Mitigation Plan for Archaeological Properties in the Onondaga Lake Bottom, Subsite of the Onondaga Lake Superfund Site, Onondaga County, New York

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ABSTRACT

Mitigation Plan for Archaeological Properties in the Onondaga Lake Bottom, Subsite of the Onondaga Lake Superfund Site, Onondaga County, New York

In October 2011, the Lake Champlain Maritime Museum (LCMM), under subcontract to Parsons and on behalf of Honeywell, submitted the *Phase 1B Underwater Archaeological Report for the Onondaga Lake Bottom, Subsite of the Onondaga Lake Superfund Site, Onondaga County, New York.*[1] The report recommended the mitigation of six historically significant properties that are located within the Syracuse Maritime District and will be impacted during remedial activities in Onondaga Lake. The following document presents the plan for collecting archaeological data from these sites.

The Syracuse Maritime Historic District is a proposed National Register district and is contained in 58 acres (23.9 hectares) of Onondaga Lake bottom lands. The boundaries are delineated to the east and north by the lake shoreline and Salina Pier, respectively. The southern and western boundaries are lines drawn to encompass the extent of the contributing properties.

The six sites addressed in this plan represent a variety of property types including three vessels (A4, A12 and A53), one pier (A1/2), one breakwater (A45) and one aid to navigation (A7). Each of these is representative of historical activities that led to the creation of the Syracuse Maritime Historic District.

These sites will be documented using several methods of data recovery including videography, photography, detailed measured drawings, and the recovery and analysis of wood samples. Video documentation of submerged sites will be carried out with a digital HD camcorder enclosed in watertight housing. Still photographs of submerged sites can also be captured with this equipment. For above water photography, a digital SLR camera will be employed and all photos will be recorded in a detailed photographic log. Highly trained archaeologists will measure and record the submerged sites in detail employing a variety of equipment adapted for use underwater. Small samples of wood will be recovered from selected sites and analyzed in order to understand which wood types were employed in the construction of the sites.

The proposed archaeological activities will comply with the New York State Office of Parks, Recreation and Historic Preservation's *Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State* and the Secretary of the Interior's *Standards and Guidelines for Archaeology and Historic Preservation,* as amended and annotated (48 FR 44716).

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1.0 INTRODUCTION

In October 2011, the Lake Champlain Maritime Museum (LCMM), under subcontract to Parsons and on behalf of Honeywell, submitted the *Phase 1B Underwater Archaeological Report for the Onondaga Lake Bottom, Subsite of the Onondaga Lake Superfund Site, Onondaga County, New York.*[2] The report recommends the mitigation of six historically significant properties, located within the Syracuse Maritime District that will be impacted during remedial activities in Onondaga Lake. The six sites represent a variety of property types including three vessels (A4, A12 and A53), one pier (A1/2), one breakwater (A45) and one aid to navigation (A7). This mitigation plan describes how archaeological data will be collected from these sites.

This document begins with a description of the Syracuse Maritime Historic District and the sites that have been identified within it. Section 2 discusses the methodology that will be followed during data recovery. This section includes a detailed discussion of the archaeological and dive procedures that will be employed and outlines the research questions that will be applied to each site and what types of data will be gathered to answer them. The last portion of this section will outline the content and organization of the final project report.

The work outlined in this plan will facilitate the study of archaeological resources in Onondaga Lake consistent with Sections 106 and 110 of the *National Historic Preservation Act* (NHPA) of 1966, as amended; and in accordance with the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation*; the New York Archaeological Council's *Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State;* and the New York State Historic Preservation Office's *Phase I Archaeological Report Format Requirements*.

1.1 THE 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 (the numbering system ties to locations depicted on Figure 1).

Table 1: 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 encompasses 58 acres (23.9 hectares) of Onondaga Lake bottom lands. The boundaries are delineated to the east and north by the lake shoreline and Salina Pier remnants, respectively. The southern and western boundaries are lines drawn to encompass the extent of the contributing properties (Figure 1).

