REVOLUTIONARY WAR
GUNBOAT Spitfire

October 2018 Inspection Report

Arthur B. Cohn, Principal Investigator
Fred Fayette, Captain RV Neptune
Karl Lander, Greenseas Systems
Cameron Bradley, Greenseas Systems
Chris Sabick, LCMM Archaeologist
To: Robert Neyland, George Schwarz, Naval History and Heritage Command; Laura Trieschmann, Jess Robinson, Vermont Division for Historic Preservation; Daniel Mackay, Philip Griffin, New York State Historic Preservation Office; Eric Howe and Jim Brangan, Lake Champlain Basin Program

Submitted by: Art Cohn, Principal Investigator, Spitfire Management Project

Executive Summary

On October 23, 2018, a Remote Operated Vehicle inspection of the Gunboat Spitfire was successfully undertaken, and which resulted in two important observations:

- The long-anticipated infestation of the quagga mussels has not yet begun.
- New damage was observed to the trestletree, the structure where the upper end of the main mast and lower end of the top mast come together.

Preliminary drawing of Spitfire showing the centerline cross-section based on video footage. Drafted by David Robinson and Adam Loven. (LCMM)
Historical Background

In the spring of 1776, after a failed attempt to invade British Canada, a Rebel army fell back into the Champlain Valley demoralized and sick with smallpox. They were being pressed by a fresh British force recently arrived at Quebec to support the small British force spread thinly throughout the now rebelling colonies. As the British massed their forces at St. Johns at the northern end of Lake Champlain navigation, they realized that to invade the colonies they would first have to gain naval control of the strategic waterway.

The rebelling Americans also realized that if they were to stop the British from invading further south they would have to maintain their control of the waterway by building new warships to strengthen their fleet.

The shipbuilding arms race took four months, with each side rising to the challenge and adding significant naval strength to their existing resources. The two combatants, working at opposite ends of the lake, succeeded in launching powerful new warships to tip the scales of battle in their favor. On October 11, 1776, at what has become known as the Battle of Valcour Island, the two fleets met for over five hours and fought to a draw. Taking stock of their losses, the Americans, led by General Benedict Arnold, chose a bold plan of escape by stealthily rowing passed the British blockade established at the south end of Valcour Island. During their southward escape, the Americans had to abandon two weakened gunboats that were sinking under their crews. One of these was the gunboat Jersey, which did not sink but was found awash the next day by the pursuing British. Our research of the event has determined that the second gunboat, now identified as the Spitfire, was successfully sent to the deep lake bottom so that the British could not use her against them.
The gunboat *Spitfire* was located during our Whole Lake Survey on June 6, 1997. Since its discovery, the shipwreck has been the subject of intensive management study to determine the best recommended preservation strategy. While that information was being assembled, the *Spitfire* has been regularly inspected to monitor its condition. The inspection on October 23, 2018 was the most recent examination and what follows is the inspection report from that survey.

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*The Missing Gunboat Found*, by marine artist Ernie Haas, was based on video and still images taken by the ROV. (LCMM)

(right) The ROV team was generously provided by Greenseas Systems of Richmond, Vermont. ROV operators Cameron Bradley, left, and Karl Lander getting the gear ready for deployment on the bow of the RV *Neptune*. (far right) Cameron Bradley sits at the controls of the ROV as LCMM archaeologist Chris Sabick looks on.
Discussion

On October 23, 2018 a Remote Operated Vehicle team consisting of RV *Neptune* Captain Fred Fayette; Karl Lander and Cameron Bradley of Greensea Systems; Chris Sabick, LCMM Archaeologist; and Art Cohn, Principal Investigator assembled aboard the RV *Neptune* at the Burlington ferry dock to stage an on-water operation to inspect the Gunboat *Spitfire*. Our goal for this inspection was to evaluate whether the invasive quagga mussels have, as has been predicted, arrived in Lake Champlain. In addition, we were aware that during the last three years at least two unauthorized scuba dives had taken place on the *Spitfire*. We would, therefore, be examining the 242-year old gunboat for any signs of disturbance, accidental or intentional, since our last inspection. We would also be on the lookout for any potential damage caused by fishing gear, which is dragged through the water-column at depth as a standard practice for fishing. Lastly, we would be examining the site for signs of any obvious alteration from the natural process of material floating through the water column. This type of impact had been observed previously and so our overall objective can be summed up as looking for any signs of alteration to the site since it was last viewed.
No Trespassing notice signs for unauthorized diver activity were installed on the *Spitfire* shortly after its discovery. A surface mooring which would also provide fishermen and divers notice, further protecting the site, is under consideration.

(Photograph Woods Hole Oceanographic Institution/LCMM)
**Inspection results**

Generally speaking, the inspection revealed the gunboat *Spitfire* is largely unchanged from previous condition inspections. Having only recently returned from Seneca Lake where quagga mussels have encrusted several shipwrecks discovered in the same depth range as *Spitfire*, I was particularly concerned that the quagga invasion of Lake Champlain might have begun. We have been previously told by aquatic biologists that we work with that quaggas are predicted with certainty to eventually come to Lake Champlain. Therefore, it was with significant relief that in the early moments of viewing the gunboat through the ROV console aboard the *Neptune* that the inspection team realized that the dreaded quagga mussels had not yet arrived and colonized the shipwreck.

The boat itself appears essentially unchanged and no intentionally caused impact has been observed. The inspection went very well and we examined and recorded the boat without mishap.

