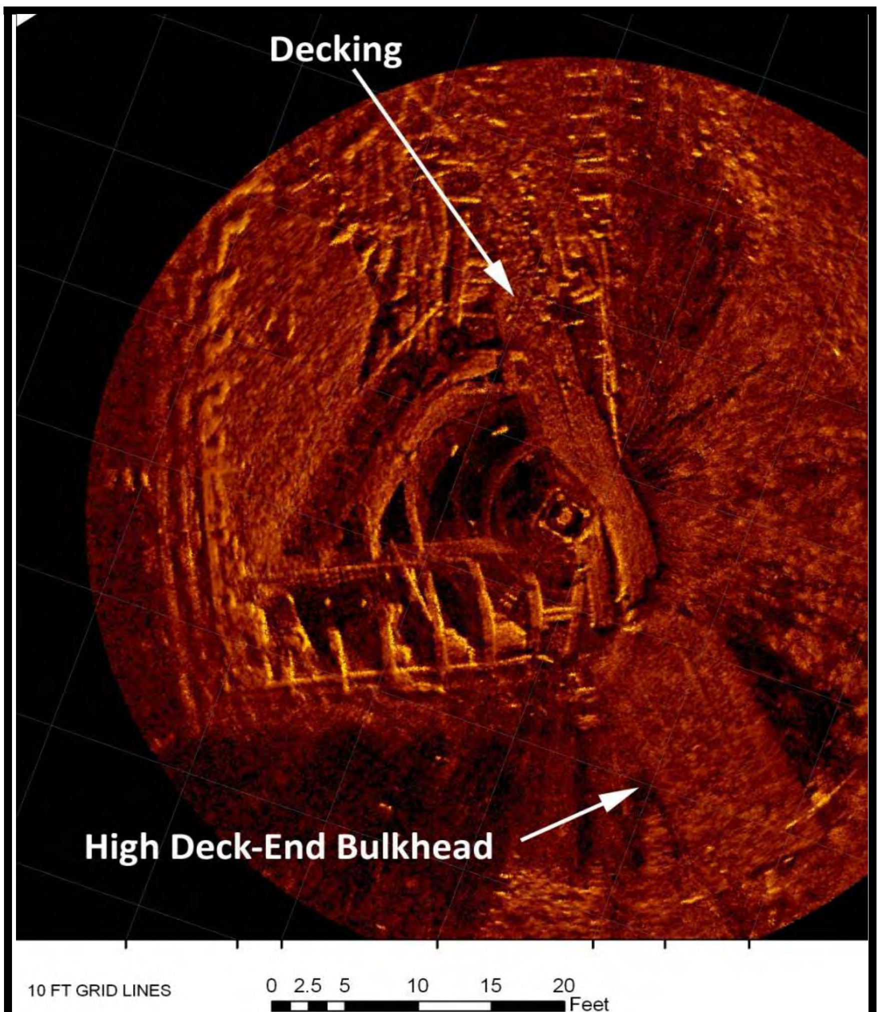


Figure 111. Sector scan sonar detail showing the displaced high deck-end bulkhead and the decking.

Significance Evaluation

National Register Evaluation		
Integrity of:	Location	A20 remains at its original location, thus LCMM recommends it retains integrity of location.
	Design	A20 retains design elements such as spatial organization, technology and materials that are reflective of the boatbuilders' original shipbuilding activities. LCMM recommends A20 retains integrity of design.
	Setting	The area of lake in proximity to A20 retains a similar character to that when the vessel was lost some 60 to 80 years ago. LCMM recommends A20 retains integrity of setting.
	Materials	Approximately 90% of the fabric of the site remains either intact or adjacent to the scow. The hull construction can reveal the boatbuilders' construction preferences and (potentially) regional boatbuilding traditions. LCMM recommends A20 retains integrity of materials.
	Workmanship	A20 has significant potential to yield information about the boatbuilders' skill and techniques, thus LCMM recommends it retains integrity of workmanship.
	Feeling	The historic character of A20 in its largely intact as its exposed condition evidences. LCMM recommends A20 retains integrity of feeling.
	Association	A20 is sufficiently intact to convey to an observer its nature as a rock scow. From an information potential perspective, integrity of association is measured in terms of the strength of the relationship between the site's data and important research questions. The archaeological data gathered from A20 indicates the site has the potential to answer questions about the engineering considerations for building this specific vessel type and vessels designed to carry large deck loads. LCMM recommends A20 retains integrity of association.
Criterion:	A: Event	The circumstances of A20's loss and its association with the New York State Canal system are unclear, thus LCMM recommends A20 is ineligible under Criterion A.
	B: Person	No known individually significant persons are associated A20. LCMM recommends A20 is ineligible under Criterion B.
	C: Design/ Construction	A20 embodies the distinctive characteristics of rock scows, and can be considered representative of the type. LCMM recommends A20 is eligible under Criterion C.
	D: Information Potential	A20 is likely to yield information about early twentieth century boatbuilding techniques, their operational history and the specific construction characteristics of rock scows. LCMM recommends A20 is eligible under Criterion D.

Recommendations

LCMM's analysis suggests that A20 retains integrity and is eligible for the National Register of Historic Places under Criteria C and D. The remedial design for the area calls for capping. As per the Section 106 process, LCMM has recommended avoiding adverse impacts to A20. In response, the remedial design has been altered to avoid depositing cap materials on the site.

A20 should be marked during remedial activities to ensure that no adverse impacts occur via the inadvertent anchoring of work vessels.

Anomaly 22: Pleasant Beach Pier

Anomaly 22 Summary Table	
Anomaly Identification	Pleasant Beach Resort Pier; NY Site Number 06740.012299
Remedial Impact	Capping
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	314
Side Scan (2010)	6/2/10
Sector Scan (2010)	No
ROV (2010)	6/8/10
Diver Observations	No
Diver Videography	No
Maps/Charts	Yes
Aerial Imagery	Yes
Historic Accounts	Yes

Historic Context[149]

The Pleasant Beach Resort was located on a cove approximately 4000 feet (1220m) north of Lake View Point and north of the mouth of Nine Mile Creek. The resort, which was originally known as Cowan's Grove, was opened in 1874.[150] The resort mainly consisted of a beach within the bay, but drew a lower number of tourists in the 1870s compared to Lake View Point. However, in 1885, Willis Barnum and Alfred Aldridge took possession of the resort and renovated it. They cleared the grove, leveled the beach, built restaurants (dining hall), a bowling alley, a dance pavilion, and bathing houses. The new owners also constructed a great stone pier for steamboats. By 1887, the resort was reopened under the new name of Pleasant Beach.[151] During the 1890s and into the early twentieth century, the resort thrived. Improvements included a shooting range, a midway with games of chance, a photo studio and a children's zoo. In 1892, the Sanborn map noted that a chowder house was 100 feet (30m) from the water; a pavilion and a dining hall were 150 feet (45m) from the water; the bar was approximately 175 feet (52m) from the water; the bowling alley and bar room were 250 feet (75m) from the water; cottages were 200 feet (60m) from the water; and a hotel was located on the west side of the railroad tracks and north of an old wooden bridge.

Between 1890 and 1900, the original hotel on the resort, the Lackawanna Hotel, burned to the ground, and a new hotel was constructed (Reichert's Hotel). Reichert's hotel catered to annual outings and picnics through the 1910s. In 1912, a new hotel was under construction to replace Reichert's. With the construction of the Barge Canal and a new dam at Phoenix, it became clear that Reichert's would no longer be above the elevated water line of the lake. In 1915, Reichert's was demolished. The new hotel, Bob Johnson's Pleasant Beach Hotel, was constructed on the side of a hill on land 300 feet (90m) farther from Onondaga Lake. Through the 1950s, the hotel and resort thrived and was especially popular for weekend clambakes. However, in 1954, the hotel and resort were removed by New York State for the construction of I-690.

Research Results

A22 was confirmed as the pier associated with the Pleasant Beach Resort. The site was investigated with side scan sonar, visually from the surface and with the ROV. The investigations were generally hampered by dense aquatic vegetation which covered the pier and surrounding bottomlands.

The pier 150 feet (45.7m) long and 20 feet (96.1m) wide with a 50 foot (15.2m) long T at the end (Figure 112). The pier was built using timber cribbing and rock fill. The structure is well preserved, with the portions of the end T retaining an original stone or concrete decking surface.

Figure 112. Aerial view showing pier remnants at Anomaly 22 (courtesy Microsoft® Virtual Earth).

Significance Evaluation

The Pleasant Beach pier was one structure within the larger Pleasant Beach Resort, which included attractions such as restaurants, a bowling alley, a dance pavilion, bathing houses, a shooting range, a midway, a photo studio and a children's zoo. These standing structures are no longer extant, however, it is highly likely that the associated archaeological remains still exist. The absence of data from the presumed terrestrial portion of the site makes the property problematic to evaluate. Although the pier retains its integrity, the integrity of this one site component alone is not sufficient to determine that the terrestrial site also retains integrity. The Pleasant Beach Resort at present remains an unevaluated site in terms of its eligibility for the NRHP.

Recommendations

The remedial design calls for capping in the area adjacent to the end of Pleasant Beach Pier with 2½ feet (76cm) of sand. This capping is unlikely to have an adverse effect on the pier remnants if capping material is not dropped specifically on the pier. LCMM recommends that capping be undertaken on the bottomlands surrounding the pier, with a 50-foot (15m) buffer around the pier buoyed during the remedial action and left uncapped.

Anomaly 33: Canal Boat

Anomaly 33 Summary Table	
Anomaly Identification	Canal Boat; NY Site Number 06740.012300
Remedial Impact	Capping
NRHP Eligibility Recommendation	Eligible
Anomaly Dataset	
Side Scan (2005)	321, 326
Magnetometer (2005)	947, 59, 949, 951, 953, 60, 955, 959,
Side Scan (2010)	6/3/10
Sector Scan (2010)	6/5/10
ROV (2010)	6/9/10
Diver Observations	Yes
Diver Videography	Yes
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

A33 is an intact, buried nineteenth century canal boat. The site was identified in the *Underwater Workplan* based on a complex magnetic signature and several small sonar returns. The site was investigated in June 2010, with the side scan sonar, sector scan sonar and a remotely operated vehicle. The site was dive verified in October 2010.

The initial side scan and sector scan sonar data from A33 did not yield any targets which seemed likely to be a submerged cultural resource. The remotely operated vehicle survey located several upright timbers protruding from the bottom, however, the extremely silty bottom conditions and associated poor underwater visibility lead to inconclusive results. The timbers that could be seen had enough potential that A33 was recommended for dive verification, which was undertaken on October 27 and 28, 2010. This fieldwork lead to the discovery that A33 was an intact, almost entirely buried wooden canal boat.

The upright timbers initially seen during the ROV work were determined to be the boat's bitt posts and stem (Figure 113). The exposed portions of the stem, bitt posts and gunwale, although very limited, contained features diagnostic of a wooden nineteenth century canal boat. The vessel had a distinctively canal boat shaped bow with iron bands along the forward face of the stem, a rub strake in the bow and an iron traveler on the after face of the stem. The gunwale had fair leads, used to guide the boat's towline, cut into it. The bitt posts were found immediately aft of the stem, with a buried windlass attached just below the sediment.

The run of the boat's hull contained no structural elements exposed above the lake bottom, however, structure was encountered with a probe 2 to 3 feet (.61 to .3m) below the sediment in numerous locations. Dive verification did eventually yield the very end of a wooden tiller bar and buried rudderpost located 95 feet 5 inches (29.1m) aft of the stem. The tiller had a tiller bar extender, another diagnostic canal boat feature, which is an iron band and loop around the tiller used to insert a long steering pole so that the boat could be steered from on top of the cabin.

The length of the vessel from stem to rudder post (95 feet 5 inches [29.1m]) is consistent with canal boats built between 1862 and 1915.

The archaeological data collected from A33, although limited due to the sediment deposition, conclusively illustrates that the site is a buried canal boat. The remains that are visible (stem, tiller) represent the highest points on the vessel, with the exception of the cabin trunk and roof. The preservation of these elements indicates that the buried portion of the site is intact. A canal boat the size of A33 was 8 to 10 feet (2.4 to 3.1m) tall, suggesting the bottom of the vessel rests below 10 to 12 feet (3.1 to 3.7m) of sediment (Figure 114).

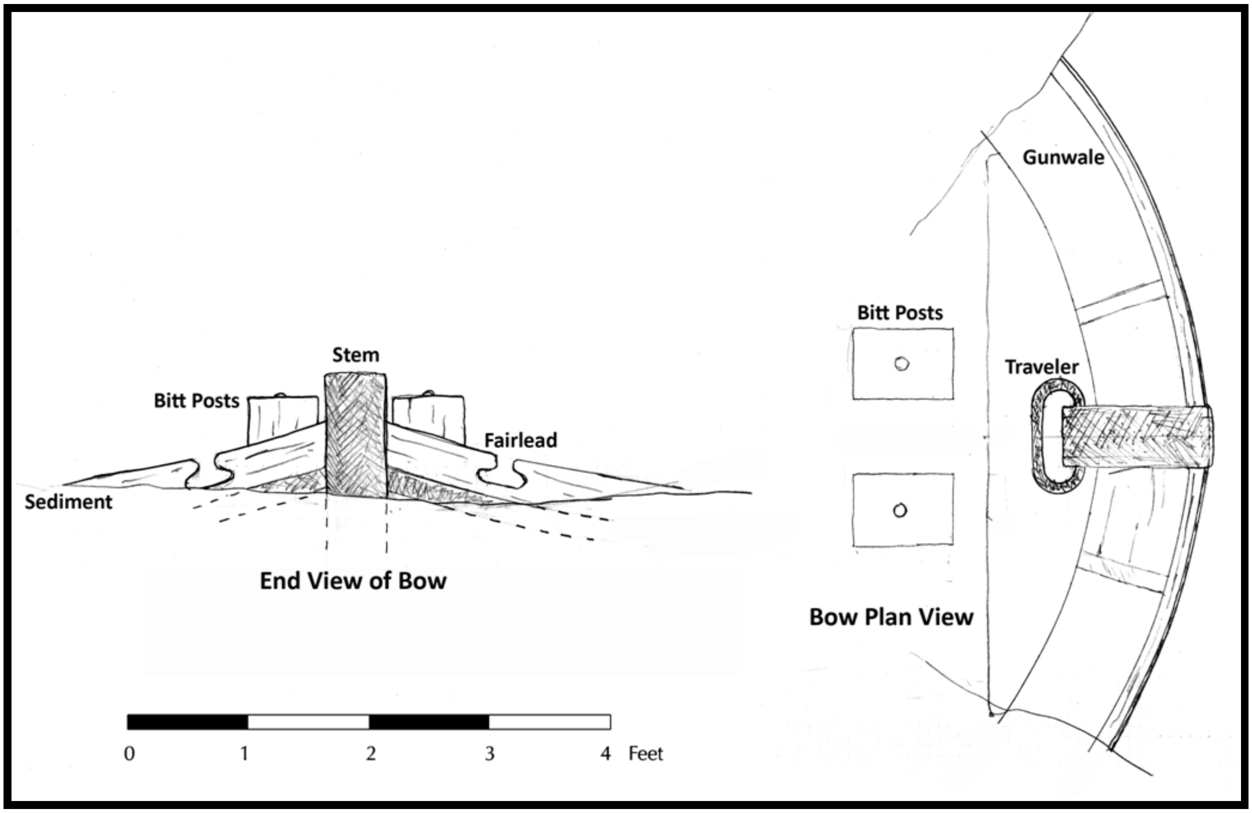


Figure 113. Scale drawing of A33 showing the visible bow remains (Adam Kane, LCMM Collection).

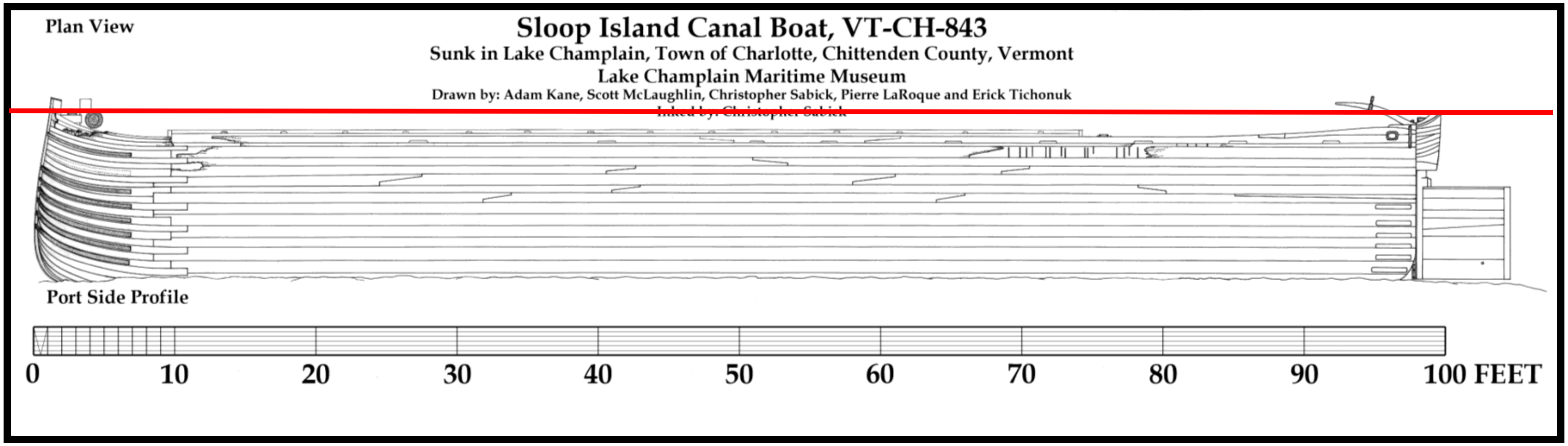


Figure 114. Profile of a Lake Champlain canal boat similar in size to A33 with the red line illustrating the level of siltation over A33 (LCMM Collection).

Significance Evaluation

National Register Evaluation		
Integrity of:	Location	A33 remains at its original location, thus LCMM recommends that it retains integrity of location.
	Design	A33 is likely to retain design elements such as spatial organization, technology and materials that are reflective of the boatbuilders' original activities. LCMM recommends that A33 retains integrity of design.
	Setting	Although A33's location in Onondaga Lake remains the same as when it sank, its specific surroundings have changed significantly. Sedimentation around and over the site has changed the adjacent lake bottom, vegetation and topography. LCMM recommends that A33 does not retain integrity of setting.
	Materials	Nearly all of A33 is buried beneath the lake bed. Although this makes the assessment of the configuration of the site difficult, if not impossible, it is safe to conclude that those materials remain intact. Moreover, those buried materials will be in a better state of preservation than those exposed above the lakebed. LCMM recommends that A33 retains integrity of materials.
	Workmanship	A33 may have significant potential to yield information about the boatbuilders' skill and techniques; however this aspect of integrity cannot be concluded with the current data set. LCMM recommends that A33 may have integrity of workmanship.
	Feeling	The historic character of A33 is limited by the buried nature of the archaeological remains. LCMM recommends that A33 does not retain integrity of feeling.
	Association	A33 remains in the place where the sinking occurred and it is sufficiently intact to convey its nature as a canal boat. From an information potential perspective, integrity of association is measured in terms of the strength of the relationship between the site's data and important research questions. The known archaeological data, although extremely limited due to the buried nature of the property, indicates that the site could answer important questions about canal boat construction materials and techniques, and, if the boat sank in distress, canaller culture and the operational use of an Erie Canal Boat. LCMM recommends that A33 retains integrity of association.
Criterion:	A: Event	A33 has an association with pattern of events comprising the commercial use of the New York State Barge Canal. Areas of significance include commerce and transportation. LCMM recommends that A33 is eligible under Criterion A.
	B: Person	No known individually significant persons are associated with the A33. LCMM recommends that A33 is ineligible under Criterion B.
	C: Design/ Construction	A33 may be eligible under Criterion C, but the lack of archaeological data makes this conclusion difficult to reach. LCMM recommends that A33 is currently ineligible under Criterion C.
	D: Information Potential	The study of A33 is likely to yield information about nineteenth century boatbuilding techniques and, if the vessel sank in distress, information

		about the reason for its loss, its cargo, and the culture of canalers. LCMM recommends that A33 is eligible under Criterion D.

Recommendations

LCMM's analysis suggests that A33 retains integrity and is eligible for the National Register of Historic Places under Criteria A and D. The remedial design for the area around A33 calls for capping, the impact of which is impossible to determine given the lack of information regarding the site's structural composition. LCMM recommends that the remedial design be altered so that any potential adverse impacts to the site are avoided. Consultation with Parsons indicates that A33 is in an area where concentrations are relatively low. The area is net depositional, so concentrations will continue to decrease over time.

The depth of sediment over the site makes the archaeological study of the vessel impossible with current technologies. A33 should be marked during remedial activities to ensure that no adverse impacts occur via the inadvertent anchoring of work vessels.

RECOMMEND OTHER

Anomaly 13: Canal Boat

Anomaly 13 Summary Table	
Anomaly Identification	Canal Boat
Remedial Impact	Outside of Remediation Area
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	264, 269, 267
Magnetometer (2005)	202, 471, 472, 1232, 76, 477
Side Scan (2010)	No
Sector Scan (2010)	No
ROV Video Footage (2010)	No
Diver Observations	No
Diver Videography	Yes, Hunt Diving 2005
Maps/Charts	No
Aerial Imagery	No
Historic Accounts	No

Research Results

Anomaly A13 is 250 feet (76.2m) outside of a remediation area, thus it was not evaluated as part of the Phase 1B survey. However, given the property's proximity to the remediation areas, it is included in this report for informational purposes should there be an adjustment in the remediation areas. A13 is an intact late nineteenth/early twentieth century canal boat (Figure 115). This vessel was examined by divers from Hunt Diving of Clayton, New York in October 2005. The video showed the vessel to be intact up to gunwales standing at least 6 feet (1.83 m) proud of the bottom. The boat was built using edge fastening construction; a common canal boat building technique that used iron pins driven vertically into the planking to create a rigid longitudinal structure. The bow is stave built, another commonly used late nineteenth/early twentieth century canal boat building technique where the bow was constructed of vertically oriented planks.

Recommendations

The eligibility of A13 for the NRHP remains unevaluated; however, given its intact nature it is likely eligible. Although the site is outside the remediation areas, LCMM recommends that additional steps be taken during the remediation to prevent any inadvertent impact to the site. A 50-foot (15m) buffer around the wreck site should be marked with seasonal buoys as a no anchorage site during the remediation, and watercraft operators on site should be informed of the site's location and protocols.

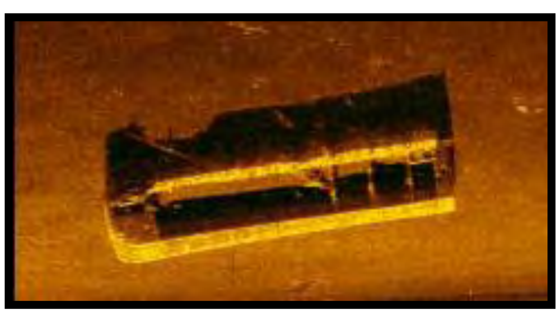


Figure 115. Sonar image from 2005 showing Anomaly 13 (courtesy CRE).

Anomaly 54: Wooden Bulkhead

Anomaly 54 Summary Table	
Anomaly Identification	Wooden Bulkhead
Remedial Impact	Dredging and Capping
NRHP Eligibility Recommendation	Unevaluated
Anomaly Dataset	
Side Scan (2005)	No
Magnetometer (2005)	No
Side Scan (2010)	No
Sector Scan (2010)	No
ROV (2010)	No
Diver Observations	Yes (above water photographs)
Diver Videography	No
Maps/Charts	Yes
Aerial Imagery	No
Historic Accounts	Yes

Research Results

During the June 2010 fieldwork, an inspection of the shoreline near Harbor Brook revealed the presence of wooden structural remains (Figure 116). This structure, lying immediately west of the mouth of Harbor Brook, was designated A54.