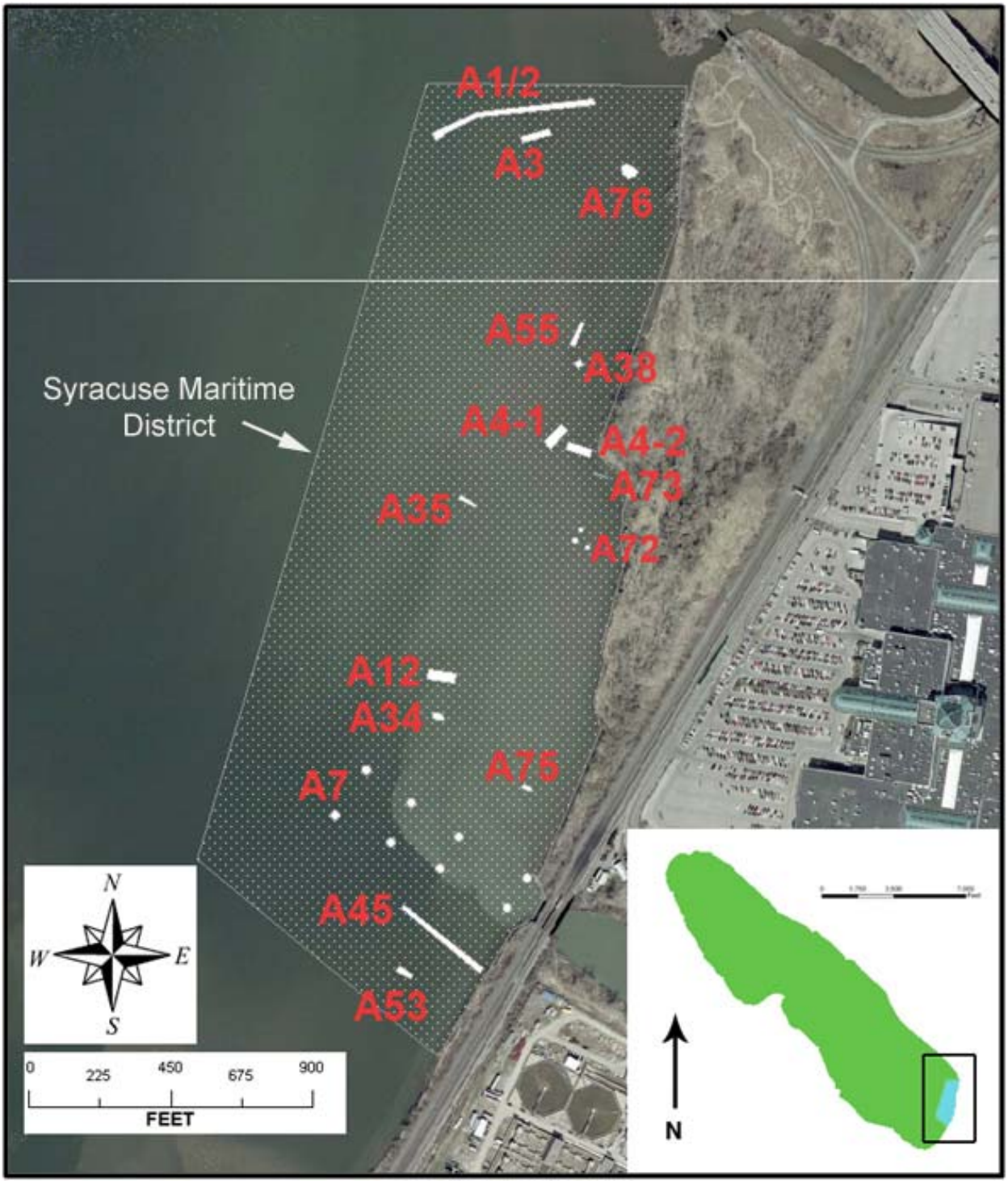

Figure 1. Map of the southeastern portion of Onondaga Lake showing the Syracuse Maritime Historic District (see Table 1 on preceding page for key to specific features).

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 rerouting, 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, the lake 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.[3] However, the disposal of a boat in the open waters of Onondaga Lake yielded no such punitive actions.

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 the 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. As the wooden boats were replaced with steel-hulled vessels, the unwanted wooden boats were disposed of in backwater areas along the canal route.

The final causal factor in the establishment of the Syracuse Maritime Historic District was the decline of the Salina Pier resort (active between 1870 and the 1910s) and the Iron Pier resort (active between 1890 and 1906). Although the active use of the resorts predates the District, their decline and abandonment were an important prerequisite 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.

Six Historic District properties (Table 2, Figure 2) have been selected for mitigation prior to the remediation activities. The other contributing properties either have limited data potential or potential data cannot be gathered without significant excavation of lake bottom sediments (these include archaeological sites A55, A35, A4-2, and A38 where most of the remains are buried). The archaeological excavation of these sites would require extensive excavation, which could potentially disperse sediments intended to be remediated outside of the remediation areas.

Table 2: Properties to be mitigated in the Syracuse Maritime Historic District

Wooden Watercraft	**Marine Infrastructure**
A4-1 (Dump Scow)	A1/A2 (Salina Pier)
A12 (Derrick Lighter Spud Barge)	A7 (Piling Clumps)
A53 (Canal Boat)	A45 (Concrete Breakwater)

