



CHERISH

*Newid Hinsawdd a Threftadaeth yr Arfordir
Climate Change and Coastal Heritage
Athrú Aeráide agus Oidhreacht Chultúrtha*

PRELIMINARY RESEARCH SURVEY REPORT

Survey Code:	Survey Name:	Institution
KRY20_03	KRY20_CHERISH	Geological Survey Ireland

Section A: Description of the Research Survey

A1 Overview of survey personnel

Names	Institute/	Position	Number of Days
Crew:			
Agust Magnusson	GSI	Vessel Master	19
Jess Murray	GSI	Party Chief / Surveyor / Processor	19

A2 Objectives

CHERISH (Climate, Heritage and Environments of Reefs, Islands and Headlands) is a 6 year (2017-2023) European-funded Ireland-Wales project between the Royal Commission on the Ancient and Historical Monuments of Wales, the Discovery Programme: Centre for Archaeology and Innovation Ireland, Aberystwyth University: Department of Geography and Earth Sciences and Geological Survey Ireland. The project will receive €5.1 million through the Ireland-Wales 2014-2020 Interreg Programme.

CHERISH is a cross-disciplinary project. It raises awareness and understanding of the past, present and near future impacts of climate change, storminess and extreme weather events on the rich cultural heritage of the Irish and Welsh regional seas and coast. It employs innovative techniques to study some of the most iconic coastal locations in Ireland and Wales.

The CHERISH project identified two sites in Cardigan and Caernarfon Bays for which the project required detailed bathymetric surveys (Sarn Badrig and Dinas Dinlle). Three main site types were targeted: reefs, headlands, and shipwrecks. Reefs for multibeam surveys included Sarn Badrig in Cardigan Bay, while headlands included Dinas Dinlle in Caernarfon Bay. The wreck of "The Bronze Bell off Tel Y Bont, Gwynedd" (hereafter "The Bronze Bell") was selected due to its designated status. Headland bathymetry will be used to generate seamless onshore-offshore maps.

Multibeam surveying was carried out in depths <50m using the Geological Survey research vessel Keary which is equipped with a Kongsberg EM 2040 D multibeam echosounder between the 1st and 19th September 2020. Sub-bottom profiling using an Edgetech CHIRP 3200 was conducted along all survey lines.

Authorisation for the KRY20_CHERISH survey was received from the Foreign & Commonwealth Office (Ref: 66/2020), permitting surveying between 16th August and 4th October 2020. A license to survey the wreck of "The Bronze Bell" was also obtained from the Historic Environment Service of the Welsh Government Cadw.

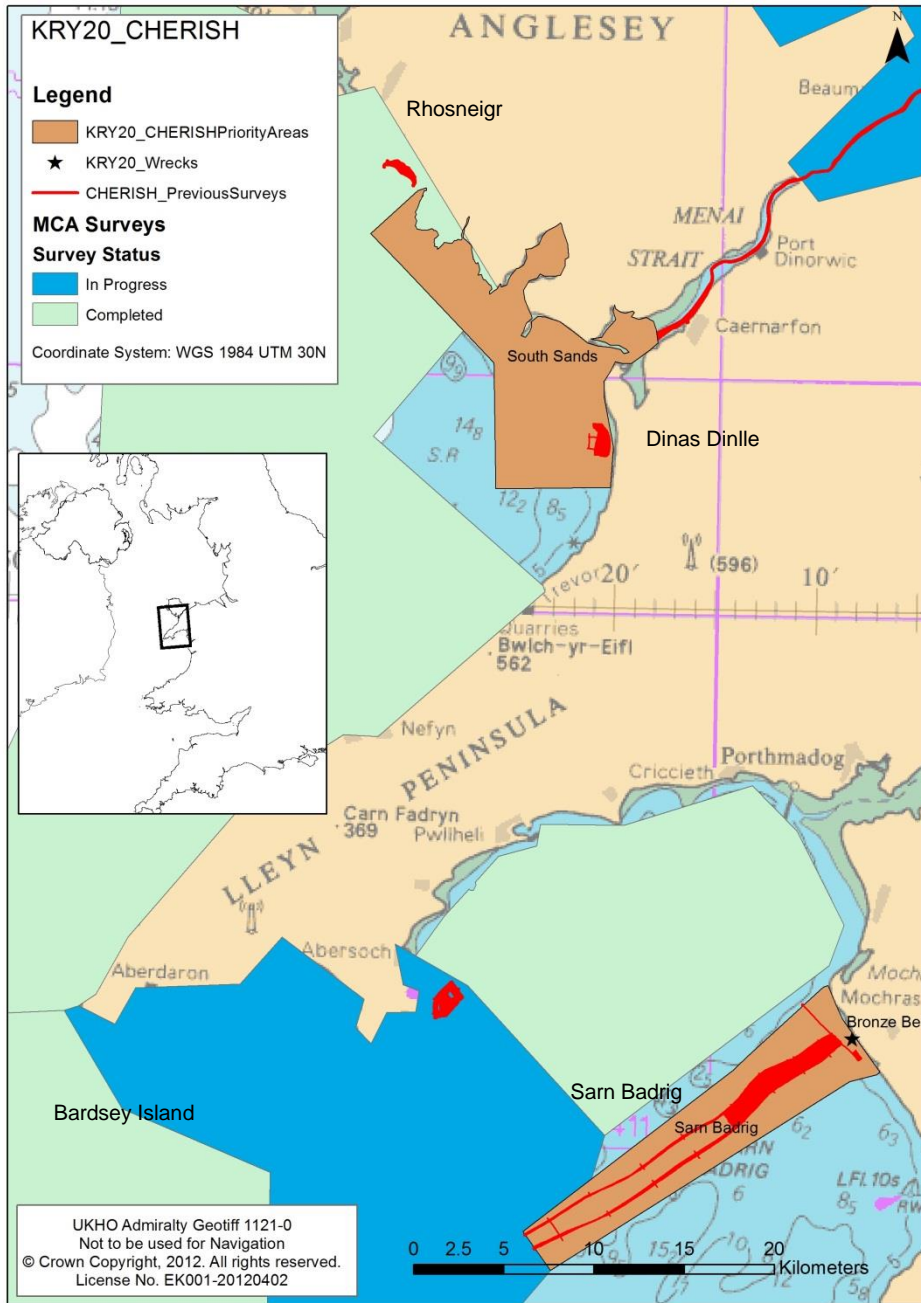


Figure 1: KRY20_CHERISH target areas in relation to existing UKHO coverage and previous CHERISH bathymetric surveys.