In consultations with Parsons and Public Archaeology Facility this anomaly was assigned to the Harbor Brook archaeological study being undertaken by PAF.[152]

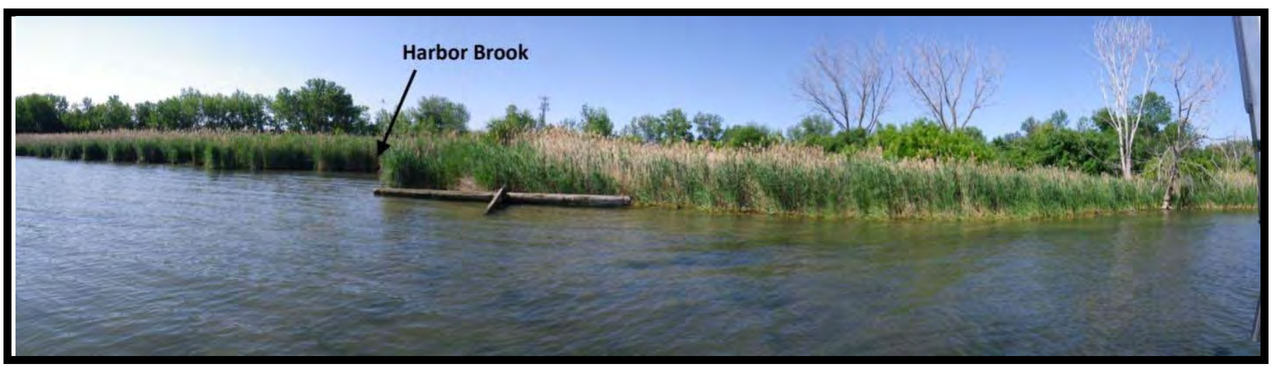


Figure 116. Photograph of A54 with the mouth of Harbor Brook to the left (LCMM Collection).

CONCLUSIONS

Lake Champlain Maritime Museum (LCMM) concluded that the Phase 1B underwater archaeological research undertaken in Onondaga Lake demonstrated that several archaeological remains still lie on the lake bottom. Overall, these properties tend to be well-preserved, although many lie partly or largely buried below the lake bottom. The Phase 1B survey examined 60 anomalies of which 20 are recommended as eligible for the NRHP, while 18 were culturally derived features which are recommended as ineligible for the NRHP. Three of the anomalies were non-cultural, 15 remain unidentified, and four are identified but their NRHP status remains unevaluated.

LCMM recommends the following approach and sequence of activities to comply with Section 106 of the *National Historic Preservation Act*.

1. Develop the remedial design for the sites in the Syracuse Maritime Historic District to minimize adverse effects (Fall 2011).
2. Develop the remedial design for A33 (buried canal boat) to avoid adverse impacts (Fall 2011).
3. Data Recovery on anomalies A1/A2 (Salina Pier), A4-1 (dump scow), A7 (pilings), A12 (spud barge derrick lighter), A45 (concrete breakwater), and A53 (canal boat) (summer 2012).
4. Mark anomalies A22 (Pleasant View Resort pier), A33 (buried canal boat), A20 (rock scow), and A13 (canal boat outside of remediation area) with seasonal float balls to assist in avoiding adverse impacts during the remedial work (prior to start of debris removal).
5. Tailor shoreline stabilization design to avoid adverse impact to A17-1 and A17-2 (spud barges) (Fall 2011).

Table 4. Summary of anomalies, findings and LCMM recommendations.

Anomaly No.	Identification	NRHP Eligible	Adverse Effect	Recommendation
1 and 2	Salina Pier	Eligible (Syracuse Maritime Historic District)	Yes	Data Recovery
3	Wooden Barge	Eligible (Syracuse Maritime Historic District)	No	No Further Work
4-1	Dump Scow	Eligible (Syracuse Maritime Historic District)	Yes	Data Recovery
4-2	Dump Scow	Eligible (Syracuse Maritime Historic District)	Yes	No Further Work
5	Isolated Debris	Ineligible	N/A	No Further Work
6	Solvay Waste Shelf	Unevaluated	N/A	No Further Work
7	Piling Clumps	Eligible (Syracuse Maritime Historic District)	N/A	Data Recovery
8	Aquatic Vegetation	Non-cultural	N/A	No Further Work
9	Tree Branch	Non-cultural	N/A	No Further Work
10	Aquatic Vegetation	Non-cultural	N/A	No Further Work
11	Pipes	Ineligible	N/A	No Further Work
12	Derrick Lighter Spud Barge	Eligible (Syracuse Maritime Historic District)	Yes	Data Recovery
13	Canal Boat	Unevaluated	No	Mark During Remediation
17-1	Spud Barge	Eligible	To be determined	Alter Shoreline Stabilization
17-2	Spud Barge	Eligible	To be determined	Alter Shoreline Stabilization
19	Unidentified	Unevaluated	N/A	No Further Work
20	Wooden Rock Scow	Eligible	No	Alter Remedial Design
22	Pleasant Beach Resort Pier	Unevaluated	No	Alter Remedial Design
33	Buried Wooden Canal Boat	Eligible	To be determined	Alter Remedial Design
34	Rock Mound	Eligible (Syracuse Maritime Historic District)	N/A	No Further Work
35	Watercraft of Unknown Type	Eligible (Syracuse Maritime Historic District)	Yes	No Further Work
36	Wire Rope	Ineligible	N/A	No Further Work
37	Unidentified	Unevaluated	N/A	No Further Work
38	Iron Pier Marine Infrastructure	Eligible (Syracuse Maritime Historic District)	Yes	No Further Work
43	Pipe	Ineligible	N/A	No Further Work
45	Concrete Breakwater	Eligible (Syracuse Maritime Historic District)	Yes	Data Recovery
47	Pipeline	Ineligible	N/A	No Further Work
48	Pipeline	Ineligible	N/A	No Further Work
51	Solvay Intake	Ineligible	N/A	No Further Work
52	Syracuse Yacht Club	Ineligible	N/A	No Further Work
53	Canal Boat	Eligible (Syracuse Maritime Historic District)	Yes	Data Recovery
54	Wooden Bulkhead	Unevaluated	Yes	See PAF *Harbor Brook Report*
55	Canal Scow	Eligible (Syracuse Maritime Historic District)	Yes	No Further Work

56	Unidentified	Unevaluated	N/A	No Further Work
57	Wooden Barrel	Ineligible	N/A	No Further Work
58	55-Gallon Drum	Ineligible	N/A	No Further Work
59	Wire Rope	Ineligible	N/A	No Further Work
60	Unidentified	Unevaluated	N/A	No Further Work
61	Unidentified	Unevaluated	N/A	No Further Work
62	Unidentified	Unevaluated	N/A	No Further Work
63	Unidentified	Unevaluated	N/A	No Further Work
64	Unidentified	Unevaluated	N/A	No Further Work
65	Unidentified	Unevaluated	N/A	No Further Work
66	Unidentified	Unevaluated	N/A	No Further Work
67	Unidentified	Unevaluated	N/A	No Further Work
69	Iron Debris – Ladder, Sheet Iron, Slag	Ineligible	N/A	No Further Work
70	Unidentified	Unevaluated	N/A	No Further Work
72	Wood Pilings	Eligible (Syracuse Maritime Historic District)	N/A	No Further Work
73	Bulkhead	Eligible (Syracuse Maritime Historic District)	Yes	No Further Work
74	Isolated Piling	Ineligible	N/A	No Further Work
75	Rock Pile	Eligible (Syracuse Maritime Historic District)	Yes	No Further Work
76	Rock Pile	Eligible (Syracuse Maritime Historic District)	No	No Further Work
77	Unidentified	Unevaluated	N/A	No Further Work
78	Iron Wire	Ineligible	N/A	No Further Work
79	Unidentified	Unevaluated	N/A	No Further Work
80	Unidentified	Unevaluated	N/A	No Further Work
81	Motorcycle	Ineligible	N/A	No Further Work
82	55-Gallon Drum	Ineligible	N/A	No Further Work
83	Wood and Metal Debris	Ineligible	N/A	No Further Work
84	Paint Cans and Bottles	Ineligible	N/A	No Further Work

BIBLIOGRAPHY

Addington, L. R. *Lithic Illustration: Drawing Flaked Stone Artifacts for Publication.* Chicago: The University of Chicago Press, 1986.

Adkins, L. and R. A. Adkins. *Archaeological Illustration*, *Academic Manuals in Archaeology Series*. New York: Cambridge University Press, 1994.

Adney, Edwin Tappan and Howard I. Chappelle. *Bark Canoes and Skin Boats of North America.* India: Skyhorse Publishing Inc., Reprint 2007.

Aiuvalasit, Michael and Joseph Schuldenrein, *Preliminary Geomorphological Observations for the Onondaga Lake Project*. Geoarchaeology Research Associates, Yonkers, New York, 2010.

Allen, S. J. *The Illustration of Wooden Artifacts: An Introduction and Guide to the Depiction of Wooden Objects*, ed. B. Hurman and M. Steiner, vol. 11, *Technical Paper*. Oxford, England: Association of Archaeological Illustrators and Surveyors, 1994.

Anderson, Richard Kerfoot, Jr. *Guidelines for Recording Historic Ships.* Washington, DC: Historic American Buildings/Historic American Engineering Record, National Park Service, U.S. Department of the Interior, 1988.

Bradley, James W. *Evolution of the Onondaga Iroquois, Accommodating Change 1500-1655*. Syracuse: Syracuse University Press, 1987.

Brouwer, Norman J. *A Synopsis of Maritime Activity in New York State and New York State Vessel Typology*. New York: South Street Seaport Museum, 1990.

Clark, Joshua V.H. *Onondaga Reminiscences of Earlier and Later Times*…. Syracuse: Stoddard and Babcock, 1849.

Courier, July 18, 1881.

CR Environmental, Inc. *Onondaga Lake Phase 1 Pre-Design Investigation Geophysical Survey Report*. Falmouth, MA: CR Environmental, Inc, 2005.

Delgado, James P. and Kevin J. Foster. *Guidelines for Evaluating and Documenting Historic Aids to Navigation.* Washington, D.C.: National Park Service, n.d.

Delgado, James P. *Nominating Historic Vessels and Shipwrecks to the National Register of Historic Places.* Washington, D.C.: National Park Service, n.d.

Dean, Martin et al., eds. *Archaeology Underwater: The NAS Guide to Principles and Practice*. Portsmouth and London: Nautical Archaeology Society and Archetype Publications, 1992.

Department of the Army. *Safety and Health Requirements Manual, EM 385-1-1, 15 September 2008.* Washington D.C.: U.S. Army Corps of Engineers, 2008.

Dillon, B. D. ed. *Student's Guide to Archaeological Illustrating*, vol. 1, *Archaeological Research Tools.* Los Angeles: Institute of Archaeology, University of California, 1992.

Dorrell, P. G. *Photography in Archaeology and Conservation*, ed. D. Brothwell, et al., *Cambridge Manuals in Archaeology Series*. New York: Cambridge University Press, 1989

Drzyzga, S. A. "Relict Shoreline Features at Cockburn Island, Ontario." *Journal of Paleolimnology* 37 (2007): 411-417.

Dwyer, T. R., H. T. Mullins, and S. C. Good. "Paleoclimatic Implications of Holocene Lake Level Fluctuations, Owasco Lake, New York." *Geology* 24(6) June (1996): 519-522.

Edwards, W. E. *Traveler's Guide: Through the Middle and Northern States and the Provinces of Canada*, *Fifth Edition.* Carvill, NY: G. M. Davison, 1833.

Effler, Steven W. *Limnological and Engineering Analysis of a Polluted Urban Lake: Prelude to Environmental Management of Onondaga Lake, New York.* New York: Springer-Verlag, 1996.

Finklestien, Sarah A. and Anthony M. Davis. "Paleoenvironmental Records of Water Level and Climate Changes from the Middle to Late Holocene at Lake Erie Coastal wetland, Ontario, Canada." in *Qarternary Research* 65 (2006): 33-43.

Garofalini, L. "Resource Evaluation for New York State Canal System." New York State Office of Parks, Recreation and Historic Preservation, 1993.

Green, Jeremy. *Maritime Archaeology: A Technical Handbook*. San Diego, California: Academic Press, 1990.

Hogan, Matthew P. *C.A.N.A.L.S. Underwater Archaeology Diver's Manual*. Syracuse: Canal Museum, 1981.

Hohman, Christopher. *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project, Onondaga Lake, Wastebed B and Wastebed 13, Towns of Camillus, Geddes and Salina and City of Syracuse, Onondaga County, New York*. Binghamton, NY: Public Archaeology Facility, 2004.

Hohman, Christopher D. and Cynthia Carrington Carter, *Cultural Resource Management Report, Phase 1B Reconnaissance Survey, Onondaga Lake Project, Upland and Shoreline Area Wastebed B/Harbor Brook IRM, City of Syracuse, Onondaga County, New York.* Binghamton, NY: Public Archaeology Facility, 2010.

Hopkins, G.M. *Map of the City of Syracuse, Onondaga County, New York.* Philadelphia: G.M. Hopkins Company, 1908.

Hopkins, G.M. *Map of the City of Syracuse, Onondaga County, New York.* Philadelphia: G.M. Hopkins Company, 1924.

Hopkins, G.M. *Map of the City of Syracuse, Onondaga County, New York.* Philadelphia: G.M. Hopkins Company, 1938.

Howell, C. L. and W. Blanc. *Practical Guide to Archaeological Photography*, ed. R. Demsetz, et al., 2nd ed., vol. 6, *Archaeological Research Tools*. Los Angeles: Institute of Archaeology, University of California, 1995.

James, Stephen R. *Cultural Resources Survey, New York Harbor Collection and Removal of Drift Project, Arthur Kill, Richmond County, New York Reach; Arthur Kill, Union and Middlesex Counties, New Jersey Reach; and Kill Van Kull, Richmond County, New York Reach*. Memphis: Panamerican Consultants, 1999.

Jervis, T. B. *Laws of the State of New York in Relation to the Erie and Champlain Canals, Together with the Annual Reports of the Canal Commissioners, and Other Documents.* Albany: F. and E. Horsford Printer, 1825.

Kane Adam I. and Joanne DellaSalla, *Underwater Archaeological Resources Phase 1B Work Plan for the Onondaga Lake Bottom, Subsite of the Onondaga Lake Superfund Site, Onondaga County, New York*. Vergennes, VT: Lake Champlain Maritime Museum, 2010.

Kane, Adam I. ed., *Underwater Barge Documentation for the Alburg-Swanton Bridge Replacement Project, BRF 036-1(1), Alburg, Grand Isle County, Vermont.* Vergennes, VT: Lake Champlain Maritime Museum, 2001.

Lake Champlain Maritime Museum, "Dive Safety Plan, Onondaga Lake Superfund Site, Onondaga Lake, New York, October 12, 2010." (Lake Champlain Maritime Museum, 2010).

Lake Champlain Maritime Museum, *Safe Diving Practices Manual.* Vergennes, VT: Lake Champlain Maritime Museum, 2010.

Lipke, Paul, Peter Spectre, and Benjamin A. G. Fuller, eds. *Boats: A Manual for Their Documentation*/ Nashville, Tennessee: American Association for State and Local History, 1993.

Little, Barbara, Erika Martin Seibert, Jan Townsend, John H. Sprinkle, Jr., and John Knoerl. *Guidelines for Evaluating and Registering Archeological Properties.* Washington, D.C.: National Park Service, 2000.

"Local Yachtsmen, The." *Syracuse Standard,* December 15, 1889.

Lord, Philip Jr., *Navigation Before the Erie Canal.* Albany: New York State Museum.

Maine Climate Institute. "Maine Geologic Survey." Accessed October 2010. http://www.maine.gov/doc/nrimc/mgs/explore/surficial/facts/dec00.htm.

McKinney, William M. *The Consolidated Laws of New York, Annotated as Amended to the Close of the Regular Session of the Legislature of 1916, Book 7, Canal Law*. Northport, NY: Edward Thompson Company, 1916.

Mullins, Henry T. "Holocene Lake Level and Climate Change Inferred from Marl Stratigraphy of the Cayuga Lake Basin, New York." *Journal of Sedimentary Research* 68 (4) July (1998): 569-578.

National Park Service. *Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines.* Washington, DC: Government Printing Office, 1983.

New York Archaeological Council. *Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State*. Albany: New York Archaeological Council, 1994.

New York State Historic Preservation Office, *Phase I Archaeological Report Format Requirements.* Waterford, NY: New York State Office of Parks, Recreation and Historic Preservation, 2005.

Onondaga Lake Bottom Subsite of the Onondaga Lake Superfund Site, Syracuse, New York, Record of Decision. Albany, NY: NYSDEC and USEPA, 2005.

Onondaga Lake Partnership Website. Accessed October 2010. http://www.onlakepartners.org/

Parker, Arthur C. *The Archaeological History of New York, Part 2*. New York State Museum Bulletin No. 238, Albany, New York. 1922.

Post Standard. April 14, 1957.

Post Standard. August 18, 1899.

Post Standard. March 16, 1957.

Post Standard. September 18, 1929.

Post Standard. September 29, 1929.

Post Standard. January 2, 1890.

Post Standard. April 16, 1880.

Pratt, Peter P. and Marjorie K. Pratt, *Phase IA Cultural Resource Survey, Onondaga Lake LCP Bridge Street Site and Related Wastebeds, Village of Solvay, Town of Geddes and Town of Camillus, Onondaga County, New York.* Cazenovia, New York: Pratt and Pratt Archaeological Consultants, 2003.

Raber, Michael S. *Reconnaissance Cultural Resource Investigations Arthur Kill New York Reach Richmond County, New York, New York Harbor Collection and Removal of Drift Project.* South Glastonbury, CT: Raber Associates, 1996.

Raber, Michael S. *Reconnaissance Cultural Resource Investigations Arthur Kill New Jersey Reach, Union and Middlesex Counties, New Jersey, New York Harbor Collection and Removal of Drift Project, U.S. Army Corps of Engineers, New York District.* South Glastonbury, CT: Raber Associates, 1996.

Raber, Michael S. *Reconnaissance Cultural Resource Investigations Kill Van Kull, New York Reach Richmond County, New York New York Harbor Collection and Removal of Drift Project, U.S. Army Corps of Engineers, New York District.* South Glastonbury, CT: Raber Associates, 1996.

Ritchie, William A. *The Archaeology of New York State*. Harrison, New York: Harbor Hill Books, 1980.

Sanborn Fire Insurance Company, *Insurance Maps of Syracuse, New York*. New York: Sanborn-Perris, 1892.

Smith, H.P , edited by Robert Joki. *Syracuse and Its Surroundings: A Victorian Photo Tour of New York's Salt City*. New York: Black Dome Press Corp., 2002. Reprint of 1878 edition.

Snow, Dean R. *Peoples of the Americas Series: The Iroquois*. Malden, MA: Blackwell Publishers Ltd., 1996.

Sonnenburg, Elizabeth. "Holocene Lake Level Change and Submerged Archaeological Site Potential in Rice Lake, Ontario." Unpublished PhD Proposal, McMaster University, n.d.

Staff of the Canal Museum. *A Canalboat Primer on the Canals of New York State*. Syracuse: Canal Museum, 1981.

"Steamboat's Boiler Bursts. The Captain Killed and Engineer Badly Scalded." *New York Times,* May 25, 1885.

Steffy, J. Richard. *Wooden Shipbuilding and the Interpretation of Shipwrecks.* College Station, Texas: Texas A&M University Press, 1994.

Syracuse Herald. April 5, 1957.

Syracuse Herald. April 4, 1905.

Syracuse Journal. July 31, 1871.

"Telegraphic Brevities." *New York Times,* July 22, 1892.

Thompson, Donald H. *The Golden Age of Onondaga Lake Resorts*. Fleischmanns, NY: Purple Mountain Press, 2002.

Townsend, Jan, John H. Sprinkle, Jr., and John Knoerl. *Guidelines for Evaluating and Registering Historical Archeological Sites and Districts.* Washington, D.C.: National Park Service, 1993.

Tuck, James A. *Onondaga Iroquois Prehistory: A Study in Settlement Archaeology.* Syracuse: Syracuse University Press, 1971.

U.S. Department of the Interior. *How to Apply the National Register Criteria for Evaluation.* Washington, D.C.: National Park Service, 1997.

U.S. Lake Survey Office. *Chart No. 5, New York State Canals, Brewerton to Cross Lake and Syracuse to Oswego*. Detroit: U.S. Lake Survey Office, 1915.

U.S. Lake Survey Office. *New York State Canals, Erie Canal, Brewerton to Cross Lake and Syracuse and Oswego Canal, Three River Point to Oswego.* Detroit: U.S. Lake Survey Office, 1926.

U.S. Lake Survey Office. *New York State Canals, Erie Canal, Brewerton to Cross Lake and Syracuse and Oswego Canal, Three River Point to Oswego*. Detroit: U.S. Lake Survey Office, 1932.

U.S. Lake Survey Office. *New York State Canals, Chart No. 185, 1937*. Detroit: U.S. Lake Survey Office, 1937.

U.S. Lake Survey Office. *New York State Canals, Chart No. 185, 1942*. Detroit: U.S. Lake Survey Office, 1942.

U.S. Lake Survey Office. *New York State Canals, Chart No. 185, 1947*. Detroit: U.S. Lake Survey Office, 1947.

Versaggi, Nina "Prehistoric Hunter-Gatherer Settlement Models: Interpreting the Upper Susquehanna Valley," *Golden Chronograph for Robert E. Funk*. Occasional Publications in Northeastern Anthropology 15 (1996), 129-140.

Versaggi, Nina "An Overview of Prehistoric Settlement Patterns and Landforms in the Northern Appalachians." *Current Topics in Northeastern Geoarchaeology: Glaciated Landscapes*. Albany: New York State Museum and Science Service Bulletin, 2000.

Whitford, Nobel E. *History of the Canal System of the State of New York: Supplement to the Annual Report of the State Engineer and Surveyor of the State of New York*. Albany, New York: Brandow Printing Company, 1905.

Wiseman, Frederick M. *The Voice of the Dawn: An Autohistory of the Abenaki Nation.* Hanover, New Hampshire: University Press of New England, 2001.

"Young Man Drowned in Onondaga Lake on Sunday, A." *Watertown Re-Union,* August 28, 1879.

Yu, Z. J., H. McAnderews and U. Eicher. "Middle Holocene Dry Climate Caused by Change in Atmospheric Circulation Patterns: Evidence from Lake Levels and Isotopes." *Geology* 25 (3) (1997).

APPENDIX 1: FIELD LOGS

Field logs recorded by Adam Kane, LCMM Archaeological Director, during the 2010 and 2011 fieldwork. Transcribed by Chris McClain, LCMM Education Assistant.

