Hampshire & Wight Trust for MARITIME Archaeology

The Mystery Wreck

(Aggregate Area 122/2 - UMD), Eastern Solent:

Desk Based Assessment

Stage 1: Final Report

July 2009

The ‘Mystery Wreck’, (Aggregate Area 122/2 - UMD), Eastern Solent: Desk Based Assessment

Stage 1 Final Report

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This project has been undertaken by Victoria Cooper with contributions from Brandon Mason (geophysical assessment) and Nicola Goodwyn (GIS support). The project has been managed by Vir Dellino-Musgrave and Julie Satchell.

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IV. PROJECT SUMMARY

The 'Mystery Wreck' is currently an unidentified wooden shipwreck lying in a licensed dredging area in the Eastern Solent. Diving work undertaken by the HWTMA between 2004 and 2007 had revealed a site split into two large sections, each measuring over 20m in length and lying over 35m apart. Survey, recovered artefacts and samples are potentially indicating a late 18th century or early 19th century date with a number of features appearing earlier than this suggesting potential re-fitting. Although the site is not in a current active dredge area, it is within the aggregate licence area 122/2 and has been provided an exclusion zone for protection. Due to the urgent need to determine the date and identity of the vessel to help determine its archaeological significance and develop sustainable long-term monitoring and management of the site, funding from the Aggregate Levy Sustainability Fund, distributed by English Heritage, has been awarded for this project.

The first stage of the project reviewed all available data and artefacts recovered from the site and put them in context through a desk based research on the historic shipwrecks of the area. The assessment and analysis of geophysical data kindly facilitated by United Marine Dredging (UMD) provided information on the site and surrounding seabed. Further context for the site, was provided through research on the environment of the area and interpretation of other available datasets which helped determine the principal environmental impacts on the site.

The results have shown that the Mystery Wreck could be one of the following three losses on the Horse and Dean Sand:
• 1364225, *Hopewell*, lost 1838: Struck heavily on the Horse Shoe during ESE violent gale and filled. Part of her stores saved.
• 898886, *Flowers of Ugie*, lost 1852: Abandoned and sank in SW force 10 winds.
• 1240494, *Arrow*, lost 1852: Drove on the Horse Sand in SSW force 11 wind and filled, Stores being landed.

Flowers of Ugie, in particular, shows other aspects which would fit with the Mystery Wreck. She was an English barque built in 1838 in Sunderland. In 1851 she was refitted with felt and yellow metal (i.e. Muntz metal) and was carrying a cargo of coal to Cartegena in Spain when she was abandoned and sank due to the ‘stress of weather’ in 1852 while anchored near the Horse Sand.

Geophysical data has identified a significant anomaly which is apparent in the 2005 multibeam data, since it is in sharp contrast to the surrounding seabed and is emphasised by the associated scour pit. The second portion of the site is not clearly visible. Geophysical data also indicates that there has been a general tendency towards sediment erosion over the last ten to twelve years, and further fieldwork in 2009 as well as future survey data provided by UMD will inform on the best management strategy for this wreck.

While it is, however, impossible to confirm any identification for the Mystery Wreck at this stage it is hoped that parallels drawn between the remains and reported losses may identify the wreck after a further season of fieldwork.

1. Project Description

The ‘Mystery Wreck’ was discovered in 2003 when a fisherman snagged his nets on an obstruction. The Hampshire and Wight Trust for Maritime Archaeology (HWTMA) were invited to investigate the site and discovered the substantial remains of a wooden shipwreck lying exposed just off the south eastern edge of Horse Tail Sands in the eastern Solent.

The wreck lies within licensed dredging area 122/2, operated by United Marine Dredging (UMD), a division of Tarmac Ltd. The area was licensed by the Crown Estate prior to any requirements for an ‘Environmental Impact Assessment’. Therefore, the site has not previously been subject to a full archaeological assessment. After initial investigation in 2004 the HWTMA made contact with UMD and an exclusion zone was established around the site to prevent any damage.

Since the discovery, the HWTMA have been working to establish a pre-disturbance survey of the site. The remains are relatively flat to the seabed and include two sections of wooden hull lying around 35 metres apart and each measuring over 20 metres in length. A range of ship fittings lie on the seabed between the two pieces of structure.

Diving investigation has involved both professional dive teams working alongside students and volunteers and a plan of the remains has been produced. However, limited funds and the sheer size of the site have restricted the extent of investigations and the work that has been carried out.

The HWTMA is now extremely concerned that the archaeological significance of this site is yet to be fully established, and hence appropriate management plans put in place. This desk based assessment represents the first stage in a

programme of work aiming to address these concerns. Further stages of work will include analysis of recovered material, diver survey and recording, a significance assessment and the development of suitable management and monitoring approaches. The programme of work may be summarised as follows:

Stage One – Desk Based Research and Archive Assessment

• Desk-based research to establish shipwreck losses in the area and any previous work undertaken on the marine environment
• Assessment of available geophysical and geotechnical survey data
• Assessment of available site survey data
• Assessment and analysis of artefacts and samples previously recovered from the wreck site (timber, copper, pottery) and required to develop fieldwork priorities
• Dendrochronological analysis will be undertaken to try and provide a precise date for construction of the vessel. This would help in focussing attempts to identify the wreck
• Historical research into broad period of possible wreck date
• Development of detailed plans for fieldwork, including plans for monitoring measures

Stage Two – Recording

• Diving Archaeology: detailed site survey, further targeted timber sampling, recovery of artefacts and samples as required for research purposes, establishment of monitoring approaches
• Checking, consolidation and assessment of fieldwork archive produced
• Assessment of artefacts and samples recovered to determine future analysis requirements
• Review of field and assessment results against the results of stage one to develop requirements for stage three
• Attendance at ALSF meeting
• Public local activities to raise awareness and disseminate project results

Stage Three – Analysis

• Collected fieldwork data analysis and interpretation
• Specialist analysis: ship structure, copper fastenings, iron components, timber, pottery, and other types of artefact if recovered
• Further historical research into period of shipwreck based on new data from fieldwork and specialist analysis and (subject to identification of vessel) detailed archival research
• Assessment of archaeological significance of the site
• Recommendations for future management and monitoring, and assessment of whether designation (or registration) under the Protection of Wrecks Act 1973 or the forthcoming Heritage Protection Act is required
• Production of draft publication report
• Production of report on management and monitoring options and recommendations
• Public local activities to raise awareness and disseminate project results

Stage Four – Publication and Archiving

• Preparation of draft publication in response to comments and in line with selected publishers' requirements
• Archive work in preparation for deposition, including production of archive summary report
• Paper presentation at relevant conference
• Attendance at ALSF meeting

This report details the results of 'Stage One - Desk Based Research and Archive Assessment.

2. Site Background

In 2003 a fisherman snagged his nets on a previously unidentified obstruction on the seabed. The HWTMA were invited to investigate and a substantial wreck site was discovered comprising two main sections of wreckage lying 35 metres apart and relatively flat to the seabed.

The Mystery Wreck lies in 12m of water just off the south eastern edge of Horse Tail Sands in the eastern Solent (**Figure 1**).

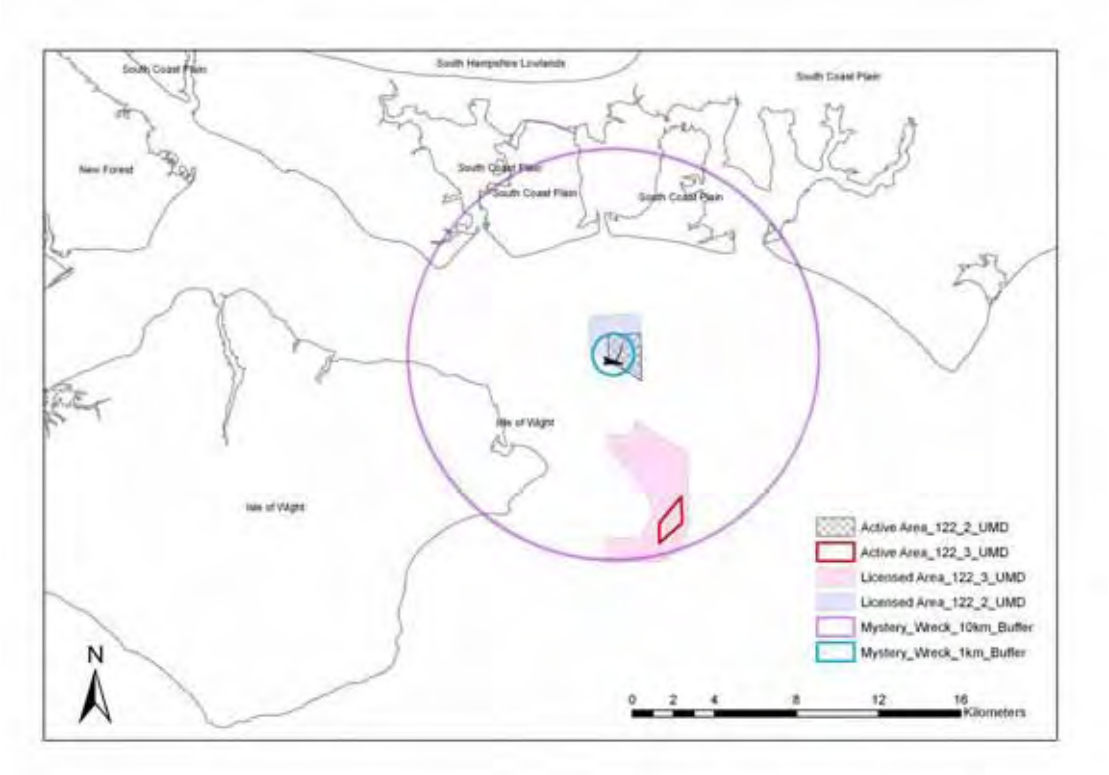


Figure 1: Location and Study Area

The site lies within licensed dredging area 122/2 operated by UMD, a division of Tarmac Limited. Approximately 21% of all sand and gravel used in England and Wales is currently supplied by the marine aggregate industry and approximately 23 million tonnes of material is produced per annum across 80 licensed dredging areas (http://www.crownestate.co.uk/marine_aggregates).

Following the discovery of the wreck an exclusion zone was established around the site preventing further dredging.

Horse Tail Sands is one of several treacherous sandbanks in the Solent responsible for the grounding and wrecking of ships throughout history. The Horse Tail lies to the south of the larger Horse and Dean Sands.

The Mystery Wreck has been investigated during four seasons of work under the 'Eastern Solent Marine Archaeological Project' (SolMAP). SolMAP incorporates work focused upon the particular requirements of a number of different sites and areas of archaeological interest in the Solent with professional divers working alongside students and volunteers to undertake survey and small scale excavation. The four seasons of work on the Mystery Wreck are summarised below.

2004

Initial dives revealed two substantial sections of wreckage lying 35 metres apart. Divers sketched the site, took photographs and video footage and recovered a number of artefacts for dating purposes (**Appendix 1** & **2**). Detailed survey began on the western section of wreckage (**Figure 2**) after a network of datum points was established.

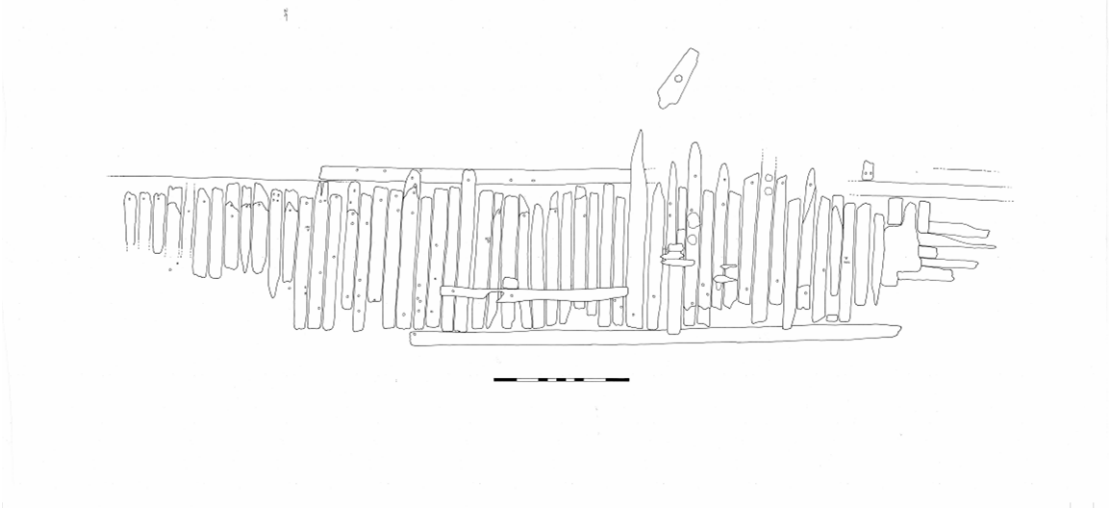


Figure 2: Mystery Wreck Western Section (Scale 1:20)

2005

Diving was significantly hampered by poor weather, with only a limited number of dives being undertaken on site. Despite this, survey of the western section (**Figure 2**) continued, datum points were established on the eastern section (**Figure 3**) and further artefacts were recovered (**Appendix 2**).

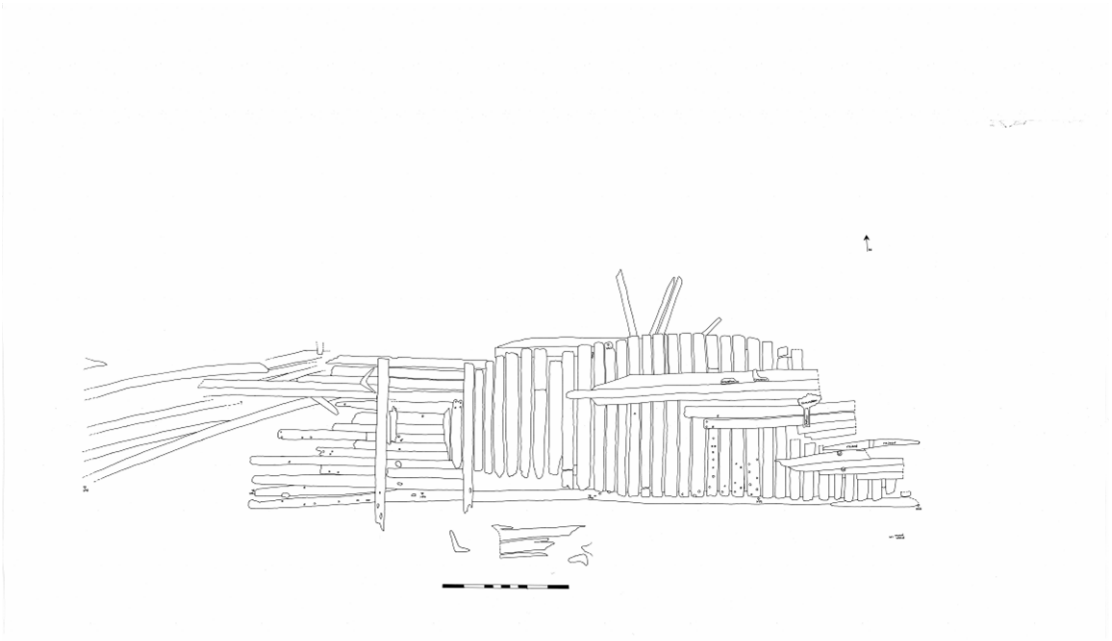


Figure 3: Mystery Wreck Eastern Section (Scale 1:20)

2006
Planning of the western section continued and work began on the eastern section. Some survey was also carried out on the area of seabed between the two sections. Further photographs and video footage were taken and artefacts were recovered when at risk of immediate loss or where they could add to dating evidence (**Appendix 1** & **2**).

2008
Work during SolMAP was split between Mystery Wreck and HMS *Impregnable* with the latter taking precedence due to required survey tasks. On the Mystery Wreck survey continued on the eastern section and on the scattered remains between the two sites. Nigel Nayling undertook a diving assessment of the site to prioritise the initial collection of timber samples for identification and dendrochronological dating, after selection each sample was surveyed and photographed prior to being recovered (**Appendix 1** & **2**).

In summary, the HWTMA has been able to develop outline plans of the ships structure visible on the seabed although further survey is required to finalise the basic plan of the eastern section of the site and develop a more detailed survey of the fastenings and timber to enable full analysis of the ship construction. A general photographic and video archive has also been created but targeted images and footage will be required to support further analysis of the wreckage.

3. Aims and Objectives

3.1 AIM

The aim of this assessment is to establish the significance of the 'Mystery Wreck 'lying within aggregate licence area 122/2, off Horse Tail Sands and to inform future management and monitoring approaches

3.2 OBJECTIVES

The specific objectives of this assessment are:

• To undertake an archaeological desk-based assessment to inform site survey approaches, assess historical wrecking information and review prevailing environmental conditions on the site.

• To assess currently available survey data, timber and artefact samples to investigate the age and identity of the site and inform recording strategies for diving fieldwork in stage two.

• To assess any currently available geophysical survey data to inform archaeological assessment, monitoring and management approaches (data to be supplied by UMD, a division of Tarmac Ltd).

• To disseminate the results to the scientific community

4. Methodology

4.1. APPROACH

The methodology adopted reflects best practice in carrying out archaeological desk based assessments as outlined by the Institute for Archaeologists (IfA) in *Standard and Guidance for Archaeological Desk Based Assessment* (Revised 2008).

The approach taken may be categorised under five main headings:

• Desk based research into shipwrecks and the historic environment
• Desk based research into the environmental characteristics of the area
• Specialist assessment and analysis
• Review of available geophysical and geotechnical data
• Site archive assessment and analysis

Each of these areas of research will inform the development of monitoring measures and the establishment of a fieldwork plan.

Study Area
A 1km buffer was placed around the wreck site to form a study area defined by a roughly circular polygon (**Figure 1**). This was then used as a search area with regard to the various data sources on wrecks and obstructions and the historic and physical environment.

However, the remains of ships can often drift long distances from their reported location of loss. For example, wrecks reported as lost off the eastern edge of the Isle of Wight may have drifted across the Solent and come to rest on Horse Tail Sands. For this reason a 10km buffer was placed around the wreck site to form a second study area to look at reported losses in the wider area of the eastern Solent (**Figure 4**).

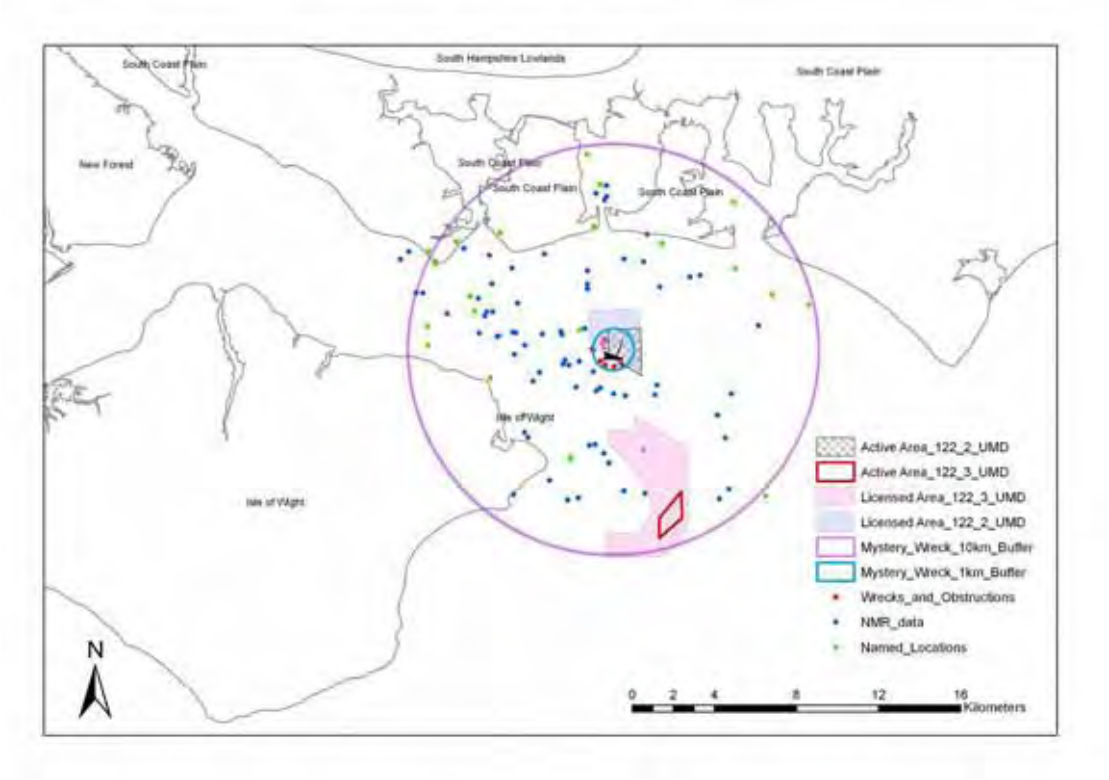


Figure 4: Reported Losses

Relevant Policy, Guidance and Legislation

Archaeological remains on the seabed, and any archaeological procedures associated with them, are subject to local, regional and national policy, guidance and legislation aiming to protect and maintain the historic environment. Key articles relevant to the Mystery Wreck and this programme of work are outlined below.

IfA Standard and Guidance for Archaeological Desk Based Assessment (Revised 2008)

This report has been compiled and written in accordance with the principles outlined in the IfA *Standard and Guidance for Archaeological Desk Based Assessment.* The standard set by this document is as follows:

"A desk-based assessment will determine, as far as is reasonably possible from existing records, the nature of the archaeological resource within a specified area. It will be undertaken using appropriate methods and practices which satisfy the stated aims of the project, and which comply with the *Code of conduct, Code of approved practice for the regulation of contractual arrangements in field archaeology*, and other relevant by-laws of the *IfA*."

A desk based assessment is defined as:

"a programme of assessment of the known or potential archaeological resource within a specified area or site on land, inter-tidal zone or underwater. It consists of a collation of existing written, graphic, photographic and electronic information in order to identify the likely character, extent, quality and worth of the known or potential archaeological resource in a local, regional, national or international context as appropriate."

The purpose of desk-based assessments is:

"to gain information about the known or potential archaeological resource within a given area or site (including the presence or absence, character and extent, date, integrity, state of preservation and relative quality of the potential archaeological resource), in order to make an assessment of its merit in context, leading to one or more of the following:
• the formulation of a strategy to ensure the recording, preservation or management of the resource
• the formulation of a strategy for further investigation, whether or not intrusive, where the character and value of the resource is not sufficiently defined to permit a mitigation strategy or other response to be devised
• the formulation of a proposal for further archaeological investigation within a programme of research

This desk based assessment will inform both the development of monitoring measures for the Mystery Wreck and the establishment of a fieldwork plan for further recording and possible excavation at the site wreck (**Section 7.2**).

IfA Standard and Guidance for Nautical Archaeological Recording and Reconstruction (2008)

Proposals for further fieldwork at the site of the Mystery Wreck will be informed by the IfA *Standard and Guidance for Nautical Archaeological Recording and Reconstruction*.

This document states that the primary aim of recording nautical archaeological remains is

"to complete an accurate as-found record of the vessel or parts thereof so they can be properly interpreted by a nautical specialist. The aim of reconstruction is an understanding of the vessel's hull-form and construction."

Protection of Wrecks Act 1973

Under the Protection of Wrecks Act 1973 Act, wrecks and wreckage of historical, archaeological or artistic importance can be protected by way of designation. It is a criminal offence to carry out certain activities in a defined area surrounding a designated wreck unless a licence for those activities has been obtained from the government. It is illegal to:

• Tamper with, damage or remove any part of a vessel lying wrecked on or in the seabed or any object formerly contained in such a vessel.

• Carry out diving or salvage operations directed to the exploration of any wreck or to removing objects from it or from the seabed, or uses equipment constructed or adapted for any purpose of diving or salvage operations. This is likely to include deployment of remotely operated vehicles.
• Deposit anything including anchors and fishing gear which, if it were to fall on the site, would obliterate, obstruct access to, or damage any part of the site.