A3 Overview of research survey

The RV Keary transited from Arklow, Ireland to Cardigan Bay, Wales on the 1st September 2020. While in Cardigan Bay, Pwllheli Marina was used for port calls. In Cardigan Bay, survey work was conducted on Sarn Badrig with a wreck survey of "The Bronze Bell" located near Sarn Badrig on 10th September. During bathymetric surveying of Sarn Badrig a previously unrecorded wreck was identified and surveyed using MBES on the 10th September (wreck report attached). Following transit to Caernarfon Bay on 16 September, shallow bathymetry from Dinas Dinlle was acquired, extending previously acquired data (2019 CHERISH survey - KRY19_CHERISH) to include the reef of Caer Arianrhod. In Caernarfon Bay, Victoria Dock was used for port calls. The survey was completed on 18th September, with a return to Dun Laoghaire, Ireland on 19th September 2020. Figure 2 outlines the KRY20_CHERISH survey areas relative to passed CHERISH surveys. Survey tracklines are included as an Appendix I to this report, with H525 Report of wreck investigation included as Appendix II.

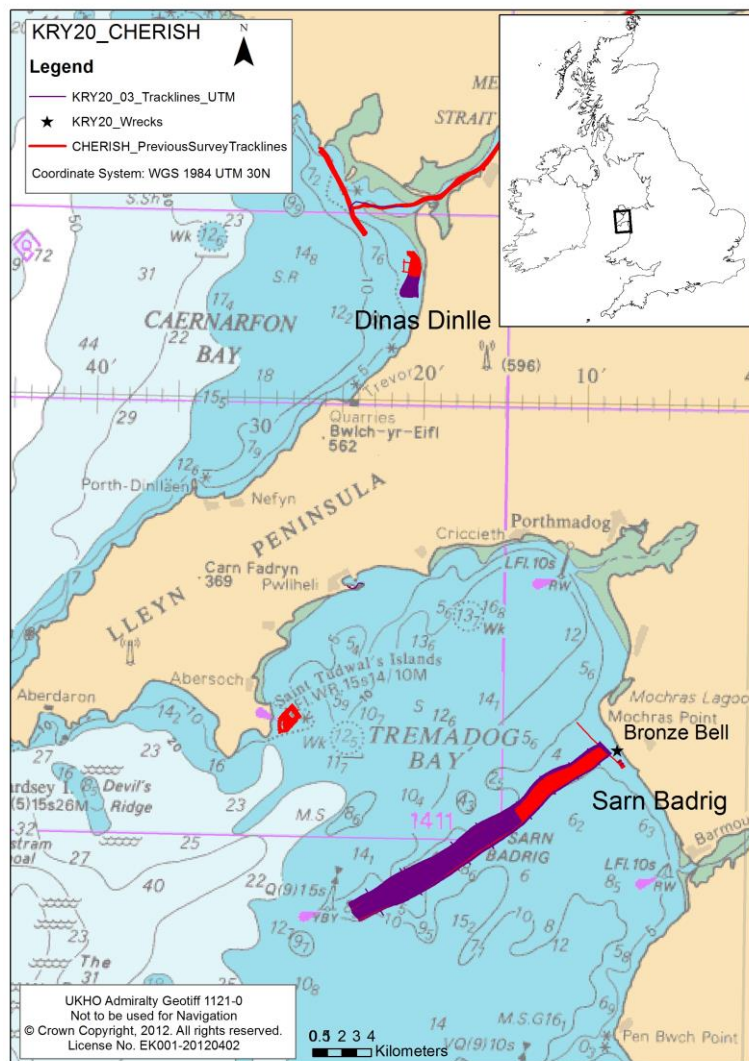


Figure 2: Survey tracklines of KRY20_CHERISH (purple), with tracklines from previous surveys (red)

Operation of the multibeam and sub-bottom profiling equipment followed “JNCC guidelines for minimising the risk of injury to marine mammals from geophysical surveys” (August 2017), including pre-survey monitoring for marine mammals. No mitigation measures were required during surveying.

A complete MMO report will be included as an appendix in the final report.

A4 Preliminary Results

An area over Sarn Badrig was surveyed from 2nd to 15th September (Figure 3), extending coverage previously acquired during the 2019 CHERISH marine survey.

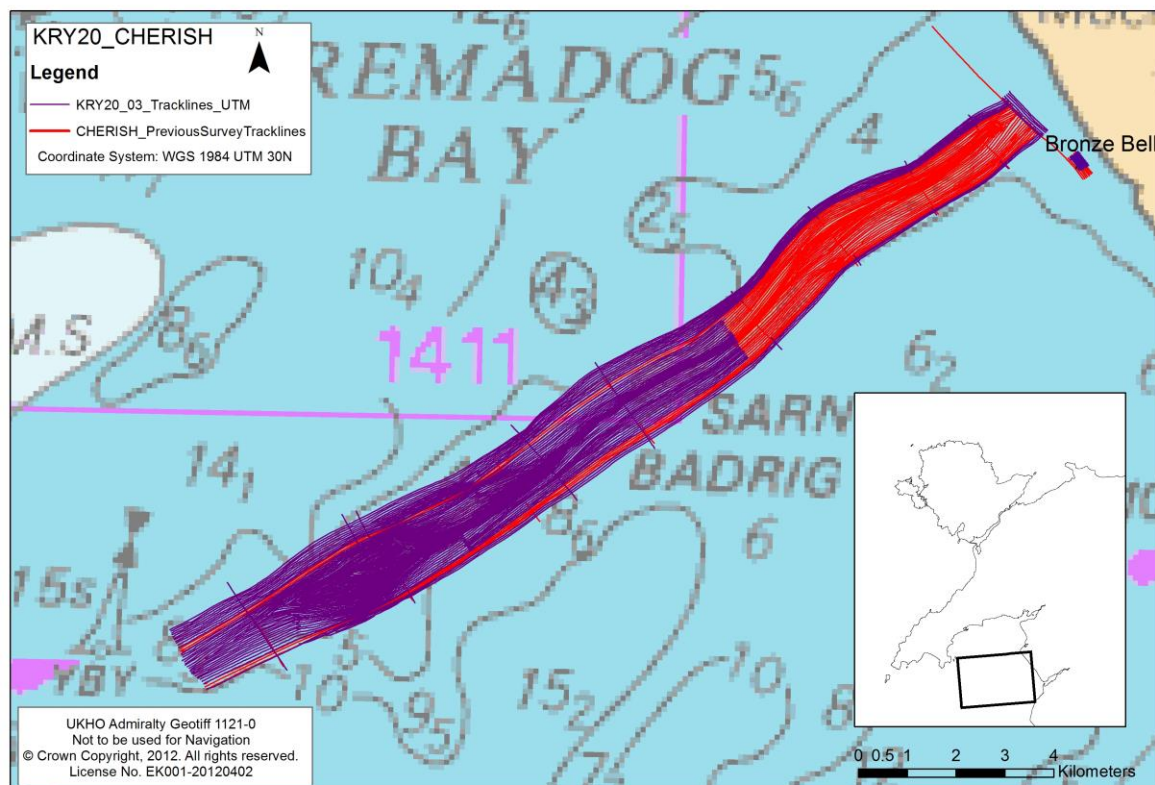


Figure 3: KRY20_CHERISH survey tracklines on Sarn Badrig in relation to previous surveys (KRY19_CHERISH), and location of the wreck “The Bronze Bell”

The bathymetry of Sarn Badrig is extremely shallow and differs from the charts (relevant H notes will be submitted to the UKHO on full processing of the data). With the sinuous ridge terminating in what appears to be a delta (Figure 4), the morphology of the ridge is similar to glacial eskers, and may have been formed from ice originating from the north-west of the survey area during the end of the last glaciation.