6/1/2010 Onondaga Phase 1B Mobilization		
	900	Depart Vermont-just AK
	1430	Arrive Liverpool at Marina. Meet with CR Environmental crew (Chip Ryther, Chris Wright, Shipherd Densmore) and Parsons Safety person Dale Dolph.
	1530	Depart Marina for drug testing facility
	1600-1630	Drug testing/ breathalyzer
	1700	Arrive back at marina for continuation of set up
	1800	Set up completed. Crew has discussion of project requirements, logistics and safety
	1815	Depart Marina

6/2/2010 Phase 1B Onondaga Side Scan Sonar		
	0600	Depart hotel with crew for breakfast: AK, CR, DD, SD
	0700	At the dock
	0705	Depart Marina for Parson's dock
	0730	At Parson's dock
	0740	At Parson's trailer for safety briefing. Briefing by DD, Pete Petrone in attendance; sign secrecy forms, safety acknowledgement forms, float plan
	0830	Depart trailer for boat
	0845	Depart Parson's dock for marina
	0900	At marina for set up
	0945	Depart marina for side scan survey work
A30	0955	Maple Bay Pier
	1005	Sonar into the water. Visual inspection of pier shows it to be heavily covered in milfoil. Pier outline is defined by collection of milfoil on the surface. Construction looks to be vertical planks (+/- 1' wide) making up the exterior wall. One pass off SS along southern face (going EW) showed SS to be ineffective through milfoil. Did pass along eastern face (going S-N) and picked up faint image of dock.
	1023	Depart Anomaly 30
A22	1030	At Anomaly 22. Pleasant Beach Resort dock. Visual inspection shows it to be very shallow and generally well preserved. Again, lots of milfoil-like A30. Looks to be timber crib with rock fill. Outline of dock was very clearly visible from the surface. Excellent integrity.
	1041	Depart Anomaly 22

A19	1045	Arrive Anomaly 19 Unknown target-possible wreck. Could not find visually, Site is in about 6' with good visibility (6'-8') but lots of weeds.
	1055	Depart Anomaly 19. No visual or sonar evidence of anomaly
A47	1100	Arrive Anomaly 47. Could not locate visually. Did not show up.
	1105	Depart Anomaly 47
A48	1107	Arrive Anomaly 48 Did not show up visually with about 2' visibility. Nothing on SS
	1115	Depart Anomaly 48
A43 & 20	1120	Arrive Anomaly 43 & 20. Anomaly 20 is a barge. Anomaly 43 is a magnetometer anomaly in proximity. Caught a brief visual glimpse of barge from surface. Barge had scow end; wooden structure. SS sonar image is very good. First sonar pass also showed a sonar anomaly in the area of Anomaly 43. Barge appears to be plank-on-frame. Passes @ 1200 KHz showed lots of detail.
	1150	Depart Anomaly 43 & 20. Head to marina for lunch.
	1200	Lunch
A52	1235	Arrive Anomaly 52. Syracuse Yacht Club. Sonar clearly shows car, but no evidence of pilings or other club related structures. Pilings are visible just above lake surface at the SW corner of the Yacht club peninsula
	1250	Depart Anomaly 52
A51 A13	1305	Arrive Anomaly 51. Suction intakes for Solvay Process. Sonar also showed excellent view of adjacent canal boat (Anomaly 13). Sonar data show only one intake. Capture very good image of Anomaly 13
	1400	Finished with Anomaly 51
A10	1405	Arrive at Anomaly 10. Not significant.
	1410	Depart Anomaly 10
A8 & 9	1415	Arrive Anomaly 8 & 9. Inconclusive anomalies that will be surveyed together. Sonar of images suggests muddy logs, but is not conclusive.
	1425	Depart Anomaly 8 & 9
A6	1430	Arrive Anomaly 6. Messy sonar image-origin unclear.
	1440	Depart Anomaly 6
A37	1445	Arrive Anomaly 37. Magnetometer anomaly without sonar. Nothing at all showed up on sonar.
	1450	Depart Anomaly 37
A5	1455	Arrive Anomaly 5. Geddes Pier. Sonar shows nothing conclusive. Runs toward the shore are very weedy.
	1535	Depart Anomaly 5
A36	1545	Arrive Anomaly 36. Magnetometer anomaly with no sonar. SS shows a mound. Unclear if it is just weeds. Nothing conclusive.
	1600	Depart Anomaly 36

A45	1605	Arrive Anomaly 45. Can see Anomaly 45 from surface. Linear, breakwater composed of a mound of cobbles +/- 20' wide. Possibly a breakwater associated with the entrance to the canal. While surveying Anomaly 45, another site was found which appears to be a barge or canal boat. Wooden in very shallow water just SE of Anomaly 45. Brief glimpse suggested a plank-on-frame built vessel-could have some curvature, but not clear at this point. Gave this new site the designation of A53
	1620	Done with Anomaly 45 Finished surveying for the day.
	1640	Back at marina
	1700	Depart for hotel
	1710	At hotel

6/3/2010 Phase 1B Onondaga Side Scan Sonar		
	00700	Arrive at marina. Crew AK, DD, CW, CR, SD. Safety briefing by Dale. Beginning of second, presumably last day of side scan work.
	0730	Depart marina for southern end of Onondaga
A7	0750	Arrive at Anomaly 7. Dolphins at canal entrance. Very shallow at the entrance into the canal. Clumps are probably less than 50 years old.
	0820	Done with Anomaly 7
A12 & 34	0830	Arrive Anomaly 12 & 34. Anomaly 12 has parts showing above water. It looks like there are structures to hold a spud on either side. A chain plate is clearly visible on the northern exposed structure. Barge is edge fastened with thick planks and framing every +/- 6'. Anomaly 12 & 34 appear to be the same with 34 being a magnetic anomaly associated with the barge.
	0850	Done with Anomaly 12 & 34
A11	0900	Arrive Anomaly 11. Tried to get in to look at this linear anomaly. Could not get sonar image because we had to abort line as we approached to avoid hitting the objects/anomaly. Anomaly looked like a series of concrete or metal pipes.
	0905	Done with Anomaly 11
A33	0910	Arrive Anomaly 33. Inconclusive sonar with magnetometer. Sonar of this anomaly is unclear. Sonar showed two clearly visible but indistinct anomalies. Sector sonar may be able to better define these.
	0930	Done with Anomaly 33
A35	0935	Arrive at Anomaly 35. Magnetic anomaly without any sonar. Anomaly was completely obscured by weeds. Anomaly seemed to be some type of mound, but character is unclear.
	0940	Done with Anomaly 35
A4	0945	Arrive at Anomaly 4. Two barges. Barge A4-1 is the one furthest out in the lake. It is an edge fastened barge with two longitudinal edge fastened bulkheads. Framing is placed every +/- 4'. Barge A4-2 (shallower) is less visible. Longitudinals were visible but could not get in close due to shallow water.

A38	0955	Magnetometer anomaly without sonar. Side scan showed lots of tires and other debris but nothing historic. Water was very shallow for this near shore target. Visibility in the water was not good due to waves and poor sun. Some glimpses of possible structure but nothing conclusive.
	1005	Done with Anomaly 38
A1 , 2 & 3	1010	Arrive anomalies A1-3. A1 is a barge; A2 Salina Pier; A3 is a possible barge. A1 is visible just above the surface. A3 really unclear-need john boat for these.
	1030	Done with A1-3Done with all official Side Scan sites
	1045	Arrive Tug *Stillwater* to collect some nice images.
	1100	Done with *Stillwater*
A15	1105	Arrive at Anomaly 15 to collect nice images.
	1120	Back at marina for lunch. Spoke with Pete Petrone about the metro outfall and mystery bulkhead to be imaged. A change order has been issued for that work, so we will proceed with those anomalies.
	1200	Prep for scanning sonar work and CW works on side scan mosaics.
	1245	Depart marina for Parson's docks.
	1255	Arrive at dock to pick up map of additional anomalies to investigate.
	1315	Arrive at Metro outfall for engineering survey. Thoughts on barges/sites in the southern end. The sites individually may lack significance, but as a whole may constitute a maritime industrial district.
	1420	Done with Metro Outfall
	1425	At dock to discuss outfall and wooden bulkhead feature of wastebed B.
	1430	Depart dock to go to wooden wall feature. The area is too shallow to get ROV into, so operation is postponed until john boat is operational.
	1440	Depart wall feature
A48	1445	Arrive at Anomaly 48. Navigation was not functioning for this one when it was done on 6/2, so we have to resurvey it.
	1455	Done with Anomaly 48
A19	1455	Re-look visually for Anomaly 19. Still nothing. Excellent visibility but 100% weed over rising about 3' above the bottom
	1505	Done with SS survey. Going back to marina to set up sector scan.
	1510	At marina. Set up and testing sector scan sonar.
	1700	Depart Marina
	1720	Back at hotel

6/4/2010 Phase 1B Onondaga Sector Scan Sonar		
	0700	Arrive Marina Crew: AK, CW, CR, SD, Eli Perrone (EP), Kelly Miller (KM). Pete Petrone here in AM for safety inspection. Continued set up of sector sonar including addition of a second GPS because the sonar does not have a compass and the second GPS will give orientation
	0815	Depart marina heading toward A20 to figure out the best techniques for the sector scan.
A20	0820	Arrive Anomaly 20. Undertake sector scan. Dropped sonar at each end and amidships. Image has tremendous detail. Image suggests barge is scow ended with rake beams. Part of the deck or side has dropped into the wreck. The frequency of framing suggests the barge is plank-on-frame.
A20	1010	Done with A20. Heading back to dock to pick up EP after his breathalyzer.
	1025	Chip Ryther departs. Enroute to A12
A12	1030	Arrive A12. Excellent topside visibility – over 10'. Barge details: edge fastened every +/- 18"; sides are about +/- 4" thick with framing every 3-4'; there are 4 bulkheads, also edge fastened. Framing system consists of futtocks with clamp holding the joint between futtock/floor. The shoreward end has a step for a derrick. The structures above the surface are for holding spuds. The ends are vertical-not raked. Bulkheads are edge fastened. The shoreward end is sheathed in iron (sheet). Good scanning sonar image. Deck is gone, but the frames/bulkheads are preserved up to just below deck level.
A12	1130	Depart A12
A 4	1140	Arrive A4. Notes on western barge: sides are edge fastened, although infrequently. Most strength from framing frames are about 6x6. Bulkheads about 6" wide. The northern end is raked. The middle section at the northern end has two parallel longitudinal beams with sheaves or them. Purpose unknown, but key to knowing purpose of the barge. The long bulkheads are about 8" wide, trans 6", and sides about 4" suggesting there was a lot of stress in the middle of hull, less so at the sides. Longitudinal bulkheads edge fastened about every 2'; sides have 2 edge fasteners between every frame, spaced about 6" apart. Looks like a shallow barge-perhaps depth of hold 5'. Both ends are scow raked.
	1215	Done with 1st barge. Lunch
	1245	Move onto shoreward barge. Ends are raked. Preserved up to just below deck level-site is largely buried. Has 2 longitudinal bulkheads and 11 (?) transverse-only 3 of which go entirely athwartship. The rest do not go through the central section of the longitudinal bulkheads. No framing in the barge. Edge fastening is not apparent, but the lack of visible fasteners is likely because the bulkheads/side are preserved up to just below deck level.
A4	1320	Done with A4
A1 – 3	1330	Arrive A 1-3. Salina Pier. could not get a good image of the pier rises to within 3' of the surface. Appears to have a rock/stone center with wooden sheathing. Mapping was not possible due to very heavy aquatic weeds.
	1400	Arrive at A3. This is the barge that shows up on the aerial. It is misidentified as A1 in the workplan. Excellent sonar image. A3 appears from the sonar image to be longer than the other barges. Heavily built with sporadic framing. Each

		area between bulkheads has two bilge stringers. Preserved up to just below the deck. Apparently edge fastened, but preservation is such that fasteners are not evident. Image of pier shows up in the view of the eastern end of the barge. After imaging the barge, we got a good look at the shallow end of the pier-at least 50'wide near its intersection with the shore.
	1445	Done with A3. Moving on to the northern side of the pier for another shot at imaging it.
	1500	Arrive at Salina pier about 100 yards from shore and dropped sonar in between wooden structure of pier. Pier consists of vertical planking with rubble fill.
A 1 -3	1525	Done with A 1 -3. Salina pier and one barge showed up very clearly. However, on anomaly in the location of A2 did not show anything on sonar but parallel planks were visible from the surface. Must return here with ROV or drop camera to sort out.
	1530	At Parson's dock for bathrooms.
A53	1545	Arrive A53 which is newly located wreck just south of pier adjacent to canal entrance. Wreck has flat floors with cocked hat construction at the turn of the bilge. Wreck is just the very bottom of the hull. Room and space of about 1' with floors +- 3" sided. Bow is at the shore end, appears to be rounded. Looks like a canal boat. Plank on frame construction. Only the very bottom of the hull is left -floors, cocked hats, bottom planking. Ceiling is completely gone.
	1630	End A53
	1635	Back at Marina
	1700	Depart Marina

6/5/2010 Phase 1B Onondaga Sector Scanning Sonar		
	0700	Arrive Marina. Set up gear. Safety briefing. Crew: AK. EP. KM. SD, CW
A9	0810	Arrive A9 for sector scan. Sonar shows nothing at the location of the mag anom. An undefined anom showed up about 40m from the center of the mag hit-too far to be A9.
	0825	Depart A9
A8	0830	Arrive A8. Sonar shows a small sonar anomaly in the location. Not able to tell what it is, but looks like debris.
	0840	Done with A8
A33	0845	Arrive A33. Sonar shows two anomalies similar to those on side scan. More akin to a pile of rocks. Need ROV to verify origin.
	0915	Done with A33
A7	0920	Arrive A7 to image pilings
	1000	Depart A7. Recorded good images of pilings. Didn't find anything else. Need to come back here to look for obstruction next to rock wall.
A52	1020	Arrive A52. Syracuse Yacht Club (and car). Too deep to spud, so will scan on the fly. Did not see any evidence of pilings etc. Good images of car.

	1035	Done with A52
A6	1050	Arrive A6. Some inconclusive-some debris, but nothing characteristic of a cultural resource.
	1100	Done A6
A37	1110	At A37 too deep to spud and too rough to survey on the fly.
	1125	Leave A37 and this part of the lake for more protected area off Nine Mile Creek.
A43	1135	Arrive A43. Extensive search for target. Located but sonar is inconclusive and main sonar target is about 50' from the highest amplitude mag target.
	1225	Done with A43
	1230	At marina for lunch
	1315	Call off field work for the day due to impending thunderstorm. CW to head home
	1330	Back at the hotel

6/7/2010 Onondaga Phase 1B Sector Scanning Sonar Day		
	0650	Arrive Marina. Crew: EP, SD, Bill Campbell, AK, Xiaodong Huang (Parsons). Safety briefing by XH. BC departs to get breathalyzer
	0830	Off the dock to A5
A5	0845	Arrive A5. Very weedy, nothing apparent on sonar, but the weeds really hamper the sonar's utility at this site.
	0915	Moved on from scanning out in the lake at A5 to a timber structure at the shoreline approximately in the location where Geddes Pier should be. Looks to be timber crib with central longitudinal bulkhead. Remains are about 40' wide. Transverse timber is about 10" x 12". Seems odd that the central bulkhead of this pier sticks out into the lake, but there are no remnants out in the lake. Designed this timber bulkhead A54.
	0940	Done with A5
A45	0955	Arrive A45. Stone pier next to canal entrance. Constructed of rounded cobbles, densely packed on the north and south sides (along the exterior walls of the pier) with an open gap with only sporadic cobbles in between. Good sonar images. No visible evidence of wooden structure at all-only stones averaging about 1-2' in diameter. Lack of timber structure suggests that this feature may have functioned only as a breakwater, not a pier.
	1045	Depart A45
A11	1055	Arrive A11. Good images of pipes. Good sized tree is located just southeast of pipes.
A35	1130	Arrive A35. Too weedy for sonar to work well
	1140	Depart A35
A38	1140	Arrive A38. Nothing on sonar, pretty weedy
	1155	Done with A38
	1210	Back at marina for lunch

A19	1310	Leave dock to re-survey A19. Quite rough; not very good data., but apparently sufficient to rectify compass issues.
	1345	Done with A19
	1355	Back at Marina. Break down scanning sonar and gear up for ROV
	1500	ROV up and running
	1630	Depart marina for the day.
	1700	Back at hotel

6/08/2010 Onondaga Phase 1B ROV Survey		
	0650	At the marina. Crew: AK, EP, BC, SD, KM
	0735	Leaving Marina
A3	0805	Arrive A3 Barge next to Salina Pier for ROV work.
	0810	ROV into the water. Barge is scow ended-interesting framing with transverse beams running in the middle of the hold. Quite a bit of timber stacked inside the hull suggesting a heavily built boat. Barge has a wale along the exterior of the side. Could not get any interior information from the end- just too hard to get into. Edge fastened. Boat is built with transverse beams set on the chine log and longitudinal stringers. There are two stringers in each side of the hull.
	0925	Done with A3
A2	0930	Arrive A2. Inspection of “thumb pier” area. Some brief views of rocks and a few vertical planks and timbers. Very weedy and difficult to discern any patterns
	1030	Move onto A2 area called “ROV Spot” where we viewed some planks on the bottom on 6/04/2010. Saw at least 4 vertical posts (4x4 or 6x6) in a row. They could denote the end of the pier. Viewed several more vertical planking pieces, but could not make out anything coherent due to extremely heavy weed growth. There is some concern here that the pier would have been made out of boats and nothing seen so far would disprove that.
	1130	Done with A2
	1145	Docked at Parson’s dock for lunch
A51	1215	Depart dock for A51. Make several attempts to anchor, but wind (15-20 knots with gusts to 25) makes it impossible.
A51 A30	1245	Leave A51 for A30
A30	1315	Arrive A30 Maple Bay Pier
	1320	ROV into the water. A30 incredibly dense weeds, especially on the pier itself. ROV was able to get a good look along the southeastern face in very shallow water, too shallow for milfoil. Constructed with vertical planks and stone fill.
	1405	Done with A30

A22	1425	Arrive A22. Pleasant Beach Resort Pier. Good underwater visibility (7-8') but many weeds. Pier appears to be constructed on top of rubble fill. Did not get a good look at the wooden structure. Visual on the first day was the best look. The top of the pier is covered with either stone or concrete slabs.
	1500	Done with A22
A20	1515	Start A20. Fair visibility. Barge has significant wreckage. Possibly the deck is lying off the northeastern side of the boat. Barge has a scow end. Got ROV hung up on a beam. Spent considerable time in freeing it. Only looked at one end of the barge. Will need to come back here.
	1615	Depart A20. End of the day.
	1630	Back at the marina. Repairing spud holder, which was damaged during ROV work on A20.
	1730	Depart Marina
	1745	Back at hotel

6/9/2010 Onondaga Phase 1B ROV survey		
	0650	At the marina. Crew: AK, BC, SD, EP, DD
	0730	Depart Marina
A33	0740	At A33. Large mag, inconclusive sonar.
	0755	ROV into the water at A33
	0825	Done with A33. ROV showed 3 metal box shaped objects. ID is not clear, but definitely a significant sized object/series of objects. Will need to dive to verify.
A51	0840	At A51 Solvay Intake Anchoring, with drop buoy. Could not anchor, bottom too soupy.
	0900	ROV into the water. Live boating. Intake looks to be cast iron, large, heavily corroded. Lifting loop on top.
	0915	Done with A51
A9	0930	At A9. Inconclusive sonar with no mag. Found a pile of weeds, probably is hanging up on some structure, but there was no way to tell what it was. Very soupy bottom. ROV constantly silted out.
	0950	Done with A9
A8	1000	At A8. Inconclusive sonar without mag. ROV showed nothing but patches of weeds. Very silty. The weeds could have been hung up on structure, but impossible to tell.
	1015	Done with A8
A6	1030	At A6. Mag with sonar. Tried ROV at sonar location-nothing. Moved ROV to mag location. Flat bottom, no weeds with layer of green algae. Fine silt, easily disturbed. Bottom is really soft. Mag target must be buried. Should monitor here while dredging.
	1115	A6 done

A37	1130	Tried a ROV run, but drifted off too far. Re-anchor to try again. Nothing on ROV, either try. Target must be buried.
	1210	Done A37
	1215	Head back to marina for lunch
	1230	Back at marina for lunch
	1330	Marina. Back out
A1	1345	At A1. Got a good look at the end of the pier. Appears to be made out of stone blocks. One area had an iron bar coming out of the stone. Very weedy. Difficult to make out shape, but there is a lot of structure there.
	1415	Done with A1
A38	1420	At A38. Wooden remains visible from the surface. Difficult to tell what they are, best guess is that it's the deck to a barge. Remains consist of two coaming-like features, two box-like metal features, several thick wood planks. One plank was clearly edge fastened. No weeds- too shallow with sandy bottom. Site is about 3' deep.
A4	1515	Did NW (farther out barge 1st) Good images of loops 'S' turning mechanism.
	1550	A4 NW barge done
	1555	A4 SE barge. Barge is beat up, especially the shore side end which is quite broken up. Scow barge.
	1615	Done A4
A12	1620	Arrive A12. Good ROV conditions. Vertical ends. Metal reinforcement for holding the spud.
A4	1650	Done A4
	1710	ROV into the water at the Metro Outfall
	1750	Done with Outfall inspection
	1805	Back at marina.

06/10/2010 Onondaga Phase 1B ROV survey		
	0645	At marina Crew: AK, Peter Petrone, EP, BC, SD
	0745	Depart Marina
A53	0800	At A53. Canal boat next to canal entrance. ROV inspection showed several cocked hats at the ends of floors. Bow is towards the shore. It appears to be traditional plank-on-frame. Floors are completely flat. The video showed what might have been a transverse bottom plank at the stern as if the boat had a rounded or scow stern. However, the stern was very difficult to define. Most of the remains are buried. In its entirety there is perhaps 25% of the original hull left. Did not see any side planks, just the very bottom of the hull
	0855	Done with A53

A45	0900	At A45. Stone pier next to canal. Pier appears to be made entirely of stones (1-2' in diameter). Stones piled 1 to 2 high (visible) but could be significantly more buried. Tire and a tree at the shore end. One piece of vertical wood seen, but probably didn't have anything to do with the construction.
	0920	Done with A45
A36	0940	Arrive A36. Mag without sonar. One spud hit something solid. Very weedy. Took a good look around. Found one object, perhaps a tree, very difficult to tell under these conditions. Source of anomaly is either buried or hidden in weeds.
	1005	Done with A36
A35	1020	At A35. Mag with inconclusive sonar. Tremendous volume of wooden wreckage. Very difficult to tell what this is. It could be an entire barge, largely buried or a substantial piece of wreckage (deck of a nearby barge). Nothing was evident that showed specific construction techniques. Very weedy.
	1110	Done with A35
	1120	Back at marina for lunch
	1215	Depart Marina
A5	1235	At A5. Scattered, low intensity mag with no sonar.
	1245	Done with A5. This site is far too weedy for the ROV to be effective. The mag anomalies here don't look very promising (low intensity, spread out), so this can probably be written off as an isolated modern debris.
	1305	At Solvay waste wooden wall (SMU 1) near Parson's trailer. Water is too shallow with too much algae (which clogged both boat outboard and ROV thruster). Never saw the wall.
	1215	Leave wooden wall area
A52	1325	At A52. Syracuse Yacht Club. Very dense weeds along shore. Shoreline is all slag and scrap metal, presumably fill from Crucible Steel. This slag is visible in shallow water along the shoreline. No evidence of pilings or other Yacht Club features. The slag fill looks like it has been pushed out well past the original Yacht Club location. Recorded some good video of the car, a sedan, heavily covered in zebra mussels.
	1500	Done with A52
A43	1520	ROV in at A43. Mag anomaly next to A20 barge. Two targets to find; a sonar target from the high frequency side scan and a mag anomaly. The A43 "ROV Here" anomaly (linear anomaly on side scan) was a tree. The mag anomaly at A43 was a metal pipe about 20' long. Bottom here was weed-free with scattered rock and heavily encrusted with zebra mussels. Excellent underwater visibility (+/- 10')
	1620	Back at the marina

06/11/2010 Onondaga Phase 1B ROV survey		
	0645	Arrive Marina
	0715	Crew: AK, DD, EP, SD, BC with Pete Petrone for project update, but not fieldwork. Safety briefing by Dale.
	0730	Depart marina for A19

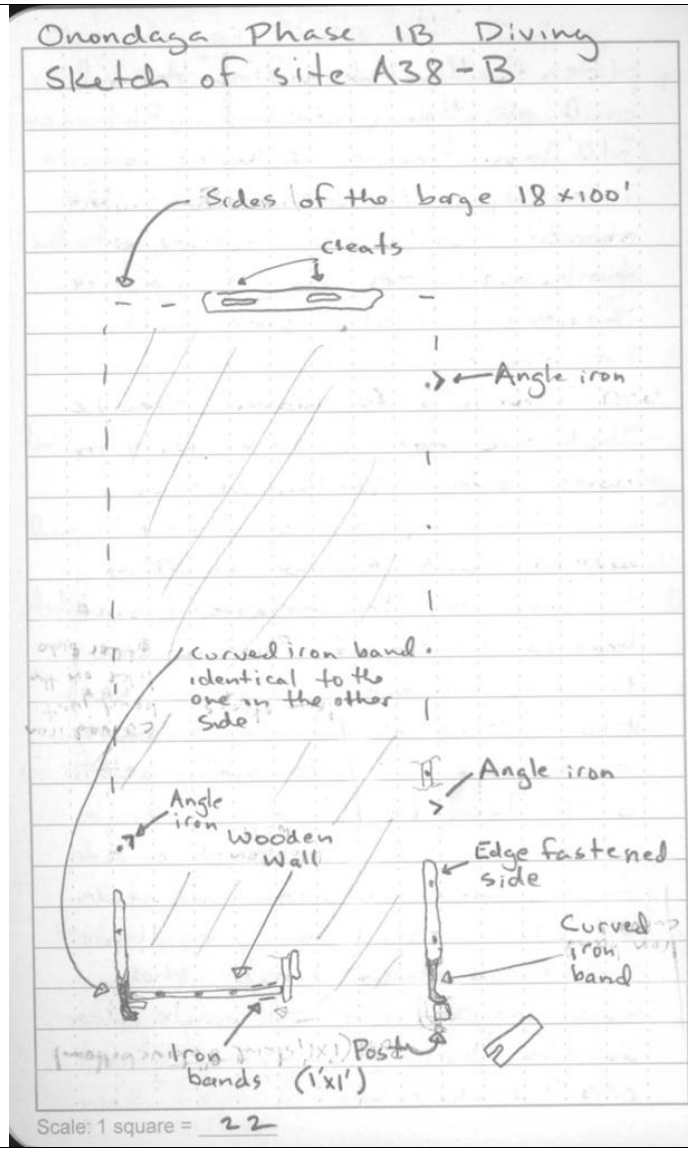
A19	0735	At A19 for yet another look from the surface. Excellent surface conditions- calm, no wind, glassy surface – visibility about 4-5’. Water is about 4 ½ - 5’ deep with 3’ of weed. Did not ROV because of the dense weed would have made it useless. Source of mag must be below the vegetation level.
	0750	Done with A19
A47	0755	Arrive A47. Linear anomaly with no sonar. Excellent surface conditions allowed for ID of target as a pipeline. Pipeline is lying at the bottom surface. Hard to figure out the material, but probably cast iron. Diameter of about 1’, runs perpendicular from the shore.
	0805	Done with A47
A48	0810	At. A48. Ran all along A48 from start toward shore. Good conditions, calm, 2-3’ visibility. Did not see anything. Went to the spot of max amplitude and probed. Could not find anything solid. Near shore, there was an iron ring, not sure if related, but outside of shallow water limit of mag anomalies. Adjacent to the anomaly on shore there is an upwelling monitoring station. Need to contact Tim Johnson at Parson’s to figure out if that mag anomaly could be from the line (material unknown) that comes out into the lake.
	0830	Done with A48
A20	0845	Arrive at A20. Barge. Barge has an intact foredeck on the western side. ROV did a good pass along the southern side. Intact up to the deck beams, although it looks like a 2-3 plank wide section of the side has peeled off and is sitting along side it. One shot of a deck beam showed a large standing knee as if the barge had a very large coaming like a rock scow. At the western side, there was a very tall vertical member, perhaps metal, that stood a full 7-8’ taller than the deck. Eastern side is scow ended-standing quite tall off the bottom. Quite a bit of wreckage off the southern side- probably all from either the torn off side or tall hatch coaming. Everything is heavily covered with zebra mussels except for the undersides of beam and the scow end. Lots of fish: carp, bass, sunnies, yellow perch. There is a wale running along the south side. 1st ROV effort was several passes along the south side with looks into the barge along the length Not a great look along the northern face. We got the ROV temporarily snagged when we flew underneath an iron strap. Northern side had a whole series of knees- not quite sure how they fit into the structure, but the review of sonar data should provide enough data to figure it out.
	1020	Done with A20
	1030	At Parson’s dock to pick up Mike Broschart for inspection of wooden wall feature in SMU 1.
	1045	At wall feature. Visibility is excellent (8’) but weeds are bad. This area has a lot of low growing algae that tends to foul the thrusters. Pulled ROV due to fouled thrusters. Poled in as far as we could (about 2’ of water) but still could not find it. Abandoned effort.
	1120	Depart wooden wall area. Dropped Mike B. off at the Parson’s dock.
A17 A18	1140	Did a tour by A17 and A18 as a final field effort, just to get a sense of what type of barge A17 is relative to the others. The site was clearly visible in shallow water, consisting of the entire barge except for the deck. The barge is plank-on frame, unlike the others seen. It is a spud barge with the spud holder on the northern end. There is a flywheel at the

		center of the northern end for lifting the spuds, and a second flywheel amidships. The floors are braced with diagonal bracing lying flat. Some stone piled in the southern end of the barge suggesting it could have been used as a dock. When heading into A17, we went over another barge, or possibly large wooden dock structure, located just off shore and southeast of A17. This site was tremendously weedy so an exact ID was impossible.
	1150	Depart A17
	1155	Back at Marina. Fieldwork complete. Breakdown gear. Wash boat, put it on the trailer. Receive 11 DVDs from BC with all ROV video on it.
	1340	Depart Liverpool for Vermont
	1815	At Middlebury returning car
	1905	At Vergennes.

