



HMS EREBUS UNDERWATER ARCHAEOLOGICAL SURVEY 2018

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1. PROJECT DESCRIPTION

This short report describes archaeological survey work conducted by Parks Canada's Underwater Archaeology Team (UAT) on the wreck of HMS *Erebus*, from September 3 to 12, 2018. This work was part of a multi-year project undertaken by Parks Canada since 2014 on the study and excavation of Sir John Franklin's 1845 expedition vessels, HMS *Erebus* and HMS *Terror* (Dagneau 2018; Dagneau and Moore 2017; Moore et al. 2017).

The wreck of HMS *Erebus* is located within the Wrecks of HMS *Erebus* and HMS *Terror* National Historic Site of Canada, in Wilmot and Crampton Bay, within the Kitikmeot Region of Nunavut, Canada. The site is approximately 125 km southwest from Gjoa Haven and 275 km southeast from Cambridge Bay, the two nearest communities in Nunavut. Furthermore, it is some 70 km south of the wreck of HMS *Terror* (Figures 1.1 and 1.2).



Figure 1.1: Locations of the wrecks of HMS *Erebus* and HMS *Terror*, Kitikmeot Region, Nunavut (Map: C. Dagneau, Parks Canada; Imagery: ESRI World Imagery / Earthstar Geographics, TerraColor).

2. OBJECTIVES

Following the completion of a site evaluation in 2016 and limited observations made in 2017, the 2018 field work aimed to continue the documentation and study of the HMS *Erebus* wreck site. The specific archaeological objectives were as follows:

1. Commence excavation of selected areas on the upper and lower decks;
2. Continue exterior and interior documentation of the wreck, including artefact/feature mapping on the upper and lower decks; and
3. Continue mapping and documentation of the debris field around the hull.

Non-archaeological objectives were as follows:

1. Install four mooring anchors around the wreck to secure the diving and excavation barge *Qiniqtiryuaq* over the site;
2. Continue to survey a new, shorter marine-access corridor to HMS *Erebus* using multi-beam echosounder;
3. Support media and ministerial events, including a visit from a delegation of Canadian, Inuit and British officials while on the HMS *Erebus* site; and
4. Organize and support community events in Gjoa Haven and Cambridge Bay to share the story with Inuit communities.

3. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND

For a comprehensive historical account of the Franklin expedition, please refer to Woodman (1991) and Cyriax (1939) or some of the summaries provided within the UAT's previous reports (for example: Moore and Dagneau 2017). For more information on recent

