

Katie Eccles Site and Conditions

The *Eccles* lies within the northeastern extent of Prince Edward Bay, 8.9 km miles northeast of Timber Island and 9.7 km south of Amherst Island (Fig. 1) in Eastern Lake Ontario. The surrounding bottomland is characterized by featureless mudflats. At a depth of thirty-two metres, the wreck is situated in a low-energy environment, and lies within the hypolimnion, between 4-5.5°C (39-42F). Though the wreck itself lies in a low-energy environment, the site is exposed, with waves between 0.9 and 1.5 metres on some days of the survey on site. Visibility during the period of fieldwork was exceptional, exceeding twenty metres at depth on the first days of the survey, following a period of rough weather and high winds.

The 2019 Survey

A Teledyne Seabotix LBV-150-2 observation-class remotely operated underwater vehicle, donated for the project's use by the Institute of Nautical Archaeology, was utilized to remotely-access the site. Due to the lower resolution of the onboard camera, the video was recorded with a GoPro Hero7 as well as a GoPro Hero 3/3+ mounted externally to the frame of the remotely operated vehicle. The LBV-150-2's internal camera was used for piloting but was not recorded.

The investigation of the site was non-intrusive without attempts to access the interior of the hull or record internal features that could not be photographed without penetration. Eight dives were conducted over three days, 14, 16 and 17 June 2019 accumulating nearly eight hours of digital video of the site. The recording was conducted in consecutive passes at varying depths around the periphery of the hull and above the deck, with addition top-down passes being made to ensure complete coverage of the site. Scaling measurements were taken of identifiable site features using a scale bar attached to the LBV-150.

Still frames from the digital video were imported into Agisoft Metashape, a software program that generates a three-dimensional point cloud from overlapping photograph's Exchangable Image File Format (EXIF) data, provided a point that appears in no fewer than three photos. The use of video eliminated concerns over capturing sufficient overlap between each still frame. Through the Agisoft workflow, the program generated a sparse and dense point cloud of the subject, which was processed into a textured mesh. When scaling measurements were entered, the result was a scale-constrained, measurable model. Due to the number of photographs included within the photo model, the model was processed in several smaller chunks which were later aligned and merged to form a unified model.

The methods employed in developing the photo model possess inherent limitations. Fine detailing is often lost, likely the result of slight edge blurring in individual video frames, resulting in a reduction of edge resolution in the 2019 photo model. Experimentation with the best methods for remote-telepresence based photogrammetry, including experimentation with results from still capture