Onondaga Phase 1B Diving		
October 24, 2010		
	1330	Arrive PAL's in Ferrisburgh. AK & AC load gear
	1410	Depart Ferrisburgh for Crown Point
	1440	Pick up SL at Crown Point
	1915	Arrive Liverpool, NY. Go out to dinner
	2020	Arrive Hotel
		Project Phone #'s Shipherd Densmore (508)317-8188 Ken Thomson (781)929-1203 Pete Petrone (315) 430-0156 Kelly Miller (315) 569-6477 Industrial Medical Associates (315) 458-1335 151 Lawrence Road East North Syracuse, NY 13212

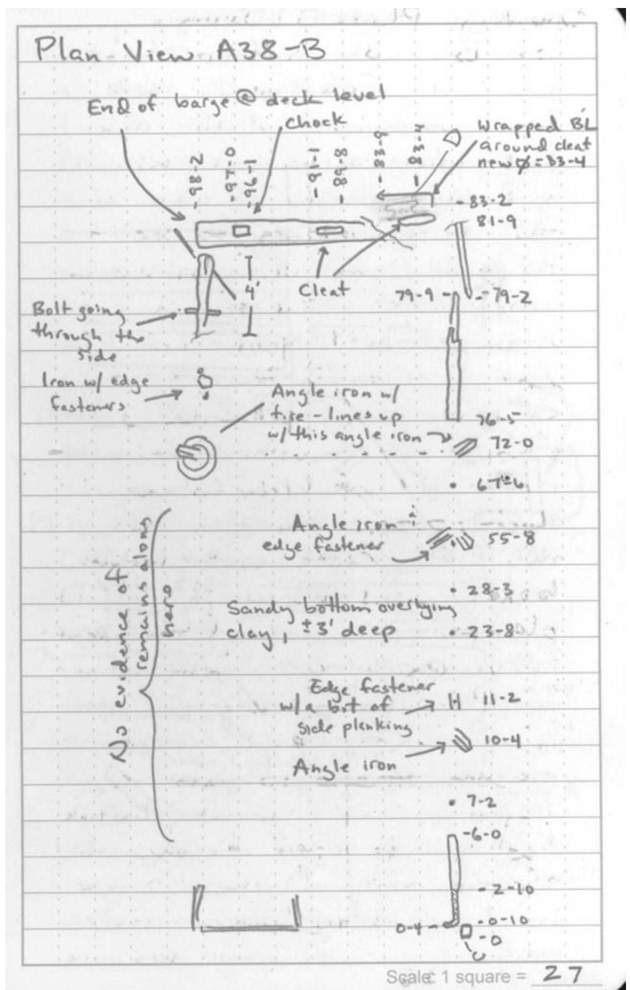
October 25, 2010		
	0745	Depart hotel. Crew: Pierre LaRocque, Art Cohn, Sarah Tichonuk, Adam Kane
	0755	Arrive Liverpool Marina
	0800	Depart Liverpool Marina. Drop trailer.
	0815	Arrive IMA for drug testing/breathalyzer for SL. AC & PAL.
	0845	Depart IMA for hardware store for supplies

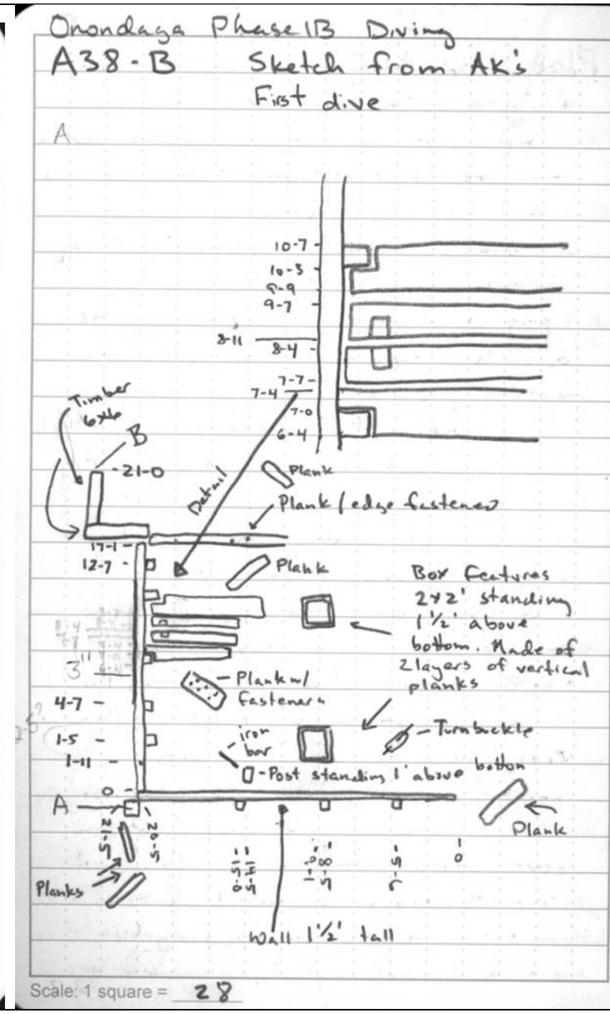
	0930	Arrive Onondaga Yacht Club. CRE was in the parking lot. CRE launches boat & LCMM team gears up for dive ops.
	1000	CRE crew leaves for drug testing.
	1030	Dale Dolph, Kelly Miller and Pete Petrone arrive for kick off and safety briefing. All gear was switched over to AGA masks & dry gloves/hoods.
	1200	Safety briefing by Dale Dolph & Kelly Miller
	1300	Geared up on boat ready to go. Weather is warm 70F , light winds with light rain showers.
	1315	Depart Marina
A38	1320	Arrive at A38. Visibility look fair (3-4'). No visual on the site from the surface.
	1402	AK into the water. Extensive search of area eventually yields an area of wooden structure, but it is different from the A38 wreckage recorded during the ROV survey. The site consists of a vertical (or near vertical) wooden wall constructed of a single run of planks. The wall of planks is edge fastened and stand s+/- 1' above the bottom sediments. The wooden end wall is +/- 9' wide, however this represents only ½ of (+/-_ of the width of the vessel. The wooden wall feature also has iron plates both inboard, outboard and on the one end. Between +- 10' and +/- 16' there is a longitudinal timber and vertical post. The longitudinal timber has an iron rub strake with is curved on the outboard end. The direction of the longitudinal timber was followed with a tape measure. This turned up sporadic vertical edge fasteners tied into the completely buried side of the vessel. At approximately 85' on the BL the end of the barge was reached consisting of a vertical end of a barge with 2 cleats. No measurements taken down at that end due to lack of time. At at least three separate spots, there were large pieces of angle iron noted standing vertically out of the bottom.

<table>
<tr><td rowspan="2">A55</td><td></td><td>
</td></tr>
<tr><td></td><td>The site located during AK's dive is designated A55. This is almost certainly an almost completely buried, edge fastened barge. The nature of the curved strapping is completely unknown at this point</td></tr>
</table>

	1320	AK out of the water
A38 A4 A55	1600	PAL into the water. Decided that the best strategy was to have PAL visually survey a larger area to make sure nothing was missed between A55 and the original site found at A38 (during ROV survey) which could be seen from the dive boat now that the waves had settled out. PAL looked at A38, believes it is part of a barge, but identification is unclear due to box features which can't be explained yet. PAL then did a shoreline survey starting +/- 100' from the barges at A4 +/- 100' from the shoreline and parallel to shoreline. 1st pass was from +/- 100' A4 running about 400'. Sweep was then stepped 50' out and survey back toward A4. PAL then came back to the boat, got the camera and filmed A38 and A55.
	1700	PAL out of the water. Done diving for today. Heavy rain.
	1730	Back at the Marina. Break down gear.
	1800	Depart Marina for the day.

October 26, 2010		
	0715	Depart hotel. Get lunch.
	0730	Arrive at Marina. LCMM crew: AK, ST, AC & PAL. Safety briefing with KM, PP, & Drew Falder, Shipherd Densmore & Ken Thomson. Gear up for dive operations. Dive plan is to finish documentation of A38 & A55 then move onto A 33 or A35 depending on conditions, Weather is clear. 65F, light winds out of the south.
	0845	Depart Marina for A38/A55.
A38 A55	0920	AK into the water at A55. A55 (barge) documentation of completed. No significant new observations. Barge is almost completely buried. Both ends are exposed. The shoreward side has some remnants exposed above the bottom in the form of edge fasteners and angle iron. The side away from the shore has much less exposed. One piece of angle iron was observed with a tire around it. A38 (original site) was looked at after the barge. A38 was documented. The site appears to be a dock or some part of marine infrastructure. The side is not a barge based upon lack of appropriate fastenings at corners and presence of framing on both sides of planks. Most likely a bulkhead dock/pier. The site has two 2' x 2' rectangular wooden boxes constructed of vertical planks. The use of the features is unclear, but likely critical to the identification of the site. At one end of the feature, there is also a mortise. The mortise suggests that the exposed timbers are at the top of the original structure. A turnbuckle was noted near one of the box features.

<table>
<tr><td>A38
A55</td><td></td><td>




</td></tr>
<tr><td>A35</td><td>1056</td><td>PAL into the water to look at A35. The site was easily found visually from the surface. PAL takes a while sorting the site out. He reports that it is a boat. Type unknown-possibly a canal boat . Very little is exposed above the bottom. He did a measured sketch of the site.</td></tr>
<tr><td></td><td>1145</td><td>PAL out of the water. After some discussion of the site, AK stages in.</td></tr>
</table>

A35	1211	AK into the water. Site lies in approximately 4' of water. Very little of the site is actually showing. The end farther from shore is likely the stern. The stern is the best preserved portion of the boat consisting of a sternpost, frames and planking. The shape of the stern seems to be scow-like. An iron rub rail was noted on the exterior of the port side. The planking goes from outboard of the frames to on top (interior) of the sternpost. The stern post is vertical with an iron plate on the side and what might have been a gudgeon, however, it was too buried to tell with certainly. The frames are arranged in a scow-like pattern. There are also a pair of lodging knees(?). The starboard side of the stern does not have any frames preserved. The boat amidships had two longitudinal beams. The beams were angled downward toward the stern with the bow end about 1' above the bottom. Their nature is unclear-perhaps cylinder timber. There is a large coil of wire rope amidships. The bow seems to be largely buried. The keelson is visible along most of the forward half of the boat. Probing inside the vessel revealed hull structure buried from 6" to 3' deep.
	1257	AK out of the water
	1320	Boat GPS takes bow/stern locations for A35
	1430	Depart Marina for A33
A33	1500	AC into the water at A33. AC quickly finds the anomaly source fairly quickly. Described as iron post sticking out of an otherwise non-descript soft bottom. The posts were 8" long x 6" wide with 6" gap between them. Standing 12" above the bottom. Probed around and hit structure immediately around, but nothing 8' away. Did not find anywhere else further away. Art did circle searches at 20 & 30 feet. Did not locate anything else. The identification of the iron objects is unknown, however, their mass is certainly the source of the anomaly.
	1533	AC out of the water. Extensive discussion about A33 and how to proceed. Decided to come back with metal detector to more clearly define boundaries.
	1600	Depart A33 for Marina
	1615	Arrive Marina. Breakdown gear for the day. Forecast for tomorrow looks bad.
	1630	Depart Marina
	1645	Arrive hotel

October 27, 2010		
	0720	Depart hotel. AK,ST, PAL, AC
	0735	Arrive Marina
	0815	Safety briefing. AK, PAL, AC, St, Kelly Miller, Shipherd Densmore & Alex Costa. Dive plan is to go to A1 & A2 with PAL and AC to do dives 1 & 2 to do first look at A1 & 2 (Salina Pier).
	0835	Depart Marina for A1 & 2.
A1 & 2	0840	Arrive A1 & 2. Visibility is very poor +/- 2'. Decide based on poor condition to move onto A33.
	0855	Depart A1 & 2 for A33

A33	0900	Arrive A33
	0925	PAL into the water at A33 with video camera. PAL reports that A33 is a boat. The iron pieces sticking up were bitt posts. There is chain strewn around them. There is a bow/sternpost. The wreck is very buried. A sweep 70' off the bitt posts did not turn up anything in that visual survey.
	0943	PAL comes to surface drops off camera.
	0948	PAL back down to document exposed remains.
	1013	PAL out of the water. PAL notes suggest the boat is a canal boat-possibly all iron. Extensive discussion of process for A33. Decide the A33 will require supplies not currently on the boat (probes & metal detector) to properly assess. Instead of A33, we will stage a dive on A38 to mark A38 and A55, so that good coordinates can be recorded. Winds are also picking up out of the SW.
	1045	Depart A33 for A38
A38	1055	Arrive A38. Surface conditions suggest no visibility at the sites.
	1109	AK into the water. A38 is marked with 2 buoys as A55. For mapping locations, see pg. 28 for A38 & page 27 for A55 (referencing original field log, not transcribed log). A= Post on westernmost extent of remains of A38: N-43, 04'20.7211; W 76-10'38.5978 B= Post on eastern side of remains of A38: N-43-04'20.6225; W-76-10'38.8942 C= Post adjacent to southeastern corner of A55: N-43-04'21.2517; W-76 10'38.9880 D= Cleat at northeastern corner ofA55: N 43-04'22.0594; W-76-10'38.5154
	1149	AK out of the water. Finished with A38 & A55
	1200	Look at A1 & 2 again. Still no visibility and the silt plume has moved out over A33. Head for Marina
	1215	Arrive Marina for lunch. Wind picks up to 20-25 SW. Eat lunch and end dive operations due to wind.
	1300	Depart Marina
	1330	Arrive Lowes to pick up probes for A33
	1440	Arrive hotel
	1445	Go to pool to get ST trained on Aga.

October 28, 2010		
	0720	Depart hotel. LCMM crew; AC, AK, PAL, ST
	0740	Arrive Marina. Safety briefing with Kelly Miller, Peter Petrone, Shipherd Densmore & Alex Costa. Prep gear, load boat. Dive plan is to look at A1 & 2, assess visibility. If visibility is reasonable, put AC & PAL in to do preliminary work on site. If visibility is bad, go to A33 and have AC find the stern.
	0820	Depart Marina for A1 & 2.
A1&2	0830	ArriveA1 & 2. Visibility is 18". Move on to A33

A33	0845	Arrive A33. Prep AC for dive-specifically rig probes with tools attached so that the diver can stay off the bottom. The goal of the dive is to determine the boat's beam and see if there is any part of the stern protruding above the bottom.
	0915	AC into the water. AC reports that the boat is wooden. Attempt to measure beam was problematic due to difficulty in telling hatches from walkways from side of boat due to buried nature of vessel. Beam was taken 18' aft of the forward end of the stem. Measurement on the beam BL was 19', although AC doesn't have a lot of confidence in that number. With slope, the beam could be 17 ½ '. AC ran BL out 100' west, which was the orientation based on the alignment of the stem and bitt posts. No remains found visually in the area. AC hit solid structure at 97' on the BL buried+/- 3'. Site continues to be very difficult to work on due to extraordinarily silty conditions.
	0952	AC out of the water. Discussion of PAL's dive plan. Strategy is to probe along one gunwale as far as possible to try to locate the stern.
	1020	PAL into the water. PAL probes along port side. Difficulty in probing due to layer of hard sediment (Solvay waste?) just below surface. Once this layer is punched through, the boat below could be located. PAL worked along the port side at about 95'. He intersected AC's BL tape. At this point he found the tiller & tiller bar extender standing above the bottom. The rudder post was buried, but easily found just below the sediments. The length from the forward face of the stem to the after face of the rudder post was 95'5". The tiller is typical canal boat type-graceful curve with iron tiller bar extended. No other part of the stern was visible. PAL then left the stern to work on the beam measurement. New measurement is 17'6". Surface conditions continue to deteriorate during this dive with 25-30 mph gust SW. Anchor drags and we have to live boat PAL.
	1104	PAL out of the water
	1120	Depart site for the day due to bad weather.
	1145	Back at the marina. Break down gear.
	1200	Depart Marina for Hotel
	1210	Arrive hotel. Lunch
	1330	Go to Parson's office. Meet with Pete Petrone. Discuss project status.
	1400	Return to hotel. Work on notes. AK drafts A33, ST drafts A38.

October 29, 2010		
	0715	Depart hotel: ST, AK,AC & PAL
	0730	Arrive Marina
	0745	Safety briefing with Pete Petrone, Kelly Miller, Alex Costa & Shipherd Densmore. Gear up for dive ops. Weather conditions marginal with SW wind 15-20, rain showers 50F.
	0815	Take forecast for the day. Weather is predicted to deteriorate with wind building to 25 mph. Call off dive

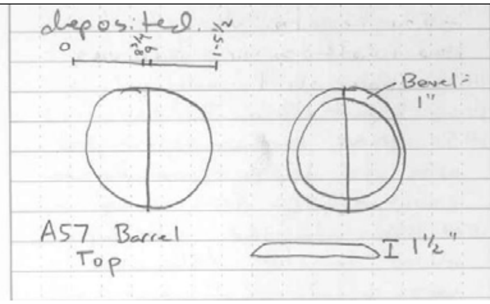
		operations. Off load gear.
	0845	SD, KM, & AK depart marina to retrieve A33 buoy.
	0910	Return to marina with buoy. Pull RV Lophious.
	0945	Depart Marina for Vermont.
A35 A33	Onondaga Lake Coordinates	
		A35 Bow: N 43 4’ 16.2913 W 76 10’ 43.2593 (? 2513?) A35 Stern: N 43 4’ 16.6700 W 76 10’43.9498 A33 Bow: N 43 04’ 21.8310 W 76 10’ 55.9361
	1500	Arrive Vergennes, VT. End of Diving Fieldwork

Onondaga Phase 1B Diving - 2011

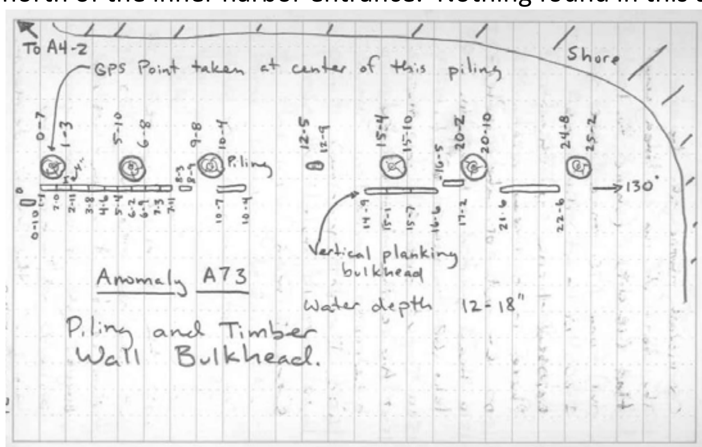
June 20, 2011		
	0900	Arrive LCMM, prep for Onondaga Phase 1B diving survey. Pull inflatable from North Harbor, clean and go through equipment. Multiple discussions today with ST and PAL about project logistics.
	0430	Depart LCMM. PAL with truck and trailer departed a bit earlier.
	0445	Arrive Crown Point ferry.
	0510	Arrive Crown Point park and ride to pick up ST.
	2130	Arrive Liverpool, NY. Check in hotel. End of day.
June 21, 2011		
	0600	Meet in hotel lobby: Sarah Tichonuk, Pierre LaRocque, Adam Kane.
	0630	Depart hotel.
	0645	Arrive Liverpool Marina. Gear up, set up inflatable.
	0700	CRE crew arrives: Chris Wright, Ship Densmore.
	0730	Parsons crew arrives: Kelly Miller, Dale Dolph, and Pete Petrone. Also Bob Edwards (NYSDEC).
	0830	Safety briefing/site orientation with entire crew. Discussion of safety procedures, boat operations, dive safety and project goals.
	0915	Continue to gear up for dive ops - plan will be to dive verify potential archaeological targets.
	1030	Done with gear prep - *Lophius* is loaded.
	1115	Lunch.
	1140	Depart Liverpool Marina en route to A36 for target verification.
A36	1200	Arrive at A36 buoy location. AK to suit up for first dive.
	1247	AK into the water at A36. Water depth +/- 7’, weeds stand 2’ above the bottom. Initial search at the down line did not reveal anything. Visibility approximately 1½’. AK returned to boat to get metal detector. Anomaly was located in about 2 minutes of metal detecting. Anomaly source was an isolated 10’ length of wire rope.
	1258	AK out of the water.
	1305	Depart A36 for A34.
A34	1325	AK into the water at A34. Located a rock mound near A12 (Spud barge). The extent of the mound was recorded with 4 GPS points. The anomaly consists of a pile of stones-varying sizes from baseball to basketball size. In the middle, the mound stood 1’ to 1½’ above the surrounding bottom tapering at the edges. Metal detecting in the mound located several iron artifacts including a 2’ long section of iron railroad rail and an unidentified iron circular object. The site conditions were marginal with 1’ visibility and moderate aquatic vegetation, making documentation more difficult. The mound is cultural in origin, most likely the result of a barge clearing its deck load. Looked extensively for any evidence of wooden structure