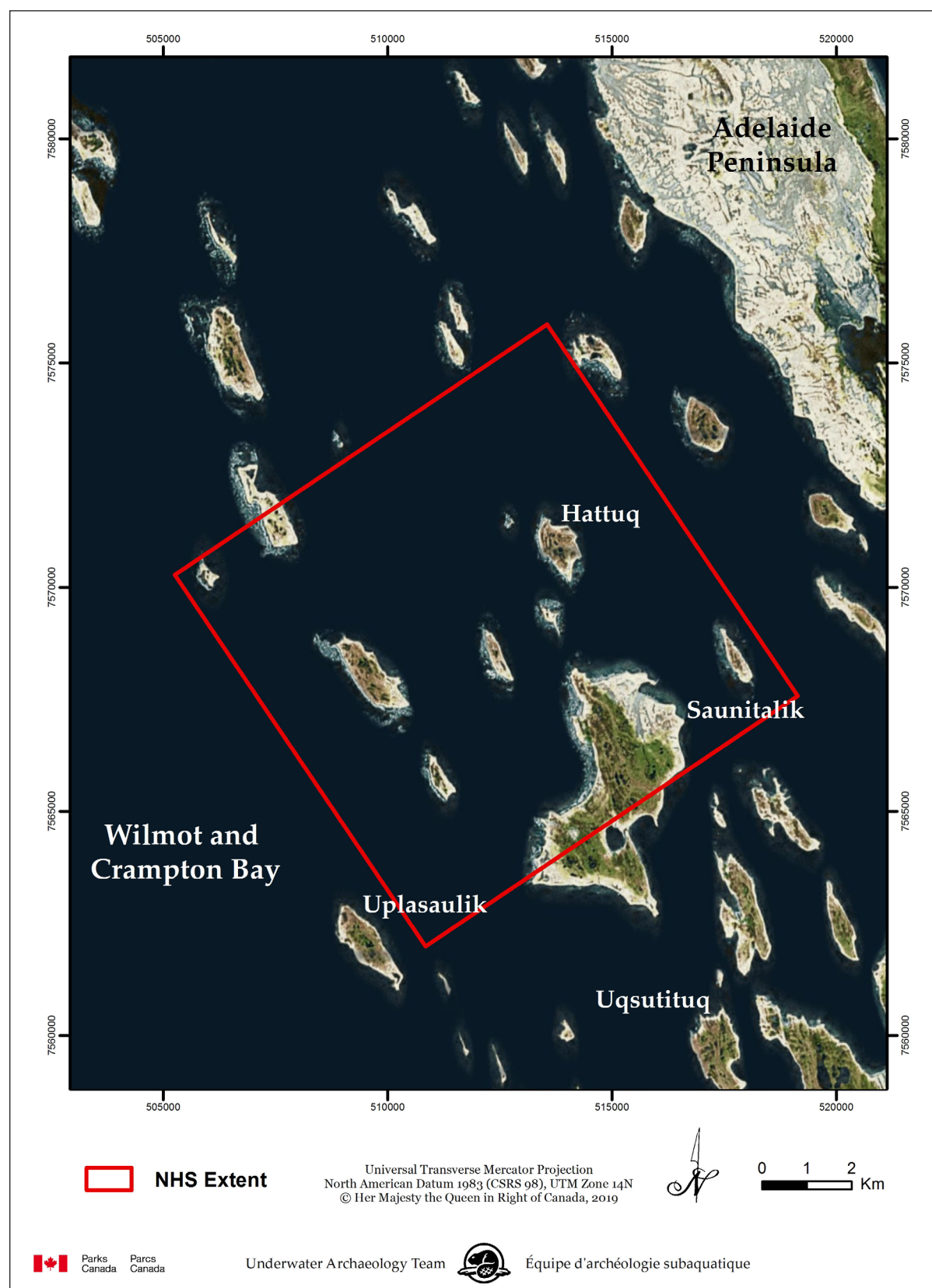


Figure 1.2: Wrecks of HMS Erebus and HMS Terror National Historic Site protected area around the HMS *Erebus* wreck site, Wilmot and Crampton Bay, Kitikmeot Region, Nunavut (Map: C. Dagneau, Parks Canada; Imagery: ESRI World Imagery / Earthstar Geographics, TerraColor).

archaeological investigations, the reader can refer to the latest reports by the UAT (Dagneau 2018; Dagneau and Moore 2018; Moore and Dagneau 2017; Moore et al. 2017) and articles by Stenton (2014 and 2018) and Stenton et al. 2015.

4. FIELDWORK DESCRIPTION

Due to both a delay in the delivery of a replacement propeller, and adverse ice conditions in the Beaufort Sea, Parks Canada's research vessel and main UAT research platform RV *David Thompson* was delayed three weeks in its northbound transit from Sidney, British Columbia to Cambridge Bay, Nunavut. On account of adverse ice conditions, the ship was also forced to leave the Arctic 2–3 weeks earlier than expected. The original plan to depart the Arctic via the east had to be abandoned due to ice blocking Bellot Strait, forcing the RV *David Thompson* to re-route back to Sidney. As a result, the 2018 field operations were drastically reduced from an anticipated 5–6 weeks to nine days, and no work was conducted on HMS *Terror*.