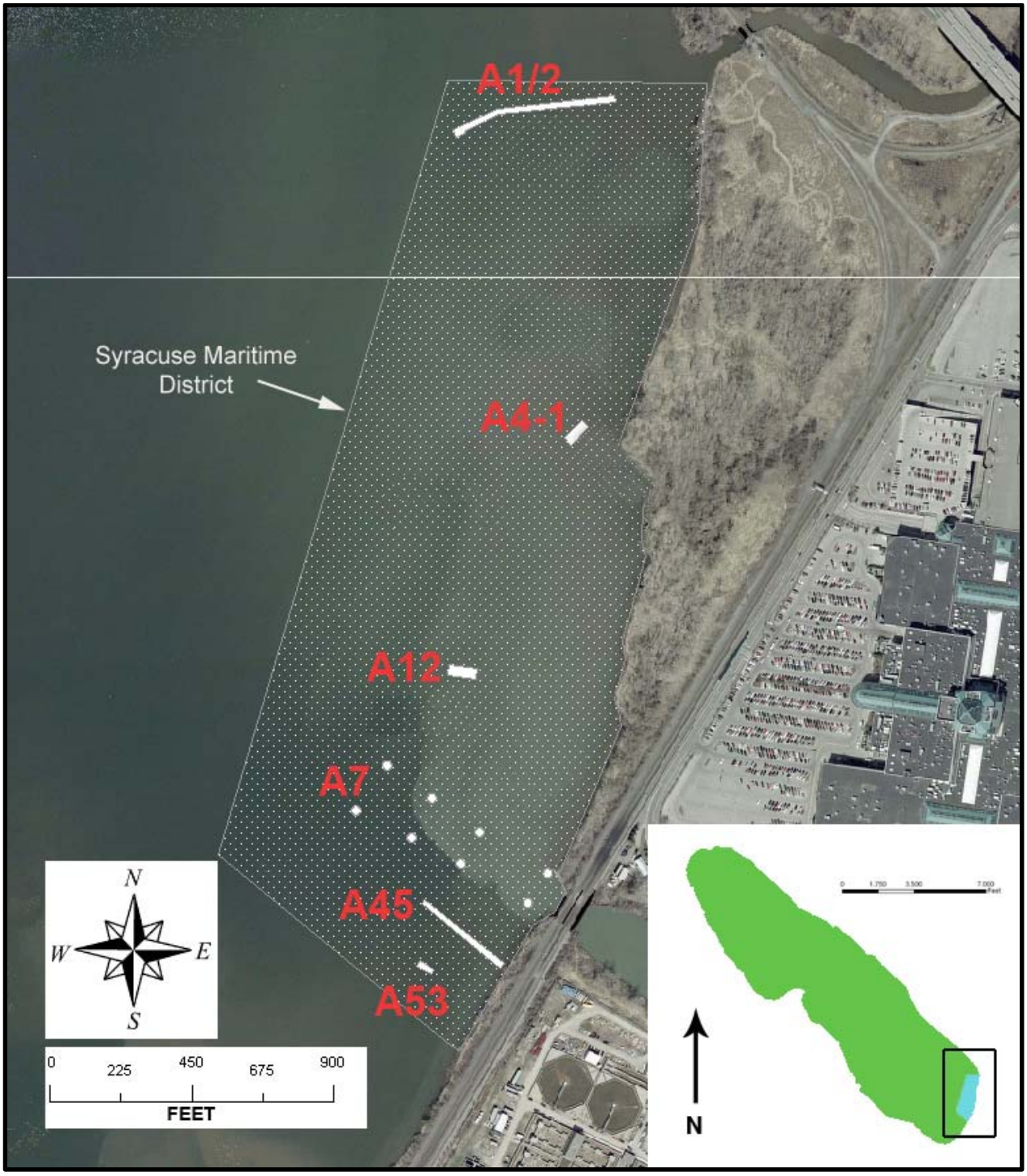

Figure 2: Sites to be mitigated within the Syracuse Maritime Historic District.

2.0 METHODOLOGY

This section of the report presents the procedures that will be implemented during the project. Section 2.1 describes the archaeological procedures that will be implemented during the project. Section 2.2 outlines the project dive operations and safety procedures that will be followed during data recovery fieldwork. The research questions for each property are laid out in Section 2.3, and the data sets required to answer those questions are identified. Section 2.4 includes a preliminary description of each site and outlines the specific tasks that will be carried out in order to fully mitigate that property. A preliminary outline for the final project report is provided in Section 2.5.

2.1 ARCHAEOLOGICAL METHODOLOGY

The investigation of the six contributing properties on the bottomlands of Onondaga Lake will be carried out under an archaeological permit granted by the New York State Museum. Each stage of the project will be carried out according to the principles and standards for archaeological and historical research established by the National Park Service, the State of New York, and professional standards within the field.[4] The documentation products will not conform with the Historic American Building Survey – Historic American Engineering Record (HABS-HAER) recordation standards. The specific documentation products to be produced for each site are summarized in Table 3.

Measured Documentation
The sites to be documented include both historic vessels and marine infrastructure features. While the documentation of these two site types will share many of the same techniques, there are variations based on the specific features inherent to each.

A vessel's hull structure lends itself to use as a reference grid for recording the locations of features. Baselines will be established on the site using fiberglass reel tapes. Features will be located and recorded using multiple baselines and off-set measurements. Small steel rulers will be used to map smaller details of the shipwreck. Other recording tools include clipboards with drafting film, staplers, and awls. Recording curved portions of a structure will be aided by using a digital goniometer. This tool is a digital level set in a 1-footwide (30.5 cm), waterproof housing. The level allows the curvature of a structural member to be recorded in a series of 1-foot (30.5 cm) increments as the goniometer is "walked" along a baseline. This methodology accurately captures the complex curves found in vessel hulls.

The documentation of the non-vessel properties will also employ baselines, though these may be placed to the side of the site or laid down the centerline of the feature. Off-set measurements will be employed to tie in the notable features and delineate the extent of the site, while steel rulers will be used for documenting details. Where extant structures are in place, the digital goniometer will be used to record the current orientation of some portions of the feature. This procedure may be particularly useful for the Salina Pier (A1/2) structures.