A licence can only be granted by the Secretary of State advised by the Advisory Committee on Historic Wreck Sites (ACHWS). There are four levels of licences: a visitor licence, a survey licence, a surface recovery licence and an excavation licence.

There are currently 61 wrecks of historical, archaeological or artistic importance designated under the 1973 act.

There are no designated wrecks within the 1km buffer of the wreck although the protected wreck of *HMS Invincible*, a 74-gun French ship-of-the-line captured by the British Navy in 1747 lies to the north west of the Study Area on Horse Tail Sand (**Section 5.1**).

Merchant Shipping Act 1995

Under the Merchant Shipping Act 1995 all wreck material recovered from UK waters must be declared to the Receiver of Wreck who acts to settle questions of ownership and salvage. Wreck is defined as anything which is found in or on the sea, or washed ashore from tidal water and all items which are raised, regardless of age or importance, must be reported to the Receiver of Wreck.

HWTMA have a legal responsibility, therefore, to report all items raised from the Mystery Wreck to the Receiver.

Protection of Military Remains Act 1986

The Protection of Military Remains Act is administered by the Ministry of Defence (MoD) and provides for the protection for the protection of military remains of any nationality in UK waters. This includes both vessels and aircraft lost at sea. The MoD can designate 'controlled sites' around wrecks which have sunk within the last 200 years and whose position is known and designate named vessels lost after 4 August 1914 as 'protected places' even if the position of the wreck is not known. Diving, salvage and excavation are prohibited on 'controlled sites' and while diving is allowed, it is an offence to tamper with, damage, move or remove sensitive remains at 'protected places'.

The Mystery Wreck is currently unidentified but if the remains prove to be of military origin they may be subject to designation under the Protection of Military Remains Act 1986.

Draft Heritage Protection Bill 2008

The draft Heritage Protection Bill was published in April 2008 based upon proposals set out in the White Paper *Heritage Protection for the 21st Century*

(2007). It is a draft Bill for England and Wales, which sets out the legislative framework for a unified and simpler heritage protection system that will be more open, accountable and transparent.

The draft Bill contained provisions to unify the designation and consent regimes for terrestrial heritage assets, and transfer responsibility for designation of these assets in England from the Secretary of State to English Heritage; it also contained provisions to reform the marine heritage protection regime in England and Wales by broadening the range of marine historic assets that can be protected and bringing greater flexibility to the licensing system.

Any new provisions for the protection of the marine historic environment set out in this draft Bill, however, have not yet been passed by parliament.

Marine and Coastal Access Bill 2008

The Marine and Coastal Access Bill was introduced to Parliament in December 2008 based upon proposals set out in *A Sea Change: A Marine Bill White Paper* (2007).

The purpose of the Bill is to improve and simplify arrangements for managing marine development and protecting the marine environment and biodiversity, including a new planning system for the marine area, and to provide greater recreational access to the English coast.

The Bill allows for the creation of protected Marine Conservation Zones (MCZs) and introduces a new forward-looking, strategic spatial planning system for the sustainable use and protection of the marine environment.

As this Bill has only recently been published in it most recent form the full implications of the proposed new legislation are yet to be realised and thus the impact of the Bill on sites such as the Mystery Wreck cannot yet be fully assessed.

Strategic Guidance for the Solent: Historic Heritage and Maritime Archaeology

The Solent Forum was established in December 1992, in order to develop a greater understanding among the authorities and agencies involved in planning and management in the Solent area, and to assist and influence them in carrying out their functions.

The Solent Forum's *Strategic Guidance for the Solent* was published in December 1997. It aims to establish the general direction for the whole Solent in terms of strategic planning and management; to raise awareness and understanding of the main issues; and to set out the ground rules for consultation.

The chapter dealing with 'Historic Heritage and Maritime Archaeology' states that the long term aim of the strategic guidance is:

'to identify and protect the archaeological and historic heritage of the Solent, and promote its understanding and enjoyment, ensuring equal attention to sites on land and underwater'.

The guidance recognises the importance of the Solent as a focus for maritime heritage as an area of high interest and potential. Six main objectives are identified for local authorities, seabed developers, archaeological and heritage bodies and other agencies:

1. Continue to protect historic and archaeological sites from development
2. Give increased protection to archaeological sites underwater
3. Improve the information base - particularly underwater
4. Recognise the importance of maritime archaeology within coastal defence policies
5. Take a strategic approach to the protection and use of historic buildings and sites
6. Promote widespread support for archaeological conservation

All archaeological work and future management strategies associated with the Mystery Wreck will take into account these aspects of the strategic guidance.

Seabed Development Policy and Guidance

In recent years there has been a significant increase in the number of documents setting out guidance and best practice for seabed developers. Those which may prove relevant to the site of the Mystery Wreck include:

•The Joint Nautical Archaeology Policy Committee (JNAPC) Code of Practice for Seabed Development (2006)
•Marine Aggregate Dredging and the Historic Environment: Guidance Note, 2003
• British Marine Aggregate Producers Association (BMAPA) Protocol for Reporting Finds of Archaeological Interest, 2003

Relevant documents associated with seabed development will be considered with regard to all archaeological work and future management strategies associated with the Mystery Wreck.

4.2. DESK BASED RESEARCH: SHIPWRECKS AND THE HISTORIC ENVIRONMENT

Research focused on the interrogation of available data sources on shipwrecks in the eastern Solent area and available historic environment data and literature related to the site and the general period of the vessel.

Sources

The study area defined above was used to conduct searches for shipwrecks and historic environment data from the following sources:

• National Monuments Record (NMR)
• Hampshire Archaeology and Historic Buildings Record (AHBR)

• Isle of Wight Sites and Monuments Record (SMR)
• United Kingdom Hydrographic Office (UKHO) via SeaZone
• Maritime and Coastguard Agency Receiver of Wreck

The available data was entered into a project database and GIS Platform (see **Section 4.7**), records were compared and the datasets were amalgamated to provide a comprehensive list of the known and potential historic environment.

Available literature on the shipwrecks and the historic environment of the eastern Solent was also consulted including:

• Results from the *ALSF Navigational Hazards project* (Merritt *et al* 2007)
• Results from the *ALSF England's Shipping* (Wessex Archaeology 2003, 2004)
• Results from the *BMAPA Protocol for Reporting Finds of Archaeological Interest* (Wessex Archaeology 2006, 2007, 2008)
• *Dive Wight and Hampshire* (Pritchard, 2001)
• Relevant articles from the *International Journal of Nautical Archaeology*
• Relevant articles from the *Mariners Mirror*
• Other publications concerned with the historic environment of the eastern Solent

4.3 DESK BASED RESEARCH: ENVIRONMENTAL CONTEXT

Research into the environmental characteristics of the area was carried out to provide information on the factors affecting the survival of the archaeological remains. An assessment of the stability of the site was required to inform the monitoring and long term management recommendations for the site.

Sources
The eastern Solent is an extremely busy waterway and several environmental studies have been carried out resulting in a wide range of literature and data available for study.

The following datasets were reviewed as part of the project and incorporated into the GIS platform where appropriate:

• East Solent Coastal Sediment Transport Study (Standing Conference on Problems Affecting the Coastline (SCOPAC) Website)
• Wave, tide and meteorological data (Channel Coastal Observatory (CCO) Website)
• UKHO Charts – historic and current (UKHO Archives, Taunton)
• Offshore Geological Mapping (British Geological Survey (BGS) Maps)
• SeaZone Hydrospatial including:
    - bathymetry and elevation
    - natural and physical features
    - structures and obstructions
    - socio economic and marine use
    - conservation and environmental protection
    - climate and oceanography

Literature on the environment of the eastern Solent was also consulted to add context to the wreck site and the factors affecting its stability.

4.4 SPECIALIST ASSESSMENT AND ANALYSIS

Specialist assessment and analysis of specific aspects of the Mystery Wreck were carried out to provide dating information and to assist with the interpretation and identification of the vessel. The results were also used to develop specific research questions and inform the development of a programme of work for Stage Two: Recording (diving fieldwork).

Ship Structure (HWTMA)
The site plan and fieldwork archive was used to analyse the wreckage to gain a fuller understanding of the vessel structure and any diagnostic features. Relevant articles in books and journals such as the *International Journal of Nautical Archaeology* and the *Mariners Mirror* were consulted for parallels with the Mystery Wreck.

Timber Analysis (Nigel Nayling)
In 2008 a number of timber samples were collected from the Mystery Wreck for identification and dendrochronological dating (**Appendix 1** & **2**). The collected samples were analysed by Nigel Nayling of Lampeter University.

Copper Analysis (Peter Northover)
Analysis of the copper alloy artefacts collected from the site was undertaken by Peter Northover of BegbrokeNano Oxford Materials Characterisation Services. The samples included a number of different fastening types, sheathing and a piece of hand bell (see **Appendix 1**). Analysis utilised optical microscopy and a scanning electron microscope to recover the required data.

Pottery Analysis
The two sherds of pottery recovered from the site (see **Appendix 2**) were reviewed, to attempt to help narrow down the date of use of the vessel.

Carronade (HWTMA)
The presence of a carronade on the site was identified as one of the key interpretive features of the wreck. Relevant articles in books and journals were consulted to attempt to identify the date, type and origin of the gun. Information was also sent to expert volunteers at 'Explosion' the museum of naval firepower in Gosport.

4.5 REVIEW OF AVAILABLE GEOPHYSICAL AND GEOTECHNICAL DATA

UMD kindly agreed to supply available geophysical survey data including sub bottom seismics, side scan sonar, magnetometer, bathymetry (single beam and multi beam) and geotechnical data. This was reviewed to determine whether further information about the wreck site can be gained from any of

the data sets and to assess the surrounding conditions to feed into monitoring recommendations.

4.6 SITE ARCHIVE ASSESSMENT AND ANALYSIS

There were a number of tasks which needed to be carried out to bring the site archive up to date and to realise its full research potential. However, due to a lack of funding following the 2008 dive season, it had not been possible to draw up the 2008 survey data.

These tasks included:
• 2008 survey data (eastern end) – review and add to plan
• 2008 survey data (seabed between sections) – review and add to plan
• Create combined site plan – review all plans from the site, amalgamate and create digital site plan to be incorporated into AutoCAD and the project GIS
• Photograph archive – assess potential of images for specialist assessment and publication
• Video archive – assess potential of images for specialist assessment and publication

Once these tasks had been completed it was then possible to use the site archive in conjunction with the results of the desk based research to inform proposals for targeted fieldwork during Stage Two of the project (Recording: diving fieldwork). For example:

• Identify any areas of the site where the basic outline plans are incomplete
• Identify which areas of ship structure will be targeted for detailed recording of ship fastening and timber characteristics
• Identify areas of the ship structure which aren't currently identified in terms of which parts of the hull they represent
• Identify parts of the site which require photographic or video survey

4.7 DATABASE CREATION AND DEVELOPMENT OF GIS PLATFORM

Database Creation

Shipwreck and historic environment data was entered into a Microsoft Excel workbook. The sets of data were then amalgamated to produce a single database of known wrecks within the study area (**Appendix 3**), a summary of the dive sites in the area (**Appendix 4**) and a list of reported losses in the eastern Solent which may provide an identity for the Mystery Wreck (**Appendix 5** & **7**).

Development of Project GIS

Shipwreck and historic environment data, SeaZone Hydrospatial data, UKHO historic charts and the combined site plan were incorporated into a GIS platform utilising the ESRI software ArcView 9.3. This allowed for the data to be visually represented thus assisting with the interpretation and analysis of the historic and physical environment.

The data was collated to meet English Heritage best practice standards, following the *Guidelines for English Heritage Projects Involving GIS* (2004) and the AHDS GIS guide to Good Practice (http://ads.ahds.ac.uk/project/goodguides/gis/).

A WGS84 compliant datum below Mean Low Water (MLW) was used as best practice for marine GIS as the datasets utilised did not include data from the terrestrial zone. Any data supplied using projected co-ordinates (either UTM or BNG) was translated using the ArcView 9.2 toolbox software.

The GIS project was also used to produce graphic representations of the results of the archaeological desk based assessment.

5. Results

5.1. DESK BASED RESEARCH: SHIPWRECKS AND THE HISTORIC ENVIRONMENT

Records of wrecks and obstructions within the 1km study area were collated from the NMR, from Hampshire SMR and the Isle of Wight SMR and from the UKHO via SeaZone (**Appendix 3**). Records were also requested from the Receiver of Wreck.

Reports of dive sites in the guide *Dive Wight and Hampshire* were also examined to see if there were any further wreck sites which may help to establish the nature of losses and the shipwreck resource in the area (**Appendix 4**).

Records of reported losses within the larger 10km study area were obtained from the NMR. These are wrecks for which a record of their loss exists but no remains have yet been found. Ultimately, one of these reported losses may be identified as the remains at the site of the Mystery Wreck (**Appendix 5**).

Finally, documentary sources were used to summarise the maritime history of the area and the potential for unreported losses.

5.1.1. Known Wrecks

Wrecks and Obstructions

There were surprisingly few known wrecks and obstructions recorded within the 1km study area. These comprised four seabed obstructions reported by fishermen, which may or may not prove to be the remains of vessels with further investigation, scattered pontoon remains, an unidentified possible landing craft and three identified wrecks:

- UB21 – WW1 German u-boat
- HMS *Undine* – WW1 British destroyer
- HMS *Invincible* – 18th century 74-gun third rate ship of the line

Further details can be found in **Appendix 3**.

It is not possible at present to correlate any of these known wrecks or obstructions to the Mystery Wreck.

Receiver of Wreck

The Receiver of Wreck has five records of reports from the 1km study area, three of which relate to artefacts raised from the Mystery Wreck by HWTMA during previous fieldwork seasons (144/04, 090/06, 132/08). Both of the other reports include collections of items found in various locations rather than a specific wreck site. Items from both reports may possibly relate to the Mystery Wreck but without an exact location it is impossible to confirm this. These reports are listed in the table below.

Droit Number	Date Found	Exact Position Found	Description	Remarks
A/2053	01/05/94	Various	1 x shell case, 1 x bottle, 1 x brass quoit thing, 1 x brass steam whistle cover, 1 x concreted 6" nail etc	Offered in lieu of salvage
044/01	17/04/01	Various off St Catherine's Point IoW, Littlehampton & Bournemouth	Variety of Shell cases and parts of shell cases, totalling 55. Also, 1 x pulley wheel assembly, 2 x brass box, 1 x drawer handle, 1 x clear glass bottle, 1 x hydrostatic valve. 1 x filler cap. 1 x cup holder. 1 x brass hinge pin	lieu of salvage - Alan Stevens MDP verified safe
144/04	14/06/04	Horsetail Sands, eastern Solent.	3 x small copper pins, 4 x copper nails, 2 x sherds pottery, 1 x copper pin, 2 x pieces copper sheathing	Some pins identified as Muntz Metal, which gives the wreck an earliest date of 1830. Trust are continuing to dive on, survey & record site, but still no identity. May never know. Year up, close case & pass title of items to Trust, probably for display at F
090/06	09/06/06	Horsetail Sands, eastern Solent.	2 x Copper nails. 1 x Coal piece. 1 x Keel pin (copper alloy). 1 x Bolt (part of, copper). 2 x Copper sheathing fragments. 1 x Bell fragment (possibly), copper alloy. 1 x copper alloy artefact, probably part of shell casing, not related to wreck assemblage	The HWTMA have undertaken archaeological survey & recording of site & some small scale surface recovery. Year not quite up, but no owner likely to be found & items not of any financial value. Close & pass title to Trust for further research, conservation & display at Fort Victoria, IoW.

Droit Number	Date Found	Exact Position Found	Description	Remarks
132/08	01/06/08	Horsetail Sands, eastern Solent.	1 x piece of copper sheathing, 22 x timber samples for dendro/ID	Estimated as being approx 200 years old.

Dive Sites

Dive sites recorded in *Dive Wight and Hampshire* by Martin Pritchard and Kendall McDonald (2001) were assessed for any possible correlations with the Mystery Wreck and to help summarise the shipwreck resource in the eastern Solent. The dive sites listed in "Area 4: Gosport to Hayling Island; Ryde to Culver Cliff" (Pritchard, 2001: 75 - 113) are listed in **Appendix 4**.

The dates and types of the dive sites may be summarised as follows:

Date	Type	Frequency
1300-1399	Submerged village	1
1500-1599	Battleship	1
1700-1799	1st Rate Ship of the Line	1
	2nd Rate Ship of the Line	1
	3rd Rate Ship of the Line	2
	Forts	2
1800-1899	Barque	1
	Prison Hulks	1
1900-1913	Submarine	1
	Anti-Submarine Defences	1
WW1	Destroyer	1
	Paddle Steamer	1
	Torpedo Gunboat	1
	French Collier	1
	Patrol Boat	1
1919-1938	German Submarine	1
	Offshore Lighthouse	1
	Barge	1
	Lighter	1
WW2	Boom Defence Vessel	2
	Coaster	1
	Anti-Submarine Yacht	2
	Aircraft	1
	Tug	1
	Paddle Steamer	1
	D-Day Debris	1
	Harbour Wall/Dredger	1
	Petrol Barge	1
	Submarine	1
	Defence/Bombardons	1
	Pontoon	1
	Large Box Section	1
Post WW2	German E-boat	
	Dredger	1
	Danish Coaster	1
	Yacht	4
	Torpedo Search and Recovery Boat	2
	Fishing Vessel	1

Date	Type	Frequency
Unknown	Cabin Cruiser	1
	Greek Motor Vessel	1
	Hovercraft	1
	Landing Craft	1
	German Tug	1
	Wreck/Craft	10
	Barge	3
	Pontoon	2
	Dredger	2
	Collier	1
	Spoil Mound	1
	Naval Vessel	1
	Mooring Block	1
	Obstruction	1
	Steamship	1
	Tank Landing Craft	1
	Cylinder	1
	Total	77

It is not possible at present to associate any of these sites with the Mystery Wreck. The majority of the dive sites date to the Modern period post 1900. However, rather than being a true reflection of the shipwreck resource in the eastern Solent this is most likely a reflection of the survival of remains and the increased attraction of such sites for divers.

5.1.2. Potential Wrecks

NMR Reported Losses

The NMR holds records of reported losses for which no grid locations can be confirmed. Instead, these vessels are recorded at certain arbitrary points called Named Location (NLOs). These points represent general loss locations and do not (except by chance) relate to actual seabed remains.

A full list of reported losses can be found in **Appendix 5**.

Within the 10km study area there are 303 reported losses distributed across 18 NLOs (**Figure 4**):

- Bembridge Ledge, Isle of Wight (37 reported losses)
- Bracklesham Bay, West Sussex (1 reported loss)
- Chichester Bar, West Sussex (4 reported losses)
- Chichester, West Sussex (34 reported losses)
- Coastal Waters (1 loss)
- Eastney, Hampshire (9 losses)
- Gilkicker Point, Hampshire (8 losses)
- Gosport, Hampshire (6 losses)
- Hayling Bay, Hampshire (15 losses)
- Horse and Dean Sand, Hampshire (13 losses)
- Langstone Harbour, Hampshire (4 losses)

• Offshore Chichester, West Sussex (1 loss)
• Pole Sands, West Sussex (3 losses)
• Portsmouth, Hampshire (80 losses)
• Ryde, Isle of Wight (33 losses)
• Seaview, Isle of Wight (6 losses)
• Spithead, Hampshire (40 losses)
• St Helens, Isle of Wight (8 losses)

None of these NLOs lie within the 1km study area although the Horse and Dean Sand NLO lies approximately 2 km to the north west of the Mystery Wreck.

The reported losses are summarised by date and type below. They include vessels lost between 1238 and 1944 and consist primarily of cargo vessels. Some of these may relate to unidentified wrecks of obstructions within the study area, including the Mystery Wreck. However, it is likely that the remains of a number of vessels that were lost in or close to the study area are yet to be discovered.

Date	Type	Frequency
1200-1299	Sailing Vessels	1
1300-1399	Cargo Vessel	1
1400-1499	Carrack	1
	Cargo Vessel	1
1500-1599	Galley	1
	Pink	1
	Cargo Vessel	5
1600-1699	Craft	4
	Fire Ship	2
	Brig	3
	Cargo Vessel	18
	Craft	23
	East Indiaman	1
	Fly Boat	1
	Galliot	1
	Hoy	2
	Ketch	2
	Lugger	1
	Pink	1
	Prison Hulks	1
1700-1799	Privateer	1
	Sailing Vessel	7
	Sloop	1
	Snow	1
	Store Ship	1
	Tender	1
	Transport Vessel	4
	Troop Ship	1
	Warship	2
	2nd Rate Ship of the Line	1
	3rd Rate Ship of the Line	1
	4th Rate Ship of the Line	1
	Barge	12
1800-1899	Barque	4
	Brig	9

Date	Type	Frequency
1900-1913	Brigantine	2
	Cargo Vessel	23
	Craft	27
	Cutter	8
	Ketch	14
	Sailing Vessel	1
	Schooner	12
	Sloop	2
	Smack	5
	Snow	2
	Transport Vessel	2
	Tug	1
	West Indiaman	1
	Wherry	1
	Yacht	2
	Yawl	5
WW1	Barge	3
	Cutter	11
	Dandy	1
	Ketch	4
	Leisure Craft	1
	Lugger	1
	Schooner	3
	Smack	2
	Yacht	2
	Yawl	2
1919-1938	Cargo Vessel	1
	Drifter	4
	Ketch	3
	Schooner	1
	Trawler	2
	Tug	1
	Barge	1
	Ketch	1
	Troop Ship	1
WW2	Aircraft	22
	Cargo Vessel	1
	Drifter	1
	Ferry	1
	Landing Craft	3
	Seaplane	1
	Torpedo Boat	1
	Yacht	2
	Total	303

The total number of reported losses recorded within the 10km study area for each period is shown below, together with the figure expressed as a percentage of the total number of recorded losses.

Date	Total	Percentage of Total
1200-1249	1	0.3%
1250-1299	0	0.0%
1300-1349	0	0.0%
1350-1399	1	0.3%

1400-1449	1	0.3%
1450-1499	0	0.0%
1500-1549	1	0.3%
1550-1599	2	0.7%
1600-1649	5	1.7%
1650-1699	6	2.0%
1700-1749	19	6.2%
1750-1799	57	18.81%
1800-1849	53	17.49%
1850-1899	80	26.40%
1900-1913	32	10.56%
WW1	10	3.3%
1919-1938	3	1.0%
WW2	32	10.56%
Total	**303**	

The above table shows a marked increase in the number of reported losses after the period 1700-1799. This coincides with the beginning of the systematic recording of casualties during the mid 18th century. The highest percentage of losses (26.4%) occurs in the second half of the 19th century. This most corresponds to the rapid development of trade and industry in the Solent and the growth of ports around the region coinciding with the 2nd Industrial Revolution. The reduction of losses in the early 20th century may reflect the decline of the Solent ports with the development of improved road and rail transport networks. An outline of the maritime history of the Solent is given below.

Potential for Unreported Losses

In addition to reported losses many vessels were lost with no record being made. 'Best guesses' for the volume of shipping losses around the coast of the UK estimate between eight to forty wrecks for every mile of coastline. This does not include losses in open water which are particularly difficult to quantify. Records of shipping, such as Lloyds Lists, dating back to the 1750s contain many references to ships that are 'overdue' and for which no knowledge of their fate has ever been recovered.

D B Kitchen's *Solent Chart Book* published in 1898 includes sailing directions for the rivers and harbours between Selsea and Portland. The book described the Horse and Dean Sands as, "extensive shoals or hard sand and gravel from the north side of the deep-water channel from the Nab to Spithead. They must be approached with caution, as they are steep-to on the south side". It suggests that, as the tide is less strong over the shoals than in the deep-water, channel vessels of light draught often find it advisable to cross the Horse sand which may be done safely within certain limits.

This description suggests that the sands and gravels in the area in which the Mystery Wreck was found have represented a significant hazard to shipping in the past, as they do today. This, coupled, with the high levels of shipping in the eastern Solent results in high potential for as yet unidentified wrecks in and around the area.

Maritime History of the Solent

The potential for wrecks within the eastern Solent may date as far back as the inundation of the area during the Mesolithic and Neolithic (Momber, 2000; SCOPAC, 2004a: 8). However, this sub-section will refer to the chronological period around the Mystery Wreck.