The RV *David Thompson* departed Victoria, British Columbia, on August 5 and arrived in Gjoa Haven, Nunavut, on September 3. Fieldwork operations at HMS *Erebus* per se started on September 4, when the RV *David Thompson* towed the barge *Qiniqtiryuaq* from Gjoa Haven to Wilmot and Crampton Bay, at a rendez-vous point with CCGS *Sir Wilfrid Laurier*. A large amount of UAT equipment kindly transported north by the Canadian Coast Guard (CCG) in the hold of the CCGS *Sir Wilfrid Laurier* was transferred to the *Qiniqtiryuaq* on September 6. In order to secure the barge in position over the wreck during

excavation work, four massive anchors and mooring chains were also graciously provided by the CCG to Parks Canada, to be put in around the site. On September 7, two of these moorings were transferred and catted on the side of the *Qiniqtiryuaq* with quick release systems (Figure 4.1), and then installed in position using the barge assisted and powered by CCG staff aboard the rigid hull inflatable boat (RHIB) *Laurier One*. Unfortunately at that point, due to foul weather, it was not possible to install the last two moorings and the dives had to be postponed to September 10.

Shortly after the installation of the moorings and securing of the *Qiniqtiryuaq* on site, the UAT welcomed aboard the RV *David Thompson* a delegation of Canadian, Inuit and British officials (Figure 4.2). The Minister of Environment and Climate Change and Minister responsible for Parks Canada, Catherine McKenna was accompanied by British Deputy High Commissioner to Canada, David Reed, and British High Commission Military Attaché, Commander Neil Mariott. Also present were: Aluki Kotierk, President of Nunavut Tunngavik Incorporated; Pam Gross, Mayor of Cambridge Bay and Inuit Heritage Trust representative; and Stanley Anablak, President of the Kitikmeot Inuit Association. The visitors also had the opportunity to meet with Inuit Guardians on Saunitalik Island and to visit the area.

The archaeological work was limited to five two-persons dives conducted over a shortened, two-day period on September 10–11, for a total individual bottom time of 7 hours (Figure 4.3). Considering the limited window of opportunity, the focus was to assess any major changes to the wreck's condition since 2017. A few dives were



Figure 4.1: The crew of the CCGS *Sir Wilfrid Laurier* lowers a mooring anchor to the barge *Qiniqtiryuaq*, while Parks Canada staff set up the mooring lines (Photo: J. Moore, Parks Canada, 89M09435EF).



Figure 4.2: The UAT welcomed aboard the RV *David Thompson* a delegation of Canadian, Inuit and British officials. Here part of the visiting group is being ferried from Saunitalik Island to the ship (Photo: J. Moore, Parks Canada; 89M09465EF).



Figure 4.3: Preparation for a dive on HMS *Erebus* from Parks Canada RHIB *Broad Arrow* alongside the barge *Qiniqtiryuaq*. The RV *David Thompson* can be seen in the background (Photo: J. Moore, Parks Canada, 89M09486EF).

also dedicated to surface mapping and collection of artefacts in selected areas of the site that were readily accessible and/or vulnerable to loss or movement. The underwater work was conducted using UAT's standard scuba diving gear and was carried out from the Parks Canada RHIB *Broad Arrow* and the barge *Qiniqtiryuaq*.

In order to complement the record of any large-scale condition changes to the site and to confirm the location of the two new moorings, a side-scan sonar survey of the wreck was also completed on September 11 (Figure 4.4). Lastly, while returning to Gjoa Haven that same day, a multi-beam echo sounder pilot line was surveyed to the east of Kirkwall Island, in an effort to continue the mapping of a shorter navigable route between the HMS *Erebus* site and Storö Passage. This shorter navigation route saves more than four hours of navigation between the site and Gjoa Haven.

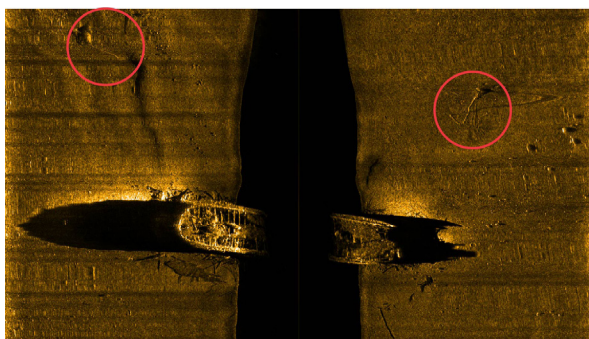


Figure 4.4: Side-scan sonar transect image of HMS *Erebus* showing northwest and northeast mooring anchors (red circles). North is up (Sonar image: R. Harris, Parks Canada).