LCMM archaeologists will implement field techniques that are designed to gather the data necessary to accurately reflect the structure and location of each vessel or feature. Data will gathered in a logical progression from general to detailed. Documentation will initially focus on the site's overall construction or arrangement, with later dives devoted to filling in specific construction details. Because this project will have the advantage of continuity of crew, individual team members will be given large portions of

each site to record in detail. All field measurements will be recorded in feet and inches to reflect the system of measurement by which the vessels and features were originally constructed.

The underwater recording of field measurements is only the first step in the site documentation process. The field notes will be initially recorded on gridded drafting film with a pre-printed title block noting the site name and number. Each film will also feature spaces to fill in the date, area of investigation, the recorder's name, and the field note number. Immediately after finishing a dive, each archaeologist will be tasked with recopying the field notes onto graph paper. These recopied notes will also be used to record observations that are too complex to note while working underwater. Recopied notes will be given a recopied field note number that corresponds with the original field note number, and both will be inventoried. This system will allow matching original and recopied notes to be easily relocated and compared during later processing of the data.

Each archaeologist will convert his or her field measurements into scale drawings. This process will lead to the creation of a number of drawings for each site, including the following:

- Plan View: A drawing showing the site as if viewed from above looking straight down.
- Port/Starboard Exterior Elevation: A drawing showing the structure as viewed from the side.
- Centerline Elevation: A drawing showing a longitudinal section of the vessel or feature.
- Cross-Section: A drawing showing a transverse section of the vessel or feature.
- End Elevation: A drawing showing the structure as viewed from the end.

Photographic Documentation

The documentation the Piling Clumps (A7) will rely on above-water photographs. This will be carried out with a digital single lens reflex camera with a resolution of over six mega-pixels. Each feature of this property will be photographed from several angles. Photographs of the surrounding area will also be captured to place the property in its environmental setting. A scale will be placed in each photograph when appropriate and plausible,. A detailed photographic log will be maintained during this process that will record each feature being documented, what the orientation of each photograph is, and what details are shown in each image.

After fieldwork is complete, management of the digital files will follow the guidelines outlined in the National Register of Historic Places Photo Policy Factsheet.

Videographic Documentation

A Sony HDR-HC3 HDV 1080i Mini DV Handycam in a Light and Motion Blue Fin housing will be used to gather videographic documentation of the contributing properties. Archaeologists will make sufficient passes with the video camera to ensure thorough coverage of the site. Features of particular interest will be documented thoroughly by videoing them from as many angles as possible.

Wood Sampling

Samples of the wooden components of the sites will be gathered and examined to determine what type of wood was used. Sampling will be achieved through the use of a chisel and hammer to extract a small piece of wood, approximately 1x1 inch (2.5x2.5 cm). Each wood sample will be placed into a ziplock bag labeled with site name, date, archaeologist's initials, and timber name or number. Examination and identification of each wood sample will be undertaken by a Roy Whitmore, Professor Emeritus of Forestry at the University of Vermont.

Historic Context

The preceding *Phase IB Underwater Archaeological Report*[5] included background research into the lake's prehistoric and historic context, accounts of boats lost in Onondaga Lake and a typology of historic-era vessel which operated on the lake. This context will be enhanced for the Phase 3 study. Specifically, researchers will focus on locating U.S. Army Corps of Engineers permits for the marine infrastructure sites, additional primary source material on Salina Pier and Iron Pier, and information on individual vessels should they prove identifiable (either through enhanced historic research or the archaeological fieldwork).

Table 3: Documentation to be produced for historic properties during the mitigation.

	Documentation to be Undertaken									
Property	**Videography**	**Still Photography**	**Plan View**	**Port Exterior Elevation**	**Starboard Exterior Elevation**	**Centerline Elevation**	**Cross-Section**	**End Elevation**	**Wood Samples**	**Other Detailed Documentation**
A1/2 (Salina Pier)	X	X	X	NA	NA	NA	1*	1	X	Deck Features
A4-1 (Dump Scow)	X	X	X	X		X	2	1	X	Dump Door(s)
A7 (Piling Clumps)	X	X	NA	NA	NA	NA	NA	NA	X	
A12 (Derrick Lighter Spud Barge)	X	X	X	X	X	X	2	2	X	Spud Holders, Mast Step
A45 (Concrete Breakwater)	X	X	X	NA	NA	NA	1	NA	NA	Concrete Block
A53 (Canal Boat)	X	X	X	X	X		3		X	Cocked Hat Frame

*Numbers indicate the number of each type of drawing that will be produced for that property.

** NA=not applicable to this site.

2.2 DIVE METHODOLOGY AND SAFETY PRACTICES

This section outlines procedures intended to (1) ensure the safety of project divers and (2) effectively and efficiently complete project goals and objectives. The diving operations for this project will meet all federal requirements for safe diving. All diving activities will be in accordance with the strictest provisions of U.S. Army Corps of Engineers and LCMM diving safety manuals and diving guidelines. The safety of project divers is given priority in all decisions and actions undertaken during diving operations.

Diving Operations
The primary dive platform will be securely anchored or moored during all diving operations. All dive operations will take place within 100 feet of a dive flag.