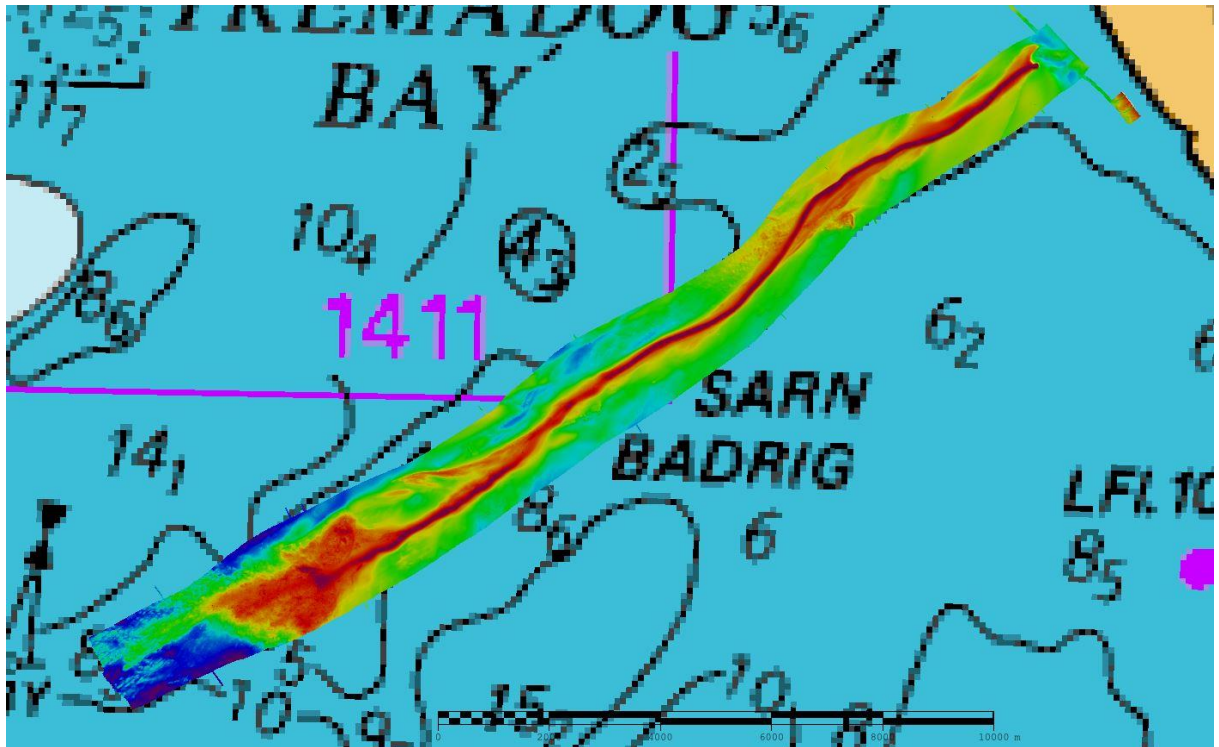


Figure 4: Draft bathymetry of Sarn Badrig ridge, from 2019 and 2020 surveys (for illustration only, bathymetry will be fully processed for final cruise report)

Between 16th and 19th September, surveying was conducted near the hillfort Dinas Dinlle (Figure 5) with the bathymetric coverage acquired in 2019 extended to the south to include Caer Arianrhod (Figure 5). This offshore Dinas Dinlle survey coincided with spring high tides. CHERISH colleagues in the Royal Commission on the Ancient and Historical Monuments of Wales conducted UAV photogrammetry surveys at corresponding low tides in an effort to acquire data to produce a seamless onshore-offshore map.

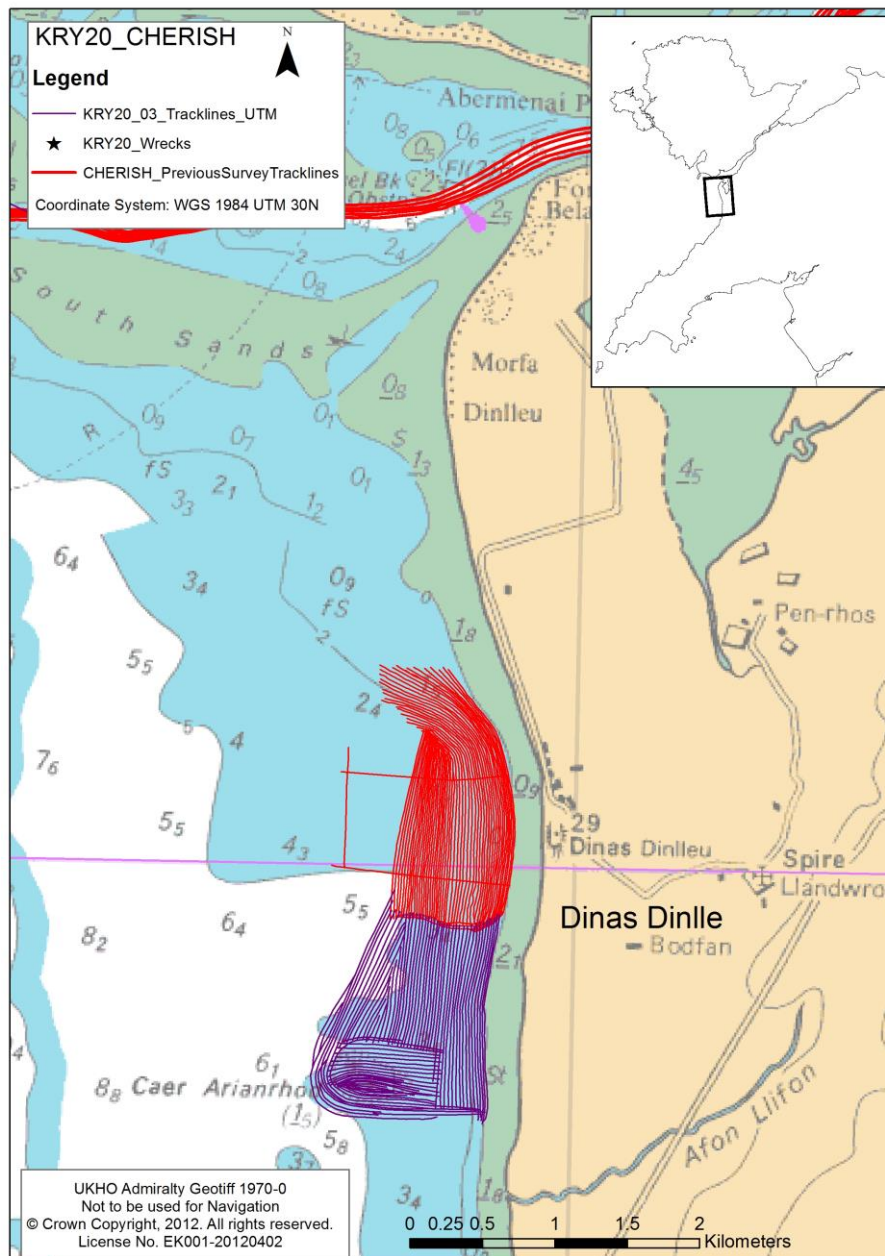


Figure 5: Survey tracklines offshore of Dinas Dinlle, including the reef of Caer Arianrhod. 2020 tracklines extended the coverage acquired in 2019.