5. ARCHAEOLOGICAL RESULTS

The fieldwork on HMS *Erebus* focused on a general site evaluation and targeted artefact mapping and recovery. Two inspection dives and a side-scan sonar survey were devoted to detect any major changes to the site, including its structure, and the surrounding debris field. As observed in previous years, a few loose timbers have moved here and there as recently as 2017. These are all normal changes for this fairly dynamic site. No significant changes to the debris field immediately around the hull were observed, other than the movement of a few loose planks. More surprising is the fact that, over the last year, a 14 m-long section of upper deck originally located between the bow and the main hatch on the starboard side was detached from the deck beams, flipped upside down, and moved some 8 m aft, with a slight clockwise rotation. This movement significantly changed the areas of lower deck that are now exposed (Figures 5.1 and 5.2).

A portion of the double-planked decking is damaged, exposing some of the fearnought (a thick wool felt) used as a waterproofing agent between the upper diagonal and lower longitudinal planking (now upside down). The windlass has moved as well, and its outboard end has rotated approximately 90 degrees clockwise and is now aligned fore-and-aft, probably due to the same factors that displaced the starboard deck section. (Figures 5.3 and 5.4). The windlass has rolled free and is now clear of any corrosion, debris and anchor chain. Lengths of stud-link chain that once ran from the windlass to the stem seem to have fallen inside the hull to the lower deck. This important change possibly created by swell, is fairly recent, as the section was still in place in 2017. Interestingly, this new detached starboard section is a mirror image of the port side section found detached in the debris field upon site discovery in 2014.

The thicker and stronger king planks on the central longitudinal axis of the hull are still in position. This major change affecting the hull structure may or may not have been caused by unexpectedly intense ice conditions this year. In any cases, it illustrates that the site is even more dynamic than previously expected; it reaffirms the need to consider controlled dismantling and/or shoring of the different upper deck sections of HMS *Erebus* not playing any structural role (Dagneau 2018; Moore et al. 2017:125–126).