The *Spitfire* has several areas where artifacts are visible above the mud inside the hull. These vulnerable areas were examined for indications of intentional disturbance. (left) The swivel gun ammunition box attached to the interior of the starboard-side hull still shows the visible lead shot has not been disturbed. We concluded that no intentional alteration of the archaeological record has occurred. (right) Our intense search for quagga mussels revealed only a few mussels attached to the iron bow cannon. These may be zebra mussels that have dropped into the site from shallower water. (bottom) Preliminary drawing of *Spitfire* showing the plan view based on video footage and drafted by David Robinson. (LCMM)
When the time came to ascend, the ROV was skillfully guided slowly up the mast assembly to both inspect the mast and begin its recovery. When the ROV reached the trestletree, where the top of the main mast and the bottom of the top mast come together, we were startled to see that this assembly appeared to be ajar. The horizontal framework, which had been observed on previous inspection to be roughly level, now appeared to have been yanked hard enough to drop the forward facing end downward by approximately four inches. It appears unlikely that the assembly simply settled into this new position by natural process, and although no evidence of the cause of the impact was observed to be present, our best hypothesis is that the damage was likely caused by a diver downline or fishing tackle.

Trestletree assembly feature.
(top left) The trestletree assembly was photographed in June, 1997 shortly after the gunboat’s discovery and provides remarkable detail of this feature.
(bottom left) This mast-securing feature was again recorded in 2011 during a video-documentation project with Woods Hole Oceanographic Institution.
(top right) the trestletree as filmed on October 23, 2018 shows a clear change in the horizontal orientation from a near level position to a distinct drop at its forward end.

Profile view of the gunboat *Spitfire*. Drawn by David Robinson. (LCMM)

**Damage to mast**

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A trestletree is: "Two strong bars of timber fixed horizontally on the opposite sides of the lower mast-head, to support the frame of the top, and the weight of the top-mast."

(From William Falconer, An Universal Dictionary of the Marine...Technical Terms and Phrases. London, 1780.)

Trestletree Assembly, 2003
This photograph was taken during the 2003 Spitfire inspection and shows the trestletree was in a near horizontal level position until recently. Photograph by Pierre LaRocque. (LCMM)

Howard Hoffman’s plans are based on his detailed survey of the vessel and were proven in his model of the Philadelphia. These plans made it possible for Lake Champlain Maritime Museum to build the full-scale replica Philadelphia in 1991. Hoffman’s plans allowed a transfer of the exact shapes and sizes of every part of the vessel.

(Smithsonian Institution)
Conclusion

The lack of quagga mussels on the site and the generally unchanged condition of the gunboat was a relief. However, the localized damaged to the trestletree assembly, almost certainly inadvertent, highlights the urgent need to protect the gunboat under the regulatory framework of a Federally designated “Regulated Navigation Area” (RNA). This ongoing discussion between the US Coast Guard and the Naval History and Heritage Command was formally begun in 2017. It is hoped that the designation of the gunboat’s site as an RNA would provide divers and fishermen notice of the site’s location and restricted conditions of access. The RNA evaluation is also examining the potential benefits of the installation of a mooring system that could both facilitate awareness of the site’s location in order to aid in avoidance and also provide safer access for any authorized future visitation and research.

The *Spitfire* is a powerful connection to the formation of the nation. The diminutive warship fought the British at the Battle of Valcour Island and was abandoned during the nighttime retreat that followed. Preserved for more than two centuries under the lake’s cold, fresh water, the archaeological record contained within the *Spitfire*’s hull holds unique potential to enrich our understanding of the times and the men who served “in the cause of Liberty” on Lake Champlain in 1776. The damage caused to the *Spitfire*’s trestletree, while not catastrophic, are a strong reminder of the fragile nature of the site and the ease at which the archaeological record can be altered. A short-term strategy that better informs the public of the *Spitfire*’s special archaeological status and provides an engineered access which eliminates the need for anchors and downlines will better protect the shipwreck and the story it has to tell.

The *Spitfire*’s Bow Cannon.
The bow cannon in its firing position and resting in its carriage provides strong testimony to the conflict in which it participated. The cannon extends over the cut-down stem post, still covered by a lead patch held in position by iron tacks. (LCMM)
Invasive species threat

Invasive mussels in our ecosystem have added an important and urgent new dimension to the Spitfire’s preservation strategy. Zebra and quagga mussels first colonized the Great Lakes. In the early 1990s, zebra mussels migrated into Lake Champlain. Since that time they have expanded their presence to many inland waters and currently no effective mechanism has been identified to control them. As a component of the twenty-year long Spitfire management study, an analysis of the impact of zebra mussels to the fabric of historic shipwrecks was undertaken. This multi-year study observed that while the mussel colonies do not appear to impact the shipwrecks wood, their presence does facilitate the growth of sulfur-reducing bacteria that results in significantly increasing the rate of deterioration of the iron fastenings that holds these ships together.

Our conclusion is that the invasive mussels colonizing historic shipwrecks will greatly increase the speed of iron degradation. The Spitfire rests in deep water and, as observed during our inspection, the shallow dwelling zebra mussels are only present in limited, non-impactful numbers. However, the dreaded quagga mussels, which have not yet been identified in Lake Champlain, are just on the horizon and predicted with certainty to eventually appear. Viewing through the crystal ball, the future preservation of the collection historic shipwrecks within our freshwater ecosystems is in jeopardy. Quagga mussels will reach the Spitfire in the near future and do what the British Navy failed to do in 1776; destroy the gunboat. Hence, we continue to be convinced that recovery, conservation and exhibition of the Spitfire is the best preservation option.
Inspired by Nick Muller and painted by Ernie Haas, this depicts the American Navy’s escape during the aftermath of the Battle of Valcour Island. (Courtesy Nick Muller)