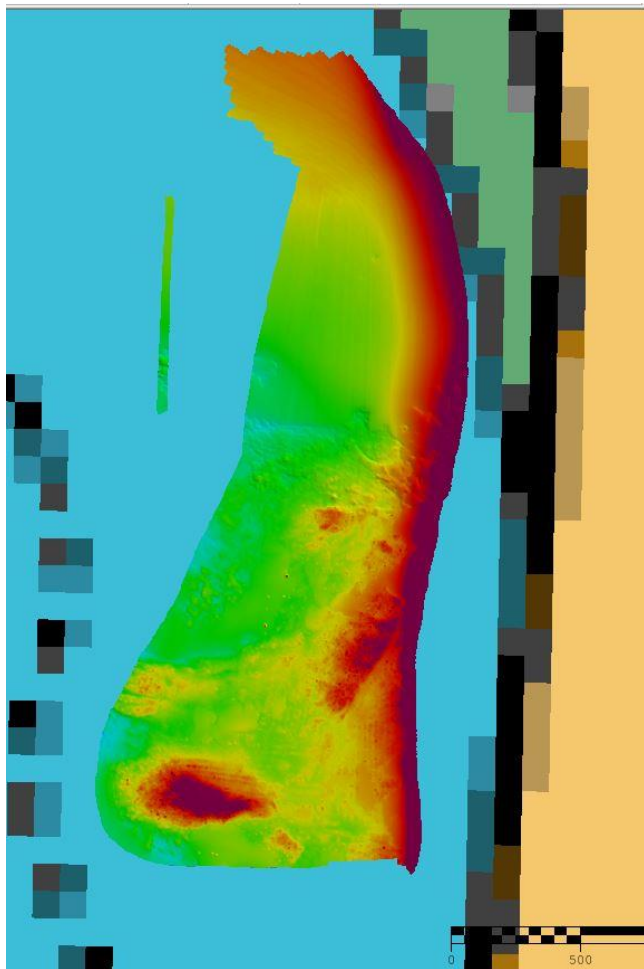


Figure 6: Draft bathymetry offshore Dinas Dinlle, including Caer Arianrhod in the south of the image (for illustration only, bathymetry will be fully processed for final cruise report)

Tremadog Bay Wrecks:

Two wrecks were surveyed on the 10th September within Tremadog Bay. These were "The Bronze Bell" (Figure 7 and Figure 8) and an unrecorded wreck on Sarn Badrig (Figure 9 and Figure 10).

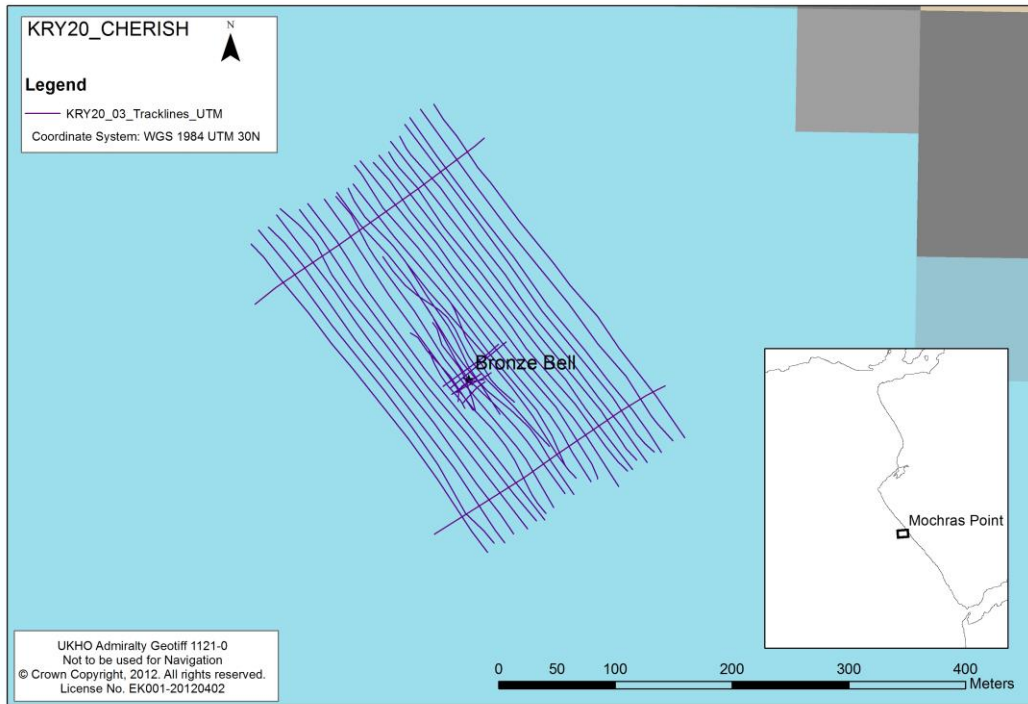


Figure 7: Survey tracklines over "The Bronze Bell" wreck and debris field

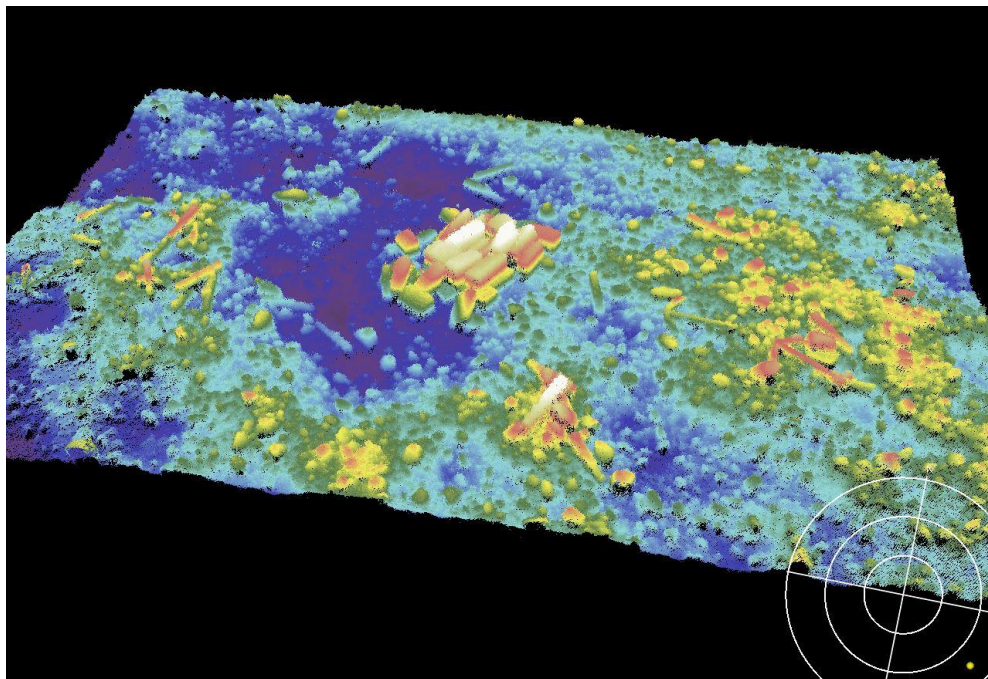


Figure 8: Draft bathymetry image of debris field of "The Bronze Bell"