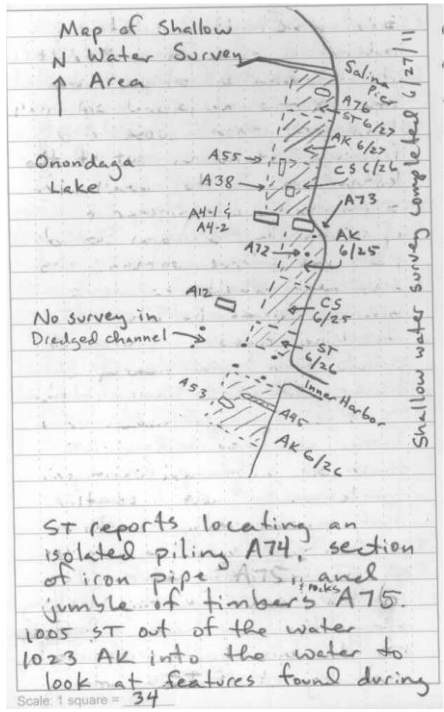
		which might suggest an underlying wreck or that the mound is some type of pier, but nothing of that nature was apparent anywhere. The magnetic signature was certainly the result of the ferrous debris mixed in the mound. The pieces of iron debris found with the detector were within the mound and partially buried, indicating their deposition was contemporaneous with the stone pile formation. GPS locations for A34: A34-A 928190.48 1118625.36 A34-B 928228.86 1118605.64 A34-C 928202.01 1118607.95 A34-D 928212.10 1118628.93 The dimensions of the rock pile are 42½' x 23½'.
	1416	AK out of the water.
	1430	Head back to marina to pick up 6 volt batteries for the comms unit.
	1530	Depart Liverpool Marina for A6.
A6	1606	ST into the water to verify A6. After a few minutes of searching, ST returns to the boat for metal detector. Patches of aquatic vegetation with open areas of solvay waste. Some weed very high; others relatively low. No cultural objects seen. CW looked at sonar data and believes that the original acoustic anomaly was a solvay waste shelf.
	1649	ST out of the water.
	1710	Depart worksite for marina.
	1720	Arrive marina. Break down gear.
	1750	Depart Marina. End of day.
June 22, 2011		
	0600	Meet with ST & PAL for breakfast. Weather looks bad with scattered T-storms all day. Kelly Miller calls. We discuss weather outlook and call it a weather day.
	0700	AK, ST & PAL meet to discuss survey methodology for Syracuse Maritime Historic District (SMHD).
	0830	Depart hotel for marina. Inventory necessary gear for SMHD survey.
	1000	Depart marina for supply shopping. West Marine and Home Depot for survey supplies.
	1200	Lunch.
	1300	Back at marina. Set up four reels, each with 1000' of poly line. The survey strategy for the Syracuse Maritime Historic District is to set up transects at set intervals using the reel and travel lines with mushroom anchors at either end to hold the line in place on the bottom. The survey transect will be placed in a pre-determined location by putting drop weights without markers at either end of the transects. [drawing of transects] Transects are 1000' long, running perpendicular to the shoreline.
	1500	Arrive back at hotel. End of day.
June 23, 2011		

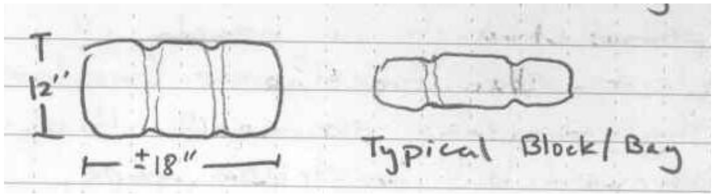
	0600	ST, AK & PAL meet for breakfast.
	0645	Discuss weather outlook with Kelly Miller. T-storms associated with a front are moving through this morning. Delay start until 0730.
	0730	Arrive on site. ST, AK, & PAL. SD & CW of CRE and KM of Parsons already on site. Prep gear for the day. Issues with the inflatable outboard. Fuel line will not keep pressure. Pulled the outboard off and will send it back to Vermont with PAL tonight. Parsons has an outboard that we are trying to acquire. The plan today is to do the visual survey of the SMHD, but this is dependent on the inflatable being up and running.
	0915	Depart Marina.
	0930	At DOT Turnaround to pick up 25 hp outboard from Dale Dolph. Hook up motor to inflatable.
	0945	Depart turnaround. Inflatable outboard cuts out. Extensive time spent trying to get outboard to run.
	1100	Abandon inflatable. Put it out at anchor. Start laying out transects with just *Lophius*. Takes about an hour to lay out two lines.
	1200	Done laying out two lines. Gear up to survey these lines. PAL to dive. ST as safety diver.
	1215	PAL into the water. Examined lines 3 & 4.
	1240	PAL out of the water. He reports near zero visibility in waters deeper than 10’ and 1-2’ visibility in shallow water. The entire survey area was very weedy. No cultural resources or other notable features were observed.
	1255	Pull both survey transects.
	1330	Done pulling transect lines. Head back to marina to drop off inflatable and get a new dry glove for PAL. The survey methodology designed for the SMHD has proven ineffective. The low visibility and complicated nature of the reel system are serious impediments. The low visibility in particular, greatly diminishes the effectiveness of a diver survey. The dive would need to run into a resource to find it. New methodology for the SMHD: Diver survey of shallow areas where there is no magnetic data and a re-examination of the extant CRE magnetic data. CW and AK looked at the data during the return trip to the marina. There are no large complex anomalies left that have not been examined, but there are numerous smaller, lower intensity anomalies that could be looked at. We marked 25 magnetic targets for verification.
	1400	Back at Marina.
	1420	Depart Marina.
A56 A59	1430	Arrive southern SMHD to deploy four marker buoys. A56-A59.
A56	1531	PAL into the water with metal detector. A56, which was a low amplitude mag anomaly, remains unresolved. PAL located small modern trash (soda can) and several buried anomalies, but nothing that could be conclusively identified. The buried metallic anomalies could not be found with modest hand probing, so they were left unresolved.
A57 A58	1555	PAL back into the water with metal detector on A57. A57 was determined to be a wooden barrel with iron hoops. The barrel lid was brought to the surface for documentation and redepositied.

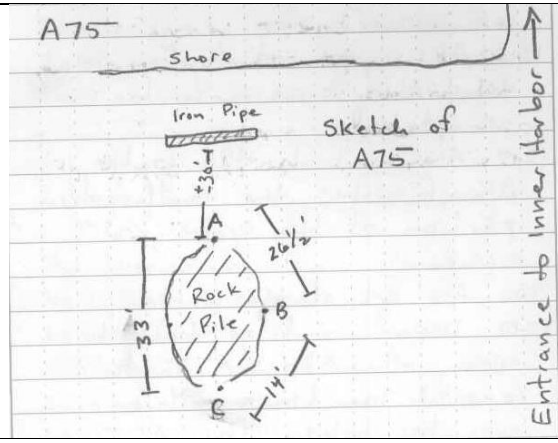
		 After A57, PAL swam over to A58 which was determined to be a disintegrating 55 gallon drum. The sheet iron was falling to pieces. Two parts were brought to the surface and photographed.
A59	1630	PAL back into the water at A59, verified to be a long coil of wire rope.
	1640	PAL out of the water. End of dive operations for the day.
	1700	Depart dive site.
	1710	Arrive Marina
	1730	Depart Marina. PAL departs for Vermont.
	1945	Chris Sabick arrives in Liverpool.
June 24, 2011		
	0600	Meet for Breakfast. AK, ST, and CS.
	0645	Depart hotel.
	0700	Arrive marina. CW & SD from CRE are here already as well as KM from Parsons. CS gets safety overview from KM. Gear up for the day. The plan is to dive verify magnetic anomalies in the SMHD. The weather looks marginal with scattered T-storms all day.
	0815	Safety briefing. AK, ST, CS, CW SD & KM. T-storms approaching.
	0900	Still waiting for T-storms to pass.
	0905	Depart Marina.
A60-A64	0915	Arrive dive site. Deploy five marker buoys at magnetic anomalies. A60 – A64.
	0950	ST into the water. First target is A60. A60 too buried to be conclusively identified; however, a ferrous target was located in the correct spot. ST moved the buoy so that we could take an exact coordinate on the feature.
	1023	ST move on to A61.
	1040	ST moves from A61 to A62. Comms have gone out, so no information on A61.
	1055	ST out of the water. A60 is an anomaly with 3' diameter signature. ST could not find 3' down. ST could not locate A61 or A62.
	1122	AK into the water. Examined A60. Located anomaly. Hit something hard 4' down. The object was not large, but considerably

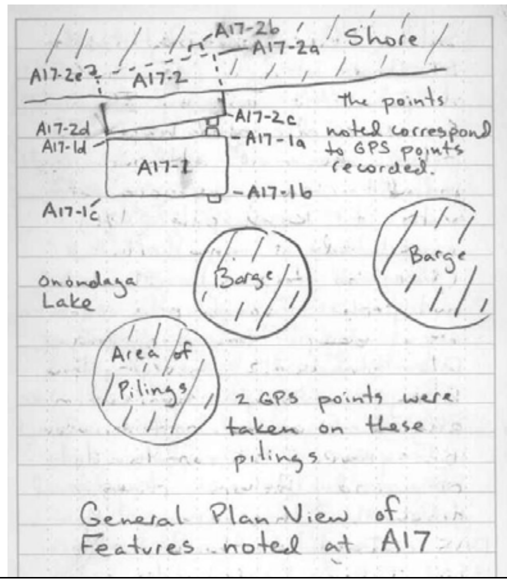
		buried. A61 & A62 – could not find. A63 was located. Probing suggested it was buried approximately 3'. The anomaly based on the detector was quite large. A64 could not be located. Markers for A63 & A60 were moved and will have new coordinates taken.
	1245	Pulling buoys for A60-64. A61 when being pulled is determined to be 30' off the original mark.
	1250	Moving onto new set of anomalies. Deploy five marker buoys.
	1310	Head back to marina to avoid T-storm.
	1320	Arrive Marina. T-storm visible in Syracuse. Break for lunch.
	1410	Depart marina. Going back to SMHD.
	1420	Arrive dive site.
A11	1430	CS into the water at A11 to reinvestigate 2010 target. All confirmed as two pieces of cast iron pipe, approximately 15' long with a 9' long piece of solid iron stock resting on top of them.
	1440	CS out of the water. Boat moved over to A65.
A65	1449	CS into the water at A65. Could not locate A65 with metal detector.
A66	1510	CS into the water at A66. Could not locate. Unresolved.
	1527	CS out of the water.
A67	1535	CS into the water at A67. Storm comes up 15-20 mph winds with higher gusts. Recall CS.
	1555	CS out of the water. Head back to marina. CS did not locate anything at A67
	1615	Back at marina. Break down gear for the day.
	1650	Back at hotel. End of day.
June 25, 2011		
	0600	ST, AK & CS meet. Go out to breakfast.
	0700	Arrive Liverpool Marina. Prep gear for the day. The forecast if for scattered T-storms. The plan for the day is to dive verify mag targets in the SMHD. Other crew: SD, & CW from CRE and Dale Dolph from Parsons.
	0800	Depart Marina
A69-71	0810	Arrive SMHD and pull markers left out from yesterday. Drop 3 markers in shallow area between A12 and A-4-1 & A4-2. Marked A69-71.
	0900	ST into the water at A69. Metal detecting at A69 yielded several fragments of slag, an iron step to a ladder, and several other smaller pieces of sheet iron.
	0925	ST moves onto A70. The metal detector battery died after completing most of A70, without finding anything. While moving between A708 & A69, ST located series of pilings. ST documented the pilings now labeled as A72.
	1105	ST out of the water.
A73	1123	AK into the water for a visual survey of the shallow water bottomlands between A70 and A4-1 & A4-2. The entire area was very shallow, maximum depth of 4'. Underwater visibility was 1 to 1½' with aquatic vegetation covering about 50% of the

		survey area. A pier feature was located in the northern corner of the survey area. This pier feature is designated A73. The pier consists of seven pilings with each standing approximately six inches above the bottom. The tops of the pilings were flat, i.e. cut, meaning that the upper surfaces are the tops of the pilings as exposed during its use life. There is a linear arrangement of vertically oriented planks paralleling the pilings, but located 4" south of the line of pilings. The interior of the piling behind the bulkhead is filled with stones (based on probing). The structures (pilings and bulkhead) stand 2 to 8" above the bottom. A GPS point was taken at the piling farthest from the shore and the orientation was 130.
	1305	AK out of the water.
A71	1329	CS into the water to dive verify A71 and visually survey the area from A71 south. At A71, nothing was found with the metal detector CS visually surveyed the shallow water area along the shoreline (shore to 150' out) from A70 to a point +/- 200' north of the inner harbor entrance. Nothing found in this area. 
	1500	CS out of the water.
	1510	Head over to A72 to take GPS measurements.
	1520	Depart dive site for marina.
	1527	Arrive marina. Breakdown gear.
	1600	Depart marina.
	1610	Arrive hotel. End of day.
June 26, 2011		
	0600	ST, AK & CS depart hotel for breakfast.
	0705	Arrive Marina. CW & SD from CRE here as is KM from Parsons.
	0755	Safety briefing.
	0805	Depart marina. Dive plan is to continue surveying shallow water SMHD. ST first diver working from point a bit north of the

		inner harbor entrance down to the dredged channel. Some concern today as there is a carp fishing tournament and no license fishing day.
	0820	Arrive dive site.
A74 A75	0838	ST into the water, shallow water survey starting along the northern edge of the inner harbor channel working north.  ST reports locating an isolated piling A74 section of iron pipe and jumble of timers and rocks A75.
	1015	ST out of the water.
	1023	AK into the water to look at features found during ST's dive. The isolated piling is exactly that (A74). It is likely a piling from one of the adjacent dolphins that has torn loose and is now standing out of the bottom at a 45 degree angle. The piling has a diameter of approximately 12" and stands 12" above the bottom. A75 was determined to be a pile of rocks. The pile was one layer deep. It could be probed through in nearly all places. The stones were limestone. The pipe was examined. It was an isolated cast iron pipe, 12" in diameter approximately 10' long. It was located 50' immediately in shore of A75. It was not given a number designation due to the isolated nature of the find.
	1057	AK out of the water so that the boat can move over to the shallow water survey area south of the inner harbor channel.
A53	1113	AK back into the water to survey the bottomlands (in the area of A53 & A45). A45 (breakwater) was located. Examination

A45		showed the site to be constructed of bags of concrete. Each concrete block was pillow shaped with two indentations from band that went around the bags.  The breakwater was clearly built by throwing bags of concrete into the water. A53 was found during the survey. The remains were consistent with what was shown during ROV/sonar work and what was stated in the report. Numerous pieces of A53 were located around the wreck, particularly to the southeast. Disarticulated pieces included several frame sections, which were of cocked hat construction like the wreck itself. Each disarticulated piece was examined in detail to make sure it was not a larger section or a new wreck.
	1211	AK swaps out tanks so that this area can be completed.
	1217	AK back into the water. AK finishes the southeastern portion of the SMHD.
	1300	AK out of the water.
A74 A75	1310	Depart and go back to area of A74 & A75 to record locations. Three points taken for A75.
	1320	Depart A74 & A75 area.
A55 A38	1335	CS into the water for the shallow water survey of the area immediately north of A4-1 & A4-2. CS relocates A55 and A38. No other finds in this area. CS surveys from A4-1 to A55.
	1515	CS out of the water. End of dive ops for today.
	1525	Pull dive flags from survey area.

		
A17	1535	Arrive at A17 for inspection to determine documentation approach. Inspection shows the site to be two barges resting side by side. The inshore barge is about 50% buried. The approach will be to document the inside barge with chest waders and the outside one on scuba.
	1550	Arrive at marina.
	1600	AK departs to go out to buy chest waders.
	1640	AK returns to marina with waders.
	1650	Depart marina.
	1705	Arrive hotel. End of day.
June 27, 2011		
	0700	Arrive marina. ST, AK & CS. Already at marina, SD & CW of CRE and KM & Pete Petrone of Parsons. Load gear. The plan for today is to document the barges at A17, followed by more shallow water survey in the afternoon.
	0745	Safety briefing.
	0820	Depart marina for A17.
A17	0830	Arrive A17. Proceed to document A17-2 (inshore barge) and A17-1 (outer barge). The barges are identical spud barges. The ends closest to the spud holders are vertical with vertical planking. The sides are vertical sides, built plank-on-frame. Approximately half of A17-2 is buried below the shore. Much of the machinery is not visible and/or gone, as opposed to A17-1, where the flywheel and other machinery is evident. The non-spud holder end of the barge is raked with transverse planking. Phragmites cover about ½ of A17-2. A17-1 was not documented in as much detail as A17-2 because it will not be impacted by the proposed shoreline improvements. Much of the interior structure of A17-1 is clearly visible, all the way down to the stringers and floors. The barges are both very shallow with a depth of +/- 3'. The hull structures consisted of planking, floors, and stringers. Those three, all connected, made up the entire depth of hull. The non-spud end of A17-1 had a mound of concrete immediately adjacent to it. Inspection of the concrete suggested that it was formed by pouring it into

		that end of the barge, likely as ballast for the spuds and machinery on the other end. It was likely pulled out and dumped so that the vessel could be pulled into shallow water next to A17-2. While departing A17, a series of pilings were seen from the boat with tops about 4' from the surface. Visual examination elsewhere around A17 showed that there were at least two other offshore barges, however, extremely dense vegetation (particularly inside the barges) make it impossible to conclusively determine the extent of the barge remains. The pilings appear to correspond with the two barges onshore indicating that the barges formed the shore end of a pier structure. 
	1045	Depart A17.
	1100	Arrive at the northern end of the SMHD. Spud boat immediately south of the Salina Pier.
A76	1124	ST into the water for shallow water survey from Salina Pier working south. ST finds a rock pile south of pier. 41' long by 24' wide. The rock pile also has one piling near it, although it is not clearly associated with it. Rock pile A76 consisted of small rocks (8" or so typical). ST could not probe through pile suggesting it is deeper than one layer. Pile stands +/- 12" above bottom. Piling is a single square timber angled from the bottom, about 10" square. ST reports lots of woody debris, tires and trash in the area.
	1305	ST out of the water.
	1320	Taking coordinates of A76.
	1335	AK into the water to survey last remaining bit of SMHD. Extremely dense collection of tires and woody debris. Visibility about 1 foot. No sites found.

	1430	AK out of the water.
	1445	Mark targets A77, A78 and A79.
A77 A78 A79	1503	AK into the water to dive verify. A77 is in about 7' of water. The area is filled with metallic trash including a tin can, zinc attachment for a boat and a small metal fragment. No features were found that were the likely source of the original mag anomaly. A78 was confirmed as several feet of iron wire; seemed similar to fence wire, very corroded. An aluminum can was found at A79, but this was not the source of the anomaly.
	1615	AK out of the water.
	1630	Back at the marina.
	1710	Arrive back at hotel. End of day.
June 28, 2011		
	0600	Breakfast ST, AK & PAL. C. Sabick rotated out last night, replaced by P. LaRocque. Plan for the day is to finish dive verifying mag targets in the SMHD and take sediment samples inside barge A20. Weather outlook is not good with afternoon T-storm predicted.
	0730	Safety briefing: AK, PAL, ST and CW & SD from CRE and KM & Pete Petrone from Parsons.
	0750	Depart marina for dive ops.
	0800	Arrive SMHD to deploy markers at magnetic anomalies.
A37	0848	PAL into the water at A37. PAL found that he could detect an anomaly in multiple locations, but could not verify. At several high anomaly points, he used the six foot probe to attempt to find it. The probe could be sunk down its entire depth without hitting any resistance. Conditions were a flat silty bottom with only sporadic vegetation. Depth was 15'.
	0920	PAL out of the water. Taking him over to the next anomaly.
A80	0930	PAL into the water at A80 which is adjacent to the inner harbor. The area was characterized by lots of garbage collected into a slight depression. Numerous bits of garbage made finding the actual source of the mag target impossible. This target is very likely the depression left from a mooring to an old navigational marker. Source is probably pieces related to an old marker.
	0950	PAL out of the water.
A81	0958	PAL into the water at A81. A81 verified as a motorcycle heavily corroded and in pieces. The seat was recovered and photographed.
	1010	PAL out of the water.
A82	1024	PAL into the water at A82. Verified as a 55 gallon drum.
A83	1040	PAL back into the water. Swapped out tank. Verification of A83. Pal found a series of disarticulated wooden and metal debris there. A section of wooden debris was brought up and documented. It consisted of an 8' sheet of plywood with two ringbolts and 2 pipe fittings. It was fastened to other pieces with sheet rock screws. One side still had paint on it. It is likely a piece of an ice shanty. A second smaller, stout piece of wood was recovered. Timber is 3'1" long by 3" wide and thick. The wood is very solid, probably oak. It has three fasteners in it. This timber appears historic in nature, but appears to be

		an isolated find.
	1100	PAL out of the water.
A84	1115	PAL into the water at A84. Verified as a pile of paint cans and bottles.
	1130	PAL out of the water.
	1145	Depart SMHD. Finished with verification in this area.
A20	1217	AK into the water at A20 Barge. Took samples at each with a lexane tube. Both areas had a dense layer of zebra mussel shells (3-4" thick) overlying softer sediment.
A19	1247	AK out of the water. Move boat over to A19 and mark for verification.
	1304	AK into the water. The A19 area is 5-6' deep with extraordinarily dense aquatic vegetation. Extensive metal detecting did not yield any metallic anomalies.
	1333	AK out of the water.
	1400	Arrive back at the marina. Done with dive ops for this project. ST & CW begin setting up the ROV. T-storms look imminent, so we won't likely get back out on the lake today. ST preps ROV for debris inspection tomorrow. AK & PAL work on and send out response to safety concerns about foot punctures through dry suit booties.
	1500	Depart marina.
	1510	Arrive hotel. End of day.
June 29, 2011		
	0700	Arrive at marina, PAL, ST & AK. SD & CW of CRE and KN & PP of Parsons are here. Weather is overcast with 10-15 mph winds and gusts to 20-25 mph. The weather is not operational, so there is a discussion as to project plans and priorities. The cultural resources work as per the SOW is completed. The work left now is the ROV inspection of debris targets. PP gets authorization from Ed Glaza to do ROV work next week. The plan is to demobilize LCMM and CRE crew, leaving *Lophius* at Onondaga Lake. The ROV crew will mobilize on Tuesday, July 5th, weather dependent, for 1½ to 2 days of ROV debris verification work. With that plan in mind, LCMM and CRE crew demobilized, packing all dive and archaeology gear.
	1045	Depart marina, having completed demobilization, for the hotel.
	1125	Back at the Marina.
	1130	Lunch.
	1210	Depart Liverpool for Vermont.
	1640	Arrive LCMM. Offload inflatable and ROV.
	1710	Depart LCMM.
	1715	Arrive PAL's house. Pack up personal gear. End of Phase 1B Diving Project.