Dive teams will consist of four people: one diver, one standby diver, one tender, and one dive supervisor. Each diving team member will help another diving member to don, remove, and adjust equipment. The Diving Supervisor will check to ensure that each diver is properly rigged and adjusted immediately before the diver enters the water. No diver will enter the water until clearance has been received from the Diving Supervisor. Each diver will check all equipment for proper function immediately upon submerging and when reaching the bottom before conducting any work. All work is expected to occur in waters less than 35 feet deep; therefore, the same diving operating procedures and checks provided above also apply to shallow water settings. Should any equipment malfunction during a dive, the dive will be aborted and the diver will return to the surface.

Schedule and Duration of Diving
Diving will take place during a period agreed upon by the LCMM and Parsons.

Dives and divers will be restricted to no-decompression limits. In calculating no-decompression limits, the next greater time and next greater depth will be used on standard U.S. Navy Diving tables.

Environmental Conditions
Water depths in the project area should not exceed 35 feet, and currents are expected to be negligible. Underwater visibility is expected to be between 3 and 10 feet.

Water temperatures are anticipated to be between 50 and 65°F. Divers will supply a range of dry suit undergarments suitable for a variety of thermal conditions.

Hazard Analysis
Sediments at the bottom of Onondaga Lake are believed to contain mercury, benzene, toluene, ethylbenzene, xylenes, chlorinated benzenes, polycyclic aromatic hydrocarbons, polychlorinated biphenyls (PCBs), and polychlorinated dioxins and furans (PCDD/PCDFs). The Human Health Risk Assessment for Onondaga Lake found that contamination in Onondaga Lake potentially presents risks to human health from fish consumption that are, in some cases, above U.S. Environmental Protection Agency guidelines. NYSDOH has posted a fish consumption advisory for the lake to address these risks. Risks estimated for all other lake exposure pathways evaluated in the Onondaga Lake Human Health Risk Assessment, including contact with lake sediment, did not exceed the U.S. Environmental Protection Agency's target risk range.

LCMM divers will seek to avoid impacting the lake bottom sediments; however, inadvertent sediment contact is expected. However, diving equipment and techniques employed should mitigate sediments or lake water coming into contact with the skin of divers and other crew members.

All archaeological divers will be subject to the decontamination protocol described below:

1) Upon exiting the water, the diver will be washed down with lake water from a high volume hose while standing on the bow door.
2) The diver will be sprayed with a solution of Alconox and water and scrubbed with a brush.
3) The diver will be rinsed with clean water.
4) The diver will doff his gear.
5) The diver will be rinsed with clean water.
6) The dive gear will be rinsed with clean water.

Personnel

The dive team consists of four individuals: A Diving Safety Officer (DSO), an Assistant Diving Safety Officer (ADSO), and two archaeological divers. Each dive team member will meet the training and qualification requirements established in the U.S. Army Corps of Engineers (USACE) Safety and Health Requirements Manual (EM 385-1-1, September 2008).

Team members will meet the Secretary of Interior's Professional Qualifications Standards for archaeology.[6]

Dive Platform

The dive vessel will carry a spare parts kit, tool kit, first aid supplies, and potable water. The dive vessel will conform to U.S. Coast Guard specifications according to class and will have all required safety equipment on board. The vessel will be equipped with a safe and secure dive platform/ladder to be used by divers, aided by their tenders, when entering and leaving the water. The dive platform will be of a size and type appropriate for the area environment and specific diving operations.

Diving Equipment

SCUBA equipment will include:

1) Full face mask demand regulators
2) A primary SCUBA cylinder (either a standard 80 cubic foot aluminum or a steel 95 or 104 cubic foot cylinder)
3) A pony bottle (30 or 18 cubic foot aluminum) with regulator
4) A submersible pressure gauge attached to the primary cylinder regulator
5) A depth gauge
6) A bottom timer
7) A buoyancy compensator device capable of floating the diver
8) A dive knife
9) A dive light
10) Drysuits equipped with dry gloves and latex hoods
11) Surface-to-diver and diver-to-diver communications (Wireless OTS Aquacom)
12) An inflatable signal device
13) Dive Alert

Air supply fixtures will not be modified in any way. The SCUBA equipment will carry current certification. In the event of any equipment malfunction, the dive will be terminated.

A full set of back up equipment will be available in the event of equipment malfunction.

Safety Considerations

All diving will be performed in accordance with the USACE Safety and Health Requirements Manual (EM385-1-1) and the U.S. Navy Diving Manual. Safety will be a primary goal for this project, and diver safety will be given priority in all decisions and actions undertaken during diving operations.

The DSO will restrict any diver from diving if the diver appears ill in any way. Colds, upper sinus infections, respiratory infections, and ear infections that are contra-indicated for diving will preclude an individual from diving. All divers will inform the diving supervisor of any medications taken. All diving will be voluntary, and any dive team member may decline to dive at any time. All dive team members will immediately bring to the diving supervisor's attention any existing, arising, or potential threats to diver safety.

A dive briefing will precede each day of diving. The briefing will include an assessment of safety aspects, potential hazards, tasks to be undertaken, emergency procedures, and any necessary modifications to operating procedures. The DSO will note dive briefing attendees and topics discussed on the dive log. All dives will be logged throughout the dive, and the returning diver will be required to provide written comments for the dive log immediately upon completion of each dive. As a dive is completed and prior to the commencement of the next dive, the returning diver will inform the dive supervisor about diving conditions observed and specifically about any hazards or potential hazards encountered. Divers will remain awake for at least one hour after a dive. Divers will wait at least 12 hours before flying after any dive; this will be extended to 24 hours following multiple days of diving.