Over the last 1000 years the Solent has had, "a unique and vitally important strategic role in the defence of the realm" (Drummond & McInnes, 2001: 85). For example, the growth of Portsmouth as a naval base and Southampton as a major port contributed to the English strength, making the Solent a logical place to launch an attack on England. When Henry VIII came to power in 1509 and established a permanent navy, Portsmouth became the only exclusively naval harbour and Royal Dockyard in England and several fortifications were constructed around the Solent.

The dockyards at Portsmouth and the Solent fortifications continued to be enlarged and strengthened throughout the 17th century and the national strategic important of Portsmouth harbour was confirmed when Portsmouth and Gosport became the only towns to be newly fortified on a large scale during the 18th century (Drummond & McInnes, 2001: 88-89).

During the 18th century there was a growth in commercial shipyards in the Solent region, for example in the River Hamble and at Buckler's Hard on the Beaulieu River in the New Forest (Drummond & McInnes, 2001: 90). Portsmouth's role was intensified by the French Revolutionary and Napoleonic wars and by 1800 the Royal navy had 684 ships and Portsmouth dockyard was the largest industrial complex in the world. With the move from timber built ships to construction using iron and steel in the mid 19th century Portsmouth dockyard was again enlarged and in the late 1880s two new dry docks were built to facilitate the construction of new classes of battleships.

At the start of the 20th century Portsmouth had begun to build the revolutionary Dreadnought battleships and the dockyard was again extended (Drummond & McInnes, 2001: 92). By 1914 five Dreadnoughts could be docked at Portsmouth at any one time. Portsmouth played a key role in refitting and building vessels during World War 1 (WW1) and during World War 2 (WW2) the workforce grew to 25,000 people. Armies and fleets gathered in and around Portsmouth in the build up to D-Day.

As well as its military importance, the Solent was also well placed for trade with shipbuilding, maritime trade and fishing providing an economic base for Solent ports from Medieval times until the 20th century. Collectively, the Solent ports were most prosperous from the mid-18th to the early 20th century coinciding with the 1st Industrial Revolution (which began in the 18th century) and the 2nd Industrial Revolution (around 1850s). From the early 19th century Southampton developed into a major merchant port and by the end of the 19th century there were at least 34 fishing or trading ports around the Solent in addition to Portsmouth and Southampton, many of which had experienced periods of considerable prosperity. Much of the trade appears to have been

coastal and cross channel, carrying bulk goods such as bricks, chalk, timber, salt, coal and corn (see Hill, 2002; Hobsbawn, 1999).

In the 19th century the opening of the London to Southampton and London to Portsmouth railway lines in 1840 also gave the area an economic boost (Hill, 2002; Hobsbawn, 1999). The new Victorian fashion for seaside holidays was aided by the opening of the railways and resorts sprang up at Southsea, Hayling Island and Ryde. In the later 19th century, Cowes developed as a yachting port.

Natural marine resources have also proved an important part of the Solent maritime economy since prehistoric times. Between the 10th and 19th centuries, the salt industry became important in the local area and in the 17th and 18th century the Solent salt industry was among the most important in north-west Europe. In the first half of the 19th century, however, the industry died leaving few physical traces other than the sea walls which protected the works.

The oyster fishery was flourishing in the 18th century (Whitfield, 2005). By early 19th century, there was intensive exploitation of the Solent beds and to the East oysters and scallops were being dredged off the Sussex coast by boast from the Solent, fleets of smacks from Newhaven and Shoreham and by vessels from the east coast. Following an era of intensive competition and declining resource the Sussex beds were fished out by the mid 19th century. Solent vessels were forced further afield and private oyster companies sprang up to develop the industry along more sustainable lines.

The Emsworth oyster fleet came to prominence in the second half of the 19th century and beginning of the 20th and a considerable shipbuilding and fishery business was established there in the 1880s (Whitfield, 2005). However, in 1902, an outbreak of typhoid was traced back to the Emsworth oysters associated with a rise in raw sewage discharges. During this time, the oyster and scallop industry severely declined. This was compounded during WW1 by the loss of many fishermen. Today, the oyster industry has revived and the Solent now sustains the largest fishery for 'wild' flat oysters in Europe.

Other shellfish such as cockles, winkles, mussels and clams have also been harvested on a commercial scale throughout the Solent region and a number of long-distance and local fishing fleets have contributed to the maritime economy of the Solent. As with the growth in trade ports, the numbers of vessels fishing from the Solent increased through the 18th and 19th centuries and the industry continues to thrive today (Whitfield, 2005).

It has been suggested that port development began with the development of steam power. The first steam communication was established between Portsmouth and the Isle of Wight in 1817 (O'Brien, 1969). Within 15 years the three principle ferry routes to the Isle of Wight from the mainland had adopted steam over sail. The experience gained by the development of these vessels and routes assisted the introduction of steam in larger vessels and on longer passages with cross channel steamers entering service in 1824. In 1838 the

first Atlantic steamer, the *British Queen* pioneered the Southampton to New York passenger and mail service. By the mid 20th century Southampton had become the main terminus for the huge transatlantic liners and cruise ships.

At the start of the 20th century, however, Southampton and the other ports began to decline with the development of road and rail transport and the development of bulk transport overseas by larger and fewer ships from fewer and larger ports. Other factors contributing to the decline included the decline of the coastal saltworks, the reduced demand for ships after the Napoleonic wars and the switch from timber to larger steel hulled ships at fewer and more specialised shipyards.

Today, relatively few of the new industries entering the region, and a declining percentage of the population, rely on the sea. However, the Dockyard's at Portsmouth, the continental Ferry Ports at Southampton and Portsmouth, the commercial docks at Southampton and an array of other marine businesses, including the yacht and fishing industry, still comprise an important part of the Solent's economy (Tubbs, 1999).

This brief outline of the maritime history of the Solent shows how watercraft of varying kinds has been essential to populations around the Solent. There is very high potential, therefore, for unreported losses and the discovery of as yet undiscovered remains. This is further highlighted by a number of ALSF funded projects which have taken place in recent years, namely the Navigational Hazards Project, the England's shipping project and the BMAPA protocol for reporting finds of archaeological interest.

ALSF Navigational Hazards project

Bournemouth University was commissioned by English Heritage to undertake a project entitled *Mapping Navigational Hazards as Areas of Maritime Archaeological Potential* funded by the Aggregate Levy Sustainability Fund (Merritt *et al* 2007). Trends identified from historical records were combined with a model of the preservation potential of marine sediments in order to identify areas where a high potential for ship losses coincides with a high potential for preservation of archaeological materials. These areas were classified as Areas of Maritime Archaeological Potential (AMAPs).

The results of the project showed that the approaches to estuaries have generally higher potential for loss and preservation and the eastern Solent and approaches to Portsmouth, Langstone and Chichester Harbours was identified as one of the largest areas where trends coincided.

The report (Merritt *et al*, 2007: 36) identifies how the eastern approaches to the Solent are characterised by the presence of highly mobile fine grained sands and silts which, together with the shallowness of the area and the extensive foreshore banks lying on either side of the approaches to major harbours and ports, contribute to a high potential for ship losses.

The area in which the Mystery Wreck lies is described as very sheltered with an increasing number of anchorages recorded on later charts with the

development of Portsmouth's naval importance (Merritt *et al*, 2007: 36). It records that main hazardous features of the area are the extensive intertidal areas on either side of the channel including Horse Sand to the north and Mother Bank to the south.

ALSF England's Shipping project

Wessex Archaeology was commissioned by English Heritage to undertake a project to research ways of mapping evidence of historic shipping in UK waters in order to improve the incorporation of such evidence into the assessment of archaeological potential of the seabed (Wessex Archaeology, 2003, 2004). The project aimed to map the intensity and other characteristics of pre-1730 shipping in UK waters; to collate information about shipping patterns in an accessible format; to develop a database which can contain data reflecting the multiple facets of shipping related data; to map the data using a GIS format to enable the user to query the data; and to disseminate the results. Information was collated about traditional trade routes and patterns of shipping movements; modern and historic approaches to ports and harbours; incidents of contemporaneous large scale shipping losses such as sea battles; navigational hazards; and historic shipping losses where physical remains have been identified on the seabed. The data was collated and mapped using GIS and linked to a Microsoft Access database.

The primary application of the data gathered for England's Shipping was to overcome the bias towards the analysis of post-1700 shipping currently seen in Environmental Assessments. After the 1730s, hydrographic survey techniques became more commonplace and official records were increasingly maintained. Therefore, England's Shipping was conceived as an attempt to temper these biases, and provide a fuller appreciation of maritime archaeological potential through the collation of data including documentary sources relating to volumes and types of shipping extending back to early medieval records.

Although the data provided in the database enables the researcher to discuss the potential for pre-1730 shipping-related archaeology on the seabed, this data is outside the Mystery Wreck chronological window.

BMAPA Protocol for Reporting Finds of Archaeological Interest

In 2005 Wessex Archaeology prepared the Protocol for Reporting Finds of Archaeological Interest for British Marine Aggregate Producers Association (BMAPA) and English Heritage (Wessex Archaeology, 2006, 2007, 2008). The protocol applies to the wharves and vessels of all BMAPA companies so that archaeological discoveries at wharves, onboard vessels or on the seabed can be reported.

Each wharf or vessel has a Site Champion, a single person who is responsible for reporting discoveries to a Nominated Contact within the company. The Nominated Contact uploads discoveries onto the secure web-based reporting system designed for this purpose. Wessex Archaeology staff are alerted to the presence of new discoveries and every find is investigated.

To date, there has only been one find reported from UMD's Aggregate Area 122/2 in which the Mystery Wreck lies. UMA_0096_a is reported as possible WW2 rubble including a hallmarked, silver spoon and fork and a brass plate inscribed, 'portable connection for port bow light' (Wessex Archaeology, 2007). The spoon has been identified as of a 'fiddle' pattern type introduced in the 1780s and still produced today.

Although only one find has been reported from Area 122/2 a number of discoveries have been made in other areas to the East of the Isle of Wight which may relate to wrecks on the seabed. The locations of the aggregate areas are shown in **Figure 5** and the discoveries are listed in **Appendix 6**.

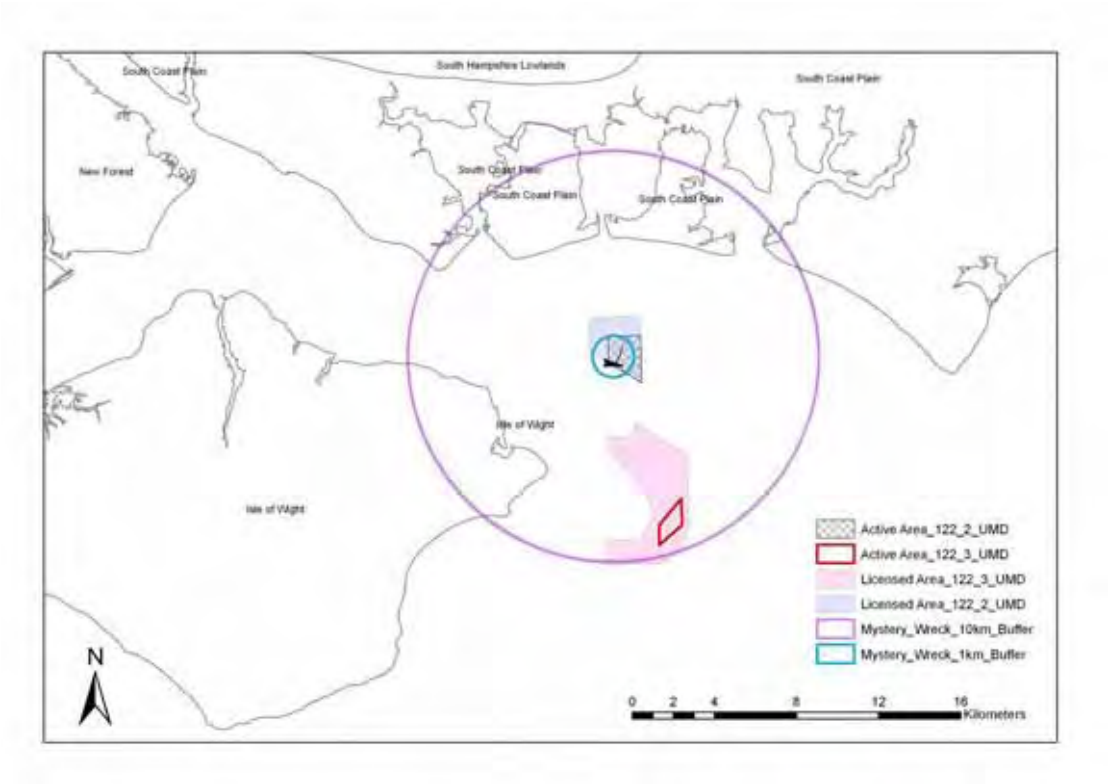


Figure 5: Aggregate Areas in the Eastern Solent Study Area

The Table below summarises these discoveries by aggregate area and date.

Aggregate Area	Discovery Type	Date	No of reports
Unknown	Metal objects	Unknown	1
City of Chichester Unknown	Metal monogram	Unknown	1
	Possible WW2 rubble	WW2	2
South Coast Region	Brass fixtures and fittings	WW1	1
Area 122/1A	Possible WW2 rubble	WW2	1
Area 122/02	Possible WW2 rubble	WW2	1
	Fragments of bone	Unknown	2
	Possible WW2 rubble	WW2	5
Area 122/03	Various fixtures and fittings	late 19th/20th century	1
	Bicylcle Bell	1879-1980	1
	Knife and axe head	post WW2	1

Aggregate Area	Discovery Type	Date	No of reports
Area 340	Employment badge	early 20th century	1
	Cannon balls	Unknown	1
	Ships timber	1500 to 1850	1
	Metal debris	Unknown	1
	Brick and a paver	1882-1936	1
	Bone fragments	Unknown	1
Area 351	Pottery sherd	19th century	1
	Admiralty telescope	1944	1
	Cannon ball	Unknown	1
Area 395/1	Brass fixtures and fittings	Early 20th century	1
	Ornamental dogs head	Unknown	1
	Flag pole finial	Unknown	1
Area 451	Bone fragment	Unknown	1
	Boat hook and cannon ball	Unknown	1
	Shells	18th to early 19th century	1

The diverse range of artefacts reported through the BMAPA protocol indicates the potential for multiple finds within the seabed deposits of the Solent. It is not possible to directly associate some finds with wrecks, such as bone fragments for example. However, without firm dating, items such as a red deer bone (UMD_0186_a) are as likely to have come from wrecks as from submerged prehistoric settlements or eroded terrestrial deposits (Wessex Archaeology 2008). On the *Mary Rose*, for example, documents record that venison was carried on board.

A large number of these records are suspected to domestic scrap and demolition debris dumped at sea in the aftermath of WW2 (Wessex Archaeology, 2007, 2008). However, there is currently no concrete evidence that this dumping actually took place and such finds may also have come from a vessel, either lost overboard or as part of a wreck.

5.2. DESK BASED RESEARCH: ENVIRONMENTAL CONTEXT

At the end of the last Ice Age sea level was substantially lower than at present. As the ice melted sea level rose rapidly transgressing the Solent valley system, cutting off the Isle of Wight and submerging wide areas of coastal lowlands.

Today, the Solent and Spithead region is the site of extensive Holocene deposits of shingle and sand with most marine shingle lying below sea level at the borders of the deep channel (West, 1980: 12). Much of the eastern Solent is characterised by mud or sand which extends down the channel between Horse Sand and No Mans Land into St Helen's Road (Dyer, 1980: 22). Hydrospatial data supplied by SeaZone identifies the underlying bedrock within the study area as argillaceous rock (a sedimentary rock formed of clay deposits). The seabed sediments of Horse and Dean sand show as sandy gravel, the Horse Tail as gravely sand while the area in which the Mystery Wreck lies as slightly gravely sand. Bathymetric data from SeaZone

Hydrospatial shows a depth contour of 5m delineating the area of the Horse Tail with isolated areas reaching 10 to 15m in depth.

In general, sediments become progressively coarser in an eastwards direction with sandy gravels, gravely sands and, finally, gravels successively taking over dominance as the outer Solent approaches become co-adjacent with English Channel sediments (SCOPAC, 2004b: 4). This general pattern is, however, complicated by large patches of coarse gravels associated with former terraces of the former Solent River and the fine to medium sands, or sandy gravels that constitute major stable banks (SCOPAC, 2004b: 4). Pockets of relict peats also occur across the Solent region (Dyer, 1980: 22).

Most of the deposits probably originate from shore erosion although large amounts of material are carried into the Solent through rivers and streams (Tubbs, 1999: 17-18, SCOPAC, 2004b: 4). Around 1000 million m^3 fresh water is discharged into the Solent each year from 39 rivers and streams and more than 50 minor watercourses. The shells of marine animals, dead marine animals, algae and other marine vegetation also contribute.

Sediments are rarely more than 2m thick with 0.5 to 1m being characteristic of large areas of mud and fine sand (Tubbs, 1999: 18, SCOPAC, 2004b: 4). Where the rising sea levels have drowned the former valleys of the Solent River, however, sediment has accumulated to considerable depths and the deeply incised channels are filled with sand and mud, now buried beneath the bed of the modern Solent.

Wave data has been collected in the Solent since 2003 as part of the Southeast Strategic Regional Coastal Monitoring Programme. This data is managed by the Channel Coast Observatory and presented through their website (http://www.channelcoast.org/). A directional WaveRider buoy was deployed off Hayling Island in July 2003. The results from this buoy so far are summarised in the table below.

Month	2003		2004		2005		2006		2007	
	H_s (m)	H_{max} (m)	H_s (m)	H_{max} (m)	H_s (m)	H_{max} (m)	H_s (m)	H_{max} (m)	H_s (m)	H_{max} (m)
January	-	-	0.967	1.471	0.893	1.433	0.72	-	0.72	-
February	-	-	0.687	1.039	0.485	0.736	0.69	-	0.69	-
March	-	-	0.689	1.048	0.57	0.863	0.83	-	0.83	-
April	-	-	0.532	0.814	0.488	0.761	0.48	-	0.48	-
May	-	-	0.403	0.621	0.562	0.86	0.66	-	0.66	-
June	-	-	0.505	0.779	0.445	0.688	0.36	-	0.36	-
July	0.575	0.894	0.474	0.731	0.472	-	0.38	-	0.38	-
August	0.4	0.627	0.611	0.945	0.405	0.62	0.48	-	0.48	-
September	0.416	0.638	0.705	1.101	0.51	0.775	0.63	-	0.63	-
October	0.653	1.015	1.02	1.587	0.785	1.2	0.88	-	0.88	-
November	0.901	1.384	0.491	0.746	0.748	1.142	0.97	-	0.97	-
December	0.798	1.228	0.635	0.982	0.702	1.076	1.15	-	1.15	-

The CCO also record the highest storm events for each year

2003	2004	2005	2006	2007

Date	H_S(m)	Date	H_S(m)	Date	H_S(m)	Date	H_S(m)	Date	H_S(m)
29/11 10:00	2.68	08/01 10:30	3.64	02/12 17:00	3.53	03/12 08:00	3.42	18/01 13.00	3.58
26/11 07:30	2.66	31/01 11:00	3.19	03/11 13:00	3.33	29/12 22:00	2.96	06/03 05.00	3.34
14/11 01:30	2.64	23/06 15:30	2.99	-	-	07/12 05:00	2.96	09/12 14.00	2.86
20/12 13:00	2.53	-	-	-	-	30/12 02:00	2.93	12/02 15.30	2.84
02/11 09:30	2.47	-	-	-	-	17/11 17:00	2.78	11/01 14.00	2.74

There are no regional monitoring tide gauges or meteorological stations within the eastern Solent or Isle of Wight region. The Hydrospatial data from SeaZone also lacks any data on climate and oceanography within our study area. Data on tides and climate has, however, been obtained from literary sources.

The climate of the central south coast of England is mild with relatively high sea temperatures year-round. The mean temperature of the Solent is 12º and average monthly temperatures in the eastern Solent range from 7.8 º in February to March to a peak of about 16.7 º in August (Clark & Gurnell, 1987: 10).

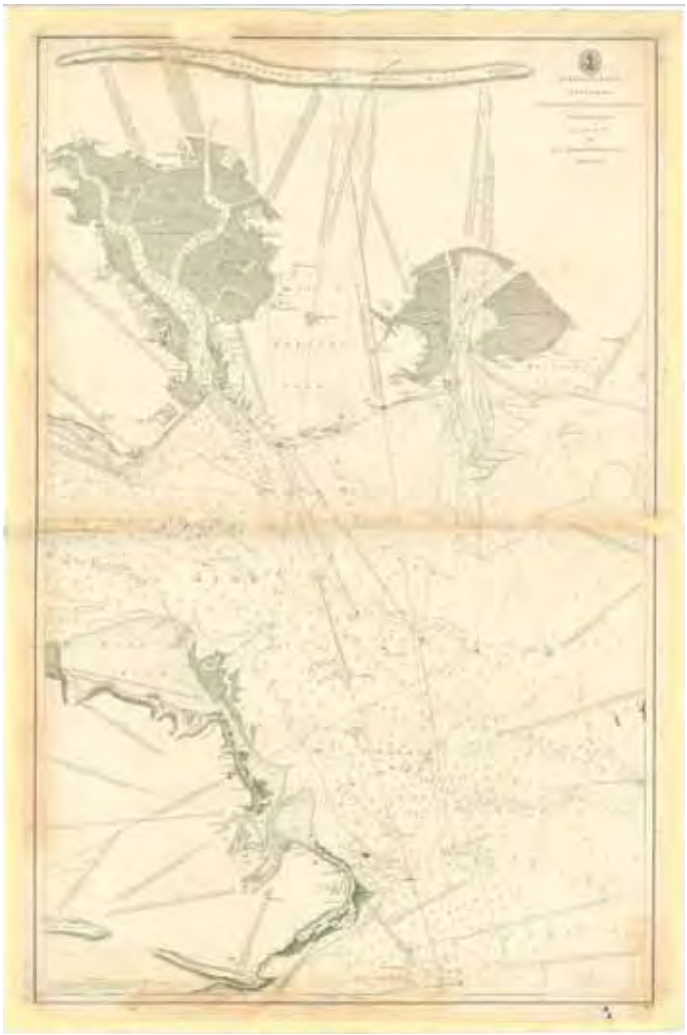
The Solent tides are among the most complex in the world with a double high water and peculiar tidal regime where the flood is longer than the ebb with a notable flood stand (Tubbs, 1999: 14-17). Net tidal flux is from the East to West Solent at approximately 38km³ per tidal cycle (SCOPAC, 2004b:2). At the entrance to the eastern Solent maximum tidal range is 4.9m with an average range of 2.7m. Surface currents change during each tidal cycle although mean current velocities are approximately 1.2ms^{-1}. In general ebb currents are stronger than those generated by flood tides.

Seabed deposits in the eastern Solent are highly mobile. The sedimentary topography of the eastern Solent is characterised by small irregular and hummocky dunes and sand waves which indicate the dominant direction of sediment movement (Dyer, 1980: 21, Tubbs, 1999: 20). Dyer (1980: 23) identified that in deeper water areas there seems to be a general movement of material into the Solent from either end. SCOPAC (2004b: 8) report a more complicated regime with the combination of wave action and time-asymmetry of tidal currents in the eastern Solent causing a westerly net sediment transport under low energy conditions and an easterly direction when high energy waves operate. However, across the study area the net bedload transport appears to be seawards. Where cobbles and gravel are exposed on the sea-bed the evidence suggests that they are 'swept' clean of sand and finer grade sediments by tidal streams or by a combination of tides and waves. Moreover, divers on the Mystery Wreck have reported newly exposed timbers from one season to the next, again indicating fairly high mobility of sediments across the site.

Copies of historic charts from the UKHO archive at Taunton were examined to see how sediment movement in the eastern Solent had affected the Horse Tail and hence may have impacted the site of the Mystery Wreck. The charts are listed in the table below.