APPENDIX 2: DIVE LOGS

Dive Log • Lake Champlain Maritime Museum • 4472 Basin Harbor Road • Vergennes • VT • 05491

Date: 10/25/10 **DSO:** Art Cohn **ADSO:** Pierre LaRocque **Log No.:** 1

Dive Site: Onondaga Lake

Reason for Dive: Phase IB Dive Survey

Weather: cloudy showers **Depth Range:** 0-4' **Water:** 60 °F **Air:** 65 °F **UW Vis.:** 4-5'

		DIVE 1							DIVE 2						
Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
1	Adam Kane	36%	3000	2:02	3:20	900	3'	/							/
								/							/

Dive Notes: Dive on A38 – found new barge wreck A38-B

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
2	Pierre LaRocque	36%	3000	4:00	5:00	1800	4'	/							/
								/							/

Dive Notes: Found A38, surveyed shoreline & video'd A38 & A38-B

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
3								/							/
								/							/

Dive Notes:

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
4								/							/
								/							/

Dive Notes:

DAN Emergency Phone Number: (919) 684-9111

Dive Log • Lake Champlain Maritime Museum • 4472 Basin Harbor Road • Vergennes • VT • 05491

Date: 10/20/10 **DSO:** Art Cohn **ADSO:** Pierre LaRocque **Log No.:** 2

Dive Site: Onondaga

Reason for Dive:

Weather: partly sunny **Depth Range:** **Water:** °F **Air:** 70 °F **UW Vis.:**

		DIVE 1							DIVE 2						
Team No.	**Name**	**Dive Gas**	**Tank PSI**	**Time In**	**Time Out**	**Tank PSI**	**Max. Depth**	**Rep. Group Out/In**	**Dive Gas**	**Tank PSI**	**Time In**	**Time Out**	**Tank PSI**	**Max. Depth**	**Rep. Group Out/In**
1	Adam Kane	36%	2175	9:20	10:05	800	4'	/							/
								/							/

Dive Notes:

Team No.	**Name**	**Dive Gas**	**Tank PSI**	**Time In**	**Time Out**	**Tank PSI**	**Max. Depth**	**Rep. Group Out/In**	**Dive Gas**	**Tank PSI**	**Time In**	**Time Out**	**Tank PSI**	**Max. Depth**	**Rep. Group Out/In**
2	Pierre LaRocque	31%	1740	1056	1145	700	5'	/							/
								/							/

Dive Notes:

Team No.	**Name**	**Dive Gas**	**Tank PSI**	**Time In**	**Time Out**	**Tank PSI**	**Max. Depth**	**Rep. Group Out/In**	**Dive Gas**	**Tank PSI**	**Time In**	**Time Out**	**Tank PSI**	**Max. Depth**	**Rep. Group Out/In**
3	Adam Kane	36%	2800	12:11	12:57	1600	3	/							/
								/							/

Dive Notes: A33 43 04.35895 N 1119809.06
-76 10.93195 E 927387.48

Team No.	**Name**	**Dive Gas**	**Tank PSI**	**Time In**	**Time Out**	**Tank PSI**	**Max. Depth**	**Rep. Group Out/In**	**Dive Gas**	**Tank PSI**	**Time In**	**Time Out**	**Tank PSI**	**Max. Depth**	**Rep. Group Out/In**
4	Art Cohn	36%	2600	3:00	1533	1700	25	/							/
								/							/

Dive Notes:

DAN Emergency Phone Number: (919) 684-9111

Dive Log • Lake Champlain Maritime Museum • 4472 Basin Harbor Road • Vergennes • VT • 05491

Date: 10/27/10 **DSO:** Art Cohn **ADSO:** Pierre LaRocque **Log No.:** 3

Dive Site: Onondaga

Reason for Dive:

Weather: Sunny, 68°F **Depth Range:** **Water:** °F **Air:** 68+ °F **UW Vis.:**

		DIVE 1							DIVE 2						
Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
1	Pierre LaRocque	36%	2966	9:25	943	1900	26'	/	36%	1900	948	1013	924	26	/
								/							/

Dive Notes: A33 Dive 1 - Video, Dive 2 - document

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
2	Adam Kane	36%	2800	11:09	11:49	1700		/							/
								/							/

Dive Notes:

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
3								/							/
								/							/

Dive Notes:

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
4								/							/
								/							/

Dive Notes:

DAN Emergency Phone Number: (919) 684-9111

Dive Log • Lake Champlain Maritime Museum • 4472 Basin Harbor Road • Vergennes • VT • 05491

Date: 10/28/10 DSO: Art Cohn ADSO: Pierre LaRocque Log No.: 4

Dive Site: Onondaga Lake

Reason for Dive: Phase 1B Dive Survey

Weather: Clear 55° SW Wind 15-20 Depth Range: 8-26 Water: 55 °F Air: 55 °F UW Vis.: 4

		DIVE 1							DIVE 2						
Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
1	Art Cohn	36	2600	915	952	400		/							/
								/							/

Dive Notes: A33

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
2	Pierre LaRocque	36	3100	1020	1104		26'	/							/
								/							/

Dive Notes: A33 @23' = 8'9" L from fwd edge of stem to after edge of rudderpost = 95'5"

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
3								/							/
								/							/

Dive Notes:

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
4								/							/
								/							/

Dive Notes:

16 18
17

DAN Emergency Phone Number: (919) 684-9111

Dive Log • Lake Champlain Maritime Museum • 4472 Basin Harbor Road • Vergennes • VT • 05491

Date: 6·21·11	DSO: Pierre LaRocque	ADSO:		Log No.: 1
Dive Site: Location A36/A34 Onondaga -> Syracuse				
Reason for Dive: Target Verification				
Weather: Sunny light & variable	Depth Range: 7	Water: °F	Air: 83 °F	UW Vis.:

		DIVE 1							DIVE 2						
Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
1	Adam Kane	EAN 36	3000	12:47	1258	2500	7'	Location A 36	36	2500	1:25	2:16	800	5'	A34 /
	coiled iron rope 10'							/	pile of stones - 4 GPS points taken						/

Dive Notes:

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
2	~~Adam Kane~~			~~13~~				/							/
	Sarah Tichonuk	362	3200	1606	1649	2000	6'	/							/

Dive Notes:

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
3								/							/
								/							/

Dive Notes:

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
4								/							/
								/							/

Dive Notes:

DAN Emergency Phone Number: (919) 684-9111

Dive Log • Lake Champlain Maritime Museum • 4472 Basin Harbor Road • Vergennes • VT • 05491

Date: 6/23/11 DSO: Pierre LaRocque ADSO: Adam Kane Log No.: 2

Dive Site: Onondaga Lake

Reason for Dive: Phase IB Diving

Weather: Scattered T-Storms Depth Range: 1 – 16' Water: 60 °F Air: 80 °F UW Vis.: 1–3'

		DIVE 1							DIVE 2						
Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
1	Pierre LaRocque	36	3567	1215	1240	2400	13	/							/
								/							/

Dive Notes: PAL surveyed 2 lines – in deeper water 3-4' vis. in shallow water vis was ±2'. No features to report

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
2	Pierre LaRocque	36	2443	1531				/		2000	1555	1625	1500		/
								/							/

Dive Notes: Dive 1 - verify A56 - unresolved, Dive 2 - verify A57 & A58
A57 - wooden barrel, A58 - metal 55 gal drum

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
3	Pierre LaRocque	36	1500	1630	1640	1400		/							/
								/							/

Dive Notes: Dive verify A59

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
4								/							/
								/							/

Dive Notes:

DAN Emergency Phone Number: (919) 684-9111

Dive Log • Lake Champlain Maritime Museum • 4472 Basin Harbor Road • Vergennes • VT • 05491

Date: 6/24/11 **DSO:** Adam Kane **ADSO:** Sarah Tichonuk **Log No.:** 3

Dive Site: Onondaga Lake

Reason for Dive: Phase 1B diving

Weather: overcast 75°F **Depth Range:** 1-5' **Water:** 60°F **Air:** 75°F **UW Vis.:** 1-2'

		DIVE 1							DIVE 2						
Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
1	Sarah Tichonuk	36	3100	950	1055	1600	6'	/							/
	A60 A61 A62							/							/

Dive Notes: A60: 3' diameter [illegible] - unable to locate by digging 5" down. A61: some low hits on the detector, but nothing produced. (1 tin can) A63: nothing - no hits on the detector.

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
2	Adam Kane	36	2960	1122	1220	1000	6'	/							/
	A60, A61, A62, A63, A64							/							/

Dive Notes:

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
3	Chris Sabick	36	2600	1430	1440	2300	4'	/		2300	1449	1505	2000	5'	/
	" "	36	2000	1510	1527	1700		/		1700	1535	1555	1000	8'	/

Dive Notes: Dive 1: All, Dive 2: A65, Dive 3: A66, Dive 4 A67

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
4								/							/
								/							/

Dive Notes:

DAN Emergency Phone Number: (919) 684-9111

Dive Log • Lake Champlain Maritime Museum • 4472 Basin Harbor Road • Vergennes • VT • 05491

Date: 6/25/11	DSO: Adam Kane	ADSO: Sarah Tichonuk	Log No.: 4
Dive Site: Onondaga Lake			
Reason for Dive: Phase IB Survey			
Weather: Overcast 70°F	Depth Range: 2-10'	Water: 60 °F Air: 70 °F	UW Vis.: 1-2'

		DIVE 1							DIVE 2						
Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
1	Sarah Tichonuk	36	3200	900	1105	500	4	/							/
								/							/
Dive Notes: Verify A69, & A70, Document pilings (A72)															
2	ADAM KANE	36	2900	11:23	13:05	500		/							/
								/							/
Dive Notes: Survey shallow water area between A70 & A4-1/A4-2 | Document A73															
3	Chris Sabick	36	2400	129	145	2100	4'	/	36	2100	1354	1500	500	5'	/
								/							/
Dive Notes: 130° Survey shallow water area between A70 and to the south															
4								/							/
								/							/
Dive Notes:															

DAN Emergency Phone Number: (919) 684-9111

Dive Log • Lake Champlain Maritime Museum • 4472 Basin Harbor Road • Vergennes • VT • 05491

Date: 6/26/11 DSO: Adam Kane ADSO: Sarah Tichonuk Log No.: 5

Dive Site: Onondaga Lake

Reason for Dive: Phase 1B diving

Weather: Overcast 70°F Depth Range: 1-5' Water: 60°F Air: 70°F UW Vis.: 1-2'

Team No.	Name	DIVE 1 Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	DIVE 2 Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
1	Sarah Tichonuk	36	2800	838	1005	500	6'	/							/
								/							/

Dive Notes: Shallow water survey, Area immediately north of inner harbor

Team No.	Name	DIVE 1 Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	DIVE 2 Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
2	Adam Kane	36	2870	10:23	10:57	2000	3'	/							/
		36	2695	11:13	12:11	600	4'	/							/
		36	2000	12:17	1:00	1175	4'								

Dive Notes: Shallow water survey, Area South of inner harbor

Team No.	Name	DIVE 1 Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	DIVE 2 Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
3	Chris Sabick		2350	1335	1515	400	5'	/							/
								/							/

Dive Notes: Shallow water survey, Area of A4-2 to A55

Team No.	Name	DIVE 1 Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	DIVE 2 Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
4								/							/
								/							/

Dive Notes:

DAN Emergency Phone Number: (919) 684-9111

Dive Log • Lake Champlain Maritime Museum • 4472 Basin Harbor Road • Vergennes • VT • 05491

Date: 6/27/11	DSO: Adam Kane		ADSO: Sarah Tichonuk		Log No.: 6
Dive Site: Onondaga Lake					
Reason for Dive: Phase 1B Survey					
Weather: Clear 80°F	Depth Range: 1-5'	Water: 60 °F	Air: 80 °F	UW Vis.: 1-2'	

		DIVE 1							DIVE 2						
Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
1	Sarah Tichonuk	36	3400	1124	1305	600		/							/
								/							/
Dive Notes: ST surveying northern end of Syracuse graveyard area from Saline Pier moving South. ST's rock pile = 41' long by 24' wide ← A76															
Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
2	Adam Kane	36	3200	13:35	14:30	1000	4'	/	surveying [illegible] Syracuse graveyard area						
	A77, 78, 79	36	3200	15:03	1615	2000	5'	/	A77: unconclusive - tin can [illegible]						/
Dive Notes: A78: A79:															
Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
3								/							/
								/							/
Dive Notes:															
Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
4								/							/
								/							/
Dive Notes:															

DAN Emergency Phone Number: (919) 684-9111

Dive Log • Lake Champlain Maritime Museum • 4472 Basin Harbor Road • Vergennes • VT • 05491

Date: 6/28/11	DSO: Pierre LaRocque	ADSO: Adam Kane	Log No.: 7
Dive Site: Onondaga Lake Phase IB			
Reason for Dive: Phase IB dive survey			
Weather: Overcast 75°	Depth Range: 5-8	Water: 60°F · Air: 75°F	UW Vis.: 1-2'

		DIVE 1							DIVE 2						
Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
1	Pierre LaRocque (1)	36	2880	8:48	920	2000	15'	/	(3) 36	1400	958	1010	1000	7'	/
	(2)	36	2000	930	950	1400	10'	/	(4) 36	1000	1024	1035	700		/

Dive Notes: Dive 1: A37, Dive 2: A80, Dive 3: A81, Dive 4: A82,

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
2	P. LaRocque (5)	36	2929	1040	1100	2000	6'	/							/
	(6)	36	2000	1115	1130	1400	5'	/							/

Dive Notes: Dive 5: A83, Dive 6: A84

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
3	Adam Kane (1)	36	3336	1217	1247	2100		/							/
	(2)		2100	1304	1333	1500		/							/

Dive Notes: (1) coring samples at A-20 (2) Dive Verify A19

Team No.	Name	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In	Dive Gas	Tank PSI	Time In	Time Out	Tank PSI	Max. Depth	Rep. Group Out/In
4								/							/
								/							/

Dive Notes:

DAN Emergency Phone Number: (919) 684-9111

APPENDIX 3: LIST OF ACRONYMS

A.B.: *Artium Baccalaureus* (Bachelor of Arts)
A.S.: Associates of Science
ASL: Above Sea Level
B.A.: *Baccalaureus Artium* (Bachelor of Arts)
BCD: Buoyancy Compensator Device
B.L.: Base Line
B.P: Before Present
Bros.: Brothers
B.S.: Bachelor of Science
°C: Celsius
CA: cooperative agreement
c.: circa
CAC: Citizens Advisory Committee
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR: Code of Federal Regulations
cm: centimeter
c/o: care of
CPR: cardiopulmonary resuscitation
CRE: CR Environmental, Inc.
CWA: Clean Water Act
DAN: Divers Alert Network
DC: District of Columbia
DGPS: Differential Global Positioning System
DSO: Diving Safety Officer
ed.: edition
EPA: Environmental Protection Agency
ESRI: Environmental Systems Research Institute
et al.: *et alii* (and others)
°F: Fahrenheit
ft: feet
FY: fiscal year
GIS: Geographic Information Systems
GPS: Global Positioning System
hp: horsepower
i.e.: *id est* (that is [to say])
in: inch
Inc.: incorporated
Inv.: inventory
kHz: kilohertz
km: kilometer
km^2: square kilometers
kmph: kilometers per hour
kW: kilowatt
LCMM: Lake Champlain Maritime Museum
m: meter

M.A.: *Magister Artium* (Master of Arts)
mi: mile
mi^2: square miles
mph: miles per hour
Ms.: manuscript
NAGPRA: Native American Graves Protection and Repatriation Act
NAUI: National Association of Underwater Instructors
n.d.: no date
No. or no.: number
NOAA: National Oceanic and Atmospheric Administration
NPS: National Park Service
NRHP: National Register of Historic Places
NY: New York
NYDEC: New York Department of Environmental Conservation
NYED: New York Department of Education
NYOGS: New York Office of General Services
NYOPRHP: New York Office of Parks, Recreation, and Historic Preservation
NYS: New York State
NYSM: New York State Museum
p.: page
PCBs: Polychlorinated biphenyls
Ph.D.: *Philosophiae Doctor* (Doctor of Philosophy)
pp.: pages
PM: *post meridiem* (after noon)
PO: Post Office
Re: regarding
Res.: resources
RFP: request for proposal
ROV: remote-operated vehicle
RV: research vessel
SCUBA: Self Contained Underwater Breathing Apparatus
SHPO: State Historic Preservation Office
SPC: Solvay Process Company
Tel: telephone number
US: United States of America
USACE: United States Army Corps of Engineers
USC: United States Congress
USEPA: United States Environmental Protection Agency
USGS: United States Geological Survey
USA: United States of America
UTM: Universal Transverse Mercator
VHF: very high frequency
Vol. or vol.: volume

APPENDIX 4: GLOSSARY

Aft Near or at the stern of a vessel.

Amidships The middle of a vessel.

Archaeological Site Locations where signs of human activity are found.

Archaeology A sub-discipline of anthropology involving the study of the human past through its material remains.

Artifact Any object used or manufactured by humans.

Athwartships From one side of a ship to the other.

Barge A large, unpowered, generally flat-bottomed boat towed by other craft and used as a freight-hauler or work platform.

Bateau (plural **bateaux**) A lightly built, flat-bottomed, double-ended boat.

Bathymetry The measurement of the depth of bodies of water.

Beam A dimension measured from side to side of a vessel.

Bedrock A mining term for the unweathered rock below the soil.

Bilge The lowest point of a vessel's interior hull.

Bilge Stringer A fore and aft timber located in the bottom of the hull that lends longitudinal strength to the hull and keeps the frames in line.

Bitts Strong wooden or metal uprights used for securing heavy ropes such as anchor cables.

Boat An open vessel, usually small and without decks, intended for use in sheltered water.

Bollard Short thick post of wood or iron (often mounted in pairs) used for securing mooring ropes, springs, or hawsers.

Bolt A fastener consisting of a threaded rod with a head at one end, designed to be inserted through a hole in assembled parts and secured by a mated nut that is tightened by a wrench.

Boom Spar used to stretch out the foot of a sail.

Bottom Planking In an edge-fastened vessel the planking that covers the flat bottom of the vessel, normally oriented transversely.

Bow The forward end of a vessel.

Bowsprit A spar projecting forward from the bow.

Breadth The measurement of a ship's width.

Breakwater A structure, usually made of stone or concrete, built to create a harbor or improve an existing one.

Breast Hook A large, horizontal knee fixed to the sides and stem to reinforce and hold them together.

Bulwark The side of a vessel above the its upper deck.

Bulkhead Vertical partition between two decks of a ship, running either lengthwise or across, forming and separating different compartments.

Cabin The living quarters of a vessel.

Canal A manmade waterway or artificially improved river used for navigation.

Canal Boat A boxy vessel designed to travel in a canal system. The vessel has no means of propulsion and must be towed or pushed by another vessel or animal.

Caprail A timber attached to the top of a vessels frames.

Cargo hatch A deck opening providing access to stow cargo below.

Causeway A raised roadway across water or mashland.

Ceiling The internal planks of a vessel.

Chine log A longitudinal timber at the angular junction of the side and bottom of a flat-bottomed vessel.

Chock Wooden wedge used to prevent other structural members from moving.

Clamp A thick ceiling strake used to provide longitudinal support.

Cleat A T-shaped rigging fitting to which a vessels lines are attached.

Coaming The raised lip with which openings in the deck such as hatchways are framed to prevent water on deck from running into the hold.

Cocked Hat Triangular wooden block used to brace the floors and futtocks where the bottom of the hull meets the sides.

Cultural Resource A nonrenewable historical resource such as archaeological sites, artifacts, and standing structures.

Deck A platform extending horizontally from one side of a ship to the other.

Decking The individual timbers that form the floor of the deck.

Deck beam A timber mounted across a vessel from side to side to support the vessel's deck and provide lateral strength.

Derrick Form of crane used to hoist cargo or their weights. It consists of a swinging boom supported by a topping lift and controlled sideways by guys.

Diagonal Bracing Angled bracing in the hull of a vessel used to resist fore-and-aft or athwarships distortion.

Draft The depth of a vessel's keel below the waterline when the vessel is loaded.

Drift bolt A cylindrical iron rod used to fasten ship timbers together; usually headed on one end and slightly larger in diameter than the hole into which it is driven.

Edge-fastened A shipbuilding technique used to attach the hull planks of a vessel together. The planks are set edge to edge and a hole drilled through them. Large iron bolts are driven through the planks to hold them together.

Fairlead A deck fixture used to lead a rope in a required direction.

Fender Timber designed to absorb the force from impacts with vessels or warfs.

Floor Timber A frame timber that crosses the keel and spans the bottom of a vessel.

Fore Located at the front of a vessel.

Fore-and-Aft From stem to stern, from front to back, oriented parallel to the keel.

Frame A transverse timber or group of timbers that creates the skeleton of a vessel and to which the hull planking and ceiling are fastened.

Futtock A frame timber that continues where the floor timber leaves off and continues up the side of a vessel.

Gudgeon: Device used to attach the rudder to the boat so that it can swing freely

Gunwale The timber above the sheer strake.

Hanging knee A vertical L-shaped timber attached to the underside of a beam and the side of a vessel; used to connect and reinforce the junction of a deck beam with the side of the vessel.

Harbor A safe anchorage, protected from most storms; may be natural or manmade; a place for docking and loading.

Hatch A deck opening in a vessel providing access to the space below.

Historic The period after the appearance of written records for a given region.

Hold The lower interior part of a ship in which cargo is stored.

Hull The structural body of a vessel, not including the superstructure, masts or rigging.

Hull Plank A thick board used to create the outer shell of a hull.

Inboard Toward the center of the vessel.

Keel The main longitudinal timber upon which the framework or skeleton of a hull is mounted; the backbone of a hull.

Keelson An internal longitudinal timber, fastened on top of the frames above the keel for additional strength.

Knee An L-shaped timber used to strengthen the junction of two surfaces on different planes.

Lighter A type of barge used to carry goods and equipment.

Longitudinal timber A long timber that runs parallel with the length of a vessel.

Magnetometer: is a scientific instrument used to measure the strength and/or direction of the magnetic field in the vicinity of the instrument. In archaeology this is used to identify metal objects.

Mast A large wooden pole that supports the sails of a vessel.

Mooring A permanent placement of an anchor, anchor chain, shackles and buoy necessary to anchor a vessel.

Mortise A cavity cut into a timber to receive a tenon.

Moulded Dimension The measurement of depth of a timber as seen in a cross-section view of a vessel.

Mud line The intersection of a shipwreck's hull with the bottom's surface.

Naphtha Launch: A small vessel that ran on the naphtha engine which did not use steam, but instead forms of gasoline and vapor.

Outboard Outside or away from the center of a vessel's hull.

Plank A thick board used as sheathing on a vessel.

Plank-on-Frame A shipbuilding technique, also commonly known as carvel built. Vessels of this type have planking running fore and aft with the planking laid edge to edge.

Port The left side of a vessel when facing forward.

Primary Source An artifact, document, or individual that provides information based on personal observations. A firsthand account.

Provenience The original location of an object, in reference to artifacts it is the exact location in which they were found.

Rabbet a concavity in the keel or chine log into which the planking is fit.

Rake The projection of a ship, at stem or stern, beyond the ends of the keel.

Rake timber Timber that acts as framing the raked end of a scow.

Rider Interior frame mounted inside a ship's hold and bolted to other structural elements to strengthen the ship's structure.

Rigging The hardware and equipment that support and control the spars and sails of a vessel.

Rigging block A wooden pulley used to operate a vessel's spars and sails.

Room and Space The distance between the moulding edges of two adjoining frames.

Rub Plate A metal band placed on the forward end of the stem and bottom of the keelson to protect the underlying wood.

Rubwale See Rub Strake

Rub Strake: A rail on the outside of the hull of a boat to protect the hull from rubbing against piles, docks and other objects

Rudderpost A vertical timber in the stern of the vessel to which the rudder is attached

Scarf An overlapping joint to connect two timbers or planks without increasing their dimensions.

Schooner A fore-and-aft-rigged sailing vessel with two or more masts.

Scow Flat bottomed watercraft, normally rectangular in cross-section with outward sloping ends.

Secondary source An individual's description and interpretation of a historical event recorded at a different time and place. A secondhand account.

Sheer strake The top strake, or plank, of a wooden vessel next below the gunwale.

Sided dimension The measurement of width of a timber as seen in a plan view of a vessel.

Sloop A single-masted, fore-and-aft-rigged sail boat.

Spar A pole used to help support the sail of a vessel.

Spike A large nail.

Spud: Posts found on some barges which are lowered from the barge and pushed into the waterway floor to anchor the vessel in place.

Stanchion An upright supporting post.

Standing Knee A vertical L-shaped timber attached to the top of a deck beam, or decking; used to connect and reinforce the junction of a deck beam with the side of the vessel.

Starboard The right side of a vessel when facing forward.

Steamboat A vessel propelled by a steam engine.

Steamer A vessel propelled by a steam engine.

Stern The after end of a vessel.

Strake A continuous line of planks, running bow to stern.

Stringer A longitudinal timber fixed to the inside surface of the frames of a vessel to provide it with greater strength fore-and-aft.

Tenon a projection on a timber which fits into a mortise.

Tiller A handle attached to the rudderpost to steer a vessel.

Timber In a general context, all wooden hull members; specially those that form the framework or skeleton of the hull.

Top Log Longitudinally oriented timber which runs on top of the futtocks.

Towfish The torpedo-shaped unit that houses the transmitter and receiver of a side scan sonar and is usually towed behind a vessel.

Transverse Describes a component of a ship that runs side to side, not fore and aft.

Underwater archaeology The archaeological study of underwater cultural resources.

Underwater cultural resource A nonrenewable historical resource that partially or entirely lies below water, such as submerged prehistoric archaeological sites, artifacts, bridges, piers, wharfs and shipwrecks.

Vessel A watercraft, larger than a rowboat, designed to navigate on open water.

Wale A thick strake of planking located along the side of a vessel for the purpose of stiffening the outer hull.

Waterline The intersection of the vessel's hull and the water's surface.

Wharf A structure, parallel to the shore, for docking vessels.

APPENDIX 5: NEW YORK STATE CANAL SYSTEM RESOURCE ELIGIBILITY STATEMENT

RESOURCE EVALUATION **DATE:** 11/29/93 **STAFF:** L. Garofalini

PROPERTY: New York State Canal System **MCD:** Multiple
ADDRESS: ______ **COUNTY:** Multiple
PROJECT REF: ______ **USN:** ______
NR REF: ______ **Survey REF:** ______

I. ___ Property is individually listed on SR/NR.
Name of listing: ______

___ Property is a contributing component of a SR/NR district.
Name of district: ______

II. X Property meets criteria * A,C,D for inclusion in the National/State Register of Historic Places.
___ Property contributes to a district which meets criteria * ______ for inclusion in the National/State Register of Historic Places.
Post SRB: ___ **SRB date:** ______ **NR application pending** ____

* **Criteria for inclusion in the National Register:**

A. Associated with events that have made a significant contribution to the broad patterns of our history;
B. Associated with the lives of persons significant in our past;
C. Embodies the distinctive characteristics of a type, period or method of construction; or represents the work of a master; or possess high artistic values; or represents a significant and distinguishable entity whose components may lack individual distinction;
D. Have yielded, or may be likely to yield information important in prehistory or history.