An international diving flag (Alpha flag) and a civilian "diver-down" flag (red with white diagonal stripe) will be raised on the diving platform prior to all diving operations and lowered at the completion the dive. One crew member will be designated as the traffic observer with the task of alerting passing craft of diving operations.

Accurate timepieces and sharp knives will be carried by all diving personnel. Fire extinguishers will be aboard the dive platform and in each vehicle used. The dive team will have a 16-unit first aid kit and a spineboard with flotation and oxygen on hand during all diving operations. All personnel will be familiar with safety procedures and with the locations of safety equipment. All accidents or injuries will be reported to the diving supervisor immediately, and a report of injury form will be completed.

The dive will be terminated should surface-to-diver or diver-to-diver communications fail.

Bottom times will not exceed two hours and will be terminated at when the SCUBA cylinder pressure reaches 500 pounds per square inch. Each diver will be limited to two dives per day.

Diving will only be conducted on days on which weather and conditions permit safe diving. Diving will not be conducted if any of the following conditions prevail: high winds, thunderstorms, waves exceeding two feet, low surface visibility conditions (less than 100 feet of visibility), or currents exceeding 1 knot.

2.3 RESEARCH DESIGN

This section discusses the research questions associated with National Register of Historic Places (NRHP) eligibility criteria defined for each of the six sites and the types of archaeological data that are required to address these questions. 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*, *Guidelines for Evaluation and Registering Archeological Properties*, *Guidelines for Evaluating and Documenting Historic Aids to Navigation*, *Nominating Historic Vessels and Shipwrecks to the National Register of Historic Places*, and *Guidelines for Evaluating and Registering Historical Archaeological Sites and Districts*.

For a property to be included on the NRHP it must meet at least one of the following four criteria:

A. Sites that are associated with events that have made a significant contribution to the broad patterns of our history
B. Sites that are associated with the lives of persons significant in our past
C. Sites 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
D. Sites that have yielded, or may be likely to yield, information important in prehistory or history

In the case of the Syracuse Maritime District criteria A, C, and D can be applied to most of the properties. These factors therefore form the basis for the research questions generated for each contributing property.

A description of the historic background for each site can be found in the *Phase IB Underwater Archaeology*[7] report and will be included (with revisions and enhancements) in the Phase 3 report.

Anomaly 1 and 2: Salina Pier

Criteria A: Recreation, Commerce, Transportation

Research Question: What role did the Salina pier play in the development of the southern end of Onondaga Lake?
Dataset: Archival research into the maritime infrastructure of Onondaga Lake

Criteria D: Information Potential

Research Question: What does the artifact scatter presumed to exist around the Salina Pier reveal about its use?
Dataset: Contextual mapping of the pier remains and the associated artifacts

Research Question: How was the Salina Pier constructed and modified during its operational use?

Datasets: Detailed documentation of the construction of the pier; archival research into similar structures built during the same time period

Anomaly 4-1: Dump Scow

Criteria A: Engineering, Industry, Commerce, Transportation

Research Question: What type of activities were dump scows employed in on Onondaga Lake?
Dataset: Archival research into the development of the maritime infrastructure of Lake Onondaga

Criteria C: Design/Construction

Research Question: How does the construction of Dump Scow 4-1 compare with other contemporary vessels that performed a similar function?
Datasets: Detailed examination and recording of the structure of the vessel remains; archival research into similar vessels from the same time period

Criteria D: Information Potential

Research Question: Is Anomaly 4-1 a Dump Scow?
Dataset: Detailed examination and recording of the vessel remains

Research Question: What are the structural and mechanical requirements for wooden dump scows?
Dataset: Detailed examination and recording of the structure of the vessel remains

Anomaly 7: Piling Clumps

Criteria A: Engineering, Industry, Commerce, Transportation

Research Question: What role did Anomaly 7 play in the development of the southern end of Onondaga Lake and its connections to the New York State Barge Canal?
Dataset: Archival research into the maritime infrastructure of Onondaga Lake.

Criteria D: Informational Potential

Research Question: What types of wood were used in the construction of the piling clumps.
Dataset: Wood sample analysis.

Anomaly 12: Derrick Lighter Spud Barge

Criteria A: Engineering, Industry, Commerce, Transportation

Research Question: What type of activities were Derrick Lighter Spud Barges employed in on Onondaga Lake?
Datasets: Archival research into the development of the maritime infrastructure of Onondaga Lake

Criteria C: Design/Construction

Research Question: How does the construction of Derrick Lighter Spud Barge A12 compare with other contemporary vessels that performed a similar function?
Datasets: Detailed examination and recording of the structure of the vessel remains; archival research into similar vessels from the same time period

Criteria D: Informational Potential

Research Question: What are the structural and mechanical requirements for Derrick Lighter Spud Barge?

Dataset: Detailed examination and recording of the structure of the vessel remains

Anomaly 45: Stone Breakwater

Criteria A: Commerce, Transportation

Research Question: What role did Anomaly 45 play in the development of the southern end of Onondaga Lake and its connections to the New York State Barge Canal?