Chart No.	Title	Surveyor	Date
15	St Helen’s Road, Spithead, Portsmouth, and Langstone Harbours	M Mackenzie	1783
2050	Spithead and approach from the eastward	Captain Sheringham	1848
2050	Approaches to Spithead	Captain Vereker	1893-4
2050	Eastern approaches to the Solent, Nab Tower to Spithead	-	1935
2050	Eastern approaches to the Solent, Nab Tower to Spithead	-	1966
2050	Eastern approaches to the Solent	-	1974

Figure 6 uses these historic charts to illustrate how the topography of the Horse and Dean Sands has changed since 1783. For illustrative purposes these historic charts are presented separately.



1783 - Horse and Dean Sands

1848 - Horse and Dean Sands

1893/4 - Horse and Dean Sands

1935 - Horse and Dean Sands

1966 - Horse and Dean Sands

1974 - Horse and Dean Sands

Figure 6: Topographical changes on the Horse and Dean Sands since 1783 (© UK Hydrographic Office)

Tubbs (1999: 21) reports that in maps of the late 16th and early 17th century much of the coastal shingle accumulation of the eastern Solent appears to be greatly reduced. The shingle headlands at Browndown and Gilkicker Point are rudimentary or absent, the shoreline of Portsea and Hayling Islands is set back from the later curve of the bay suggesting that the present day shingle beaches are missing and the entrances to Chichester and Langstone harbours were much wider, lacking their substantial sand and shingle barriers. Extending seaward from Hayling Island was a large shoal or intertidal flat called The Mackett and Selsey is shown as an island on some early maps with a tidal or intertidal connecting arm.

In contrast maps of the early 18th century show that the shingle beaches or Portsea and Hayling Island were by then very well developed and that the entrances to Chichester and Langstone harbour were narrowed by the formation of spits (Tubbs, 1999: 22-23).

5.3. SPECIALIST ASSESSMENT AND ANALYSIS

Ship Structure (HWTMA)

Diving fieldwork undertaken so far at the site of the Mystery Wreck has suggested that the western section of the vessel represents the lower ships hull, although it is not known whether this is the port or starboard side. The eastern section appears to include structure from higher in the hull, but this has not been confirmed.

The survey, recovered artefacts and samples led to the suggestion that the Mystery Wreck may date from the late 18th or early 19th century. It was also identified, however, that a number of features appear earlier than this suggesting potential re-fitting.

In general the structure comprises large planks lying flush with the seabed with regular cross members and some longitudinal components (**Photo 1**). Measurements taken during 2004 on the western section (Dive 7: 14/06/04) indicate that the planks range from 26 to 32 cm in width. A larger frame timber measured up to 38 cm wide by 18 cm high.

Photo 1. Diver filming western end of the Mystery Wreck

The Mystery Wreck is probably that of a sailing vessel. No evidence for any engines, boilers or other machinery has been found which would suggest that this was a steam or motor powered vessel. No masts or rigging have been found, but these are less likely to survive than any mechanical components.

The timbers have been fastened with both tree nails and cooper pins or bolts (**Photo 2, Photo 3**). During the 2008 season of fieldwork one diver also noted the presence of iron nails on the eastern section (Dive 11: 12/06/08). A large number of copper sheet pieces have also been found on the site indicating that the vessel was sheathed with copper or a copper alloy. Iron knees have

also been identified, most likely hanging knees to support a deck or hold structure.

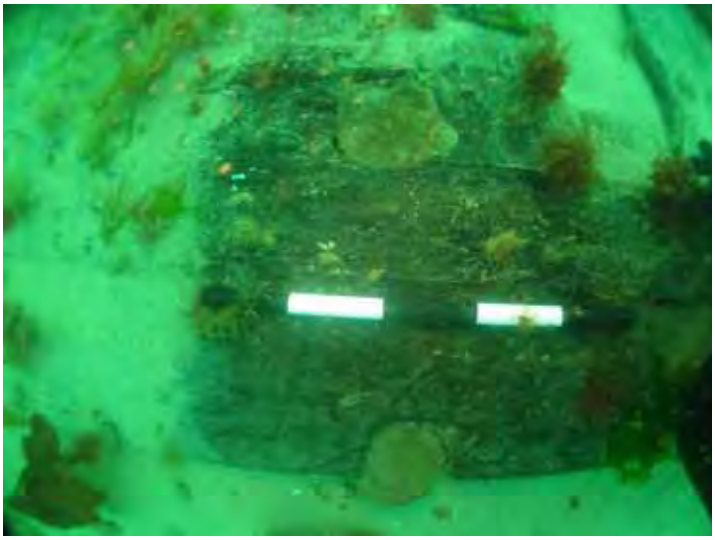


Photo 2. Timber fastened with tree nails and copper pins or bolts

Photo 3. Timber fastened with copper pins or bolts

The general impression is of a carvel built ship although in 2005 a diver identified a section of new longitudinal planks which appeared to be clinker laid (Dive 14 17/06/05). Rather than forming part of the ship structure, however, it is likely that this clinker section may be a patch or repair or part of a deck structure.

After diving the Mystery Wreck Nigel Nayling (Dive 8: 11/06/08) suggested that the frames, outer hull planks and tree nails were oak, while ceiling planks towards the western end may be elm. Two round wood posts c. 10 cm in diameter identified in this area were recognised as non-oak with a bark edge.

Other identifiable features include a large iron object c. 75 cm long with an iron loop uppermost, a large iron cylindrical feature (**Photo 4**), a water pump and a possible capstan or windlass. Many concretions and roughly rectangular stone bricks have also been reported, possibly representing cargo or ballast. Two guns have been identified, a small signal canon and a carronade (**Photo 5**).

Photo 4. Large iron object found on the wreck site

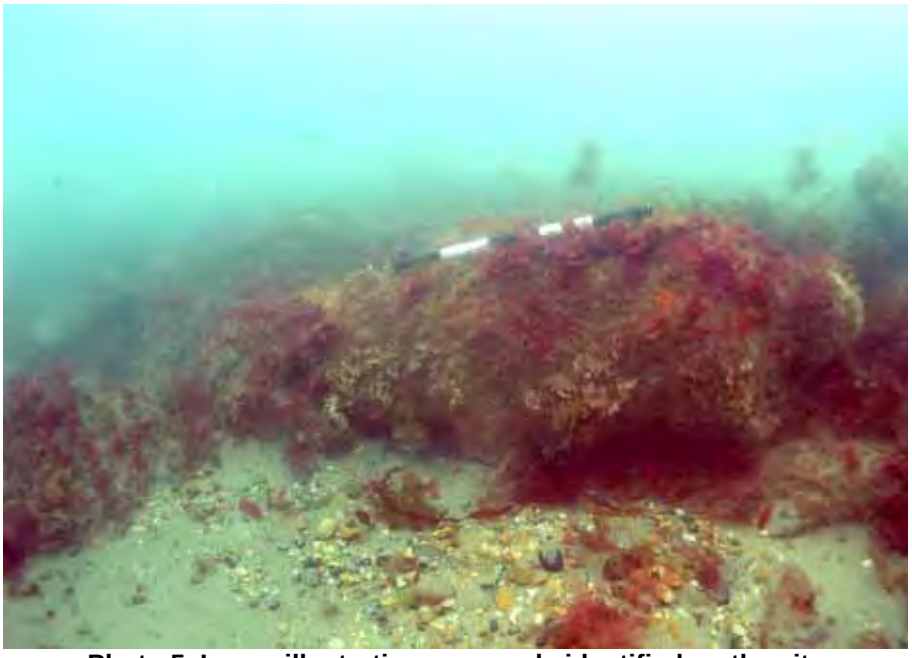


Photo 5. Image illustrating carronade identified on the site

With regard to dating the Mystery Wreck, the presence of copper sheathing is of particular interest. Apart from some early experiments, the practice of applying copper sheathing to vessels to protect against shipworm only became widespread after the Royal Navy's coppering of the vessel *Alarm* in 1761 (Bingeman et. al. 2000). Coppering had many advantages. With cleaner bottoms ships achieved greater speeds, were more manoeuvrable and spent less time in the dock for hull repairs. Initially the copper was fastened with iron nails but problems with corrosion saw their replacement with copper nails. By

1790 all the ships-of-the-line and many other Navy ships were copper bottomed and all their underwater iron fastenings replaced with copper bolts.

Slight corrosion of the copper sheathing was an advantage as it prevented marine growth (Bingeman et. al. 2000: 224). If the copper was too pure then corrosion did not take place and undesirable marine growth accumulated. The wrong inclusions, however, caused the copper to corrode too rapidly resulting in costly repairs and replacements of the sheets. In 1832 George Frederick Muntz patented a type of leaded brass (copper-zinc alloy) that was cheaper and had superior mechanical properties so that it could be used in thinner sheets (Bingeman et. al. 2000: 224). Muntz metal or 'yellow metal' as it was popularly known became the favoured choice of merchantmen, including the Cutty Sark. At first the Navy showed little interest as they had their own copper rolling mills but in 1850 the Navy sheathed 18 vessels in the metal, at a time when iron hulled ships were being rapidly introduced and the Navy was more concerned with chemical sheathing.

Whether or not the Mystery Wreck is a naval or merchant vessel, the presence of copper sheathing makes it unlikely that it would be older than 1761 in date. If copper analysis can confirm the presence of Muntz Metal then this will place the loss of the vessel at post 1832. However, the Royal Navy retained copper sheathing on wooden workboats until near the close of the 20th century.

A further diagnostic feature is the presence of iron knees, first introduced in substantial numbers by the French Navy in the mid-18th century as a substitute for the 'grown' wooden knees which were becoming scarce (Stammers, 2001: 115). They were, for example, deployed on the French warship *Invincible* built in 1744 and lost off Portsmouth in 1758. Gabriel Snodgrass surveyor to the East India Company between 1757 and 1794 was the first British proponent of the use of iron knees and some East Indiamen were strengthened with iron knees retrospectively. On retiring in 1796 Snodgrass wrote a report to the Company's directors firmly advocating the use of iron knees and stanchions from new. By 1810 Company ships were being built with iron knees, stanchions, breast hooks and crutches.

In 1814 the Shipowner's Lloyd's Register includes iron knees for the first time and the Royal Navy retrospectively fitted iron knees to vessels strained by long periods enforcing the Blockade during the Napoleonic wars (Stammers, 2001: 115). The systematic installation of ironwork into new ships began under Sir Robert Seppings, the Navy's chief surveyor from 1813 to 1832.

As the size of wooden merchant ships increased and timber supplies became more difficult to obtain, there was also a gradual increase in the use of iron components in British built vessels (Stammers, 2001: 116).

Right angled knees are the most common type and can be a hanging, lodging or standard knee according to its position (Stammers, 2001: 118). Hanging knees support the underside of a deck beam. The lower arm was usually longer. The knees on the Mystery Wreck appear to be of this type.

A further feature of the vessel which may prove diagnostic is the cylindrical object identified as a possible capstan. The oldest means of lifting heavy loads aboard ships was the windlass (Lavery, 1987: 36). The windlass comprised a rotating barrel in the horizontal plane with holes cut along its length and round its circumference so that wooden bars could be put into the appropriate holes to provide backwards and downwards leverage. The capstan's barrel was in the vertical plane. This enabled the bars to be kept in place all the time it was in use so that a man could push through a full circle, rather than just a quarter of one. Pushing horizontally was not as effective as pulling downward as on a windlass but many more men could be deployed and it required less skill.

On large ships the capstan would be fitted across two or more decks while the simplest form was confined to single decked vessels (Lavery, 1987: 38). Until the late 18th century, however, it was more common for smaller vessels to be fitted with a windlass due to a lack of space. The barrels of these short capstans rotated around a short iron spindle with a strong iron plate at the bottom, firmly bolted to the deck. Further study of the cylindrical object on the Mystery Wreck, therefore, may support other diagnostic evidence available to identify the wreck.

A search of articles in the International Journal of Nautical Archaeology, the Mariner's Mirror and other literature revealed one archaeological example of a wreck with similar features to the Mystery Wreck. The Ahrenshoop wreck is located off the Darß peninsula in north-east Germany situated between the sea ports of Rostock and Stralsund (Auer & Belasus, 2008). The wreck was partially excavated and surveyed in 2002 and was believed to be an English trading brig or barque built in the early- to mid- 19th century and after documentary research was identified as the *Water Nymph*, an English brig lost in 1875.

Water Nymph was built in 1840 and, like the Mystery Wreck, is a carvel built vessel with frames and planks of oak (Auer & Belasus, 2008). The average sided dimension of the frames is 22 cm and the outer hull planking is 6.5 to 7 cm thick and an average of 25 cm wide. Most of the planks are fastened with unwedged treenails while the butt ends of the planks are additionally fastened with 16mm copper drift bolts. Where lower wales were preserved they were found to measure 10 cm midship and 9 cm thick towards the bow and stern. The ceiling planking comprised 4.5 cm thick oak planks varying from 9 to 25 cm wide and again fastened with unwedged treenails.

Exposed sections of the inside of the hull of the *Water Nymph* showed that the hold-beams were fastened to the side of the vessel with a combination of iron hanging knees and iron straps, bolted to the beams with iron through bolts. The iron knees were 11 cm wide with up to 40 cm long vertical arms. Detailed measurements are unavailable for the iron knees identified on the Mystery Wreck although photographs and the site plans show an approximate length of 50 cm. In addition, the *Water Nymph* was coppered in preparation for Mediterranean trade in 1842 (Auer & Belasus, 2008).

The dimensions suggest that the *Water Nymph* was smaller than the Mystery Wreck but the combination of tree nails and copper nails, the presence of iron hanging knees and the coppering are interesting parallels which may be helpful in indicating a later date for the Mystery Wreck than was initially assumed.

The coppering, presence of iron knees and carronade all indicate that the Mystery Wreck can be no older than the later 18th century. All such features, however, continued into the 20th century so it is harder to establish an upper date boundary. It is possible that the copper sheathing, iron knees and capstan may have been fitted to an older vessel. Such features can only be used to date the loss of the vessel rather than the original construction. The structural parallels with the *Water Nymph*, however, may indicate that the Mystery Wreck is in fact of mid to late 19th century date. If the copper analysis confirms the presence of Muntz metal then a post 1832 date can be confirmed for the loss of the vessel.

Timber Analysis (Nigel Nayling)
Timber analysis has shown that eight of the oak samples from the site had sufficient rings for measurement and tree-ring width series were measured for these. Only two samples (UNID_14 and UNID17) cross-matched with a significant computer correlation (*t*=5.9). Individual sequences were compared with oak ring-width means from Britain and Ireland without success. They were then compared with tree-ring chronologies available through the International Tree Ring Data Bank, again without success.

Non-oak timbers were identified as larch/spruce and elm including a post, stringer and possibly an outer hull plank. Two outer hull planks and a ceiling plank were made from the same exotic hardwood. Comparison with wood anatomy databases found a closest match with *Calycophyllum multiflorum* Gris. This hardwood is found in temperate South America including Argentina, Chile, Uruguay, and S. Paraguay (Brazier and Franklin, 1961). Identification of the 'exotic' hardwood planks is provisional. It is suggested that as part of the final analysis, a sample is sent to the Jodrell Laboratory in Kew for authoritative identification against their extensive reference collection.

During the 2009 season, it is suggested that the distribution of this non-native hardwood is investigated through a combination of *in situ* assessment and selective sampling. This sampling strategy should be linked to and informed by any programme of investigation of fastenings and any other evidence for a major refit. Securing longer oak tree-ring sequences will be a challenge. Locating less eroded framing timbers may help as may examination of a wider range of timber types (for further details see **Appendix 1**).

Copper Analysis (Peter Northover)
The analysis of the copper alloy artefacts collected from the site suggested that the metal in question is brass (i.e. Muntz metal), placing the wreck within a post-1830s chronological framework. Muntz metal is a form of alpha-beta brass with about 60% copper, 40% zinc and a trace of iron. The name of the

metal derives from George Fredrick Muntz, a metal-roller of Birmingham (England). Muntz commercialised the alloy following his patent of 1832. This metal was originally used as a replacement for the copper lining placed on the bottom of vessels as it maintained the anti-fouling abilities of the pure form. Muntz metal was cheaper than pure copper and had identical properties for this application, becoming the material of choice after 1830s.

Peter Northover highlighted that there are scarce archaeological examples for brass sheathing, being this discovery of high significance, as it could help to clarify issues regarding the development of shipbuilding technologies. Moreover, since there is a lack of dated examples of this type of metal further confirmation will be required contributing to clarify this issue.

For the 2009 diving season, it would be recommended targeting specific areas of hull structure for more detailed recording as well as recovering further samples for analysis.

The above paragraphs represent an initial outline summary since HWTMA, at the time of writing this report, is waiting for the final detailed metal specialist report. It is envisaged that this specialist report will include further information regarding the range of metal samples analysed, including a number of different fastening types, sheathing and a piece of hand bell (**Appendix 1**).

Pottery Analysis

The two sherds of pottery found on the Mystery Wreck during previous diving fieldwork seasons were very small and had been subject to some marine erosion, so it was not possible to enable an assessment. Therefore, if further pieces are encountered during 2009 diving fieldwork season, HWTMA will recover them for further analysis and assessment.

Carronade Research (HWTMA)

Two guns have been found on the Mystery Wreck. One is a small signal canon 0.54m long with a bore of 0.1m. The second is a carronade (**Photo 5**) 1.32m long with a bore of 0.13m.

The invention of the carronade is usually credited to Lieutenant General Robert Melville in 1759 (Talbott, 1989). They were developed in Scotland in the foundry of the Carron Company although early trials failed to impress the government with 27% failing trials at Woolwich in 1773. Many of the cast iron guns had weaknesses associated with the casting of the bore which caused them to explode and the Carron Company was ordered to cease casting cannon. In 1774, however, John Wilkinson patented a cylinder-boring machine which enabled the Carron Company to cast the barrels as solid pieces, thus improving their safety record. The carronade was first manufactured in autumn 1778 and was used to arm the Carron Company's ships carrying goods to London (Lavery, 1987).

The carronade was designed as a short range gun which meant the barrel could be shorter and, because a smaller charge of powder could be used, the thickness of the metal could be reduced (Lavery, 1987). This meant that it

was shorter and much lighter than the long range canon carried on most naval ships at the time.

Initially it appeared that the huge British merchant fleet offered a much better market for the carronade than the navy as it promised to deter small-time privateering which relied on boarding vessels to take them and their cargoes (Talbott, 1989). By the end of 1778 the Carron Company were receiving orders from many private shipowners.

By mid 1779, controller of the navy, Charles Middleton, recognised the potential of the carronade and new trials were carried out at Woolwich (Lavery, 1987). The trials proved sufficiently successful for carronades to be introduced to the poop and quarter decks of naval vessels. The lightness of the carronade enabled it to be employed where a heavier gun could not be supported. The savings in weight made it especially popular for smaller vessels.

The carronades were put to the test during the American War of Independence (1775–1783) and, while they proved both successful and popular, experiences from the war resulted in revisions to a number of revisions to the design (Lavery, 1987: 106). For example, it was generally accepted that the first generation were too short, increasing the possibility of setting fire to the rigging. The length was therefore steadily increased over the next few years. After 1790 a further increase was achieved by the addition of a nozzle to the muzzle which added little to the weight but carried the blast a few inches further clear of the ship. After 1805 the nozzle was hollowed out, probably to make loading easier. As well as getting longer the carronade also increased in weight during this period (Lavery, 1987: 107). The gun of 1800 was around 10% heavier than that of 1780 although there was little change after that.

Early carronades were fitted with trunnions to attach them to the gun carriage, as with the longer ordinary guns (Lavery, 1987: 107). After the American War these were replaced by a loop placed under the gun and a screw thread through the button, which allowed the gun to be elevated and depressed without the use on conventional quoins and wedges, appeared around the same time. These features were linked to the Carron Company's development of a new type of gun carriage.

Breech rings to retain the breech rope were first used on carronades in the 1780s (Lavery, 1987: 107). Shortly afterwards sights were also fitted to carronades with a mounting for the breech sight on top of the breech ring. On older carronades the fore sight was fitted above the muzzle but by about 1805 it had been moved back to the reinforce ring.

The sizes of the carronade soon became standardised. The 68 pounder carronade was the true 'smasher' which gained fame because *Victory* carried two at Trafalgar (Lavery, 1987: 107). However, no ships on the 1807 Navy list were recorded as fitted with any. The original 68 pounder (as tested at Woolwich in 1780) was 4ft long and weighed 29cwt. By 1790 there was a

larger version of 30cwt and in 1796 the standard version was 5ft 2in long and weighed 36cwt. The 42 pounder was not among those tested in 1780 and does not appear to have been a standard weapon at any time. It was normally 4ft 31/2in long and weighed 22cwt. The 32 pounder appeared relatively late in the navy lists and was initially mainly used on larger ships. By 1794 its use was extended to many classes of ship including frigates and after 1797 it became very common on ships of the line. By 1800 even 20-gun ships were able to carry it as part of their main armament. The 24 pounder had appeared by 1780 and in later years was used on some of the smaller classes on ship, especially on the 20-gun ships and brigs and it became common on ships launches. Normally it was 3ft 71/2in long and weighed 13cwt.

The 18 pounder was one of the original carronades and in 1779 it was to be carried on the forecastle and quarterdecks of all ships from 28 to 44 guns (Lavery, 1987: 108). Though never entirely supplanted it was used less and less over time, replaced by the 32 pounder. The early issues were 2ft 4in long and weighed 8cwt. By 1793 3ft 4in guns were in service and after 1800 their length was slightly reduced to 3ft 3in long. The 12 pounder was another of the original guns and was the most common on the establishment of 1779 being the only type allotted to ships of the line and to ships of 24 guns or less. Like the 18 pounder it tended to be used less in later years. The original gun was 2ft 2in long and weighed 53/4cwt. By about 1800 it weighed 6 to 61/4 cwt and was 2ft 8 in long.

The carronade on the Mystery Wreck site was recorded as 1.32m (4‘ 4”) long (1.46m (4’ 9”) including the cascabel). According to the above measurements this would appear closest to a 42 pounder but it seems unlikely that a large calibre gun would be carried on a vessel of the Mystery Wreck’s size. It is possible that the carronade was simply being carried as ballast. The description of a carronade removed from the wreck of a brig *James*, however, states that it was 1.43m long with a bore of 94mm and that these dimensions are indicative of a 6 pounder (Green et. al., 1981).

The *James* was carrying passengers emigrating to Australia (Green et. al., 1981). It arrived at Swan River in 1830 but was blown ashore and the records suggest that it was not refloated. A wreck was discovered in 1975 and identified as the *James* and a heavily concreted 6 pounder carronade was found just to the south. The signal gun was found in a Perth slaughterhouse found in sand removed earlier from the beach adjacent to the wreck. A third gun remains at the site of the wreck. Guns were carried by all vessels coming from Europe to Australia in the post-Napoleonic War years. Even small coastal trading cutters of less than 30 tons were armed with at least one gun.

The size of the Mystery wreck indicates a fairly large vessel and the presence of just two guns, a small signal cannon and a carronade may also be indicative of a merchant or passenger brig such as the *James*. A 6 pounder gun would have been more appropriate for this type of vessel than a 42 pounder. 6 pounders, however, were not part of the standard naval issue.

A photograph and sketch of the carronade was sent to the museum of naval firepower at Gosport to see if they were able to aid the identification. Unfortunately their volunteers were not able to help. They did, however, suggest a further expert who may be able to help, namely Phil McGrath at The Royal Armouries, Fort Nelson. This response, however, came too late to contact Mr McGrath for the purposes of this report. It is proposed that information, including any further details obtained during the 2009 season of fieldwork, be sent to the Royal Armouries for inclusion in Stage Three.

5.4. GEOPHYSICAL AND GEOTECHNICAL DATA ASSESSMENT AND ANALYSIS

5.4.1. Data sources

Geophysical survey data for the licensed aggregate extraction Area 122/2 was provide courtesy of Dr Andrew Bellamy, Resources Manager at UMD. The Mystery Wreck lies within the western half of this license area, though 825m north-west of the working dredge area (**Figure 7**). As such, the site has been covered by a range of geophysical survey techniques over a twelve year period.