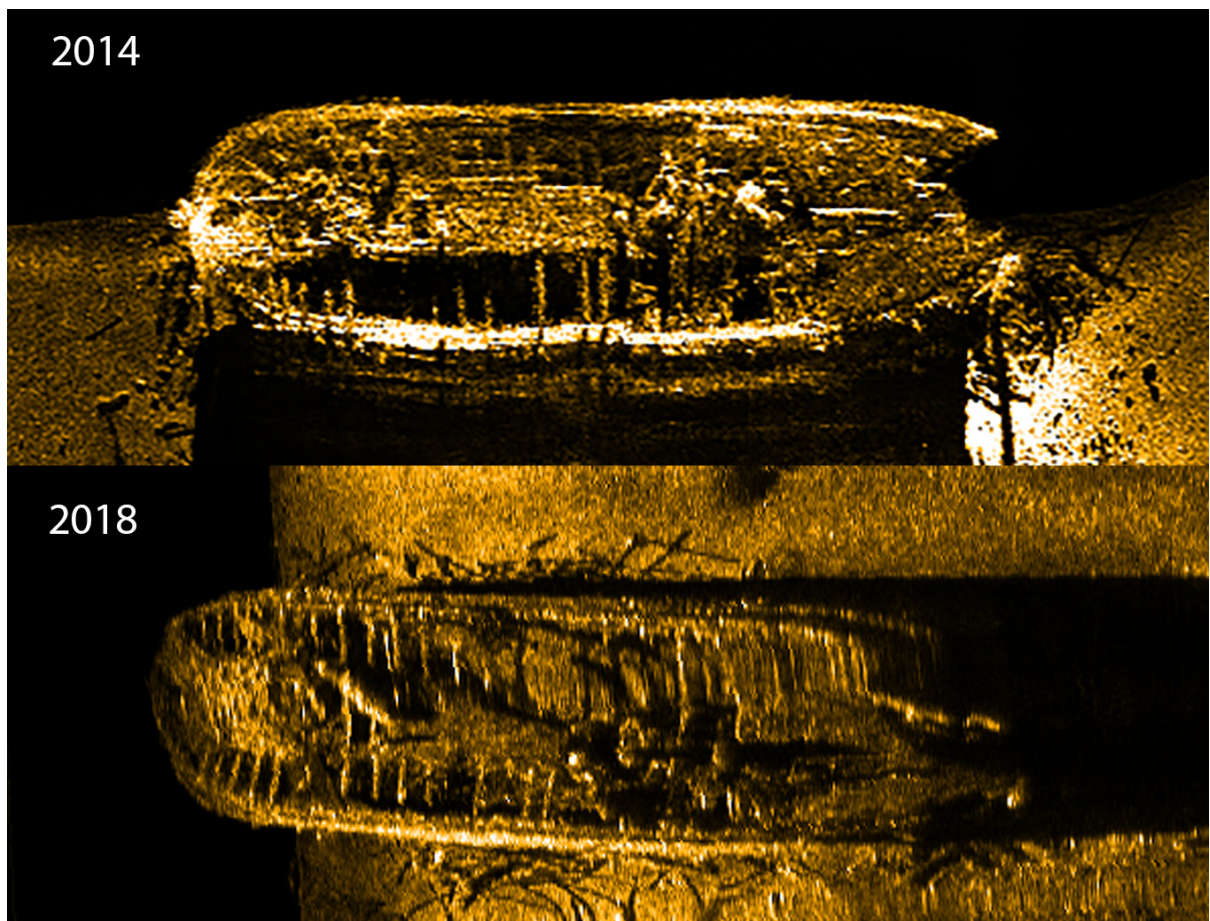


Figure 5.1: Side-scan sonar image showing HMS *Erebus* upper deck and beams in 2014 (top) and 2018 (bottom). On the bottom image, the recently exposed deck beams can be observed on the starboard side bow, next to the displaced windlass. North is up and the bow is to the left (Sonar images: R. Harris, Parks Canada).