Dataset: Archival research into the maritime infrastructure of Onondaga Lake

Criteria C: Design/Construction

Research Question: How were the concrete "pillows" that this feature is constructed from made?

Dataset: Detailed documentation of the breakwater using measured drawings and underwater photography and videography

Criteria D: Informational Potential

Research Question: Was the use of concrete "pillows" a common construction technique for breakwaters in the early 20th century?

Dataset: Archival research into construction techniques for other contemporaneous breakwaters

Anomaly 53: Canal Boat

Criteria A: Engineering, Industry, Commerce, Transportation

Research Question: What role did canal boats play in the development of the maritime industry and commerce on Onondaga Lake before and after the opening of the New York State Barge Canal?

Dataset: Archival research into the maritime commerce of Onondaga Lake

Criteria C: Design/Construction

Research Question: Why was "cocked hat" construction used on this vessel?

Dataset: Detailed examination and recording of the structure of the vessel remains

Criteria D: Informational Potential

Research Question: Was "cocked hat" construction used on other contemporary vessels?

Dataset: Archival research into the construction of similar vessels from the same time period

Research Question: Was "cocked hat" construction an effective alternative to traditional shipbuilding techniques?

Dataset: Detailed examination and recording of the structure of the vessel remains

2.4 SITE SPECIFIC MITIGATION PLANS

Site-specific mitigation plans have been developed for each property that consider the type of property in question, the research questions to be answered, and the data sets required to answer these questions. The unique environment and safety issues faced by archaeologists working in Onondaga Lake have also been considered in each mitigation plan.

Each of the following sites will be documented as a separate resource. However, the Phase 3 report will seek to integrate these resources within the framework of the Syracuse Maritime Historic District because of their concentration and linkage through the historic development of the southeastern corner of Onondaga Lake.

Anomaly 1 and 2: Salina Pier

Site Description:

A1 and A2 are parts of the remnants of the Salina Pier. The pier lies immediately north of the barge wreck designated as site A3. The pier's location was known from historic accounts and charts and from aerial images. It was also located during CR Environmental's 2005 remote sensing survey. The site consists of two parallel vertical planking walls approximately 30 feet (9.14m) apart. The area between the walls is filled with stone. The pier stretches 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.

The Salina Pier was initially constructed in the 1870s or 1880s at the mouth of Bear Trap Creek (now known as Ley Creek).[8] The structure was present on few historic maps, because a windstorm in early 1890 destroyed Salina Pier and a saloon house at the end of it.[9] 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 1890, in an attempt to compete with the Iron Pier resort, the Salina Pier company constructed a two-story pavilion that contained a concert hall and dining room 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 Salina Pier pavilion land and had Solvay soda ash refuse placed up to 4 feet (1.22m) deep to build up the land in front of the Iron Pier.[10] Salina Pier remained intact through 1898 and served boats that ran regularly to all lakeside resorts.[11] 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.[12] By 1924, the Breakwater was abandoned and flooded over by the raising of the lake for the Barge Canal.

Mitigation Plan:

Archaeological divers will thoroughly document the Salina Pier remains. The major structural elements of the Pier will be recorded in relation to one another, and detailed documentation will be completed for features of particular interest. In addition to tape measures, rulers and digital goniometers, archaeologists will use high-definition videography and still photography to aid in documentation. The archaeological data generated during the documentation will be analyzed on several different levels. First, the descriptive data will be synthesized to create a site plan and graphic reconstructions of the pier including plan and profile views. Second, the descriptive data will be used to answer specific research

questions regarding the pier's design and construction, its operational history, and how to interpret the site and evaluate its historical significance.

Anomaly 4-1: Dump Scow

Site Description:

A4-1 is an edge-fastened scow barge that 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. The barge rests in shallow water just off shore and adjacent to another barge (A4-2). 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.

Mitigation Plan:

Archaeological divers will thoroughly document the barge remains. The vessel's major structural elements will be recorded in relation to one another, and detailed documentation will be completed for features of particular interest. These features include the numerous bulkheads and the construction of the dump compartment noted on the wreck. In addition to tape measures, rulers and digital goniometers, archaeologists will use high-definition videography and still photography to aid in documentation. The archaeological data generated during the documentation will be analyzed on several different levels. First, the descriptive data will be synthesized to create a site plan and graphic reconstructions of the barge including plan, profile, and sectional views. Second, the descriptive data will be used to answer specific research questions regarding the vessel's design and construction, its operational history, and how to interpret the site and evaluate its historical significance.

Anomaly 7: Piling Clumps

Site Description:

A7 was identified from aerial images and the 2005 remote sensing survey. The anomaly is a series of six piling clumps marking the entrance into Syracuse's inner harbor. The clumps consist of between three and 10 pilings driven into the lakebed and held together with cables and/or iron bands. The clumps are visible above the surface, and have been documented with side-scan sonar, sector-scan sonar and photographs.

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.[13] The 1952 navigational chart continues to show four piling clumps; however, modern charts show the six that currently exist.

Mitigation Plan:

Documentation of this property will rely on capturing detailed surface photographs of each of the piling clumps from multiple angles. Photographs will also be taken of the surrounding area in order to place the resource within its environmental setting. A detailed photographic log will also be created that will describe what each of the pictures portrays. Wood samples will also be retrieved from each clump for analysis.