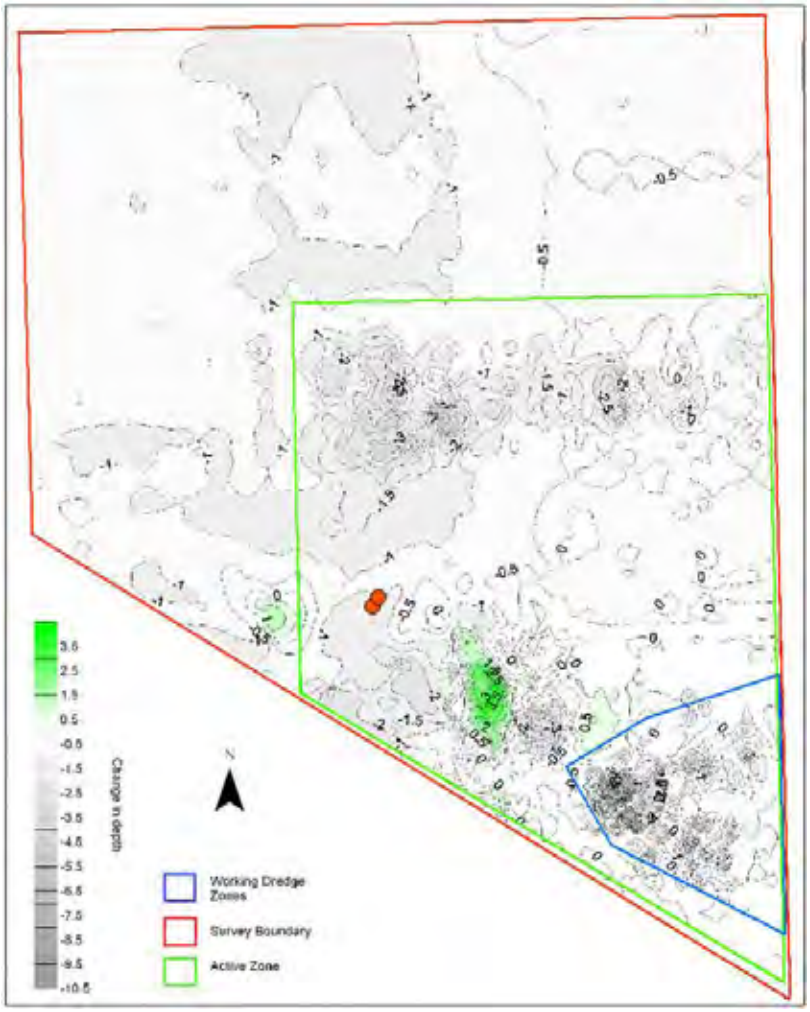


Figure 7: Location of the Mystery Wreck (UNID) within Area 122/2

A swath-bathymetric survey (multibeam) was undertaken during 2005 by Andrews Survey, now part of Gardline Environmental Services (Andrews Survey 2005). Single beam echo sounder surveys were undertaken during 1993, 1995 and 2003 (Andrews Survey 1993, 1995, 2003a) and side scan sonar and sub-bottom profile lines were run in tandem 1995. Andrews Survey also conducted a magnetometer survey in 2003 (2003b) in Area 122/2, and though this only covered the active dredge area and not the unidentified wreck site, it has been briefly examined in order to provide a general characterisation of the density of metal objects likely to be found within the study area.

5.4.2. Review Method

5.4.2.1. Swath-bathymetry

Swath-bathymetric survey was conducted in years 1993 – 2003 using an Odom Hydrotrac (210kHz) single beam, single frequency system. This provided a widely spaced grid that enabled a broad understanding of the topography of Area 122/2 to be achieved for the purposes of planning aggregate extraction (**Figure 8**). This data, although is not detailed enough to identify archaeological sites or material, is useful for the purposes of bathymetric interpretation of the area as a whole. Over subsequent years changes to the general bathymetry and depth of deposit can be observed by extracting the resulting surfaces from one another. This difference plot analysis was conducted on behalf of HWTMA by UMD (**Figure 8**).

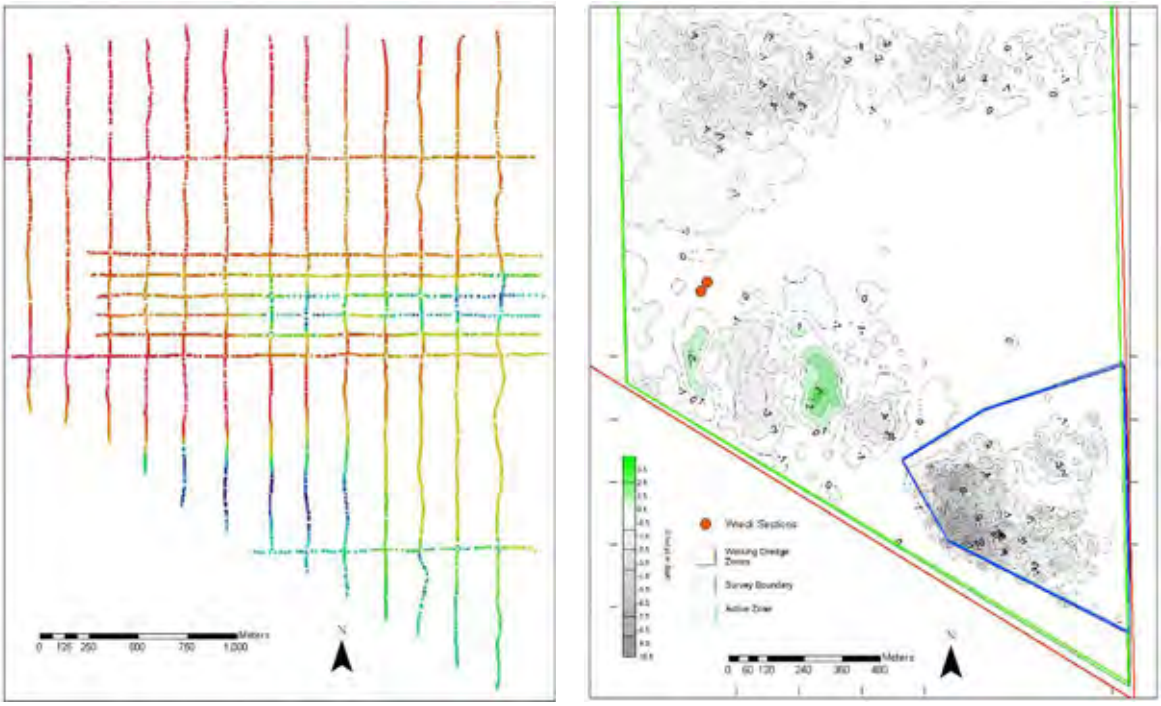


Figure 8: (Left) The track plot of survey lines from which swath-bathymetry difference plots (right) have been derived

The 2005 survey was conducted using a GeoAcoustics GeoSwath Plus (250kHz) multibeam system and D-GPS positioning. This data had been fully

processed with corrections applied and was provided by UMD as a further manipulated .scene format using the IVS Fledermaus suite of 3D visualisation applications (**Figure 9**). The site position was imported as an ArcGIS shapefile into Fledermaus as two points representing two separate hull sections. Examining the highlighted area, the illumination angle was adjusted to best highlight any seabed relief, with the best result achieved at 180º. The vertical scale was enhanced slightly to stress any local features or anomalies.

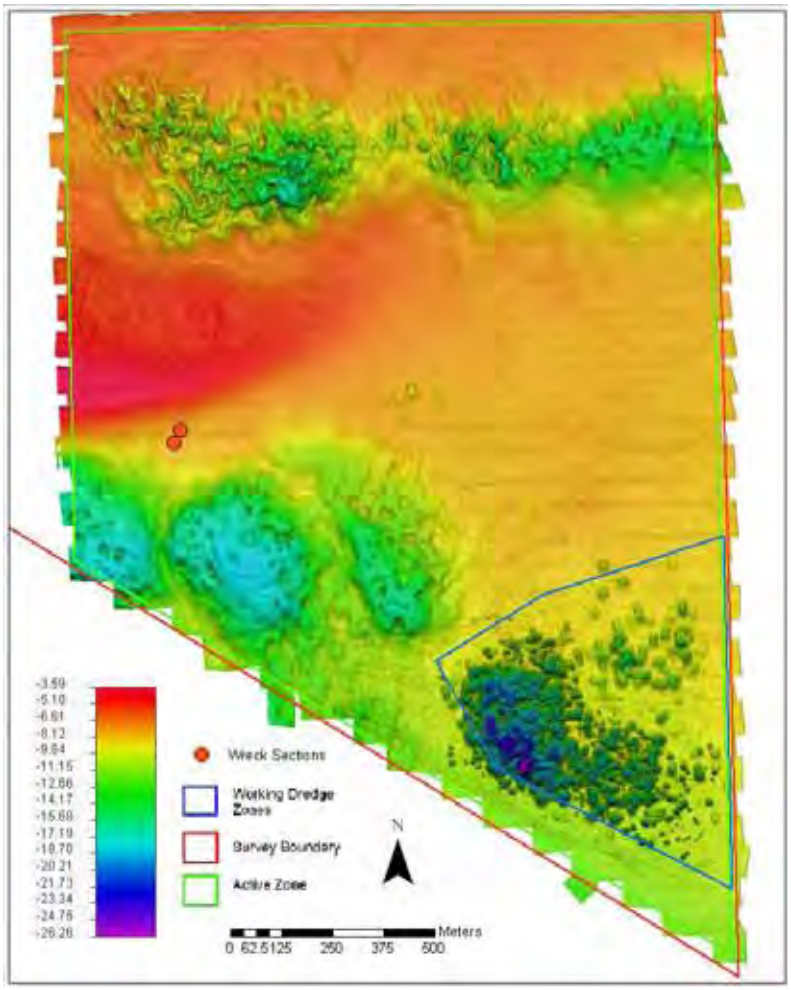


Figure 9: 2005 multibeam survey showing the position of the Mystery Wreck

5.4.2.2. Side Scan Sonar Survey

Side scan sonar data was obtained in 1995 using a Dowty Widescan (100/325kHz) analogue system. The archived data was viewed in paper format on thermal paper printouts. The 2003 bathymetry report (Andrews Survey 2003a) also contains a track plot and an interpretation of anomalies detected in the 1995 side scan survey The approximate position of the site was identified on the track plot and the two adjacent north-south lines (H06/H07) were examined (**Figure 10**). Features identified were then cross-referenced with the Andrews Survey (2003a) interpretation.

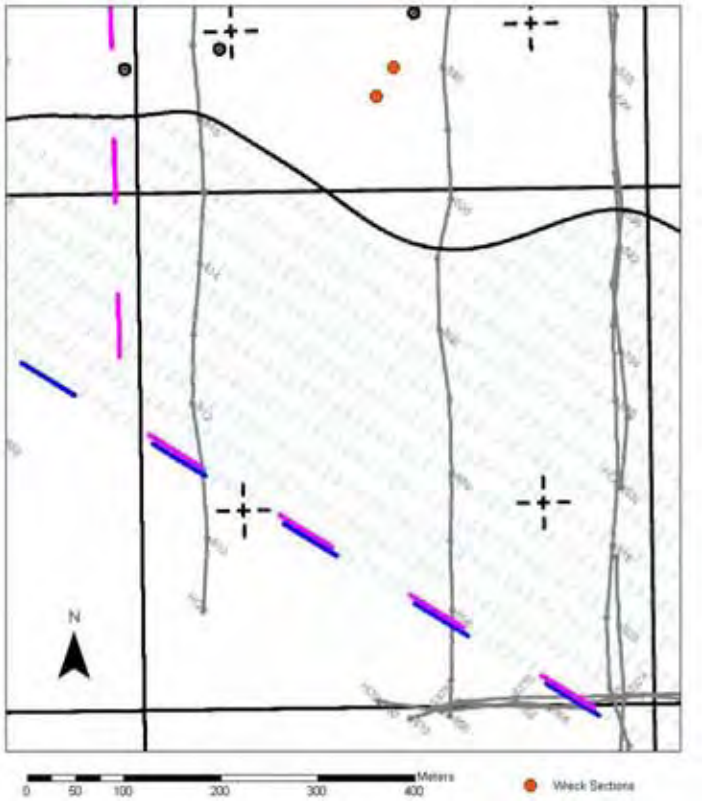


Figure 10: 1995 side scan and sub-bottom profile track plot

5.4.2.3. Seismic Survey

Though the closest survey line was approximately 50m from the wreck site, the adjacent sub-bottom profile lines (H06/H07) were examined in order to understand the general character of the seabed matrix. These were also available only as paper records once again. No line intersected the position recorded for the unidentified Horsetail wreck.

5.4.2.4. Magnetometry

A magnetometry interpretation chart was examined though coverage did not extend to the west far enough to cover the present study area, covering only the working dredge zone.

5.4.3. Results of Geophysical Survey Review

5.4.3.1 Seismic Results

The surrounding seabed adjacent to the present study area is characterised by intersecting cuts and fills within an area of disturbed and lowered seabed (**Figure 11**). This is primarily the result of dredging activity to the south of the wreck site as interpreted by UMD. However, this activity occurred before UMD began logging their activities in this area in 1993 and does not represent a threat to the Horsetail wreck. The Horsetail Sand bank is itself apparent as a thin veneer over deep gravel layers further to the north. No point hyperbole or

other anomalies that might be associated with a wreck site were visible on these lines.

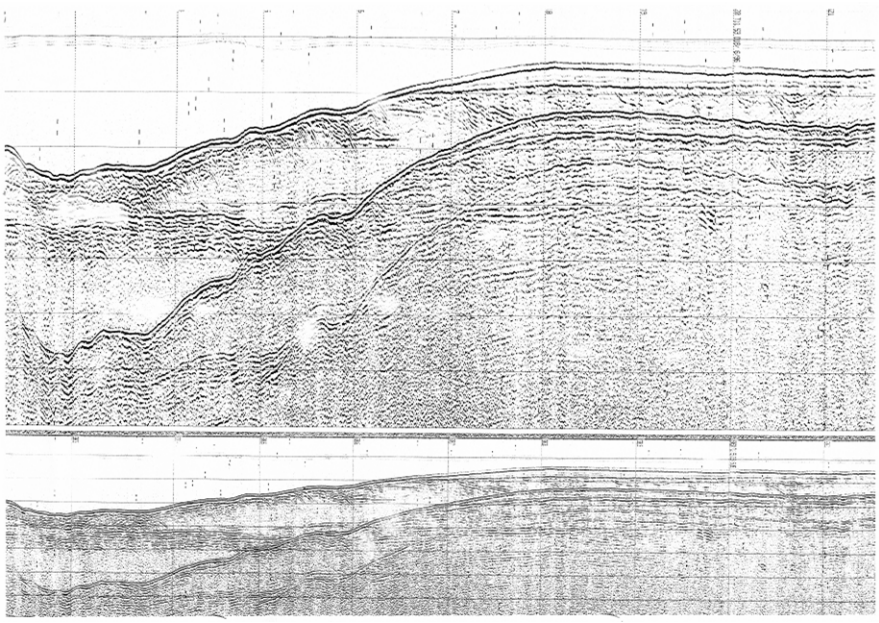


Figure 11: Seismic image illustrating that the present study area is characterised by intersecting cuts and fills

5.4.3.2. Side Scan Sonar Results

Two areas of discrete reflectors and scour features were identified on the starboard side of line H07, running north to south (**Figure 12**). This feature was thought to correlate with a revised interpretation by Andrews Survey (2003a) as at least an un-annotated ‘cobble sized object’, but comparison of the datasets in ArcGIS revealed a 50m disparity between these objects.

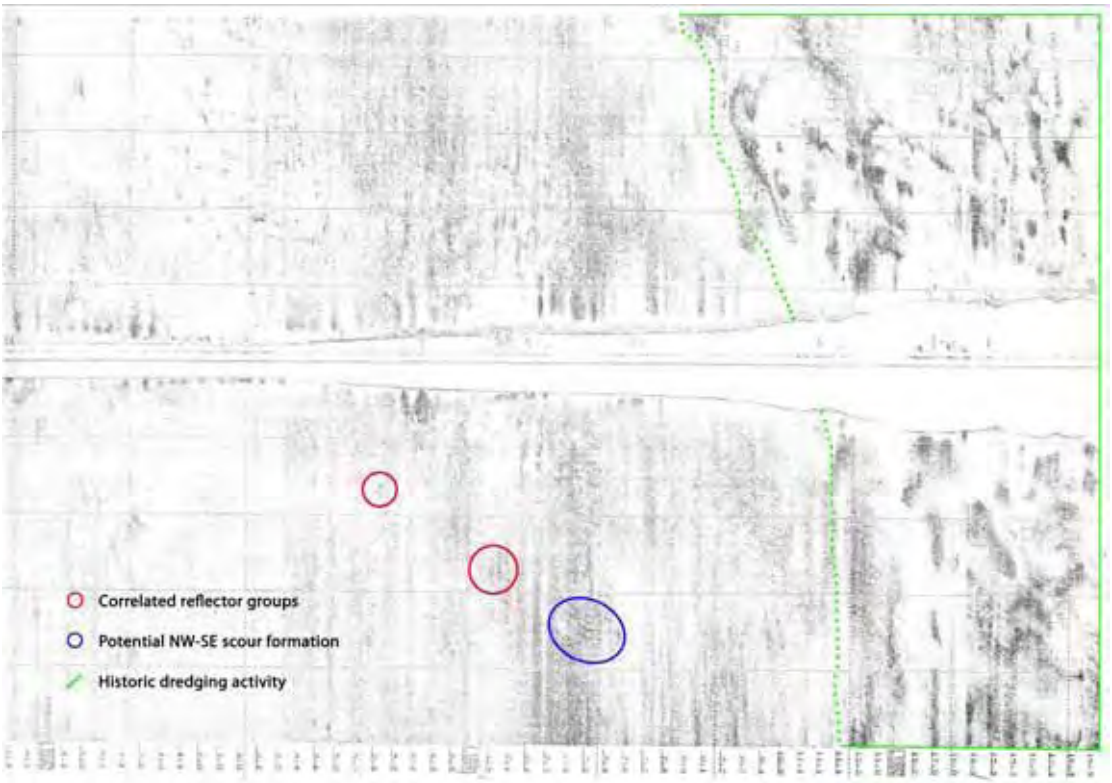


Figure 12: Side scan showing two areas of discrete reflectors and scour features identified on the starboard side of line H07

Without other coordinate data to work from, the anomalies on the thermal printout are extremely hard to identify, but two discrete reflectors, one a large point cluster and the other a linear oriented 'L' shaped feature perpendicular to the general bedform, are apparent (**Figure 13**). These do broadly correlate with the GPS positions recorded for the wreck sections.

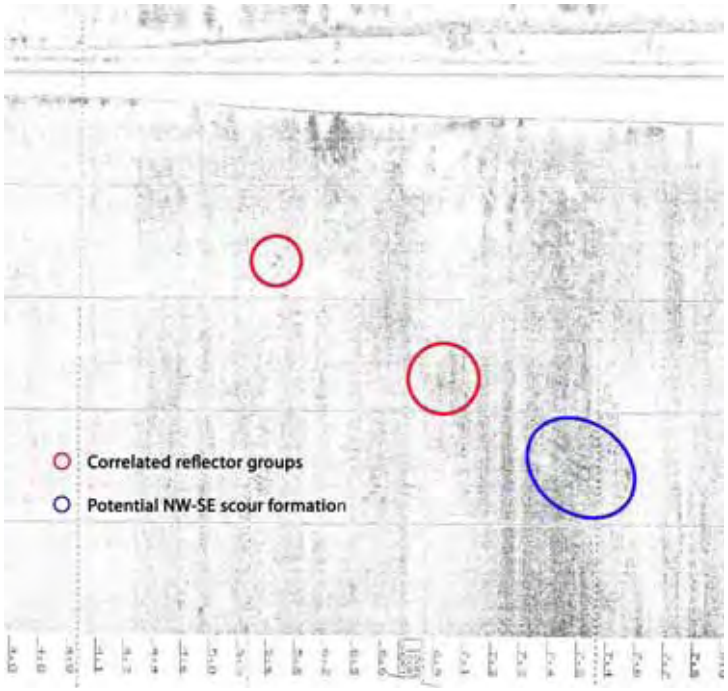


Figure 13: Detail image of two anomalies and scour area

It has not been possible to identify further concentrations of material due to the limited resolution of this data to enable detailed archaeological assessment. There is a potential area of scour with some reflectors situated approximately 20-30m south-west of the western portion of the site, and if this is the case then there could be three sections of this site arranged along a linear path. However, the archaeological application of this analogue side scan sonar data for such a site with little seabed relief is tentative at best.

5.4.3.3. Swath-bathymetry Results

Four difference plots were produced to compare various years of bathymetric survey. Due to the limited lines run with a single point, single frequency system, these results are highly interpreted and should only be viewed as indicative of the area under study.

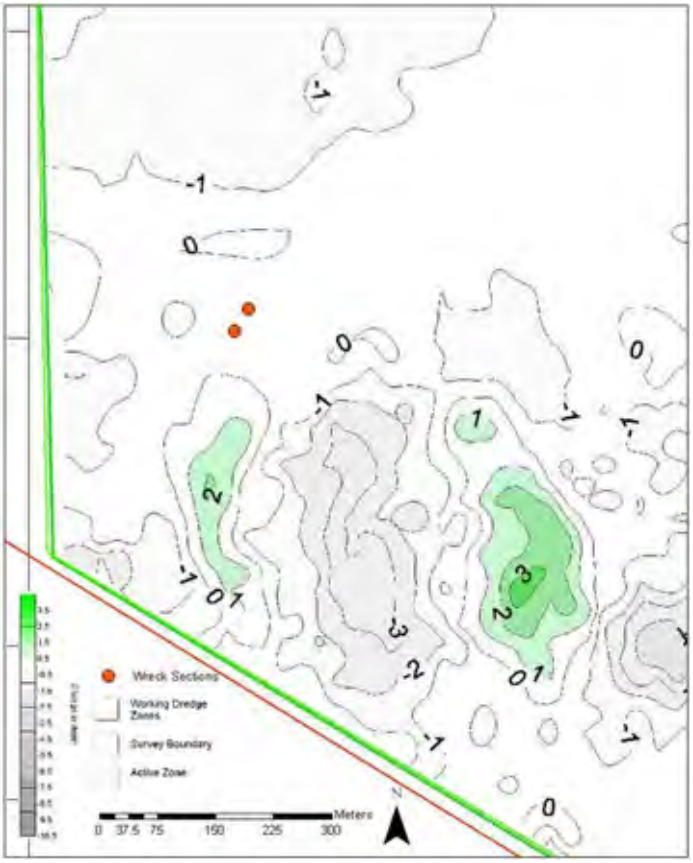


Figure 14: 1993 – 2005 Difference Plot, showing an overall loss of sediment in proximity to the wreck, and accretion within the inactive dredge footprint

These indicate that between 1993 and 2005 there is broadly a loss of sediment around the wreck site, between 1 – 1.5 m depth. This was probably caused by draw-down into the inactive dredge footprint c. 350 m to the south-east where there is a +3 m accretion (**Figure 14**). Given the low profile of the present exposed timber, this probably covers the phase of initial site exposure, likely a result of the historic dredging that took place to the south of the site.

Comparing the 1995 and 2005 surveys there is again a 0.5 – 1 m reduction of sediment depth, indicating a steady rate of loss when compared with 1993-2003, as opposed to a single high impact event.

The 2005 multibeam data shows a clearly defined raised feature, with pronounced scour to a depth of 0.25m on the north side (**Figure 15**). It measures c. 25 m in length and c.12.5 m across. This correlates very well with the south-western point.