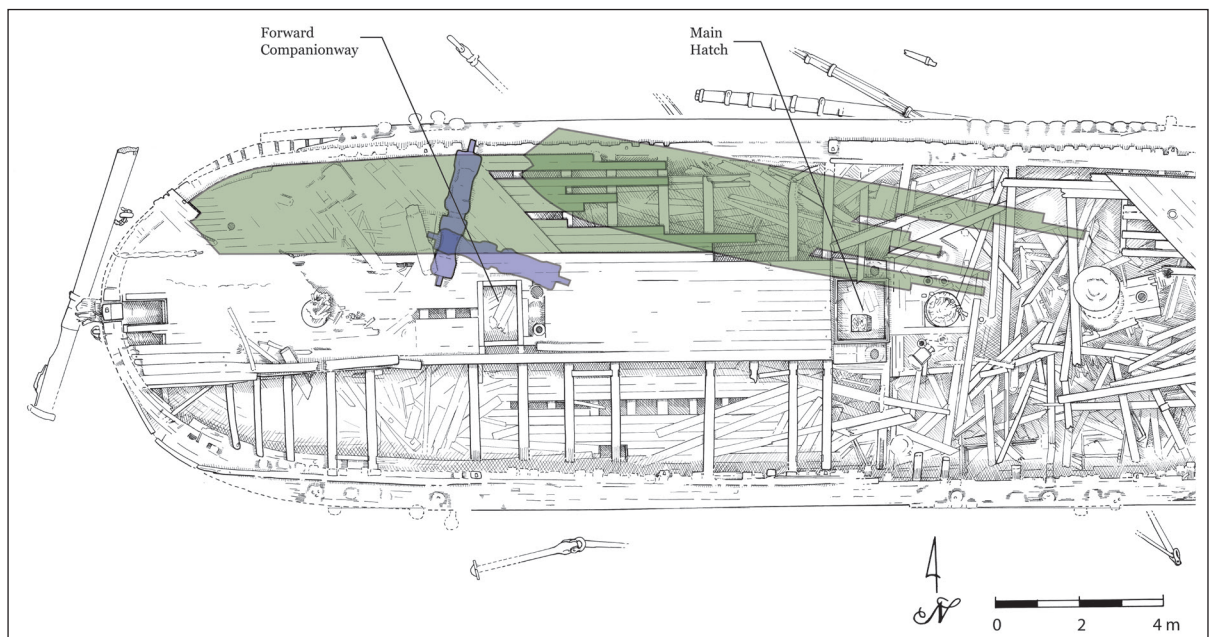


Figure 5.2: Approximate movement of the detached starboard, double-layered upper deck section. The deck piece has moved approximately 8 m towards the stern and rests upside down, and the windlass rotated approximately 90 degrees clockwise (Image: C. Dagneau; Base Drawing: C. Pillar, Parks Canada; 89M-2019-101-1).



Figure 5.3: Forward end of the detached upper deck section. The longitudinal (originally lowermost) planking is now facing up, while the (originally uppermost) diagonal planking is facing down (Photo: R. Harris, Parks Canada; 89M09510EF).



Figure 5.4: *Erebus*' windlass and newly-exposed upper deck beams and a carling, in the starboard area next to the forward companionway (Photo: R. Harris, Parks Canada; 89M09503EF).

Although a threat to the underlying features and artefacts on the lower deck, the partial “natural” dismantling of the upper deck allowed for a quick additional examination of its construction that confirmed what was observed previously (Moore et al. 2017:60). The deck planking is secured to the transverse deck beams (20.5–23.4 cm sided; ca. 22 cm moulded) using bronze dump bolts (Figure 5.4). These upper deck beams are mortised to accept longitudinal carlings (11–12 cm sided) between them at regular intervals. This strong assemblage is supported on both sides of the vessel by beam shelves that are in turn secured to the ship's frames and also supported by iron hanging knees.

The HMS *Erebus* archaeological fieldwork also permitted limited targeted recovery. A few artefacts from the affected area of the upper deck were found resting directly on the newly exposed deck beams and carlings in sub-operations 28–30N; others were found lying on the king planks next to the windlass in sub-operations 28–30M (Figure 5.5). A belaying pin, three block sheaves, as well as a nail and a block with shackle were mapped and raised from this area (see Appendix 1). A fragment of fearnought from a damaged portion of the displaced starboard upper deck was also sampled. All of these artefacts are currently under study by the UAT.

Surface mapping and artefact collection also targeted the lower deck officers' accommodation spaces on the port side amidships in sub-operations 38–40J. A mercurial artificial horizon roof discovered in 2017 on the lower deck next to the bed place in 40J was recovered in 2018. A pitcher

was found partly buried in the mud in sub-operation 38J, within what appears to be a collapsed bed place with fitted drawers (possibly in a different cabin), next to a pile of 4–5 small blue transfer print plates (not recovered). Considered in relation with the 2015 finds in the same area of the lower deck, these new finds are yet another example of the great potential for discovering groups of artefacts in well-defined, sealed contexts within officers' cabins (Moore et al. 2017:129–131).

Based on the above, the following general archaeological observations can be made:

1. The wreck structure has undergone one significant change since 2017: a large portion of the upper deck on the starboard bow area was recently detached and deposited upside down, 8 metres towards the stern, and the windlass has rotated 90 degrees clockwise;
2. No obvious changes were noted for most of the remainder of the wreck and the debris field immediately around the hull;
3. Kelp has continued to grow back in areas that were cleared in 2014 and 2015; and
4. HMS *Erebus* undoubtedly holds very well-preserved features and groups of artefacts in sealed, well-defined contexts, for example the officers' cabins on the lower deck.