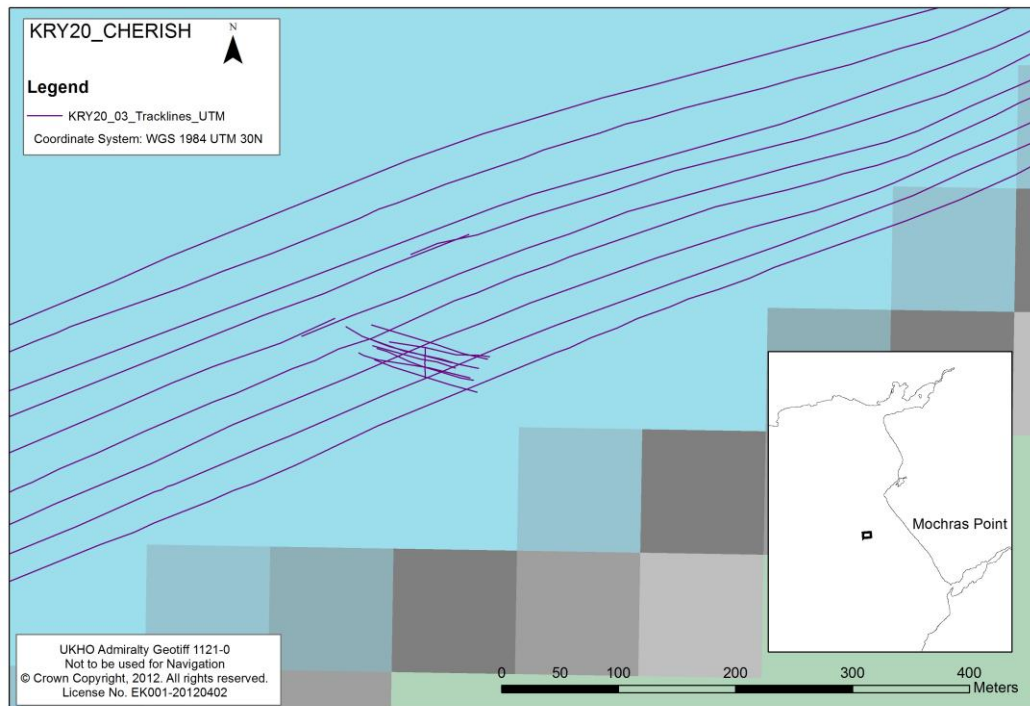


Figure 9: Survey tracklines over the previously unrecorded wreck on Sarn Badrig

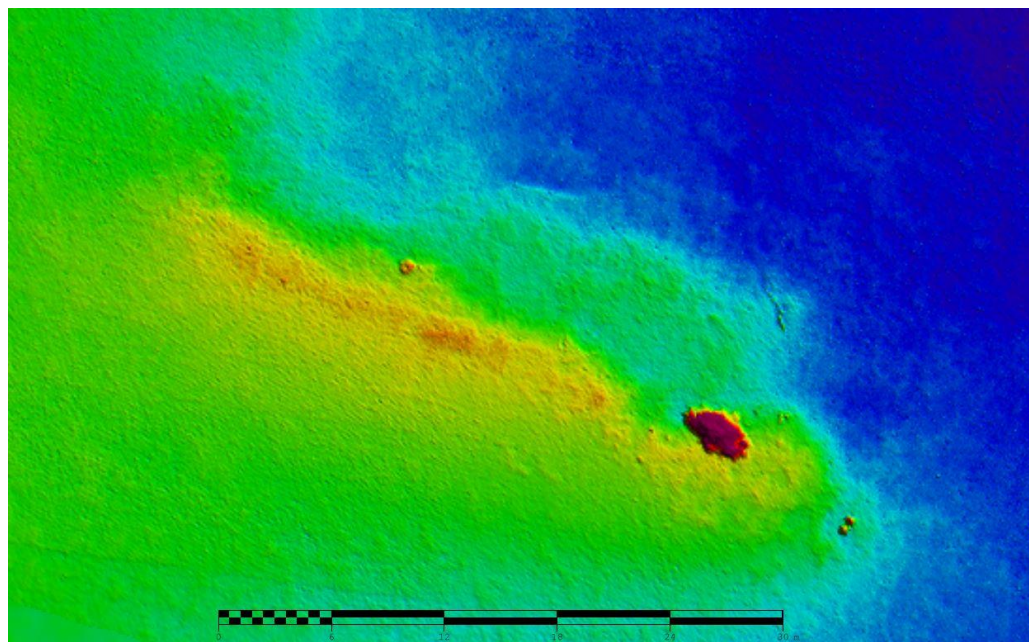


Figure 10: Draft bathymetry image of previously unrecorded wreck

Unrecorded wreck:

The main structure of the wreck appears to be well collapsed/buried, the bow is most likely oriented pointing WNW, with the highest point of the wreck being at the stern section approx. 1m from the seabed. There appears to be debris on the east side of the wreck site approx. 10-15m from the 'centre line'. Reports of wreck 'Diamond' sunk in general area.

Wreck	Northing	Easting	Result
The Bronze Bell	52° 46.7479' N	4° 07.6480' W	Located and surveyed remains
Unrecorded Wreck	52° 46.4934' N	4° 11.3137' W	Located and surveyed remains

A report on the survey of "The Bronze Bell" wreck survey will be submitted to Cadw in accordance with license awarded.

A5 Final Report

A final report on the survey will be delivered in March 2021

APPENDICES

Appendix I: Ships Expedition Track Chart

See attached folder KRY2003_PreliminaryReportData for File Geodatabase of tracklines.