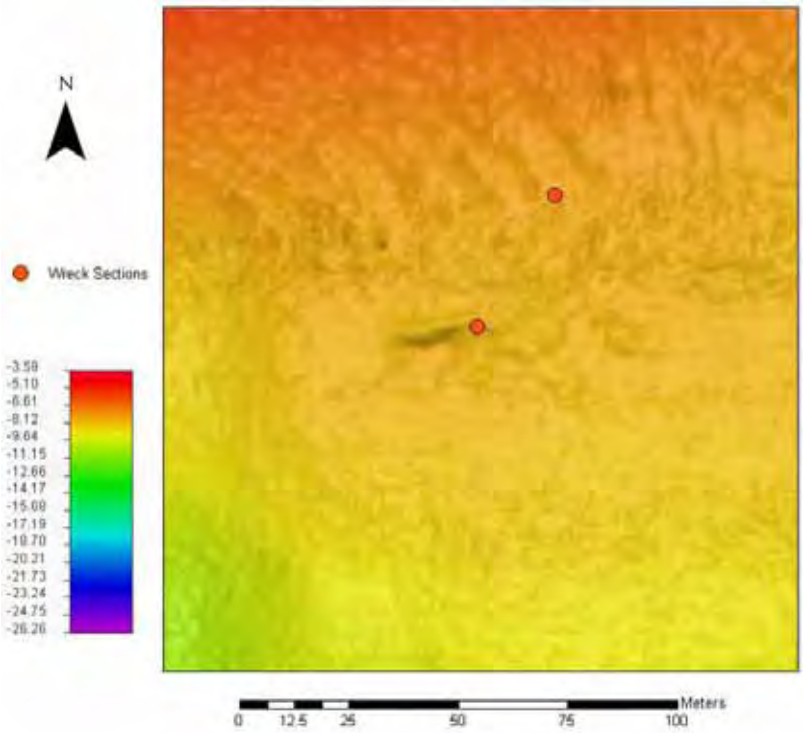


Figure 15: Correlation of the southern most point with a pronounced anomaly

There is no clearly identifiable material at the north-western point. However, an area of disturbed seabed with clear pitting can be seen approximately 20 m north-north-west of the western section, and this may relate to the second reported second section of the site (**Figure 16**). Given the low profile of exposed material as reported previously, this material may simply not be visible at this resolution.

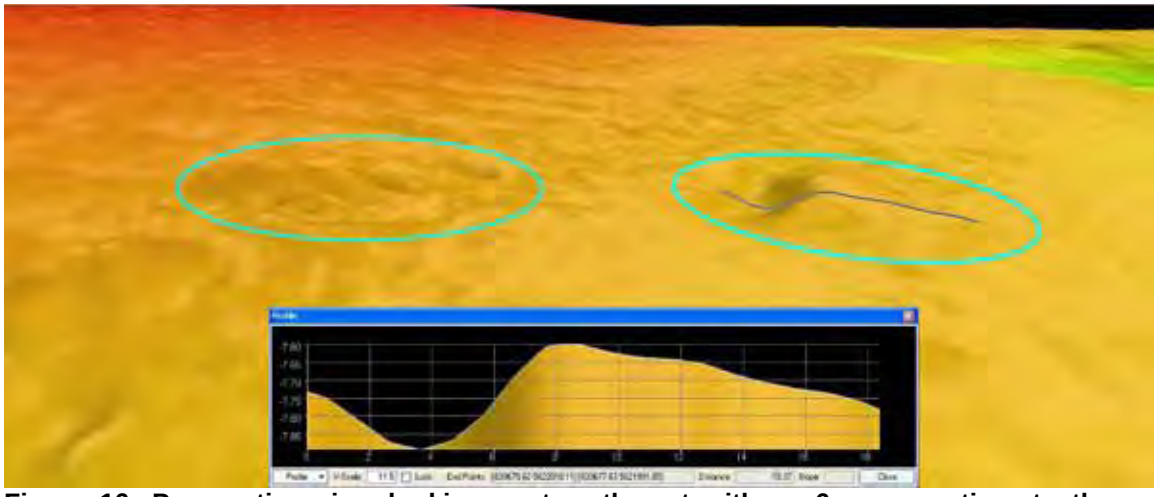


Figure 16: Perspective view looking east-north-east with a x6 exaggeration; to the right, the main feature highlighted with a cross section and shown in the inset image; to the left, a potential associated material featuring several pits or depressions

5.4.3.4. Magnetometry Results

The 2003 magnetometer survey illustrated the great density of magnetic material distributed across the area. Though this survey does not cover the present study area, it serves as a good indicator of the range of metal objects, characterised largely as ordnance (Andrews Survey 2003b), that should be anticipated in proximity to the wreck in question.

6. Identifying the Mystery Wreck

While it is unfortunate that no definitive date for the timber could be found using dendrochronology, the specialist assessments of the ship structure, the copper, the timber and the carronade have all provided information which may help with the dating and identification of the Mystery Wreck.

The confirmation of the presence of Muntz metal means that the wreck cannot have sunk before 1832. While it may have been built considerably earlier than this the parallels in constructions with the brig *Water Nymph*, excavated in Germany in 2002, suggests that a mid 19th century construction for the vessel is more likely. The lack of any mechanical components indicates that this is a sailing vessel, although further discoveries at the site may yet show otherwise. Peter Northover's suggestion that the purity of the brass tested from the site indicates a late 19th century date may indicate a date of loss after the 1880s.

The presence of only two guns on the vessel indicates that this is not a naval vessel which would have carried many more. It is, therefore, likely that the Mystery Wreck was a cargo or passenger vessel. No cargo has yet been identified although the presence of a piece of coal and regularly shaped blocks may prove to be part of a larger cargo which was salvaged or which may remains buried at the site. It is also possible that the ship may have been in ballast when it was lost or that the cargo was perishable.

The identification of a possible South American wood species by Nigel Nayling may be useful in identifying an origin or any significant trade associations. The table below summarises the nationalities of all the reported losses recorded within the 10km buffer around the Mystery Wreck.

Date	Total
Not Stated	48
American	2
British	126
Channel Islander	2
Danish/Dutch	1
Dutch	6
English	92
French	10
German	8
Irish	1
Norwegian	1
Portuguese	1
Prussian	1
Scottish	1
Spanish	2
Welsh	1
Total	**303**

This does not highlight any associations with South America. As only three samples, all of which are outer or ceiling planks, have been identified as *Calycophyllum multiflorum* Gris, these may represent repairs to the vessel while on route to somewhere or having reached its destination.

All of the reported losses from the 10km buffer were entered into the project database. The available information was then used to eliminate entries which could not be a match for the Mystery Wreck.

As this is a wooden ship all records of steel built vessels, and any aircraft, were deleted. All vessels powered by steam or motor were also deleted as the lack of machinery on the site means that the Mystery Wreck it is unlikely to have been powered mechanically.

Due to the presence of Muntz metal all vessels which sank before 1832 were also deleted. Until confirmation of a post 1880s date can be confirmed it was decided not to delete entries lost before this date with regard to the purity of the brass.

It was also decided to delete all naval vessels as such a vessel would have carried more guns. It is unlikely that they would have been removed from the site since its loss because a record of this would exist and it is unlikely that any significant treasure hunting has taken place at the site as its location was only discovered in 2003. It may have been stripped of its guns before loss, for example an old hulk on tow to a breakers yard but there are no records of vessels lost in this way in the study area.

Once these records were eliminated the number of records was reduced from 303 to 113. These are included as **Appendix 7**. It is not possible to confidently reduce these any further at this stage.

However, it is tempting to look at three losses on the Horse and Dean Sand as the closest, and therefore most likely, matches.

• 1364225, *Hopewell*, lost 1838: Struck heavily on the Horse Shoe during ESE violent gale and filled. Part of her stores saved.
• 898886, *Flowers of Ugie*, lost 1852: Abandoned and sank in SW force 10 winds.
• 1240494, *Arrow*, lost 1852: Drove on the Horse Sand in SSW force 11 wind and filled, Stores being landed.

All three of these wrecks were lost before the post 1880s date suggested by Peter Northover.

Flowers of Ugie, in particular, shows other aspects which would fit with the Mystery Wreck. It was an English barque built in 1838 in Sunderland. In 1851 the vessel was refitted with felt and yellow metal (i.e. Muntz metal) and was carrying a cargo of coal to Cartegena in Spain when it was abandoned and sank due to the 'stress of weather' in 1852 while anchored near the Horse Sand.

Parallels were drawn earlier between the excavated brig *Water Nymph* and the Mystery Wreck, although the Mystery Wreck appeared to be larger in size. The tonnage of *Flowers of Ugie* is 350 compared to 220 for the *Water Nymph*. Moreover, a brig is typically two-masted while a barque is three-masted and, hence, larger. Of particular interest is the dual treenail and copper bolt fastening techniques. Auer and Belasus (2008: 136) draw attention to reports that the fastening of plank butt-ends with treenails and copper-alloy bolts is reported to have been used on English vessels built at Sunderland. This may add extra credence to the identification of the Mystery Wreck as either the *Flower of Ugie* or the *Arrow*, both built in Sunderland.

While it is, however, impossible to confirm any identification for the Mystery Wreck at this stage it is hoped that parallels drawn between the remains and reported losses may identify the wreck after further seasons of fieldwork.

7. Review of Research Priorities

7.1. Development of Monitoring Measures

The project is considering potential impacts of extraction on the site and its setting. The sand bank feature 'Horse Tail Sands' is a notable 'ship trap' and is the resting place of a number of wrecked vessels. The project is providing enhanced understanding of this feature and its proximity to licensed extraction areas. Additionally the consideration of monitoring measures will focus on

practical, cost effective and repeatable techniques. There will also be assessment of the size and shape of the current exclusion zone to determine whether this can be modified in response to the specific characteristics of the site.

It is clear that Horse Tail Sands is subject to periodic movement. The site is also exposed to the tidal cycle and any storm events affecting the area. Additionally the site is within a licensed dredging area (although not in an active area). Therefore, further seabed movements could be linked to this extraction. In order to monitor the wreck and to determine whether it is under threat a set of monitoring measures will be established on the site as part of Stage Two. These monitoring measures will feed into long-term management requirements of this site.

Based on the HWTMA's experience of monitoring the Warship *Hazardous* and HMS *Impregnable* sites and knowledge of the conditions on the Mystery Wreck site a relatively 'low-tech' monitoring approach will be installed. Large copper nails, clearly tagged, will be installed at a range of points on the hull sections. The ship structure provides the best fixed point from which to measure seabed levels around the site. 10 points will be installed around each of the two sections providing a total of 20 seabed monitoring points. The head of each nail will act as the datum point and a measurement from this to the current seabed level will be taken. Repeated measurement of these points over time will allow for the monitoring of seabed levels. This would demonstrate whether the structure is becoming further exposed, or whether seabed levels are increasing.

7.2. ESTABLISHMENT OF FIELDWORK PLAN

Due to the results based on the desk based assessment undertaken during Stage One, the fieldwork plan for Stage Two should ensure that structure, fittings, features and artefacts are all drawn *in situ*. As standard practice, artefacts or pieces of the site to be removed for analysis will be provided with a number prior to being photographed and annotated on plans.

Recording will be based on the Museum of London Archaeology Service (MoLAS) recording system, on which the HWTMA recording sheets have been based. The main adaptation of the MoLAS system for work in the underwater zone is the addition of a 'Dive Log Sheet' and an 'Archaeological Record Sheet'. The former are used as the primary numbering system and are used for logging individual divers. Each diver will fill in an Archaeological Record Sheet which provides details of specific work undertaken on each dive and will reference any numbers utilised (e.g. context numbers, feature numbers and artefact numbers).

Additional relevant guidance documents will be drawn on for specific recording practice, such as 'Waterlogged Wood: guidelines on the recording, sampling, conservation and curation of waterlogged wood (Brunning, 1996).

Based on the results of Stage One, the site survey will include task related to producing a complete plan of the visible remains. Detailed recording should be targeted at areas and features most likely to answer the research aims and objectives for the work. Tasks should include:

- Completion of site survey of eastern section of wreck
- Completion of survey of scattered material between the two main areas of structure
- Photographic record of key structural and artefactual components to enable further assessment of key elements for analysis and for use in publication.
- Detailed recording of structural sections
- Recording of hull profiles to gather information on the curve of the structure

As far as timber sampling is concerned, it is suggested that the distribution of the non-native hardwood identified by Nigel Nayling is investigated through a combination of *in situ* assessment and selective sampling. This sampling strategy should be linked to and informed by a programme of investigation of fastenings and other evidence for a major refit. The location of less eroded framing timbers may help to the examination of a wider range of timber types.

The artefact analysis undertaken during this stage (Stage One) of the project has revealed interesting information on the copper alloy fastenings from the vessel. Further research questions remain related to the vessel structure and its function. There is a need to undertaken targeted recovery of samples from the site to develop further understanding on this issue. As standard practice, all artefacts to be raised will be handled in line with recommendations set out in 'First Aid for Underwater Finds' (Robinson, 1998).

8. Conclusions

Throughout this report, it has been concluded that the following three losses on the Horse and Dean Sand could potentially relate to the Mystery Wreck:

• 1364225, *Hopewell*, lost 1838: Struck heavily on the Horse Shoe during ESE violent gale and filled. Part of her stores saved.
• 898886, *Flowers of Ugie*, lost 1852: Abandoned and sank in SW force 10 winds.
• 1240494, *Arrow*, lost 1852: Drove on the Horse Sand in SSW force 11 wind and filled, Stores being landed.

All three of these wrecks were lost before the post 1880s date suggested by Peter Northover. Particularly, *Flowers of Ugie* shows other aspects which would fit with the Mystery Wreck. *Flowers of Ugie* was an English barque built in 1838 in Sunderland. In 1851 it was refitted with felt and yellow metal (i.e. Muntz metal) and was carrying a cargo of coal to Cartegena in Spain when she was abandoned and sank while anchored near the Horse Sand in 1852.

Side scan survey has been able to roughly identify the main site, but has not been of sufficient resolution to clearly identify further distributions of wreck material. Approximately 30m to the south-west, there is one area of potential scour and reflectors that should be examined by diver inspection during future fieldwork. The 2003 interpretation of side scan data by Andrews Survey did not detect the wreck.

Seismic data shows a deep gravel deposit, highly disturbed by dredging activity, south of the site. The Horse Tail sandbank is visible as an upper layer of soft sediment above the coarse deposit to the north. No lines intersect the wreck site or indicate archaeological material, though they usefully illustrate the local bedform.

Swath-bathymetric data over four separate years of survey has enabled the creation of difference plots that reveal a gradual loss of sediment in the area of the wreck site since at least 1993. This process has probably been instrumental in exposing the site. Although it is not clear whether this process is continuing, is slowing, or has ceased. This has important implications for the future management of this site.

It may be that the north-western position is correct and that material here is once again largely covered. In this case, the area of pitting may be a previously unidentified feature. Further diver inspection and site fixing should clarify this.

In conclusion, a significant anomaly is apparent in the 2005 multibeam data that is in sharp contrast to the surrounding seabed and is emphasised by the associated scour pit. The second portion of the site is not clearly visible. There has been a general tendency towards sediment erosion over the last ten to twelve years, and further fieldwork in 2009 as well as future survey data provided by UMD will inform on the best management strategy for this wreck.

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Appendix 1: Specialist Reports

THE UNIVERSITY OF WALES LAMPETER ARCHAEOLOGICAL SERVICES

TREE-RING ANALYSIS AND WOOD IDENTIFICATION OF SAMPLES FROM THE 'MYSTERY WRECK' OFF HORSETAIL SANDS, EASTERN SOLENT, ENGLAND

Dendrochronology Report 2009
April 2009

Report by
Nigel Nayling

Prepared for:	**Prepared by:**
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TREE-RING ANALYSIS AND WOOD IDENTIFICATION OF SAMPLES FROM THE 'MYSTERY WRECK' OFF HORSETAIL SANDS, EASTERN SOLENT, ENGLAND

Introduction

This document is a technical archive report on the tree-ring analysis and wood identification of samples taken from a wreck provisionally named the 'Mystery Wreck' located off Horsetail Sands in the Eastern Solent, England. The site lies within an area licensed for aggregate extraction, and has been the subject of study by the Hampshire and Wight Trust for Maritime Archaeology for a number of years under the ‘Eastern Solent Marine Archaeological Project’ (SolMAP). The aims of this study are to assist in the characterisation of the wreck through analysis of recovered tree-ring samples and anatomical identification of wood samples, and to make comment and recommendations in advance of additional fieldwork planned for 2009.

Methodology

The site was dived on a number of occasions by the author during the 2008 season. Assistance was provided by fellow members of the dive team forming the SolMAP team for that year. Diving was undertaken using standard scuba equipment and samples recovered using hand saws. In a number of instances, loose or displaced parts of framing timbers were recovered entire for subsequent sub sampling. In all cases samples for dendrochronological analysis were only taken where the timber appeared to be oak and a sufficient number of rings appeared to be present. Smaller samples were also recovered from selected timbers which appeared to be derived from non-oak tree species. The locations of samples were marked on interim site plans and sample record sheets completed for each sample.

Prior to measurement, the dendrochronology samples were cleaned with razor blades to expose the fullest ring sequence. Those samples which retained sufficient rings for analysis (i.e. a minimum of 50 rings) were then measured. In the case of slice samples which comprised half or more of the complete cross-section of the parent tree, two radii were usually measured. The complete sequences of growth rings in the samples that were selected for dating purposes were measured to an accuracy of 0.01mm using a micro-computer based travelling stage. Cross-correlation algorithms (Baillie and Pilcher 1973; Munro 1984) were employed to search for positions where the ring sequences were highly correlated. The ring sequences were plotted electronically and exported to a computer graphics software package (Adobe Illustrator CS3) to enable visual comparisons to be made between sequences.

Thin sections of the transverse, radial, and tangential faces of non-oak wood samples were mounted on glass slides and examined microscopically. Anatomical features were compared with wood anatomy atlases (Schweingruber, 1978), reference collections and electronic databases (Brazier and Franklin 1961, IAWA Committee 1989, Richter and Dallwitz 2000).

Results

Details of the samples recovered and the results of any subsequent analyses are summarised in Table 1. Eight of the oak samples had sufficient rings for measurement and tree-ring width series were measured for these. Only two samples (UNID_14 and UNID17) cross-matched with a significant computer correlation (*t*=5.9). Individual sequences were compared with oak ring-width means from Britain

and Ireland without success. They were then compared with tree-ring chronologies available through the International Tree Ring Data Bank, again without success.

Non-oak timbers were identified as larch/spruce and elm (see Table 1) including a post, stringer and possibly an outer hull plank. Two outer hull planks and a ceiling plank were made from the same exotic hardwood. Comparison with wood anatomy databases found a closest match with *Calycophyllum multiflorum* Gris. This hardwood is found in temperate South America including Argentina, Chile, Uruguay, and S. Paraguay (Brazier and Franklin 1961).

Comment

During diving operations, many framing timbers were examined and seen to comprise fast-grown oak with insufficient rings for analysis. The number of samples recovered which also had insufficient rings reflects the difficulty in identifying suitable material underwater given the general condition of the site.

Identification of the ‘exotic’ hardwood planks is provisional. It is suggested that as part of the final analysis, a sample is sent to the Jodrell Laboratory in Kew for authoritative identification against their extensive reference collection.

During the 2009 season, it is suggested that the distribution of this non-native hardwood is investigated through a combination of *in situ* assessment and selective sampling. This sampling strategy should be linked to and informed by any programme of investigation of fastenings and any other evidence for a major refit. Securing longer oak tree-ring sequences will be a challenge. Locating less eroded framing timbers may help as may examination of a wider range of timber types.

Acknowledgements

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Table 1 Sample details for wood samples from 2008 fieldwork at the 'Mystery Wreck'

Sample Code	Comments	Conversion	Dimensions	Species	Total Rings	Sapwood	ARW	Dating
UNID08_S01	Non-oak displaced plank with copper sheathing recovered in entirety. Not available during analysis							
UNID08_S02	Non-oak ceiling plank, eastern section. Wood identification sample			*Calycophyllum multiflorum* Gris?				
UNID08_S03	Southern end of framing timber from eastern section	B2	185 x 65	Oak	50	11	2.36	Undated
UNID08_S04	Framing timber, eastern section	E2	170 x 90	Oak	68	13	2.33	Undated
UNID08_S05	Framing timber, eastern section	B2	200 x 70	Oak	50	-	2.15	Undated
UNID08_S06	Framing timber, eastern section	B2	230 x 58	Oak	33	14+B	2.82	Undated
UNID08_S07	Outer hull plank below the framing timber sample 6			*Calycophyllum multiflorum* Gris?				
UNID08_S08	Western end of an outer hull plank with copper sheathing, eastern section			*Calycophyllum multiflorum* Gris?				
UNID08_S1	Framing timber, eastern	B2	230 x 85	Oak	40	HS	3.10	Unmeasu

0	section							red
UNID08_S11	Framing timber, eastern section. Oak treenail 30mm diameter	B2	175 x 90	Oak	12		7.5	Unmeasured
UNID08_S12	Remnant of scarfed framing timber, eastern section. Very knotty.	B2	240 x 65	Oak	Not counted		-	Unmeasured
UNID08_S13	Grab sample of scarfed framing timber, eastern section	E2	140 x 50	Oak	36		3.0	Unmeasured
UNID08_S14	Framing timber, eastern section	B2	230 x 50	Oak	49	16+?B	1.37	Undated
UNID08_S15	Framing timber, eastern section	B2	185 x 85	Oak	50	8+10s	1.76	Undated
UNID08_S16	Grab sample of scarfed framing timber, eastern section	B2	250 x 60	Oak	40	10	2.8	Unmeasured
UNID08_S17	Grab sample of scarfed framing timber. Western section. 35mm diameter treenail	B2	230 x 110	Oak	54	9	2.11	Undated
UNID08_S18	Hull plank at eastern and of western section Cu alloy? pins – sheathing? CHECK – is this actually ceiling?			Elm (*Ulmus* sp.)	-			
UNID08_S19	Grab sample of scarfed framing timber, western section							

UNID08_S20	Stringer, western section		-	Elm (*Ulmus* sp.)				
UNID08_S21	Framing timber, western section	D2	230 x 20	Oak	59	+HS+15s	1.67	Undated
UNID08_S22	One of two posts through ceiling planks	A1	125mm diameter	Larch/Spruce? *Larix/Picea*	40		2.09	

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ANALYSIS AND METALLOGRAPHY OF COPPER ALLOY METALWORK FROM AN UNIDENTIFIED WRECK

By Peter Northover

Nine pieces of copper alloy metalwork from an unidentified wreck on the Horsetail Sands, eastern Solent, were submitted for metallurgical study by the Hampshire and Wight Trust for Maritime Archaeology.

Sampling and analysis

The samples were all cut with either a small razor saw. They are labelled and identfied as follows:

SH 4	UNID 05	F13	Bolt
SH 5	UNID 06	FIWO 14	Clench bolt
SH 6	UNID 05	F15	Nail
SH 7	UNID 05	F16	Nail from planking
SH 8	UNID 06	F17	Bolt
SH 9	UNID 06	F21	Section of bolt
SH 10	UNID 06	F22	Sheathing
SH 11	UNID 06	F24	Sheathing
SH 12	UNID 06	F25	Bell fragment

The samples were all hot-mounted in a carbon-filled thermosetting resin, ground and polished to a 1µm finish. Analysis was by electron probe microanalysis using wavelength dispersive spectrometry. Operating conditions were an accelerating voltage of 20kV, a beam current of 30nA, and an X-ray take-off angle of 40. Counting times were 10s or 20s per element, and pure element and mineral standards were used. Seventeen elements were analysed as listed in accompanying table; detection limits were approximately 100ppm for all elements.

Ten areas, each 30x50µm, were analysed on each sample; Individual analyses and their means, normalised to 100%, are set out ion the table and also sorted by alloy type. All concentrations are in weight %. The writer is indebted to Mr C.J. Salter for his great assistance with the analyses and to Mr N. Wilcox for sample preparation and assistance with the metallography.

After analysis the cut samples were examined metallographically in both the as polished and etched states. The etch used was an acidified aqueous solution of ferric chloride further diluted with ethanol.

The alloys

Given the unknown date of the wreck it is important to note that there were no features in any of the compositions indicative of a 20th century date; for example aluminium, silicon, and manganese, all possible components of modern high tensile and marine brasses, were not detected.