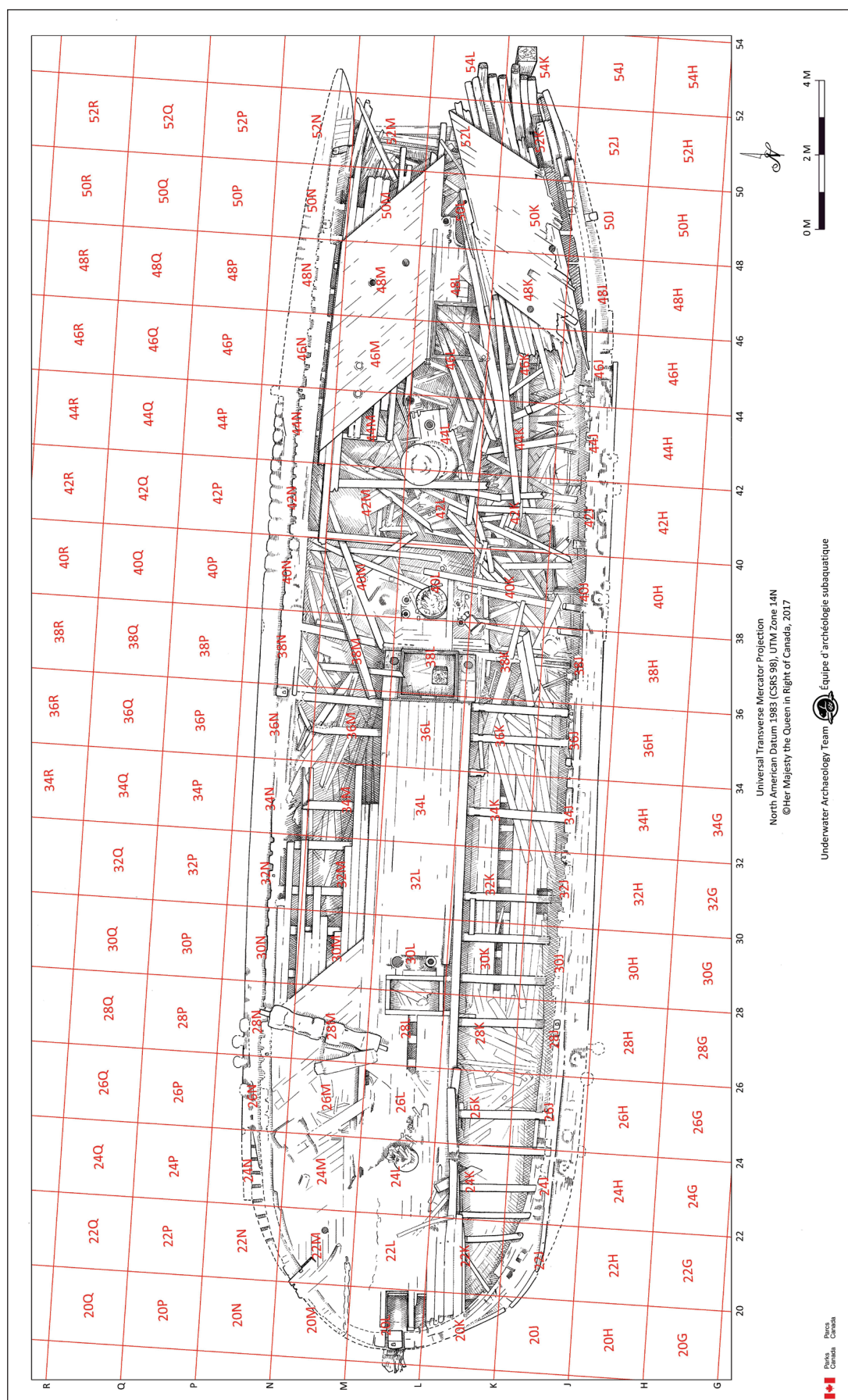


Figure 5.5: Site provenience grid superimposed over the upper deck site plan of HMS Erebus, 2016. This site plan does not reflect the most recent changes to the upper deck observed in 2018 (Image: B. Lockhart, Parks Canada; Drawing: C. Pillar, Parks Canada; 89M-2017-101-1).

6. CONCLUSION

This short report described UAT's work at the wreck of HMS *Erebus* in September 2018. The general goal was to conduct targeted artefact recovery and a site evaluation. The UAT documented and recovered nine artefacts, namely a pitcher and a mercurial artificial horizon roof discovered in the officers' cabins on the lower deck, as well as selected rigging elements from the upper deck.