Anomaly 12: Derrick Lighter Spud Barge

Site Description:

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, and the site is clearly visible on modern aerial photographs. The mechanisms for holding the spuds are exposed above water, and the remainder of the barge is just below the water's surface.

Mitigation Plan:
Archaeological divers will thoroughly document the barge remains found at A12. The vessel's major structural elements will be recorded in relation to one another, and detailed documentation will be completed for features of particular interest. These features include the spud holders, mast step, and derrick-related hardware found on the eastern end of the barge. In addition to tape measures, rulers and digital goniometers, archaeologists will use high-definition videography and still photography to aid in documentation. The archaeological data generated during the documentation will be analyzed on several different levels. First, the descriptive data will be synthesized to create a site plan and graphic reconstructions of the barge including plan, profile, and sectional views. Second, the descriptive data will be used to answer specific research questions regarding the vessel's design and construction, its operational history, and how to interpret the site and evaluate its historical significance.

Anomaly 45: Stone Breakwater
Site Description:
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 and was abandoned/partially submerged by 1947. The breakwater is 20 feet wide (6.1m) and extends 250 feet (76.2m) from the shoreline. 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. 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.

Mitigation Plan:
Archaeological divers will thoroughly document the breakwater remains. The overall extent and composition of the breakwater will be recorded, and detailed documentation will be completed for any features of particular interest. In addition to the tape measures and rulers employed for the measured recording, archaeologists will use digital and still photography to aid in documentation. The archaeological data generated during the documentation will be analyzed on several different levels. First, the descriptive data will be synthesized to create a site plan and graphic reconstruction of the breakwater including plan and profile views. Second, the descriptive data will be used to answer specific research questions regarding the breakwater's design and construction and how to interpret the site and evaluate its historical significance.

Anomaly 53: Canal Boat
Site Description:
A53 is a canal boat that was located during the Phase 1B underwater archaeological fieldwork in June 2010. A53 was not located during the 2005 remote sensing survey due to the extremely shallow water around the wreck. 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. The site is the bottom of a canal boat with elements visually noted including floors, bow frames, stem and cocked

hats. 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.

Mitigation Plan:
Archaeological divers will thoroughly document the vessel remains found at A53. The vessel's major structural elements will be recorded in relation to one another, and detailed documentation will be completed for features of particular interest, like the vessel retaining bulkheads and internal framing. In addition to the tape measures, rulers and digital goniometers employed for the measured documentation, archaeologists will use digital and still photography to aid in documentation. The archaeological data generated during the documentation will be analyzed on several different levels. First, the descriptive data will be synthesized to create a site plan and graphic reconstructions of the canal boat including plan, profile, and sectional views. Second, the descriptive data will be used to answer specific research questions regarding the vessel's design and construction, its operational history, and how to interpret the site and evaluate its historical significance.

2.5 Report Preparation

The archaeological data and accompanying historic research will be used to create a report detailing the findings of the project. This document will contain the detailed description, photographs, and drawings of each site as well as a discussion about how the additional information gained has added to our understanding of that site and about the Syracuse Maritime District as a whole. The report will also contain detailed information about the diving operations fieldwork and copies of all recopied field notes.

The report will contain the following sections:

- Introduction
- Historic Background
- Previous Research
- Methodology
- Results
- Conclusions
- Bibliography
- Appendices

This report will be written in compliance with the *Chicago Manual of Style 16th edition* and New York State's State Historic Preservation Officers *Archaeological Report Formatting Requirements*.

[1] Adam Kane, Joanne Dennis, Sarah Tichonuk and Christopher Wright, *Phase 1B Underwater Archaeological Report for the Onondaga Lake Bottom, Subsite of the Onondaga Lake Superfund Site, Onondaga County, New York* (Vergennes, VT: Lake Champlain Maritime Museum, 2011).

[2] A. Kane, J. Dennis, S. Tichonuk and C. Wright, *Phase 1B Underwater Archaeological Report for the Onondaga Lake Bottom.*

[3] 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.

[4] 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); 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); M 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); and J. Richard Steffy, *Wooden Shipbuilding and the Interpretation of Shipwrecks* (College Station, Texas: Texas A&M University Press, 1994).

[5] A. Kane, J. Dennis, S. Tichonuk and C. Wright, *Phase 1B Underwater Archaeological Report for the Onondaga Lake Bottom.*

[6] National Park Service, 36 CFR 61: Procedures for State, Tribal, and Local Government Historic Preservation Programs (Washington, DC: US Government Printing Office, 1983).

[7] A. Kane, J. Dennis, S. Tichonuk and C. Wright, *Phase 1B Underwater Archaeological Report for the Onondaga Lake Bottom.*

[8] *Post Standard*, April 16, 1880.

[9] *Post Standard*, January 2, 1890.

[10] Thompson, Donald H. *The Golden Age of Onondaga Lake Resorts.* (Fleischmanns, New York: Purple Mountain Press, 2002).

[11] *Post Standard*, April 14, 1957.

[12] G.M. Hopkins, *Map of the City of Syracuse, Onondaga County, New York* (Philadelphia: G.M. Hopkins Company, 1908).

[13] 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).