STATEMENT OF SIGNIFICANCE:

The New York State canal system including the 1918 barge system and the extant remains of its predecessors (the Erie, Champlain, Oswego, Genesee, Chemung, Chenango, Black River and related private canals, i.e., Western Inland Navigation, Chenango Extension and Junction Canals) is the most extensive canal system in North America and is of national significance for the pivotal and varied roles which it has played in not only the historical growth and development of New York State and states of the upper Midwest, but also of the nation, primarily in areas of transportation, commerce, and engineering.

Since the construction of the first canal in New York State by the Western Inland Navigation Lock Co. in 1792, the canal system has undergone a constant evolution to arrive at its present day configuration as the New York State Barge Canal System. This system represents one of the greatest engineering achievements of the early 20th century, rivaled only by the building of the Panama Canal (1914).

The entire New York State canal system is 525 miles in length and consists of the major extant branches of the state system - the Erie, the Champlain, the Oswego and the Cayuga and Seneca canals, which since the creation of the Barge Canal in 1918, have been combined to provide an uninterrupted homogeneous navigation system linking the Atlantic Ocean with the Great Lakes and Lake Champlain via the Hudson River. The Erie is the main line and stretches across the state from Waterford (opposite Troy on the west bank of the Hudson River) to Tonawanda and Buffalo on the Niagara River; the Champlain runs north near the easterly boundary of the state from Waterford to Whitehall, at the southern end of Lake Champlain; the Oswego, from a point near Syracuse, connects the Erie canal with Lake Ontario; and the Cayuga and Seneca Canal, which leaves the Erie west of Syracuse, runs southward, connecting with Cayuga and Seneca lakes. The Hudson River links the entire system to the Port of New York and the Atlantic Ocean.

The significance of the Barge Canal's predecessors cannot be overstated, as all contributed to the establishment of an inland navigation system that spanned New York State, thereby securing New York City's position as the nation's leading Atlantic port and center of trade and commerce, as well as fixing upstate New York's geographic development patterns. The Western Inland Navigation Lock Company's construction of locks around the rapids in the Mohawk River at Little Falls (1792) was the first attempt to create a reliable water route into the state's western frontier territories. The construction and elaboration of the canal system between 1817 and 1862 [Old Erie Canal (1817-35), Old Champlain Canal (1819-1918), Enlarged Erie Canal (1836-1905), as well as the lateral canals; i.e., Oswego, Black River, Genesee, Chemung, Chenango, Junction Canal, Chenango Extension Canal, Cayuga and Seneca, Crooked Lake] allowed New York state to capture and maintain the largest share of east-west traffic in the country. By giving New York the first viable trans-Allegheny route to the interior, the Erie Canal and the Enlarged Erie allowed New York City in the second quarter of the 19th century to quickly and decisively eclipse the then-larger ports of Boston, Newport, Philadelphia and Baltimore to become the pre-eminent center for trade and commerce on the eastern seaboard; the canal's continued utility for the shipment of bulky, low-cost goods helped New York to maintain its edge over its rivals despite the development of rail, road and air connections to all these cities in the 19th and 20th centuries.

The New York State canal system and its predecessors satisfy National Register Criteria A, C and D with significance in the categories of: Architecture, Archaeology, Commerce, Community Planning and Development, Economics, Engineering, Settlement, Industry, Maritime History, Politics/Government, Social History, Recreation and Transportation. Additional categories of significance may be revealed in future research.

Under Criterion A the canal system is significant for the central role it has played in the 19th and 20th century growth and development of New York State and the states of the upper Midwest as well as for its impact on the development of civil engineering as a distinct profession and the development of engineering techniques in the United States.

Under Criterion C the canal system is significant as a distinguished navigation system incorporating a broad range of engineering features and the specific canal-related property types which evolved throughout the period of significance.

Under Criterion D the canal system is significant for its archaeological potential to yield important information on early engineering techniques, transportation corridors, maritime and social histories.

Assuming adequate integrity (according to National Park Service standards), any canal-related feature is considered potentially eligible as a contributing component to this significant historic resource. Contributing features of the canal system include, but are not limited to, any and all built engineering features such as channels, prisms, locks, dams, aqueducts, bridges, towpaths, retaining walls, berm banks, turning basins, feeders, weighlocks, waste weirs, culverts as well as navigational aids (i.e., lighthouses, buoys), maintenance fleet, boat wrecks, and terminals and/or built structures/buildings associated with the canals, whether publicly or privately constructed or owned.

The Period of Significance established for the New York State canal system begins in 1792 with the construction of the Western Inland Navigation Lock Company and, given that the entire system is still in use today as a navigable waterway, has a floating end date consistent with the National Park Service 50 year threshold. Features less than 50 years old must be considered exceptionally significant.

APPENDIX 6: ONONDAGA NATION'S SPIRITUAL AND CULTURAL HISTORY OF ONONDAGA LAKE[1]

The region of Onondaga Lake and the Onondaga Lake watershed has been our homeland since the dawn of time. We have been a steward of Onondaga Lake since time immemorial and will continue to do so forever, as that is what has been mandated from the Gayanashagowa, the Great Law of Peace. In the 1794 *Treaty of Canandaigua the United States government recognized Onondaga Lake as part of our aboriginal territory. The Lake is the spiritual, cultural and historic center of the Haudenosaunee Confederacy. Over one thousand years ago, the Peacemaker brought the Mohawk, Oneida, Onondaga, Cayuga, and Seneca Nations together on the shores of Onondaga Lake. At the lakeshore, these Nations accepted the message of peace, laid down their arms, and formed the Haudenosaunee Confederacy. The Confederacy was the first representative democracy in the West.*

To symbolize the Confederacy, the Peacemaker planted a white pine, the Tree of Peace, on the shore of Onondaga Lake. It is understood that the Peacemaker chose the white pine because the white pine's needles are clustered in groups of five, just as the five founding Nations of the Confederacy clustered together for strength. The boughs of the white pine represent the laws that protect all the people. An eagle was placed at the top of the tree to watch for danger from without and within. Four white roots of peace reach out in the four directions towards anyone or any Nation who wishes to come under this tree of peace.

As the birth place of the Confederacy and democracy, the Lake is sacred to the Haudenosaunee. The Onondaga Nation has resided on the Lake and throughout its watershed since time immemorial, building homes and communities, fishing, hunting, trapping, collecting plants and medicine, planting agricultural crops, performing ceremonies with the natural world dependent on the Lake, and burying our ancestors - the mothers, fathers and children of the Onondaga Nation. The Onondaga Nation views its relationship to this area as a place where we will forever come from and will return to.

It brings great sadness to the people of the Onondaga Nation that despite our long stewardship of the Lake and its watershed, it took only one hundred years of abuse to wreak havoc to the Lake, its tributaries and all the plants, animals and marine life that depend on the Lake and its watershed. Industry interfered with the Onondaga Nation's relationship to the land and disturbed the ancestors that were interred throughout the watershed - either by direct excavation or contamination, or indirect efforts such as construction on top of grave sites. We wish to bring about a healing between us and all others who live within our homelands around the Lake. We must in order to protect the future generations "whose faces are looking up from the earth."

We are one with this land and this Lake. It is our duty to work for a healing of this land, and all of its waters and living things, to protect them, and to pass on a healthy environment to future generations - yours and ours.

[1] The Onondaga Nation requested that the oral tradition concerning the significance of Onondaga Lake to the Onondaga and Haudenosaunee Confederacy be included in this report. The Onondaga Nation's statement may not necessarily reflect the views of the Lake Champlain Maritime Museum, Parsons or Honeywell International Inc. Further, the inclusion of the Onondaga Nation's oral tradition shall not constitute an admission of any fact or law in any judicial or administrative proceeding. In addition, the statement and findings made in this report by Honeywell, Parsons and the Lake Champlain Maritime Museum may not reflect the opinions and views of the Onondaga Nation, and do not constitute an admission by the Onondaga Nation of fact or law in any legal or other proceeding.

APPENDIX 7: RESUMES OF KEY PROJECT PERSONNEL

Arthur Bruce Cohn
Executive Director
Lake Champlain Maritime Museum
4472 Basin Harbor Road,
Vergennes, Vermont 05491
(802) 475-2022

Education
Doctor of Science, Honorary. Middlebury College – 2003
Doctor of Laws, Honorary. University of Vermont - 1996
JD Boston College Law School - 1974
BA University of Cincinnati (Sociology) - 1971

Professional Experience
Executive Director, Lake Champlain Maritime Museum. Co-founder and chief planner for the Museum. 1984 - present
Delegate, Member of the U.S. State Department Delegation to the United Nations Educational, Science and Cultural Organization's (UNESCO) Convention for the Protection of Underwater Cultural Heritage. June 2000 - present
Committee Member, National Maritime Heritage Initiative Grants Advisory Committee. 1997 - present.
Proposal Evaluator, National Oceanographic and Atmospheric Administration (NOAA) Ocean Exploration Program. 2001
Adjunct Assistant Professor, Texas A&M University, Nautical Archaeology Program. 1995 - present
Adjunct Assistant Professor, University of Vermont, Instructor of Maritime History, Nautical Archaeology and Historic Preservation. 1991 - present

Diving Certifications
1974 - NAUI Instructor (3795)
TDI - Nitrox Instructor
1997- 2005 Diver's Alert Network, Member (Master Insurance)
2000 – Tri-mix certified, Crystal River, FL, active Deep Technical Diving, Mixed gases.
Current: CPR for the Professional Rescuer, First Aid, and Oxygen Administration.

Selected Publications
Books and Book Sections
Cohn, Arthur B.
1994 *Afterword*: *In Lake Champlain as Centuries Pass*, by A. P. Beach, pp. 107-115. Lake Champlain Maritime Museum, Ferrisburgh, VT.
1995a *Afterword:* Building and Sailing the Replica. In *The Gunboat* Philadelphia *and the Defense of Lake Champlain in 1776*, by P. Lundeberg, pp. 61-84. Lake Champlain Maritime Museum, Ferrisburgh, VT.
1995b *Epilogue:* Treasures Beneath an Inland Sea. In *Lake Champlain: Key to Liberty*, by R. N. Hill, pp. 283-299. Countryman Press, Woodstock, VT.

1997a *Forward, Afterword:* The Roaring '20s: Death by Automobile and Archaeology of Lake Champlain Steamboats. In *The Steamboats of Lake Champlain, 1809-1930*, by O. B. Ross, pp. ix-xi, 185-201, 202-207. Vermont Heritage Press, Quechee, VT.

1997b Lake Champlain. In *Encyclopedia of Underwater and Maritime Archaeology*, edited by J. P. Delgado, pp. 231-233. British Museum Press, London.

2003a Contributor: The Plenum Series in Underwater Archaeology *Submerged Cultural Resource Management: Preserving and Interpreting Our Maritime Heritage.* Kluwer Academic/Plenum Publishers.

2003b Contributor: The Vermont Encyclopedia. University Press of New England, New Hampshire.

2003c Author: Lake Champlain's Sailing Canal Boats: An Illustrated Journey from Burlington Bay to the Hudson River. Lake Champlain Maritime Museum, Basin Harbor, VT.

Crisman, Kevin J. and Arthur B. Cohn

1998 When Horses Walked on Water: Horse-Powered Ferries in Nineteenth-Century America. Smithsonian Institution Press, Washington, DC.

1999 Preface: Lake Champlain A Great Lake. In *Chronicles of Lake Champlain: Journeys in War and Peace* by Russell P. Bellico. Purple Mountain Press. Fleischmanns, New York.

2002 Contributor: The Plenum Series in Underwater Archaeology *International Handbook of Underwater Archaeology*. Kluwer Academic/Plenum Publishers

Research Reports

Cohn, Arthur B. (editor)

2000 *Lake Champlain Underwater Cultural Resources Survey; Volume II: 1997 Results & Volume III: 1998 Results*. Lake Champlain Maritime Museum, Ferrisburgh, VT. Submitted to Vermont Division for Historic Preservation, Montpelier, VT.

2001 Underwater Barge Documentation for the Alburg-Swanton Bridge Replacement Project. Alburg, Grand Isle County, Vermont. Submitted to the Vermont Agency of Transportation, Montpelier, VT.

2001 Lake Champlain Underwater Preserve Expansion Plan. Lake Champlain Basin Program.

2002 *Lake Champlain Underwater Cultural Resources Survey: Volume IV: 1999 Results and Volume V: 2000 Results.* Lake Champlain Maritime Museum, Ferrisburgh, VT. Submitted to Vermont Division for Historic Preservation, Montpelier, VT.

2003 *Lake Champlain Underwater Cultural Resources Survey: Volume VI: 2001 Results and Volume VII: 2002 Results*. Lake Champlain Maritime Museum, Ferrisburgh, VT. Submitted to Vermont Division for Historic Preservation, Montpelier, VT.

Cohn, Arthur B., Joseph R. Cozzi, Kevin J. Crisman, and Scott A. McLaughlin

1996a *Archaeological Reconstruction of the Lake Champlain Canal Schooner* General Butler *(VT-CH-590), Burlington, Chittenden County, Vermont*. Lake Champlain Maritime Museum, Ferrisburgh, VT. Submitted to Department of Public Works, Burlington, VT.

1996b *Archaeological Reconstruction of the Lake Champlain Canal Schooner* O. J. Walker *(VT-CH-594), Burlington, Chittenden County, Vermont*. Lake Champlain Maritime Museum, Ferrisburgh, VT. Submitted to Vermont Division for Historic Preservation, Montpelier, VT.

Cohn, Arthur B. and Adam I. Kane

2002 Spitfire *Management Plan: Phase One Draft Report*. Prepared for the Naval Historical Center, Washington Navy Yard, D.C.

Cohn, Arthur B., Adam I. Kane, Christopher R. Sabick, and Edwin Scollon
2003 Valcour Bay Research Project: 1999-2002 Results from the Archaeological Investigation of a Revolutionary War Battlefield in Lake Champlain, Clinton County, New York. Lake Champlain Maritime Museum, Ferrisburgh, Vermont. Submitted to the Naval Historical Center, Washington Navy Yard, D.C.

Adam Isaac Kane
Archaeological Director
Lake Champlain Maritime Museum
4472 Basin Harbor Road
Vergennes, Vermont 05491

Education

MA Anthropology, Texas A&M University, College Station, Texas, 2001.
Thesis: Archaeology of the Western River Steamboat, 1811 – 1860

BA Anthropology, minor Environmental Geography (honors), Millersville University of Pennsylvania, 1995.

Professional Experience

Archaeological Director, Lake Champlain Maritime Museum, October 2000–present.

Basin Harbor Site Manager, Lake Champlain Maritime Museum, May 2005 – October 2006.

Lake Champlain Underwater Historic Preserve Monitor, Vermont Division for Historic Preservation, May 2001 – present.

Nautical Archaeologist, Lake Champlain Maritime Museum. May 2000 – October 2000.

Nautical Archaeology Intern, Lake Champlain Maritime Museum. May 1999 - August 1999.

Archaeological Conservator, Texas A&M University Conservation Research Laboratory. August 1998 – May 2000.

Archaeological Consultant, R. Christopher Goodwin & Associates, Inc. August 1998 - May 2000.

Nautical Archaeologist, Remote Sensing Specialist, and Assistant Diving Safety Officer, R. Christopher Goodwin & Associates, Inc. October 1995 - August 1998.

Archaeologist, Cultural Heritage Resource Services, Inc. May 1995 - October 1995.

Archaeological Crew Chief, Millersville University, Archaeological Field School. June - July 1994.

Laboratory Assistant, Millersville University, Archeology Laboratory. February 1992 - May 1995.

Field Archaeologist, Delaware Department of Natural Resources and Environmental Control. June - August 1991 -1993.

Certifications/Memberships

New Haven Community Center Committee, member 2002 - 2005.
American Heart Association, Healthcare Provider. 4/2003
Divemaster, PADI. 1997
Nitrox Diver, NAUI. 2002
Diver's Alert Network, member since 1997.

Selected Publications

Books

Adam I. Kane

2004 *The Western River Steamboat.* Texas A&M University Press (Nautical Archaeology Series, number 8).

Adam I. Kane (contributing author and editor)

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

Articles

Adam I. Kane (editor)

2005 Lake Champlain Maritime Museum and Lake Champlain's Sailing Canal Boats. *Sea History*, Summer 2005.

2003 The Lake Champlain Maritime Museum. *Maritime Life and Traditions*, winter 2003.

McLaughlin, Scott A. and Adam I. Kane

2003 Sloop Island Canal Boat: A Preliminary Report on the Phase III Study of an Early Twentieth Century Canal Boat Wreck. *Journal of Vermont Archaeology* 4.

Research Reports

Cohn, Arthur B. and Adam I. Kane

2002a Spitfire *Management Plan: Phase One Draft Report*. Lake Champlain Maritime Museum, Ferrisburgh, VT. Prepared for the Naval Historical Center, Washington Navy Yard, D.C.

2002b *Lake Champlain Underwater Historic Preserve Expansion Plan.* Lake Champlain Maritime Museum, Ferrisburgh, VT. Prepared for the Lake Champlain Basin Program.

Cohn, Arthur B., Adam I. Kane, Christopher R. Sabick, and Edwin Scollon

2003 Valcour Bay Research Project: 1999-2002 Results from the Archaeological Investigation of a Revolutionary War Battlefield in Lake Champlain, Clinton County, New York. Lake Champlain Maritime Museum, Ferrisburgh, VT. Submitted to the Naval Historical Center, Washington Navy Yard, D.C.; American Battlefield Protection Program; New York State Museum, NY.

Goodwin, Christopher, John Seidel, Adam I. Kane, David Robinson and Martha Williams

2000 Phase II and III Archeological Investigations of the Shipwreck Kentucky (site 16BO358) at Eagle Bend, Pool 5, Red River Waterway, Bossier Parish, Louisiana. R. Christopher Goodwin & Associates, Inc., Frederick, MD. Prepared for the U.S. Army Corps of Engineers, Vicksburg and New Orleans Districts

Kane, Adam I. (editor)

2000 Report on the Phase I Submerged Cultural Resource Survey for the Village of Alburg Zebra Mussel Control Project, Grande Isle County, Vermont. Lake Champlain Maritime Museum, Ferrisburgh, VT. Prepared for Phelps Engineering, Inc., Middlebury, VT.

2001a *Underwater Barge Documentation for the Alburg-Swanton Bridge Replacement Project*. *Alburg, Grand Isle County, Vermont*. Lake Champlain Maritime Museum, Ferrisburgh, VT. Submitted to the Vermont Agency of Transportation, Montpelier, VT.

2001b *Conservation of a War of 1812 Anchor from Plattsburgh Bay, Clinton County, New York.* Lake Champlain Maritime Museum. Lake Champlain Maritime Museum, Ferrisburgh, VT.

2002 *Lake Champlain Underwater Historic Preserve: Management Plan for the State of New York.* Lake Champlain Maritime Museum, Ferrisburgh, VT. Prepared for the State of New York.

Kane, Adam I., A. Peter Barranco, Christopher R. Sabick and Sarah E. Lyman

2005 Lake Champlain Underwater Cultural Resources Survey, Volume VIII: 2003 Results and Volume IX: 2004 Results. Lake Champlain Maritime Museum, Ferrisburgh, VT. Prepared for the Lake Champlain Basin Program.

Kane, Adam I., and Christopher R. Sabick

2001 *Conservation Assessment of Metal Artifacts from the Key Corp Site*. Lake Champlain Maritime Museum, Ferrisburgh, VT. Prepared for the New York State Museum, Albany, New York.

2002 *Lake Champlain Underwater Cultural Resources Survey: 1999 and 2000 Results.* Lake Champlain Maritime Museum, Ferrisburgh, VT. Submitted to Vermont Division for Historic Preservation, Montpelier, VT.

Kane, Adam I., Christopher R. Sabick, and Sara R. Brigadier
2003 *Lake Champlain Underwater Cultural Resources Survey: Volume VI: 2001 Results and Volume VII: 2002 Results*. Lake Champlain Maritime Museum, Ferrisburgh, VT. Submitted to Vermont Division for Historic Preservation, Montpelier, VT.

Kane, Adam I., David Robinson and Martha Williams
1998 *Phase I Archeological Survey of Items 3B-2 and 4 in the Upper Yazoo River.* Goodwin & Associates, Inc., Frederick, MD Prepared for the U.S. Army Corps of Engineers.

Robinson, David S., John L. Seidel, and Adam I. Kane
1996 Phase I Remote sensing Marine Archeological Survey of the Proposed Atchafalaya Ocean Dredged Materials Disposal Area, Terrebonne and St. Mary's Parishes, Louisiana Goodwin & Associates, Inc., Frederick, MD Prepared for the U.S. Army corps of Engineers. November 1996.

Joanne M. Dennis (DellaSalla)
Archaeologist
Lake Champlain Maritime Museum
4472 Basin Harbor Road
Vergennes, Vermont 05491
(802) 475-2022

Education
MA Anthropology: Archaeology Focus, University of Denver, 2006
Thesis: Paleoindian Occupations of South Park, Colorado
BA Anthropology (Minor in Spanish), University of Vermont, 2001

Professional Experience
Maritime Research Institute Archaeologist, Lake Champlain Maritime Museum, May 2005 to present
Adjunct Professor, University of Vermont, Anthropology Department, January 2007 to present
Artifact Conservation Intern, Lake Champlain Maritime Museum, January 2005-May 2005
Staff Archaeologist, South Park Archaeology Project, South Park, CO, August 2002-November 2004
Archaeological Assistant, Skidmore College Archaeological Field School, June 2004-July 2004
Teaching Assistant, University of Denver, Department of Anthropology, September 2002-June 2004
Archaeological Collections Analyst, University of Denver, Museum of Anthropology, January 2003-January 2004
Native American Graves Protection and Repatriation Act (NAGPRA) Consultation Assistant, University of Denver, Museum of Anthropology, September 2003-May 2004
Assistant Archaeologist, Environmental Permitting Division, Vermont Agency of Transportation, May 2001-June 2002
Staff Archaeologist, Rescue Archaeology Project, Instituto Nacional del Patrimonio Cultural, La Libertad, Ecuador, November 1999
Field Archaeologist, University of Vermont, Archaeological Field School, Anguilla, British West Indies, July 1999

Clubs/Memberships

2004-Present	Gamma Chapter of Colorado Lambda Alpha Honors Society
2001-Present	Society for American Archaeology
2001-Present	Vermont Archaeological Society

Selected Publications
National Register of Historic Places Nominations
Joanne M. DellaSalla
2007 *The Gunboat* Spitfire *National Register Nomination*. Submitted to the State of New York National Register Review Board. Lake Champlain Maritime Museum, Vergennes, Vermont.

Technical Reports
DellaSalla, Joanne M.
2004 The Ludlow Massacre Site (5LA1829): Analysis of Metal and Miscellaneous Artifacts from Feature 73; Stratum E II. Submitted to the University of Denver, Colorado Coalfield War Project.

1999 *Informe de la excavación del cateo 6 en el barrio 10 de augusto, La Libertad, Ecuador*. Report on the excavation of site 6 in the 10th of August neighborhood in La Libertad, Ecuador. Site report submitted to the Instituto Nacional del Patrimonio Cultural del Ecuador. Quito, Ecuador.

DellaSalla, Joanne M., T. Lincoln, E. Friedman, R. Brunswig, S. Bender and J. Klawon.
2003 South Park Archaeology Project: Final Report of Archaeological Investigations Conducted in 2001 and 2002, South Park, Colorado. Submitted to the Colorado State Historic Fund, Contract No. 0202014.

Kane, Adam I. and Joanne M. DellaSalla
2007 Phase I Underwater Archaeological Survey for the Champlain Water District's Proposed Water Intake Staging Area in Shelburne Bay, Chittenden County, Lake Champlain. Prepared by the Lake Champlain Maritime Museum, Vergennes, Vermont. Submitted to the Champlain Water District and the Vermont Division for Historic Preservation.

Kane, Adam I., Joanne M. DellaSalla and Christopher Sabick
2007 *Phase I Archaeological Survey of Burlington Harbor in Lake Champlain, Burlington, Chittenden County, Vermont.* Prepared by the Lake Champlain Maritime Museum, Vergennes, Vermont. Submitted to the Army Corps of Engineers, Albany Office.

Kane, Adam I., Joanne M. DellaSalla and Brian R. Spinney
2007 Phase I Underwater Archaeological Survey for the Proposed Dredging of Lake George's Foster Brook Delta in Dresden, Washington County, New York. Prepared by the Lake Champlain Maritime Museum, Vergennes, Vermont. Submitted to the New York State Historic Preservation Office and the Lake George Association.

Kane, Adam I., Joanne M. DellaSalla, Scott A. McLaughlin and Christopher R. Sabick
2007 Sloop Island Canal Boat Study: Phase III Archaeological Investigation in Connection with the Environmental Remediation of the Pine Street Canal Superfund Site. Lake Champlain Maritime Museum, Ferrisburgh, VT. Prepared for USEPA Region 1 and the Vermont Division for Historic Preservation.