Diving inspections and side-scan sonar imagery of the wreck were used to assess changes to its condition. Both methods were helpful in documenting a large portion of the upper deck on the starboard bow area that was recently detached and deposited upside down, 8 m towards the stern. This new, significant change to the wreck's structure illustrates the dynamic nature of the site, and recommends considering controlled and temporary dismantling and/or shoring of the different upper deck sections in the short term. These deck sections block access to the lower deck and, if they fall, could potentially threaten features and artefacts below.

It is anticipated that the study and excavation of HMS *Erebus* and HMS *Terror* will continue for multiple years to come. It is hoped that ice conditions will be more favorable in the coming years, thereby allowing far more archaeological research and excavation time on both wreck sites.

7. ACKNOWLEDGEMENTS

The UAT acknowledges first and foremost, the Franklin Interim Advisory Committee (FIAC) board members, Kitikmeot Inuit Association, Kitikmeot Hunters and Trappers Association, Hamlet of Gjoa Haven, Government of Nunavut, and the CCGS *Sir Wilfrid Laurier* crew. Special thanks to Canadian Coast Guard Captain Bill Noon, Captain Don Gibson, and Captain Simon Dockerill, as well as Chief Officer Rich Marriott and Boatswain Rhett Miller, for their indispensable long term logistical support. Thanks also to our many colleagues and friends within the Parks Canada Agency, most importantly Tamara Tarasoff, Jennifer Ullulaq, Naomi Manik Nahalolik, and Barbara Okpik. Finally, thank you to Charlie and Bob Cahill of C.A.P. Enterprises, for their continued support on the ground in Gjoa Haven.

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APPENDIX 1

ARTEFACTS RECOVERED FROM HMS EREBUS IN 2018

PITCHER (89M38J200-9)

English brown salt-glazed stoneware

This pitcher or large jug was used for holding and pouring liquids, such as water. It was discovered in one of the officer's cabins, on the lower deck. Its contents were sampled and are being analysed to determine what substance(s) it once held.



3 BLOCK SHEAVES (89M28N100-1, 2 AND 3)

Bronze

Three sheaves or wheels were found together on the fore, starboard side of the upper deck. These were used in some of the numerous wooden and metal pulley blocks used in the running rigging. All three are marked with broad arrows.



BLOCK WITH SHACKLE (89M28M100-2)

Bronze

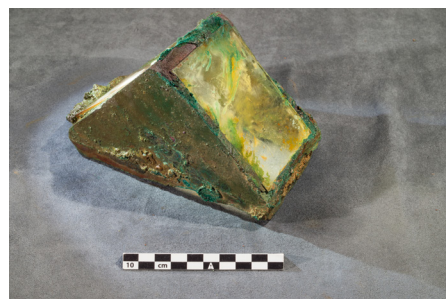
This high-quality block, fitted with an integrated shackle and split pin, was found on the upper deck. Inscriptions that are not completely legible—possibly “6 1/3” and “C[PR] N”—refer to the regulation size of the block in inches, and its maker.



ARTIFICIAL HORIZON ROOF (89M40J200-1)

Brass, glass

This brass frame with two fitted glass panes was used in conjunction with a sextant to determine latitude when the horizon was obscured, for example by ridges of sea ice. This roof would have been placed over a tray in which mercury would be poured, so as to act as a mirror. The object was discovered in an officer's cabin, on the lower deck.



NAIL (89M28N100-5)

Bronze

This small forged nail, with its tip snapped off, has a square shank and a square flat head. It was probably used to affix layers of upper deck planking together. The artefact, marked with a broad arrow, was found on one of the upper deck beams.



BELAYING PIN (89M28N100-4)

Bronze

Belaying pins were used to secure the various ropes of the rigging, such as those used to control the sails. The use of bronze instead of wood is an indication of the quality of the equipment used for the Royal Navy, generally. This broken example was found on the upper deck. Its upper end has snapped off.



FEARNOUGHT (89M34M100-1)

Wool

This type of (waterproofed) felt fabric was placed in between layers of upper deck planking to waterproof the vessel. Impressions of plank seams and butt ends, as well as nails are visible in the fabric. This sample was recovered from a much larger in situ piece.