If you have received this report by post and would like a digital copy, please contact Kieran.craven@gsi.ie



Appendix II: H525

REPORT OF WRECK INVESTIGATION

Wreck No: 01

Ship/Unit RV Keary

HMOI No:

Survey: KRY20_03

Date located: 04/09/2020

Date Examined/Swept: 10/09/2020

Listed Position: UNCHARTED

Fixed Position: 52 ° 46 . 4934' N 4 ° 11 . 3137' W

Method of Positioning: MBES GPS

Accuracy (2,447σ): 0.2 metres

Horizontal Datum: ETRS89

Depth Data:
(VORF LAT)

Swept Clear:	N/A	metres	No sweep, data from EM2040P
Swept Foul:	N/A	metres	MBES System
Least E/S Depth:	6m	metres	
General Depth:	7 m	metres	
Scour Depth:	N/A	metres	

Tidal observations at:
Cotidal adjustments by:

Tidal correction derived from GNSS height

Contact Data:

Sonar Height:	1	metres	
Sonar Length:	41	metres	
Sonar Width:	15	metres	
Orientation:	WNW ⁰ / ESE ⁰ (Bows: 294 ⁰)		

Sonar Signal Strength: Nil Poor Moderate **Strong** Unknown

Magnetic Anomaly: Nil Poor Moderate Strong **Unknown**

Scour Length: N/A Direction (towards): 0

Seabed Texture: Sub-littoral mixed sediments

Debris Field: Yes Length: 10m metres Direction (towards): 43⁰
15m 335⁰
12m 113⁰

Buoyage: N/A

Description (include attitude and whether intact): The main structure of the wreck appears to be well collapsed/buried, the bow is most likely oriented pointing WNW, with the highest point of the wreck being at the stern section approx. 1m from the seabed. There appears to be debris on the east side of the wreck site approx. 10-15m from the 'centre line'. Reports of wreck 'Diamond' sunk in general area.

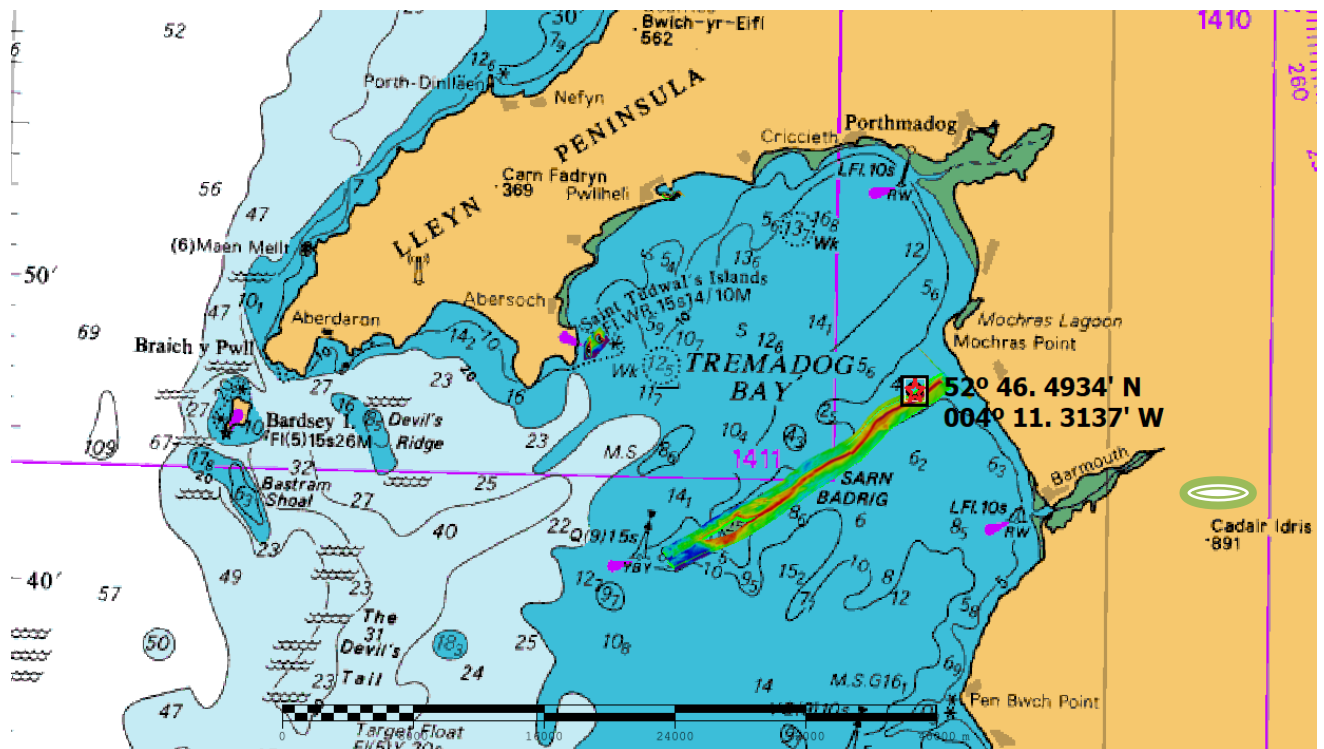


Figure 11: Position of Wreck on Chart

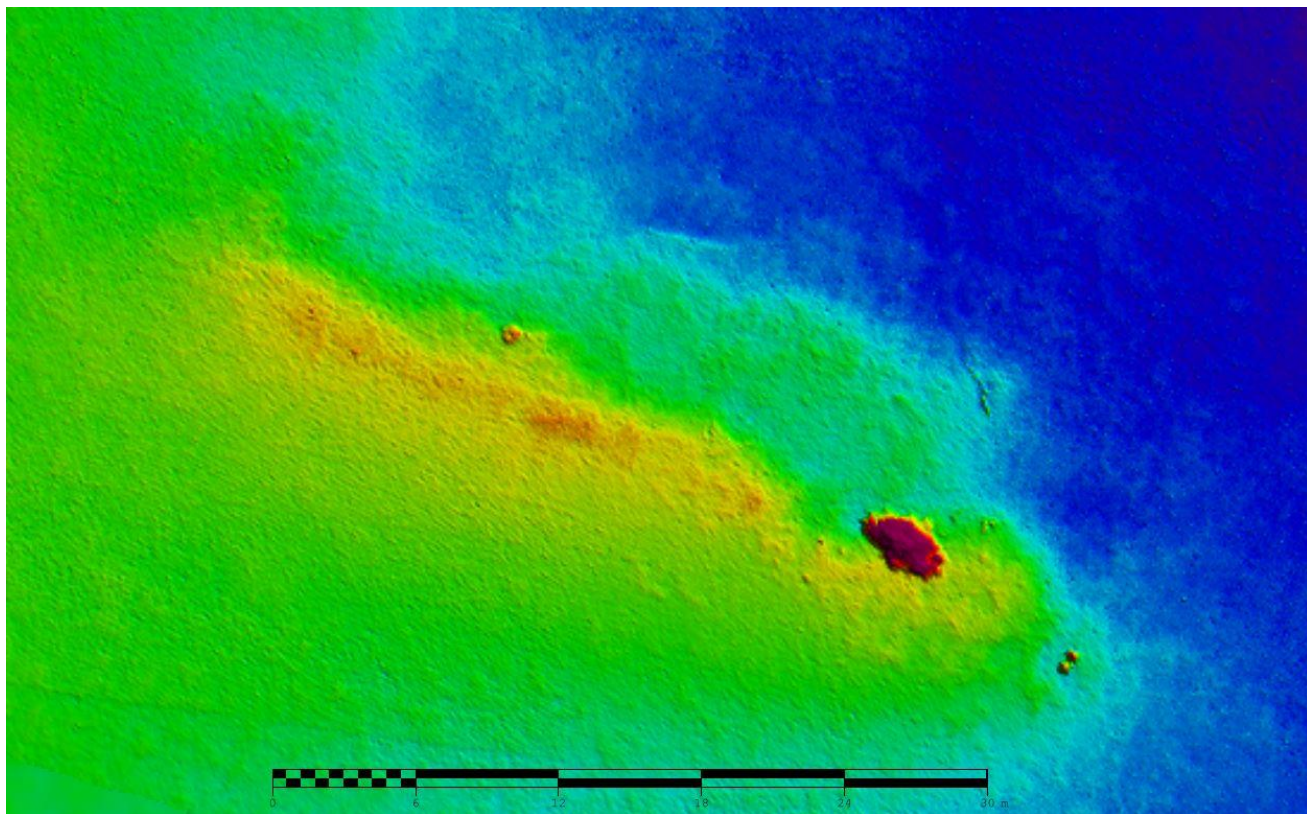


Figure 12: Wreck Orientation on the Seabed.