The second point to make is that none of the analysed components, including the sheathing, is made of copper. The two pieces of sheathing analysed are of a yellow brass containing 35.5-36.6% zinc, with all impurities sought being at trace levels

except for 0.06-0.09% iron and 0.25-0.41% lead. The sheathing of ships with brass originates with G.F. Muntz's 1832 patent for hot-rolled brass sheet which was resistant to marine corrosion. The alloy specified in the patent is for 60% copper and 40% zinc and a small amount of iron. The corrosion of this metal, Muntz believed, would form a protective coating of copper oxide on the surface which would reduce further attack of the brass. In service, however, the erosion of the surface caused by the passage of the ship through the water would mean that metal would continually be lost and the surface re-oxidised.

The actual recorded composition of the alloy is of interest with zinc at approximately 36%. Muntz's original patent was for an alloy of 60% copper and 40% zinc, although some latitude in the zinc content was seen as permissible without degrading the properties of the alloy. However, because the microstructure of the alloy was not understood in Muntz's day, optical metallography not being developed until the 1860s, there was another less visible form of corrosion that was not appreciated. A Muntz metal sheet has a two phase (ab) structure in which the b phase is subject to rapid corrosion by dezincification. In the microstructure of the sheathing (see metallography, below) the original partial intergranular network of b phase has been in part replaced by redeposited copper. This has probably only had a limited effect on the integrity of the sheathing in its lifetime on the ship and would n ot have been visible at the surface of the metal. Of course, replacing a high zinc phase by copper will lower the measured in zinc content in the sheet as received for analysis; the original zinc content would have been around 38%, closer to the Muntz metal standard.

The next group of brasses consists of bolts and a planking nail with a recorded zinc content of approximately 33% and the same impurities as the sheathing. The metallography again showed b phase in part replaced by redeposited copper. It is probable that the original zinc conte nt was 35-36%. These features suggest that the copper in the alloy had the same history but a different alloy was chosen for the bolts, presumably one that was more suitable for cold rolling. A fourth object, part of a bolt, with 30.5% zinc, might belong to the same group but there does not seem to have been sufficient zinc loss for this to be the case.

The two leaded gunmetals are very similar in composition and almost certainly came from the same source. The alloy contains 7.3-9.1% zinc, 6.2-6.4% tin, and 5.9-8.7% lead. The principal impurities were 0.57-0.64% iron, 0.12-0.15% nickel, 0.62-0.66% arsenic, 0.23-0.47% antimony, 0.08-0.10% silver, 0.12-0.23% bismuth, and 0.43-0.46% sulphur. Such an alloy as this is normally used for cast products rather than wrought and its presence here may relate directly to the function of the bolt and nail, or represent two different phases in the structure of the ship. The use of such mixed metals goes in a maritime context back to the later 18th century and cannot offer any direct chronological clues. The potential offered by the impurity pattern is discussed below.

The bell fragment, SH 12, is cast in a high tin bronze with 17.1% tin and 4.4% lead. The principal impurities were 0.41% zinc, 0.25% arsenic, 0.14% antimony, 0.07% silver, and 0.28% sulphur; there were also important traces of iron, nickel, and bismuth. For a large church bell, and even for many handbells, a higher tin content up to 24% would be expected, with no more than 1% lead. The use of 17% tin and 4%

lead suggests that the foundry was not regularly casting bells for land use. The impurity concentrations, although lower, are similar in proportion to those in the leaded gunmetals.

Metallography

The microstructures of the samples taken will be discussed in more detail at a later date, in part to use quantitative techniques to estimate the original zinc content of some of the alloys. The results of the metallographic study can be summarised very briefly. The two sheathing samples (SH 10-11) have wrought and annealed ab brass structures with a fully recrystallised grain structure with a relatively large grain structure and some final cold work, possibly incurred during the fitting of the sheathing to the ship. As noted above there is an intergranular network of b phase which has been partially de-zincified. The samples from brass bolts (SH 4, 5, 9) also have wrought and annealed microstructures with a finer grain size and much more cold work. The conclusion is that, as with Westwood and Collins' patent bolts for the later eighteenth century these have been fitted cold rolled. In contrast the two leaded gunmetal parts, a nail (SH 6) and a bolt (SH 8) have as-cast macrostructures. This is to be expected from the choice of alloy and there is abundant record of the use of cast as well as wrought nails and bolts. The microstructure of the nail is very similar to that of a cast bronze sheathing nail from HMS Impregnable recently examined by the writer (HWTMA IMPY 06 F02), while cast bronze sheathing nails were identified from both HMS Sirius, lost in 1790 after having been the flagship of the "First Fleet" taking settlers to Australia in 1788 (Samuels 1983), and from HMS Bounty (Viduka and Ness 2004). HMS Bounty (ex-collier Bethia) was built in 1784, purchased by the Navy in 1878 and refitted and sheathed at that date; she was wrecked at Pitcairn in 1790). It is reasonable to conclude that in general sheathing nails were regularly cast in copper alloys, initially bronze and, later, brass. As might be expected the bell fragment (SH 12) had a cast microstructure.

Discussion

The identification of Muntz "yellow metal" sheathing assists us in dating the wreck. It is recorded that by 1835 twenty-seven ships at London had been sheathed in Muntz metal, but the process did not become established for another two or three years at least. By 1844 over 400 English ships had been sheathed in Muntz or "yellow" metal: if an unknown wreck has such sheathing it is a reasonable presumption that it was not lost before about 1840 and that it was a merchant ship. Although "yellow metal" was cheaper than copper because of the addition of zinc and because the improved mechanical properties allowed thinner sheet to be used, the Royal Dockyards could produce copper sheet very cheaply, partly by recycling the copper from ships being re-sheathed the Royal Navy did not adopt Muntz metal sheathing until about 1850 at which time ships were increasingly built of iron so the Navy's research was directed towards anti-fouling paints (Flick 1975, Bingeman *et. al.* 2000). Records of wrecks on the Horsetail sands suggest that the wreck might be the "Flowers of Ugie" lost on the Horsetail Sands in 1852 and recently re-sheathed with that metal.

A considerable problem in interpreting analyses such as these is the lack of comparative data from similar products from similar contexts. Reports of maritime excavations do report Muntz metal but not the exact zinc content nor the impurity pattern. For brass processed in Britain in the 1850s we have cold drawn brass boiler tubes in a steam locomotive built by Neilson's of Glasgow in 1857 and lost when the

ship carrying it to Nova Scotia was wrecked off islay in 1857. The recovered remains are now in the National Railway Museum, York and some non-ferrous parts have been analysed by the present writer. These tubes, made in Birmingham, have a zinc content of 27-28%, and in most case impurity concentrations similar to those in the sheathing and bolts but with a higher nickel (0.04-0.07%), arsenic (0.13-0.38%), and silver (0.05-0.08%) contents. A copper steam pipe from the same locomotive has a very similar impurity pattern except for iron, which was not detected, showing that the iron impurity in the brasses largely entered the alloy with the zinc.

An impurity pattern with arsenic/silver/lead as seen in the locomotive can be associated with British ores sources such as Cornwall, Devon and north Wales, especially when there is also a bismuth impurity, which oxidative refining leaves as oxide inclusions. This copper also has an advantage in that the arsenic is present in high enough concentrations (>0.06%) to inhibit the dezincification of the a phase in the brasses. Other impurities can be deleterious to the working properties of the brasses through the formation of inclusions of intermetallic compounds, antimony being a particular example. If, then, a copper such as that seen in leaded gunmetals from the wreck were used for making brass it would first need extensive refining to minimise the arsenic content. It is possible that this has happened here and that the same copper into two different grades of refining has been used in the two alloys. Interestingly some cast components from the Islay locomotive have similar impurity patterns to the lead gunmetals with nickel up to 0.11% and antimony up to 0.45%.The evidence of copper alloys of British origin from the Early Bronze Age onwards suggests that the copper in the alloys in the unidentified wreck did not come from a British source, giving us a measure of the international metal trade in the 1850s. One comparison can be found in French bronze coinage of the same period where a 5 centime coin of 1856 has approximately 0.3% each arsenic and antimony, and 0.1% each nickel and silver.

On the evidence to date, therefore, the identification of the wreck with the Flowers of Ugie is reasonable. More detailed metallurgical study of contemporary brass is needed to confirm this.

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Appendix 2: Artefacts and samples recovered from the Mystery Wreck

Year	ID no	Object type	Material	Class	Reason for Sample
2004	UNID/04/F01	Pin/ bolt	Copper alloy	Ships hull fastening	Dating and interpretation
2004	UNID/04/F02	Nails	Copper alloy	Ships hull fastening	Dating and interpretation
2004	UNID/04/F03	Pottery shard	Ceramic	Pottery	Dating and interpretation
2004	UNID/04/F04	Small pin	Copper alloy	Ships hull fastening	Dating and interpretation
2004	UNID/04/F05	Pottery shard	Ceramic	Pottery	Dating and interpretation
2004	UNID/04/F06	Sheathing	Copper alloy	Hull structure	Dating and interpretation
2004	UNID/04/F07	Pin	Copper alloy	Ships hull fastening	Dating and interpretation
2004	UNID/04/F08	Pin	Copper alloy	Ships hull fastening	Dating and interpretation
2004	UNID/04/F09	Sheathing	Copper alloy	Hull structure	Dating and interpretation
2004	UNID/04/F10	Nail	Copper alloy	Ships hull fastening	Dating and interpretation
2004	UNID/04/F11	Nail	Copper alloy	Ships hull fastening	Dating and interpretation
2005	UNID/05/F12	Sheathing	Copper alloy	Hull structure	Dating and interpretation
2005	UNID/05/F13	Pin	Copper alloy	Ships hull fastening	Dating and interpretation
2005	UNID/05/F14	Pin	Copper alloy	Ships hull fastening	Dating and interpretation
2005	UNID/05/F15	Nail	Copper alloy	Ships hull fastening	Dating and interpretation
2005	UNID/05/F16	Nail	Copper alloy	Ships hull fastening	Dating and interpretation
2006	UNID/06/F17	Nail	Copper alloy	Ships hull fastening	Dating and interpretation
2006	UNID/06/F18	Nail	Copper alloy	Ships hull fastening	Dating and interpretation
2006	UNID/06/F19	Coal piece	Coal	Unknown	Dating and interpretation
2006	UNID/06/F20	Pin	Copper alloy	Ships hull fastening	Dating and interpretation
2006	UNID/06/F21	Pin	Copper alloy	Ships hull fastening	Dating and interpretation
2006	UNID/06/F22	Sheathing	Copper alloy	Hull structure	Dating and interpretation
2006	UNID/06/F23	Ring type object	Copper alloy	Unknown	Dating and interpretation
2006	UNID/06/F24	Sheathing	Copper alloy	Hull structure	Dating and interpretation
2006	UNID/06/F25	Piece of hand bell	Copper alloy	Unknown	Dating and interpretation
2008	UNID/08/S01	Ship structure	Wood	Sample	Timber characterisation/dendrochronology
2008	UNID/08/S02	Ship structure	Wood	Sample	Wood identification
2008	UNID/08/S03	Ship structure	Wood	Sample	Dendrochronology

2008	UNID/08/S04	Ship structure	Wood	Sample	Dendrochronology
2008	UNID/08/S05	Ship structure	Wood	Sample	Dendrochronology
2008	UNID/08/S06	Ship structure	Wood	Sample	Dendrochronology
2008	UNID/08/S07	Ship structure	Wood	Sample	Dendrochronology and wood identification
2008	UNID/08/S08	Ship structure	Wood	Sample	Dendrochronology and wood identification
2008	UNID/08/S09	Sheathing	Copper alloy	Hull structure	Dating and interpretation
2008	UNID/08/S10	Ship structure	Wood	Sample	Dendrochronology and wood identification
2008	UNID/08/S11	Ship structure	Wood	Sample	Dendrochronology and wood identification
2008	UNID/08/S12	Ship structure	Wood	Sample	Dendrochronology and wood identification
2008	UNID/08/S13	Ship structure	Wood	Sample	Dendrochronology and wood identification
2008	UNID/08/S14	Ship structure	Wood	Sample	Dendrochronology and wood identification
2008	UNID/08/S15	Ship structure	Wood	Sample	Dendrochronology and wood identification
2008	UNID/08/S16	Ship structure	Wood	Sample	Dendrochronology and wood identification
2008	UNID/08/S17	Ship structure	Wood	Sample	Dendrochronology and wood identification
2008	UNID/08/S18	Ship structure	Wood	Sample	Dendrochronology and wood identification
2008	UNID/08/S19	Ship structure	Wood	Sample	Dendrochronology and wood identification
2008	UNID/08/S20	Ship structure	Wood	Sample	Dendrochronology and wood identification
2008	UNID/08/S21	Ship structure	Wood	Sample	Dendrochronology and wood identification
2008	UNID/08/S22	Ship structure	Wood	Sample	Dendrochronology and wood identification

Appendix 3: Wrecks and Obstructions within the 1km Study Area

NMR UID	UKHO UID	IOW SMR UID	Hampshire SMR UID	Name	Date	Description	Easting	Northing
805579	UKHO-WO-19128/540-844216621-1877	20199	28188/55549	UB 21	Modern 1916-1920	Remains of a German UBIII Patrol Submarine built in 1916. UB21 surrendered to the Royal Navy in 1918 and foundered while being towed to the breakers yard in 1920, three miles south of Eastney Point. The wreck was demolished and partially salvaged. The wreckage is now strewn over a wide area.	468780	93620
767384	UKHO-WO-58199	20191	28235	HMS UNDINE	Modern 1917-1928	British destroyer built in 1917 by Fairfield in Glasgow. Sold by the Royal Navy to Wards shipbreakers in April 1928 and went aground off Horse Fort, Solent. Sold to Middlesborough Salvage Co. Ltd. and extensive salvage took place.	468710	93390
		20365	28239	Invincible		74 gun, 2 decker French warship launched in 1744 and captured by the Royal Navy in 1747. Invincible was stranded on Horse Tail Sands in 1758. Substantial elements of structure survive and the vessel lies on her port side. Excavations have taken place and the site has yielded large quantities of the ship's stores. The site is designated under the Protection of Wrecks Act, 1973.	468211	93145
767379	UKHO-WO-19119	20185	28233		Unknown	Possible landing craft located 1993.	468600	92540

767365			Modern Post 1901	Scattered pontoon structure. Initial diver inspection described the site as scattered wreckage. However a strong magnetometer anomaly suggested that further structure was buried. In 1985 a diver reported the site as a pontoon constructed of unifloats linked together with bolted padeyes.	468250	93050
766440	22042	28210	Unknown	Seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature. Net fastening shown as obstruction on Kingfisher chart ICES 7D-01B.	468820	92340
766437	22039	28207	Unknown	Seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature. Net fastening shown as obstruction on Kingfisher chart ICES 7D-01B.	469270	92270
766442	22044	28212		Seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature. Net fastening shown as obstruction on Kingfisher chart ICES 7D-01B.	469610	92420
	22040			Seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature. Net fastening shown as obstruction on Kingfisher chart ICES 7D-01B.	469705	92312

Appendix 4: Dive Sites from 'Dive Wight and Hampshire' Area 4: Gosport to Hayling Island; Ryde to Culver Cliff

WRECK NO.	WRECK NAME	LATITUDE	LONGITUDE	DEPTH	DATE	TYPE	MATERIAL
74	DUDDON	50.77833333	-1.15966667	8M	1924	LIGHTER	
75	UNKNOWN	50.74200000	-1.11250000	17M		VERY OLD WRECK	WOOD
76	HMS BOYNE	50.77000000	-1.08883333	10M	1795	98-GUN 2ND RATE SHIP OF THE LINE	WOOD
77	MARY ROSE	50.76333333	-1.10283333	10M	1545	BATTLESHIP	WOOD
78	SOLENT FORTS				1880	FORTS	STONE
79	OBSTRUCTIONS	50.77916667	-1.12166667	20M	WW1	ANTI SUBMARINE DEFENCES	
80	HMS ROYAL GEORGE	50.75716667	-1.11250000	22M	1782	100-GUN 1ST RATE SHIP OF THE LINE	WOOD
81	BARGE	50.75116667	-1.10283333	30M		BARGE	
82	YACHT	50.75116667	-1.10700000	30M	MODERN	YACHT	
83	HOVERCRAFT	50.74016667	-1.10000000	13M	MODERN	HOVERCRAFT	ALUMINIUM AND RUBBER
84	UNKNOWN	50.75466667	-1.08550000	13M		CRAFT	STEEL
85	HORSE SAND FORT AND NO MAN'S LAND FORT			8M/9M	1880	FORTS	STONE
86	PONTOON	50.76000000	-1.03700000	10M		PONTOON	WOOD
87	PEARL	50.77583333	-1.06616667	3M	1922	BARGE	WOOD
88	ROWAY	50.76800000	-1.03666667	8M	1967	DREDGER	
89	PRISON HULKS			12M	NAPOLEONIC	PRISON HULKS	WOOD
90	MULBERRY UNIT AND THE MASK	50.79866667	-1.02366667	3M	WW2	HARBOUR WALL/DREDGER AND SCRAP RECOVERY VESSEL	CONCRETE/WOOD
91	EXCELSIOR	50.80033333	-1.02216667	12M		DREDGER	
92	IRISHMAN	50.80500000	-1.02216667	3M	1941	TUG	
93	WITHERN	50.80166667	-1.02950000	5M		BUCKET DREDGER	

94	BUOYS	50.74166667	-1.08716667	30M		POSSIBLE WRECK	
95	DIADEM OF BURSLEDON	50.74083333	-1.06916667	30M	1970	YACHT	WOOD
96	TORPEDO RECOVERY SHIP	50.73616667	-1.08133333	28M	MODERN	TORPEDO RECOVERY SHIP	WOOD
97	CAMBRIAN	50.74166667	-1.05616667	5M	1940	BOOM DEFENCE VESSEL	
98	PONTOON	50.76216667	-1.03700000	4M		PONTOON	WOOD
99	MARGJAGULIN	50.77283333	-1.01116667	5M	1977	YACHT	
100	HMS IMPREGNABLE	50.76466667	-0.95916667	4M	1799	98-GUN 2ND RATE SHIP OF THE LINE	WOOD
101	HMS INVINCIBLE	50.74283333	-1.03966667	7M	1758	74-GUN THIRD RATE SHIP OF THE LINE	WOOD
102	MFV 118	50.74050000	-1.05533333	6M	MODERN	FISHING VESSEL	WOOD
103	TANK LANDING CRAFT	50.72750000	-1.05533333	30M	MODERN	LANDING CRAFT	
104	HMS HAZARD	50.72916667	-1.05383333	32M	1918	TORPEDO GUNBOAT	STEEL
105	COLLIER	50.72700000	-1.05133333	28M		COLLIER	
106	THE STONE WRECK	50.72383333	-1.03450000	20M		SAILING BARGE?	WOOD
107	CONCRETE CYLINDER	50.72416667	-1.07166667	10M	WW2	PETROL BARGE	CONCRETE
108	SAUSAGES	50.73216667	-1.08866667	10M	WW2	SUBMARINE DEFENCE AND BOMBARDONS	CONCRETE/STEEL
109	OBSTRUCTION	50.72033333	-1.07616667	9M	WW2	PONTOON	
110	OBSTRUCTION	50.71716667	-1.04666667	16M		SPOIL MOUND	MUD/CLAY
111	UB-21	50.73716667	-1.02533333	5M	1920	GERMAN SUBMARINE	STEEL
112	THE BROAD ARROW WRECK	50.77133333	-0.99783333	3M		NAVAL VESSEL	STEEL
113	CHURCH ROCKS	50.76000000	-0.98716667	3M	14TH CENTURY	SUBMERGED VILLAGE	STONE
114	CADUCEUS	50.76416667	-0.96616667	3M	1881	BARQUE	WOOD
115	HM SUBMARINE A1	50.74200000	-0.91983333	14M	1911	BRITISH SUBMARINE	STEEL

116	SHALLOM	50.78333333	-0.99500000	10M	1983	CABIN CRUISER	
117	THE NET WRECK	50.71550000	-1.03283333	15M		CRAFT	
118	BIG BOX	50.71666667	-1.03000000	14M	WW2	LARGE BOX SECTION	
119	CAPABLE	50.71283333	-1.01283333	14M	1940	COASTER	STEEL
120	GERMAN TUG	50.71300000	-0.99250000	23M	MODERN	GERMAN TUG	
121	LOBSTER POCKETS	50.71390000	-1.02083333	14M		CRAFT	IRON/WOOD
122	GERMAN E-BOAT	50.71250000	-0.94000000	14M	WW2	GERMAN E-BOAT	
123	HMS VELOX	50.69200000	-1.03466667	13M	1915	BRITISH DESTROYER	STEEL
124	MOORING BLOCK	50.69166667	-1.03866667	12M		MOORING BLOCK	CONCRETE
125	OBSTRUCTION	50.68800000	-1.02883333	11M	UNKNOWN	D-DAY DEBRIS	
126	UNKNOWN	50.68366667	-1.02550000	12M		BARGE	
127	BOW OF THE CAMPEADOR V	50.68916667	-1.00166667	13M	1940	ANTI-SUBMARINE YACHT	STEEL
128	SIR JASPER	50.70333333	-0.95000000	13M	1981	J-24 CLASS YACHT	
129	OBSTRUCTION	50.69333333	-0.94500000	11M		OBSTRUCTION	
130	UNKNOWN	50.67083333	-0.94333333	15M		STEAMSHIP	WOOD
131	NAB TOWER	50.66666667	-0.95000000	20m	1920	OFFSHORE LIGHTHOUSE	CONCRETE
132	STERN OF THE BETTAN	50.67133333	-1.01583333	13M	1967	DANISH COASTER	
133	UNKNOWN	50.66883333	-1.04716667	13M		POSSIBLE WRECK	
134	FRANCE AIMEE	50.66800000	-1.05450000	13M	1918	FRENCH COLLIER	
135	BEMBRIDGE LEDGE					WRECKAGE	
136	EMPRESS QUEEN	50.67666667	-1.06666667	3M	1916	PADDLE STEAMER	
137	BOW OF HMS P-12	50.67083333	-1.09166667	2M	1918	PATROL BOAT	
138	LCT 529	50.69583333	-1.08083333	6M		TANK LANDING CRAFT	
139	STERN OF THE CAMPEADOR V	50.69800000	-1.08300000	5M	1940	ANTI SUBMARINE YACHT	
140	TORPEDO AND TUBE	50.77516667	-1.16566667	8M		CYLINDER	METAL
141	BLACKBURN BOTHA	50.76033333	-1.15533333	22M	1940	AIRCRAFT	METAL
142	UNKNOWN	50.76016667	-1.15083333	21M		WRECK	

143	UNKNOWN	50.75083333	-1.13433333	8M		POSSIBLE WRECK OR MULBERRY UNIT	CONCRETE/METAL
144	GLEN	50.74933333	-1.10833333	28M	1981	FISHING VESSEL	
145	UNKNOWN	50.74200000	-1.08933333	27M		WRECK	
146	UNKNOWN	50.74050000	-1.09916667	23M		WRECK	
147	TORPEDO RECOVERY BOAT	50.72850000	-1.04400000	20M	1970	TORPEDO SEARCH AND RECOVERY BOAT	WOOD
148	FLAG THEOFANO	50.71716667	-0.99100000	20M	1990	GREEK MOTOR VESSEL	STEEL
149	CONCRETE CYLINDER	50.67000000	-1.00116667	12M	WW2	BOOM DEFENCE SYSTEM	CONCRETE
150	PORTSDOWN	50.77583333	-1.10416667	8M	1941	PADDLE STEAMER	