Kane, Adam, Peter Barranco, Joanne M. DellaSalla, Sarah Lyman and Christopher Sabick
2007 Lake Champlain Underwater Cultural Resources Survey, Volume VIII: 2003 Results and Volume IX: 2004 Results. Lake Champlain Maritime Museum, Ferrisburgh, VT. Prepared for the Lake Champlain Basin Program.

APPENDIX 8: HUMAN REMAINS DISCOVERY PROTOCOL

New York State Historic Preservation Office/New York State Office of Parks, Recreation and Historic Preservation Human Remains Discovery Protocol

At all times human remains must be treated with the utmost dignity and respect. Should human remains be encountered work in the general area of the discovery will stop immediately and the location will be immediately secured and protected from damage and disturbance.

Human remains or associated artifacts will be left in place and not disturbed. No skeletal remains or materials associated with the remains will be collected or removed until appropriate consultation has taken place and a plan of action has been developed.

The county coroner and local law enforcement as well as the SHPO and the involved agency will be notified immediately. The coroner and local law enforcement will make the official ruling on the nature of the remains, being either forensic or archeological. If the remains are archeological in nature, a bioarchaeologist will confirm the identification as human.

If human remains are determined to be Native American, the remains will be left in place and protected from further disturbance until a plan for their protection or removal can be generated. The involved agency will consult SHPO and appropriate Native American groups to determine a plan of action that is consistent with the Native American Graves Protection and Repatriation Act (NAGPRA) guidance.

If human remains are determined to be Euro-American, the remains will be left in place and protected from further disturbance until a plan for their avoidance or removal can be generated. Consultation with the SHPO and other appropriate parties will be required to determine a plan of action.[153]

ENDNOTES

[1] National Park Service, *Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines* (Washington, DC: Government Printing Office, 1983).

[2] New York Archaeological Council, *Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State* (Albany: New York Archaeological Council, 1994).

[3] New York State Historic Preservation Office, *Phase I Archaeological Report Format Requirements* (Waterford, NY: New York State Office of Parks, Recreation and Historic Preservation, 2005)

[4] *Onondaga Lake Bottom Subsite of the Onondaga Lake Superfund Site, Syracuse, New York, Record of Decision* (Albany, NY: NYSDEC and USEPA, 2005).

[5] Christopher Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project, Onondaga Lake, Wastebed B and Wastebed 13, Towns of Camillus, Geddes and Salina and City of Syracuse, Onondaga County, New York* (Binghamton, NY: Public Archaeology Facility, 2004).

[6] Ibid., i.

[7] Adam Kane and Joanne DellaSalla, *Underwater Archaeological Resources Phase 1B Work Plan for the Onondaga Lake Bottom, Subsite of the Onondaga Lake Superfund Site, Onondaga County, New York* (Vergennes, VT: Lake Champlain Maritime Museum, 2010).

[8] Onondaga Lake Partnership Website, accessed October 2010, http://www.onlakepartners.org.

[9] Sarah A. Finklestien and Anthony M. Davis "Paleoenvironmental records of water level and climate changes from the middle to late Holocene at Lake Erie coastal wetland, Ontario, Canada" in *Qarternary Research* 65 (2006) 33-43.

[10] Henry T. Mullins "Holocene Lake Level and Climate Change Inferred from Marl Stratigraphy of the Cayuga Lake Basin, New York," *Journal of Sedimentary Research* 68 (4) July (1998): 569-578; T. R. Dwyer, H. T. Mullins, and S. C. Good "Paleoclimatic Implications of Holocene Lake Level Fluctuations, Owasco Lake, New York," *Geology* 24(6) June (1996): 519-522.

[11] Mullins, "Holocene Lake Level".

[12] "Maine Geologic Survey,"accessed October 2010, http://www.maine.gov/doc/nrimc/mgs/explore/surficial/facts/dec00.htm.

[13] Z. J. Yu, H. McAnderews and U. Eicher "Middle Holocene Dry Climate Caused by Change in Atmospheric Circulation Patterns: Evidence from Lake Levels and Isotopes," *Geology* 25 (3) (1997), 251-254.

[14] Elizabeth Sonnenburg, "Holocene Lake Level Change and Submerged Archaeological Site Potential in Rice Lake, Ontario" (Unpublished PhD Proposal, McMaster University, n.d).

[15] S. A. Drzyzga, "Relict Shoreline Features at Cockburn Island, Ontario," *Journal of Paleolimnology* 37 (2007), 411-417; and Yu, McAnderews and Eicher, "Middle Holocene Dry Climate".

[16] Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project*, 12-13.

[17] Joshua V.H. Clark, *Onondaga Reminiscences of Earlier and Later Times*…. (Syracuse: Stoddard and Babcock, 1849).

[18] Nobel E. Whitford, *History of the Canal System of the State of New York: Supplement to the Annual Report of the State Engineer and Surveyor of the State of New York* (Albany, New York: Brandow Printing Company, 1905).

[19] Steven W. Effler, *Limnological and Engineering Analysis of a Polluted Urban Lake: Prelude to Environmental Management of Onondaga Lake, New York* (New York: Springer-Verlag, 1996), 6.

[20] Whitford, *History of the Canal System of the State of New York.*

[21] Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project.*

[22] Ibid, 12.

[23] Thompson, Donald H., *The Golden Age of Onondaga Lake Resorts*. (Fleischmanns, New York: Purple Mountain Press, 2002).

[24] Peter P. Pratt and Marjorie K. Pratt, *Phase IA Cultural Resource Survey, Onondaga Lake LCP Bridge Street Site and Related Wastebeds, Village of Solvay, Town of Geddes and Town of Camillus, Onondaga County, New York* (Cazenovia, New York: Pratt and Pratt Archaeological Consultants, 2003).

[25] Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project*.

[26] William A. Ritchie, *The Archaeology of New York State* (Harrison, New York: Harbor Hill Books, 1980)

[27] Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project.*

[28] Ritchie, *The Archaeology of New York State* .

[29] Ibid.

[30] Nina Versaggi, An Overview of Prehistoric Settlement Patterns and Landforms in the Northern Appalachians: In *Current Topics in Northeastern Geoarchaeology: Glaciated Landscapes* (John Hart and David Cremeens, eds). New York State Museum and Science Service Bulletin. 2000.

[31] Ibid., 8

[32] Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project*.

[33] Ritchie, *The Archaeology of New York State* , 39.

[34] Ritchie, *The Archaeology of New York State*.

[35] Ritchie, *The Archaeology of New York State,* 97-98.

[36] Ibid., 99.

[37] Ibid., 101.

[38] Ibid., 106.

[39] Ibid., 112.

[40] Ibid., 159.

[41] Ibid.

[42] Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project,* 23.

[43] Nina Versaggi, "Prehistoric Hunter-Gatherer Settlement Models: Interpreting the Upper Susquehanna Valley," *Golden Chronograph for Robert E. Funk*, Occasional Publications in Northeastern Anthropology 15 (1996), 129-140.

[44] Ritchie, *The Archaeology of New York State,* 212.

[45] Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project.*

[46] Ritchie, *The Archaeology of New York State.*

[47] Ritchie, *The Archaeology of New York State,* 278.

[48] Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project*.

[49] Frederick M. Wiseman, *The Voice of the Dawn: An Autohistory of the Abenaki Nation* (Hanover, New Hampshire: University Press of New England, 2001).

[50] Edwin Tappan Adney and Howard I. Chappelle, *Bark Canoes and Skin Boats of North America* (India: Skyhorse Publishing Inc., Reprint 2007).

[51] Adney and Chappelle, *Bark Canoes and Skin Boats of North America,* 213.

[52] Ibid.

[53] Ibid.

[54] Ibid., 213

[55] James A. Tuck, *Onondaga Iroquois Prehistory: A Study in Settlement Archaeology* (Syracuse: Syracuse University Press, 1971).

[56] Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project.*

[57] Tuck, *Onondaga Iroquois Prehistory.*

[58] Ibid.

[59] Ibid.

[60] Arthur C. Parker, *The Archaeological History of New York, Part 2*. New York State Museum Bulletin No. 238, Albany, New York. 1922; Thomas 2002.

[61] Dean R. Snow, *Peoples of the Americas Series: The Iroquois* (Malden, MA: Blackwell Publishers Ltd., 1996), 36.

[62] Ibid., 36.

[63] Hohman 2004

[64] Michael Aiuvalasit and Joseph Schuldenrein *Preliminary Geomorphological Observations for the Onondaga Lake Project*. (Geoarchaeology Research Associates, Yonkers, New York. 2010:1)

[65] James W. Bradley, *Evolution of the Onondaga Iroquois, Accommodating Change 1500-1655* (Syracuse: Syracuse University Press, 1987).

[66] Thompson, *The Golden Age of Onondaga Lake Resorts.*

[67] Philip Lord Jr., *Navigation Before the Erie Canal* (Albany: New York State Museum).

[68] Whitford, *History of the Canal System of the State of New York.*

[69] T. B. Jervis, *Laws of the State of New York in Relation to the Erie and Champlain Canals, Together with the Annual Reports of the Canal Commissioners, and Other Documents* (Albany: F. and E. Horsford Printer, Albany, 1825), 39-40.

[70] Effler, *Limnological and Engineering Analysis of a Polluted Urban Lake.*

[71] Whitford, *History of the Canal System of the State of New York.*

[72] Ibid.

[73] Ibid.

[74] Staff of the Canal Museum, *A Canalboat Primer on the Canals of New York State* (Syracuse: Canal Museum, 1981).

[75] W. E. Edwards, *Traveler's Guide: Through the Middle and Northern States and the Provinces of Canada*, *Fifth Edition* (Carvill, NY: G. M. Davison, 1833).

[76] Ibid., 240.

[77] Ibid.

[78] Ibid., 240.

[79] Ibid.

[80] Thompson, *The Golden Age of Onondaga Lake Resorts*, 127-130.

[81] Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project.*

[82] Ibid., 130-131.

[83] Effler, *Limnological and Engineering Analysis of a Polluted Urban Lake.*

[84] *Syracuse Journal*, July 31, 1871.

[85] *Post Standard*, September 18, 1929.

[86] Thompson, *The Golden Age of Onondaga Lake Resorts*.

[87] Ibid.

[88] Ibid.

[89] Ibid.

[90] *Syracuse Herald*, April 4, 1905.

[91] Thompson, *The Golden Age of Onondaga Lake Resorts.*

[92] Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project,* 93-94

[93] "A Young Man Drowned in Onondaga Lake on Sunday," *Watertown Re-Union,* August 28, 1879.

[94] "Telegraphic Brevities," *New York Times,* July 22, 1892.

[95] "The Local Yachtsmen," *Syracuse Standard,* December 15, 1889.

[96] "A Steamboat's Boiler Bursts. The Captain Killed and Engineer Badly Scalded," *New York Times,* May 25, 1885.

[97] Staff of the Canal Museum, *A Canalboat Primer on the Canals of New York State*; and Norman J. Brouwer, *A Synopsis of Maritime Activity in New York State and New York State Vessel Typology* (New York: South Street Seaport Museum, 1990).

[98] Lord, *Navigation Before the Erie Canal* .

[99] Staff of the Canal Museum, *A Canalboat Primer on the Canals of New York State.*

[100] Staff of the Canal Museum, *A Canalboat Primer on the Canals of New York State,* 14.

[101] Staff of the Canal Museum, *A Canalboat Primer on the Canals of New York State*, 14.

[102] Brouwer, *A Synopsis of Maritime Activity in New York State,* 1.

[103] For an extensive discussion of barges and barge wrecks see the documentation produced from the New York District of the U.S. Army Corps of Engineer's Collection and Removal of Drift Project. See Stephen R. James, *Cultural Resources Survey, New York Harbor Collection and Removal of Drift Project, Arthur Kill, Richmond County, New York Reach; Arthur Kill, Union and Middlesex Counties, New Jersey Reach; and Kill Van Kull, Richmond County, New York Reach* (Memphis: Panamerican Consultants, 1999); Michael S. Raber, *Reconnaissance Cultural Resource Investigations Arthur Kill New York Reach Richmond County, New York, New York Harbor Collection and Removal of Drift Project* (South Glastonbury, CT: Raber Associates, 1996); Michael S. Raber, *Reconnaissance Cultural Resource Investigations Arthur Kill New Jersey Reach, Union and Middlesex Counties, New Jersey, New York Harbor Collection and Removal of Drift Project, U.S. Army Corps of Engineers, New York District* (South Glastonbury, CT: Raber Associates, 1996); and Michael S. Raber, *Reconnaissance Cultural Resource Investigations Kill Van Kull, New York Reach Richmond County, New York New York Harbor Collection and Removal of Drift Project, U.S. Army Corps of Engineers, New York District* (South Glastonbury, CT: Raber Associates), 1996.

[104] James, *Cultural Resources Survey, New York Harbor Collection and Removal of Drift Project, Arthur Kill, Richmond County, New York Reach; Arthur Kill, Union and Middlesex Counties, New Jersey Reach; and Kill Van Kull, Richmond County, New York Reach*, 150; and Raber, *Reconnaissance Cultural Resource Investigations Arthur Kill New York Reach Richmond County, New York, New York Harbor Collection and Removal of Drift*, 60.

[105] Brouwer, *A Synopsis of Maritime Activity in New York State,* 5.

[106] Brouwer, *A Synopsis of Maritime Activity in New York State,* 40-141.

[107] See Adam Kane ed., *Underwater Barge Documentation for the Alburg-Swanton Bridge Replacement Project, BRF 036-1(1), Alburg, Grand Isle County, Vermont* (Vergennes, VT: Lake Champlain Maritime Museum, 2001), 17-22.

[108] Kane and DellaSalla, *Underwater Archaeological Resources Phase 1B Work Plan for the Onondaga Lake Bottom*.

[109] CR Environmental, Inc., *Onondaga Lake Phase 1 Pre-Design Investigation Geophysical Survey Report* (Falmouth, MA: CR Environmental, Inc, 2005).

[110] Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project.*

[111] See U.S. Lake Survey Office, *Chart No. 5, New York State Canals, Brewerton to Cross Lake and Syracuse to Oswego* (Detroit: U.S. Lake Survey Office, 1915); U.S. Lake Survey Office, *New York State Canals, Erie Canal, Brewerton to Cross Lake and Syracuse and Oswego Canal, Three River Point to Oswego* (Detroit: U.S. Lake Survey Office, 1926); U.S. Lake Survey Office, *New York State Canals, Erie Canal, Brewerton to Cross Lake and Syracuse and Oswego Canal, Three River Point to Oswego* (Detroit: U.S. Lake Survey Office, 1932); and U.S. Lake Survey Office, *New York State Canals, Chart No. 185, 1937* (Detroit: U.S. Lake Survey Office, 1937); U.S. Lake Survey Office, *New York State Canals, Chart No. 185, 1942* (Detroit: U.S. Lake Survey Office, 1942); and U.S. Lake Survey Office, *New York State Canals, Chart No. 185, 1947* (Detroit: U.S. Lake Survey Office, 1947).

[112] See Lake Champlain Maritime Museum, "Dive Safety Plan, Onondaga Lake Superfund Site, Onondaga Lake, New York, October 12, 2010" (Lake Champlain Maritime Museum, 2010); and (Lake Champlain Maritime Museum, *Safe Diving Practices Manual* (Vergennes, VT: Lake Champlain Maritime Museum), 2010

[113] Department of the Army, *Safety and Health Requirements Manual, EM 385-1-1, 15 September 2008* (Washington D.C.: U.S. Army Corps of Engineers, 2008).

[114] Richard Kerfoot Anderson, Jr., *Guidelines for Recording Historic Ships* (Washington, DC: Historic American Buildings/Historic American Engineering Record, National Park Service, U.S. Department of the Interior, 1988), Martin Dean et al., eds., *Archaeology Underwater: The Nas Guide to Principles and Practice* (Portsmouth and London: Nautical Archaeology Society and Archetype Publications, 1992), Jeremy Green, *Maritime Archaeology: A Technical Handbook* (San Diego, California: Academic Press, 1990), Matthew P. Hogan, *C.A.N.A.L.S. Underwater Archaeology Diver's Manual* (Syracuse: Canal Museum, 1981), Paul Lipke, Peter Spectre, and Benjamin A. G. Fuller, eds., *Boats: A Manual for Their Documentation* (Nashville, Tennessee: American Association for State and Local History, 1993), J. Richard Steffy, *Wooden Shipbuilding and the Interpretation of Shipwrecks* (College Station, Texas: Texas A&M University Press, 1994).

[115] Sources for illustrations see L. R. Addington, *Lithic Illustration: Drawing Flaked Stone Artifacts for Publication* (Chicago: The University of Chicago Press, 1986), L. Adkins and R. A. Adkins, *Archaeological Illustration*, *Academic Manuals in Archaeology Series* (New York: Cambridge University Press, 1994), S. J. Allen, *The Illustration of Wooden Artifacts: An Introduction and Guide to the Depiction of Wooden Objects*, ed. B. Hurman and M. Steiner, vol. 11, *Technical Paper* (Oxford, England: Association of Archaeological Illustrators and Surveyors, 1994), B. D. Dillon, ed., *Student's Guide to Archaeological Illustrating*, vol. 1, *Archaeological Research Tools*

(Los Angeles: Institute of Archaeology, University of California, 1992). Sources for photography see P. G. Dorrell, *Photography in Archaeology and Conservation*, ed. D. Brothwell, et al., *Cambridge Manuals in Archaeology Series* (New York: Cambridge University Press, 1989), C. L. Howell and W. Blanc, *Practical Guide to Archaeological Photography*, ed. R. Demsetz, et al., 2nd ed., vol. 6, *Archaeological Research Tools* (Los Angeles: Institute of Archaeology, University of California, 1995).

[116]U.S. Department of the Interior, *How to Apply the National Register Criteria for Evaluation* (Washington, D.C.: National Park Service, 1997), 44-45.

[117] U.S. Department of the Interior, How to Apply the National Register Criteria for Evaluation, 2.

[118] U.S. Department of the Interior, How to Apply the National Register Criteria for Evaluation.

[119] Barbara Little, Erika Martin Seibert, Jan Townsend, John H. Sprinkle, Jr., and John Knoerl, *Guidelines for Evaluating and Registering Archeological Properties* (Washington, D.C.: National Park Service, 2000).

[120] James P. Delgado and Kevin J. Foster, *Guidelines for Evaluating and Documenting Historic Aids to Navigation* (Washington, D.C.: National Park Service, n.d.).

[121] James P. Delgado, *Nominating Historic Vessels and Shipwrecks to the National Register of Historic Places* (Washington, D.C.: National Park Service, n.d.).

[122] Jan Townsend, John H. Sprinkle, Jr., and John Knoerl, *Guidelines for Evaluating and Registering Historical Archeological Sites and Districts* (Washington, D.C.: National Park Service, 1993).

[123] Kane and DellaSalla, *Underwater Archaeological Resources Phase 1B Work Plan for the Onondaga Lake Bottom*.

[124] See U.S. Lake Survey Office, *Chart No. 5, New York State Canals, Brewerton to Cross Lake and Syracuse to Oswego* (Detroit: U.S. Lake Survey Office, 1915); U.S. Lake Survey Office, *New York State Canals, Erie Canal, Brewerton to Cross Lake and Syracuse and Oswego Canal, Three River Point to Oswego* (Detroit: U.S. Lake Survey Office, 1926); U.S. Lake Survey Office, *New York State Canals, Erie Canal, Brewerton to Cross Lake and Syracuse and Oswego Canal, Three River Point to Oswego* (Detroit: U.S. Lake Survey Office, 1932); and U.S. Lake Survey Office, *New York State Canals, Chart No. 185, 1937* (Detroit: U.S. Lake Survey Office, 1937).

[125] U.S. Lake Survey Office, *New York State Canals, Chart No. 185, 1942* (Detroit: U.S. Lake Survey Office, 1942).

[126] William M. McKinney, *The Consolidated Laws of New York, Annotated as Amended to the Close of the Regular Session of the Legislature of 1916, Book 7, Canal Law* (Northport, NY: Edward Thompson Company, 1916), 87.

[127] The historic context for Salina Pier is excerpted from Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project.*

[128] *Post Standard*, April 16, 1880.

[129] *Courier*, July 18, 1881.

[130] *Post Standard*, January 2, 1890.

[131] Thompson, *The Golden Age of Onondaga Lake Resorts.*

[132] *Post Standard*, April 14, 1957.

[133] G.M. Hopkins, *Map of the City of Syracuse, Onondaga County, New York* (Philadelphia: G.M. Hopkins Company, 1908).

[134] See U.S. Lake Survey Office, *Chart No. 5, New York State Canals, Brewerton to Cross Lake and Syracuse to Oswego* (Detroit: U.S. Lake Survey Office, 1915); U.S. Lake Survey Office, *New York State Canals, Erie Canal, Brewerton to Cross Lake and Syracuse and Oswego Canal, Three River Point to Oswego* (Detroit: U.S. Lake Survey Office, 1926); U.S. Lake Survey Office, *New York State Canals, Chart No. 185, 1937* (Detroit: U.S. Lake Survey Office, 1937); and U.S. Lake Survey Office, *New York State Canals, Chart No. 185, 1942* (Detroit: U.S. Lake Survey Office, 1942).

[135] L. Garofalini, "Resource Evaluation for New York State Canal System" (New York State Office of Parks, Recreation and Historic Preservation, 1993).

[136] Excerpted from Stephen R. James, *Cultural Resources Survey, New York Harbor Collection and Removal of Drift Project, Arthur Kill, Richmond County, New York Reach; Arthur Kill, Union and Middlesex Counties, New Jersey Reach; and Kill Van Kull, Richmond County, New York Reach* (U.S. Army Corps of Engineers, New York District, 1999): 221, 223.

[137] The historic context for Iron City is excerpted from Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project.*

[138] Sanborn Fire Insurance Company, *Insurance Maps of Syracuse, New York* (New York: Sanborn-Perris, 1892).

[139] Thompson, *The Golden Age of Onondaga Lake Resorts.*

[140] *Post Standard*, March 16, 1957.

[141] Hopkins, *Map of the City of Syracuse, Onondaga County, New York,* 1908.

[142] G.M. Hopkins, *Map of the City of Syracuse, Onondaga County, New York* (Philadelphia: G.M. Hopkins Company, 1924).

[143] The historic context for the Syracuse Yacht Club is excerpted from Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project.*

[144] Thompson, *The Golden Age of Onondaga Lake Resorts.*

[145] The historic context for Lake View Resort is excerpted in part from Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project.*

[146] Personal communication between Chris Gandino and Christopher D. Hohman; noted in Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project.*

[147] See United States Geological Survey, *7.5 Minute Quadrangle* (Syracuse, New York 1898); U.S. Lake Survey Office, *Chart No. 5, New York State Canals, Brewerton to Cross Lake and Syracuse to Oswego* (Detroit: U.S. Lake Survey Office, 1915); U.S. Lake Survey Office, *New York State Canals, Erie Canal, Brewerton to Cross Lake and Syracuse and Oswego Canal, Three River Point to Oswego* (Detroit: U.S. Lake Survey Office, 1926); U.S. Lake Survey Office, *New York State Canals, Erie Canal, Brewerton to Cross Lake and Syracuse and Oswego Canal, Three River Point to Oswego* (Detroit: U.S. Lake Survey Office, 1932); and U.S. Lake Survey Office, *New York State*

Canals, Chart No. 185, 1937 (Detroit: U.S. Lake Survey Office, 1937); U.S. Lake Survey Office, *New York State Canals, Chart No. 185, 1942* (Detroit: U.S. Lake Survey Office, 1942); U.S. Lake Survey Office, *New York State Canals, Chart No. 185, 1947* (Detroit: U.S. Lake Survey Office, 1947); and Bing Maps, Microsoft® Virtual Earth (screen shot 2011).

[148] Excerpted from James, *Cultural Resources Survey, New York Harbor Collection and Removal of Drift Project, Arthur Kill, Richmond County, New York Reach; Arthur Kill, Union and Middlesex Counties, New Jersey Reach; and Kill Van Kull, Richmond County, New York Reach*, 167.

[149] The historic context for Pleasant Beach Resort is excerpted from Hohman, *Cultural Resource Management Report Phase 1A Cultural Resource Assessment, Onondaga Lake Project.*

[150] *Syracuse Herald*, April 5, 1957.

[151] Thompson, *The Golden Age of Onondaga Lake Resorts.*

[152] See Christopher D. Hohman and Cynthia Carrington Carter, *Cultural Resource Management Report, Phase 1B Reconnaissance Survey, Onondaga Lake Project, Upland and Shoreline Area Wastebed B/Harbor Brook IRM, City of Syracuse, Onondaga County, New York* (Binghamton, NY: Public Archaeology Facility, 2010).

[153] New York State Historic Preservation Office, *Phase I Archaeological Report Format Requirements* (New York SHPO, 2005)