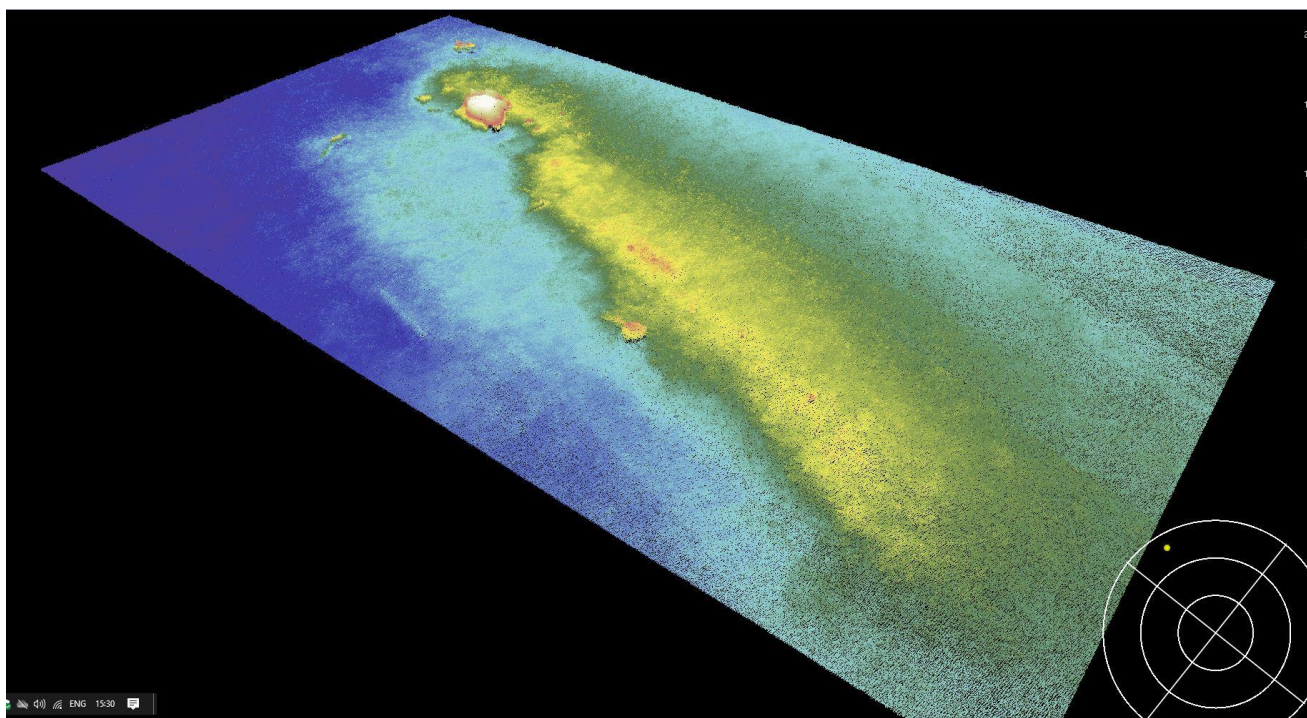


Figure 13: 3D Image of Wreck

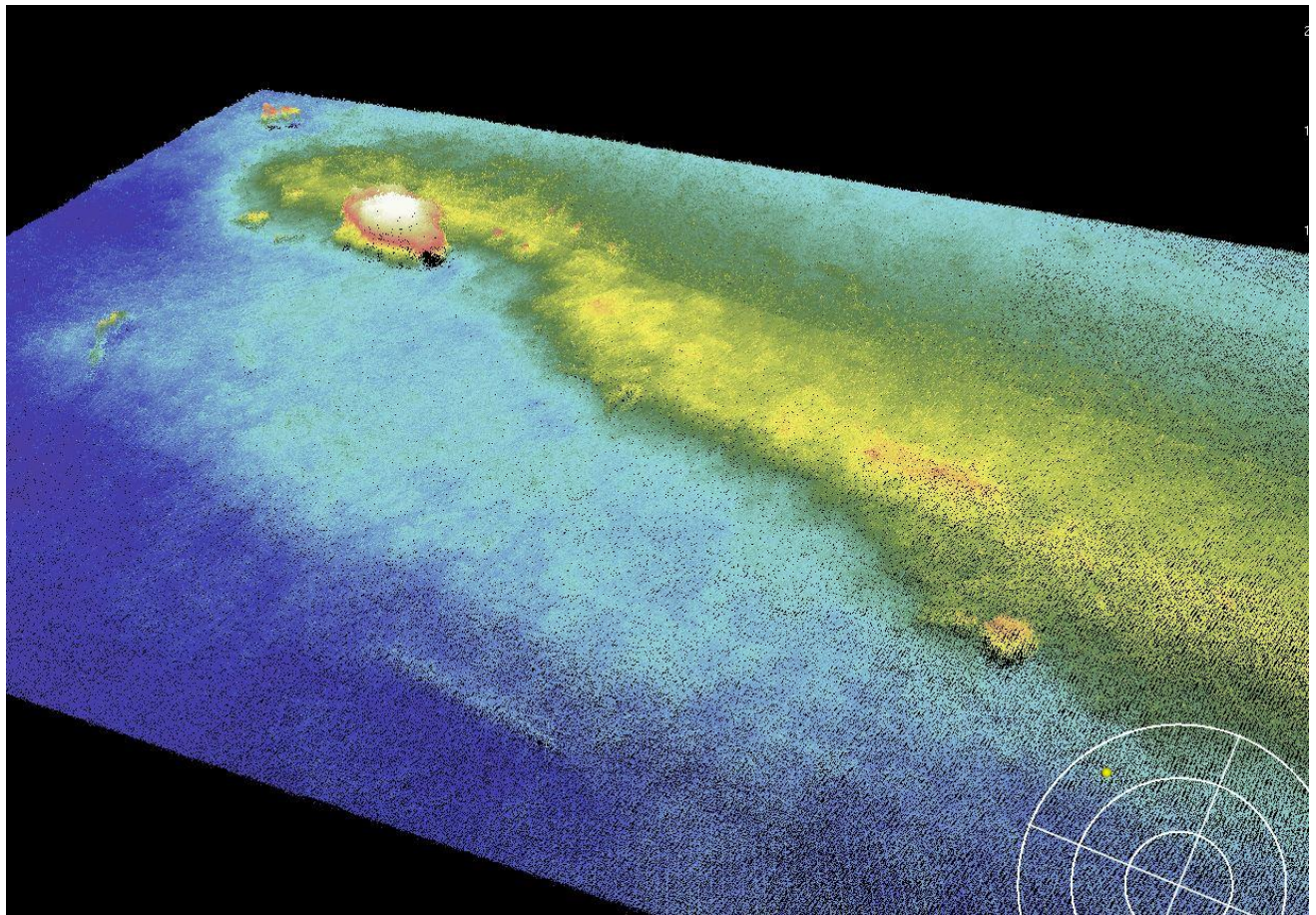


Figure 14: 3D Image of Wreck

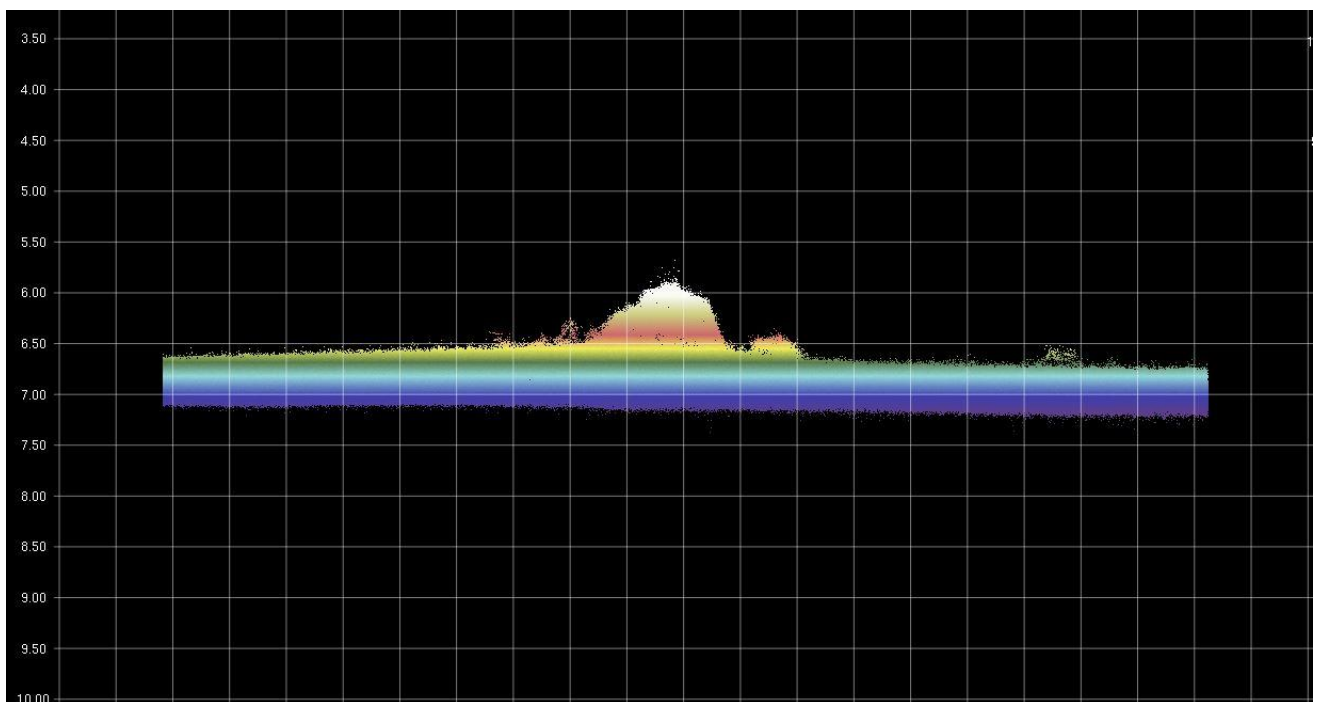


Figure 15: Cross Section along Length of Wreck

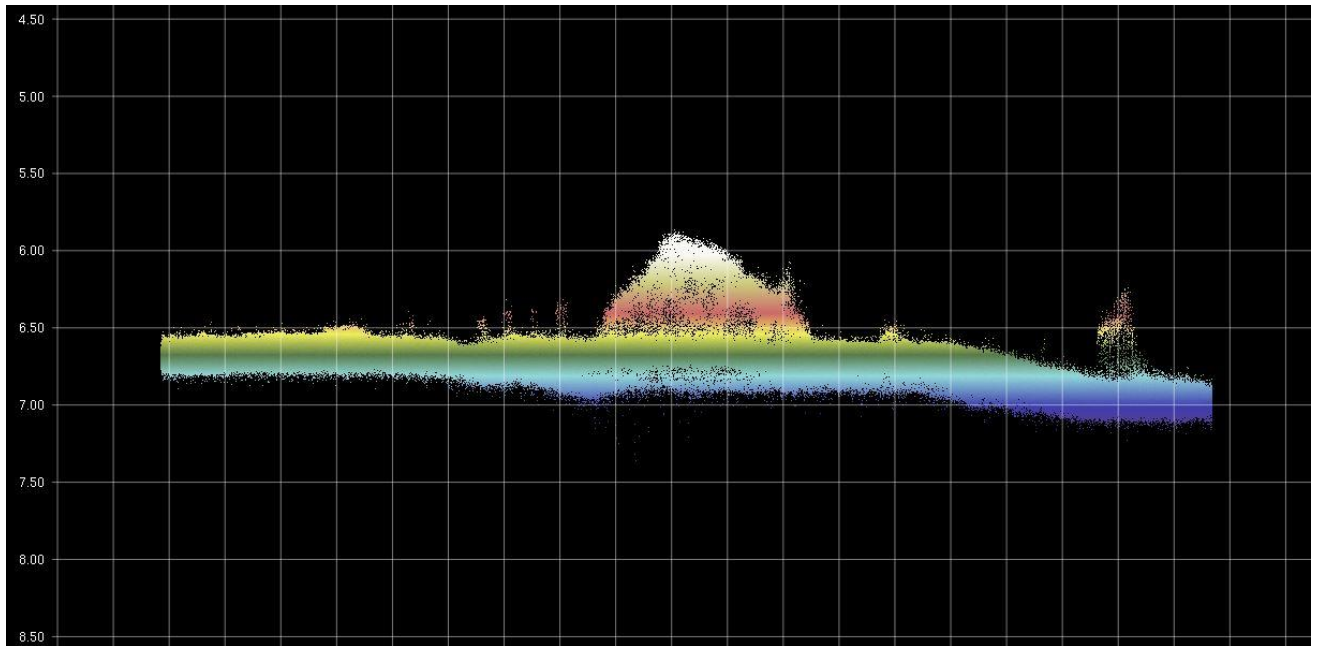


Figure 16: Cross Section Across width

Approved: Charise
McKeon

Data Processor: Jess
Murray

Date: 13/09/2020