Appendix 5: NMR Reported Losses

NMR UID	Name	Description	Date of Loss	Named Location	Easting	Northing
1072746		DUTCH PINK	1587	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87760
1162592	HMS NASSAU	ENGLISH THIRD RATE SHIP OF THE LINE	1706	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1435082		DANISH OR DUTCH SAILING VESSEL	1727	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072747	LOYAL MACS	CARGO VESSEL	1746	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1163917	JOSEPH AND MARY	BRITISH CRAFT	1750	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072748	PRETTY PATSEY	ENGLISH CARGO VESSEL	1750	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1446683	TWEE GEBRODERS	PRUSSION CARGO VESSEL	1769	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1386531		BRIG	1770	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072749	FRUITFUL VINE	ENGLISH BRIG	1783	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072750	FAIR AMERICAN	BRITISH CRAFT	1796	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072751	HENRY ADDINGTON	ENGLISH EAST INDIAMAN	1798	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072757	LIVELY	ENGLISH CRAFT	1842	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072759	JESPER	ENGLISH SCHOONER	1865	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072762	EGBERT	ENGLISH BARQUE	1867	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1160655	FLORENCE	ENGLISH CARGO VESSEL	1868	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072764	STAR	CARGO VESSEL	1871	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87760
1072766	ALPHETA	ENGLISH BARQUE	1877	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072771	PRIDE OF THE SOUTH	CHANNEL ISLAND BRIGANTINE	1883	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072775	ISABEL	CHANNEL ISLAND BRIG	1886	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072777	BRITONS QUEEN	ENGLISH SCHOONER	1886	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072780	LIONESS	IRISH TUG	1887	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072782	MARION ROSS	SCOTTISH SCHOONER	1891	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072783	SALAK	CRAFT	1895	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87760
1072785	ROSALIE	FRENCH SCHOONER	1899	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1103409	BIMBO	ENGLISH CUTTER	1903	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1243864	SANDOWN	ENGLISH LEISURE CRAFT	1907	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850

1072696	MINT	ENGLISH YAWL	1909	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072700	SHOVELLER	BRITISH YACHT	1911	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072697	ROMOLA	ENGLISH SCHOONER	1911	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072704	HMS STAR OF BUCHAN	BRITISH DRIFTER	1915	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072701	HMS ERIN II	BRITISH TRAWLER	1915	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072723	HMS PELAGIA	BRITISH DRIFTER	1916	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072725	HMS OCEAN STAR	BRITISH DRIFTER	1917	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072727	BRIGITTA	ENGLISH CARGO VESSEL	1917	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1072745	NARAGANSETT	AMERICAN TROOP SHIP	1919	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87760
1357639	HURRICANE MK I V6888	BRITISH FIGHTER	1940	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1402722	JUNKERS JU88A-5 (6260) 3Z+JR	GERMAN AIRCRAFT	1941	BEMBRIDGE LEDGE ISLE OF WIGHT	467100	87850
1165491	LIVELY	BRITISH KETCH	1886	BRACKLESHAM BAY WEST SUSSEX	478770	95150
1236842	FANNY	ENGLISH BRIG	1879	CHICHESTER BAR WEST SUSSEX	475220	96950
1240643	RENOWN	ENGLISH CUTTER	1881	CHICHESTER BAR WEST SUSSEX	475220	96950
903206	YORKSHIRE LASS	ENGLISH KETCH	1892	CHICHESTER BAR WEST SUSSEX	477000	95680
903387	BEE	ENGLISH KETCH	1894	CHICHESTER BAR WEST SUSSEX	475210	96950
902541		CRAFT	1624	CHICHESTER WEST SUSSEX	475170	100190
1432137	RICHARD AND BENJAMIN	ENGLISH PINK	1703	CHICHESTER WEST SUSSEX	475170	100190
902579	ST GEORGE	BRITISH CRAFT	1753	CHICHESTER WEST SUSSEX	475170	100190
902576		DUTCH GALLIOT	1753	CHICHESTER WEST SUSSEX	475170	100190
902583	SPEEDWELL	BRITISH CRAFT	1754	CHICHESTER WEST SUSSEX	475170	100190
902591	ROYAL GEORGE	BRITISH CRAFT	1757	CHICHESTER WEST SUSSEX	475170	100190
1438420	FREDERICK REX SWECIAE	CARGO VESSEL	1757	CHICHESTER WEST SUSSEX	475170	100190
1235701	FORTUNA	CARGO VESSEL	1767	CHICHESTER WEST SUSSEX	475170	100190
902615	FRIENDSHIP	BRITISH CARGO VESSEL	1770	CHICHESTER WEST SUSSEX	475170	100190
1200831	MARS	CARGO VESSEL	1780	CHICHESTER WEST SUSSEX	475170	100190
902633	SUCCESS	BRITISH CRAFT	1781	CHICHESTER WEST SUSSEX	475170	100190
1235766	LOVEN	BRITISH CARGO VESSEL	1782	CHICHESTER WEST SUSSEX	475170	100190
1200954	ST ANNA NOSSA SENHORA BOM SUCCESSO	PORTUGUESE CARGO VESSEL	1782	CHICHESTER WEST SUSSEX	475170	100190

902654	VON HEMMERT	CARGO VESSEL	1795	CHICHESTER WEST SUSSEX	475170	100190
902658	PEACE	CRAFT	1795	CHICHESTER WEST SUSSEX	475170	100190
902666	HENRIETTA	CRAFT	1796	CHICHESTER WEST SUSSEX	475170	100190
902657	PRINCE OF PIEDMONT	BRITISH CRAFT	1797	CHICHESTER WEST SUSSEX	475170	100190
902682	HARMONY	CARGO VESSEL	1800	CHICHESTER WEST SUSSEX	475170	100190
1174592	ACHILLES	CRAFT	1802	CHICHESTER WEST SUSSEX	475170	100190
1234330	NEW DRAPER	BRITISH CARGO VESSEL	1803	CHICHESTER WEST SUSSEX	475170	100190
1234333	THREE SISTERS	ENGLISH SMACK	1804	CHICHESTER WEST SUSSEX	475170	100190
1176571	SPRING	BRITISH CARGO VESSEL	1827	CHICHESTER WEST SUSSEX	475170	100190
895957	SKJOLD	NORWEGIAN BRIG	1881	CHICHESTER WEST SUSSEX	475170	100190
898953	TARTAR	ENGLISH BRIG	1883	CHICHESTER WEST SUSSEX	475170	100190
903170	BLUE BELL	ENGLISH KETCH	1890	CHICHESTER WEST SUSSEX	475170	100190
903425	FOX	ENGLISH KETCH	1897	CHICHESTER WEST SUSSEX	475170	100190
1238250	GENERAL HAVELOCK	ENGLISH SCHOONER	1897	CHICHESTER WEST SUSSEX	475170	100190
903435	EDITH	ENGLISH KETCH	1898	CHICHESTER WEST SUSSEX	475170	100190
903454	GEORGINA	ENGLISH KETCH	1900	CHICHESTER WEST SUSSEX	475170	100190
903485	HOPE	ENGLISH BARGE	1906	CHICHESTER WEST SUSSEX	475170	100190
899012	BRITANNIA	BRITISH CUTTER	1910	CHICHESTER WEST SUSSEX	477000	95680
903569	RESCUE	ENGLISH SCHOONER	1913	CHICHESTER WEST SUSSEX	475170	100190
1353932	SPITFIRE MK VA W3333	BRITISH FIGHTER	1941	CHICHESTER WEST SUSSEX	475170	100190
1327575	HAMPDEN MK I L4076	BRITISH BOMBER	1943	CHICHESTER WEST SUSSEX	475170	100190
1443833		SAILING VESSEL	1703	COASTAL WATERS	460310	97990
1435820	ROWLEY	BRITISH TRANSPORT VESSEL	1746	EASTNEY HAMPSHIRE	468370	99080
898814	PETER AND ANN	CARGO VESSEL	1763	EASTNEY HAMPSHIRE	468090	102600
898863	GOOD INTENT	ENGLISH CRAFT	1811	EASTNEY HAMPSHIRE	468370	99080
1240492	AMITY	ENGLISH SCHOONER	1852	EASTNEY HAMPSHIRE	468370	99080
1155711	PRINCE REGENT	BRITISH SMACK	1853	EASTNEY HAMPSHIRE	468370	99080
1155191	MARY FARLEIGH	ENGLISH SCHOONER	1902	EASTNEY HAMPSHIRE	468370	99080
1155756	LEONIE	FRENCH DANDY	1911	EASTNEY HAMPSHIRE	468370	99080
1327295	SHARK MK II L2384	BRITISH SEAPLANE	1939	EASTNEY HAMPSHIRE	468370	99080
1327393	ROC MK I L3126	BRITISH FIGHTER	1941	EASTNEY HAMPSHIRE	468370	99080
1442474		SAILING VESSEL	1703	GILKICKER POINT HAMPSHIRE	460630	97500

898810	ST MARTIN	ENGLISH PRIVATEER	1758	GILKICKER POINT HAMPSHIRE	460609	97390
1152313	SHARK	BRITISH CARGO VESSEL	1763	GILKICKER POINT HAMPSHIRE	460630	97500
898815	ALETTA	CRAFT	1764	GILKICKER POINT HAMPSHIRE	460620	97391
898831	PRINCESS OF WALES	BRITISH CRAFT	1795	GILKICKER POINT HAMPSHIRE	460630	97500
898842	THOMAS WILSON	SAILING VESSEL	1796	GILKICKER POINT HAMPSHIRE	460630	97500
898970	NIGHTINGALE	ENGLISH KETCH	1894	GILKICKER POINT HAMPSHIRE	460630	97500
899010	PETER	ENGLISH BARGE	1909	GILKICKER POINT HAMPSHIRE	460630	97500
898817	CHARLES SHARP	CRAFT	1776	GOSPORT BEACH HAMPSHIRE	461680	98440
1324710	CHARMING MOLLY	TENDER	1779	GOSPORT BEACH HAMPSHIRE	461680	98440
898820	HOPKINS	BRITISH CARGO VESSEL	1781	GOSPORT BEACH HAMPSHIRE	461680	98440
1234466	DASHER	ENGLISH CRAFT	1806	GOSPORT BEACH HAMPSHIRE	461680	98440
1356589	FAIREY SWORDFISH MK III NF333	BRITISH RECONNAISSANCE AIRCRAFT	1939	GOSPORT BEACH HAMPSHIRE	461680	98440
1327684	BEAUFORT MK I L4446	BRITISH TORPEDO BOMBER	1940	GOSPORT BEACH HAMPSHIRE	461680	98440
1435867		SNOW	1746	HAYLING BAY HAMPSHIRE	471670	98200
898809	FRANCIS	ENGLISH SLOOP	1754	HAYLING BAY HAMPSHIRE	471670	98200
1333939	HAWK	BRITISH HOY	1796	HAYLING BAY HAMPSHIRE	471670	98200
898883	GEORGE IV	BRITISH SLOOP	1843	HAYLING BAY HAMPSHIRE	471670	98200
898889	SURPRISE	BARGE	1853	HAYLING BAY HAMPSHIRE	471670	98200
1240538	OCEAN	BRITISH SCHOONER	1865	HAYLING BAY HAMPSHIRE	471670	98200
1383532	PERSEVERANCE	ENGLISH SHCOONER	1870	HAYLING BAY HAMPSHIRE	471670	98200
898946	COMMERCE	ENGLISH BARGE	1877	HAYLING BAY HAMPSHIRE	471670	98200
898963	LONGEST DAY	ENGLISH KETCH	1890	HAYLING BAY HAMPSHIRE	471670	98200
898998	FAIRY KING	ENGLISH SCHOONER	1903	HAYLING BAY HAMPSHIRE	471670	98200
899023	BERT	BRITISH CUTTER	1912	HAYLING BAY HAMPSHIRE	471670	98200
1328022	ANSON MK I L7047	BRITISH FIGHTER	1940	HAYLING BAY HAMPSHIRE	471670	98200
1327705	L4475	BRITISH TORPEDO BOMBER	1940	HAYLING BAY HAMPSHIRE	471670	98200
1327402	ROC MK I L3143	BRITISH FIGHTER	1942	HAYLING BAY HAMPSHIRE	471670	98200
1247101		GERMAN MOTOR TORPEDO BOAT	1942	HAYLING BAY HAMPSHIRE	471670	98200
1228512		DUTCH CARGO VESSEL	1697	HORSE AND DEAN SAND HAMPSHIRE	467610	94060
1368548	MARY	BRITISH CARGO VESSEL	1735	HORSE AND DEAN SAND HAMPSHIRE	467610	94060

898846	BAILIES	ENGLISH CARGO VESSEL	1797	HORSE AND DEAN SAND HAMPSHIRE	467610	94060
898854	INCREDIBLE	BRITISH TRANSPORT VESSEL	1800	HORSE AND DEAN SAND HAMPSHIRE	467610	94060
1234362	ISABELLA	BRITISH CRAFT	1806	HORSE AND DEAN SAND HAMPSHIRE	467610	94060
1234571		BRIG	1809	HORSE AND DEAN SAND HAMPSHIRE	467610	94060
898869	ANTIGONUS	SAILING VESSEL	1815	HORSE AND DEAN SAND HAMPSHIRE	467610	94060
1240379		SLOOP	1829	HORSE AND DEAN SAND HAMPSHIRE	467610	94060
1364225	HOPEWELL	BRITISH CRAFT	1838	HORSE AND DEAN SAND HAMPSHIRE	467610	94060
898886	FLOWERS OF UGIE	ENGLISH BARQUE	1852	HORSE AND DEAN SAND HAMPSHIRE	467610	94060
1240494	ARROW	ENGLISH SNOW	1852	HORSE AND DEAN SAND HAMPSHIRE	467610	94060
899033	EXCEL	ENGLISH KETCH	1925	HORSE AND DEAN SAND HAMPSHIRE	467610	94060
1322656	SPITFIRE MK I P9333	BRITISH FIGHTER	1940	HORSE AND DEAN SAND HAMPSHIRE	467610	94060
1398124		NAPOLEONIC PRISON HULKS	1792	LANGSTONE HARBOUR HAMPSHIRE	468690	101120
898899	JOHANNA ELIZABETH	BRITISH BRIG	1866	LANGSTONE HARBOUR HAMPSHIRE	468690	101120
1153193	SARAH	ENGLISH CRAFT	1866	LANGSTONE HARBOUR HAMPSHIRE	468690	101120
898954	ELIZABETH	ENGLISH KETCH	1883	LANGSTONE HARBOUR HAMPSHIRE	468690	101120
1327369	SWORDFISH MK I L2769	BRITISH BOMBER	1939	OFFSHORE CHICHESTER WEST SUSSEX	476550	85850
1233977		FRENCH CARGO VESSEL	1692	POLE SANDS WEST SUSSEX	477000	95680
1233978		FRENCH CARGO VESSEL	1692	POLE SANDS WEST SUSSEX	477000	95680
902886	JAMES AND WILLIAM	BRITISH BARGE	1860	POLE SANDS WEST SUSSEX	477000	95680
1450362	LA KATERINE	ENGLISH CARGO VESSEL	1384	PORTSMOUTH HAMPSHIRE	463790	98830
1450959	SANCTA MARIA ET SANCTUS NICHOLAUS	SPANISH CARRACK	1406	PORTSMOUTH HAMPSHIRE	463790	98830
1233950		CARGO VESSEL	1599	PORTSMOUTH HAMPSHIRE	463790	98830
1152171		CRAFT	1627	PORTSMOUTH HAMPSHIRE	463790	98830
1320976	ST ANDREW	DUTCH CARGO VESSEL	1633	PORTSMOUTH HAMPSHIRE	463790	98830
1323588		FRENCH CRAFT	1636	PORTSMOUTH HAMPSHIRE	463790	98830
1323592		FRENCH CRAFT	1636	PORTSMOUTH HAMPSHIRE	463790	98830
1449036		CARGO VESSEL	1690	PORTSMOUTH HAMPSHIRE	463790	98830
1432138	THOMAS AND FRANCIS	ENGLISH KETCH	1703	PORTSMOUTH HAMPSHIRE	463790	98830
1441655		SAILING VESSEL	1703	PORTSMOUTH HAMPSHIRE	463790	98830
1441686		SAILING VESSEL	1703	PORTSMOUTH HAMPSHIRE	463790	98830

1355394		DUTCH FLY BOAT	1726	PORTSMOUTH HAMPSHIRE	463790	98830
1368555		BRITISH CARGO VESSEL	1735	PORTSMOUTH HAMPSHIRE	463790	98830
1438785	LYON	BRITISH HOY	1750	PORTSMOUTH HAMPSHIRE	463790	98830
1152232	MORNING STAR	BRITISH CRAFT	1758	PORTSMOUTH HAMPSHIRE	463790	98830
1152371	NEPTUNE	BRITISH TROOP SHIP	1781	PORTSMOUTH HAMPSHIRE	463790	98830
898825	LARK	CARGO VESSEL	1794	PORTSMOUTH HAMPSHIRE	463790	98830
898826	HORNETT	CRAFT	1794	PORTSMOUTH HAMPSHIRE	463790	98830
898839	BRITTON	BRITISH CRAFT	1795	PORTSMOUTH HAMPSHIRE	463790	98830
898829	SISTERS	BRITISH CRAFT	1795	PORTSMOUTH HAMPSHIRE	463790	98830
898832	BETSEY	BRITISH CRAFT	1795	PORTSMOUTH HAMPSHIRE	463790	98830
898835	BRITANNIA	BRITISH TRANSPORT VESSEL	1795	PORTSMOUTH HAMPSHIRE	463790	98830
898836	COMMERCE	BRITISH TRANSPORT VESSEL	1795	PORTSMOUTH HAMPSHIRE	463790	98830
898838	GLORIANA	CRAFT	1795	PORTSMOUTH HAMPSHIRE	463790	98830
898837	PRINCESS MARIA CAROLINA	CRAFT	1795	PORTSMOUTH HAMPSHIRE	463790	98830
898845	MARY	BRITISH CRAFT	1796	PORTSMOUTH HAMPSHIRE	463790	98830
898844	GREYHOUND	BRITISH CRAFT	1796	PORTSMOUTH HAMPSHIRE	463790	98830
1152752	RICHARD AND ANN	BRITISH CRAFT	1798	PORTSMOUTH HAMPSHIRE	463790	98830
898848	IRIS	BRITISH CRAFT	1798	PORTSMOUTH HAMPSHIRE	463790	98830
898850	INDUSTRY	BRITISH CARGO VESSEL	1800	PORTSMOUTH HAMPSHIRE	463790	98830
1152812	THETIS	BRITISH CRAFT	1800	PORTSMOUTH HAMPSHIRE	463790	98830
898857	TWO FRIENDS	BRITISH CRAFT	1800	PORTSMOUTH HAMPSHIRE	463790	98830
1152792	FRIENDS	BRITISH CRAFT	1800	PORTSMOUTH HAMPSHIRE	463790	98830
898859	JUPITER	BRITISH CRAFT	1800	PORTSMOUTH HAMPSHIRE	463790	98830
1234492	RISING SUN	BRITISH CRAFT	1801	PORTSMOUTH HAMPSHIRE	463790	98830
1234469	LAIRD	BRITISH CRAFT	1801	PORTSMOUTH HAMPSHIRE	463790	98830
1234338	DIANA	BRITISH CRAFT	1805	PORTSMOUTH HAMPSHIRE	463790	98830
1234341	HERO	ENGLISH BRIG	1805	PORTSMOUTH HAMPSHIRE	463790	98830
1234357	FRIENDS	BRITISH CARGO VESSEL	1806	PORTSMOUTH HAMPSHIRE	463790	98830
1152843	MARYANN	AMERICAN CRAFT	1807	PORTSMOUTH HAMPSHIRE	463790	98830
1234520	SMALL BRIDGE	BRITISH CARGO VESSEL	1807	PORTSMOUTH HAMPSHIRE	463790	98830
898861	SARAH ANN	BRITISH CRAFT	1807	PORTSMOUTH HAMPSHIRE	463790	98830

1234643	OAK	BRITISH TRANSPORT VESSEL	1809	PORTSMOUTH HAMPSHIRE	463790	98830
1234771	SATURNUS	CRAFT	1809	PORTSMOUTH HAMPSHIRE	463790	98830
1152902	VALIANT	BRITISH BRIG	1811	PORTSMOUTH HAMPSHIRE	463790	98830
1234809	HELLEN	BRITISH CARGO VESSEL	1811	PORTSMOUTH HAMPSHIRE	463790	98830
898864	PROVIDENCE	BRITISH CARGO VESSEL	1813	PORTSMOUTH HAMPSHIRE	463790	98830
898867	ANN	ENGLISH CRAFT	1814	PORTSMOUTH HAMPSHIRE	463790	98830
898870	CAROLINE	ENGLISH CRAFT	1816	PORTSMOUTH HAMPSHIRE	463790	98830
1240301	ELIZA	CARGO VESSEL	1823	PORTSMOUTH HAMPSHIRE	463790	98830
1240283	DROVER	ENGLISH SMACK	1823	PORTSMOUTH HAMPSHIRE	463790	98830
1179611	FLY	BRITISH CRAFT	1824	PORTSMOUTH HAMPSHIRE	463790	98830
898882	LARK	BRITISH CRAFT	1834	PORTSMOUTH HAMPSHIRE	463790	98830
898885	FAREHAM TRADER	ENGLISH BARQUE	1852	PORTSMOUTH HAMPSHIRE	463790	98830
1240513	CRUIZER	BRITISH CARGO VESSEL	1856	PORTSMOUTH HAMPSHIRE	463790	98830
1240533	THAMES	BRITISH BRIGANTINE	1861	PORTSMOUTH HAMPSHIRE	463790	98830
898911	QUEEN CHARLOTTE	ENGLISH CRAFT	1872	PORTSMOUTH HAMPSHIRE	463790	98830
1153341	FOUR BROTHERS	ENGLISH KETCH	1877	PORTSMOUTH HAMPSHIRE	463790	98830
1155319	EMANUEL	ENGLISH SCHOONER	1881	PORTSMOUTH HAMPSHIRE	463790	98830
1153345	HERON	ENGLISH CRAFT	1882	PORTSMOUTH HAMPSHIRE	463790	98830
898956	RICHARD	ENGLISH BARGE	1884	PORTSMOUTH HAMPSHIRE	463790	98830
1153383	ANNIE CLARKE	ENGLISH BARGE	1891	PORTSMOUTH HAMPSHIRE	463790	98830
898981	SWIFT	BRITISH CUTTER	1897	PORTSMOUTH HAMPSHIRE	463790	98830
1153654	SWALLOW	BRITISH CUTTER	1898	PORTSMOUTH HAMPSHIRE	463790	98830
1153661	PEARL	BRITISH YAWL	1898	PORTSMOUTH HAMPSHIRE	463790	98830
898990	MARTIN	ENGLISH CUTTER	1900	PORTSMOUTH HAMPSHIRE	463790	98830
898997	PEARL	BRITISH CUTTER	1903	PORTSMOUTH HAMPSHIRE	463790	98830
899003	LANCER	BRITISH CUTTER	1905	PORTSMOUTH HAMPSHIRE	463790	98830
1155089	ZULU	ENGLISH KETCH	1910	PORTSMOUTH HAMPSHIRE	463790	98830
1155894	PEARL	ENGLISH BARGE	1922	PORTSMOUTH HAMPSHIRE	463790	98830
1151909	HMS CHARDE	BRITISH DRIFTER	1940	PORTSMOUTH HAMPSHIRE	463790	98830
1244285	WESTRA	BRITISH YACHT	1940	PORTSMOUTH HAMPSHIRE	463790	98830
1244261	ORNSAY	BRITISH YACHT	1940	PORTSMOUTH HAMPSHIRE	463790	98830
1401643	MESSERSCHMITT	GERMAN AIRCRAFT	1940	PORTSMOUTH HAMPSHIRE	463790	98830

	ME109E-1 (4082) 6+ MESSERSCHMITT					
1400105	ME110D/03M+MK	GERMAN AIRCRAFT	1940	PORTSMOUTH HAMPSHIRE	463790	98830
1155873	PORTSDOWN	BRITISH FERRY	1941	PORTSMOUTH HAMPSHIRE	463790	98830
1342788	BE687	BRITISH AIRCRAFT	1942	PORTSMOUTH HAMPSHIRE	463790	98830
895824	HMS LBV154	BRITISH LANDING CRAFT	1944	PORTSMOUTH HAMPSHIRE	463790	98830
895823	LCPL 52	BRITISH LANDING CRAFT	1944	PORTSMOUTH HAMPSHIRE	463790	98830
1155792	HMS LCPR895	BRITISH LANDING CRAFT	1944	PORTSMOUTH HAMPSHIRE	463790	98830
899331	INDUSTRY	BRITISH CRAFT	1814	RYDE ISLE OF WIGHT	460210	93420
899428	LIBERTY	ENGLISH BARGE	1836	RYDE ISLE OF WIGHT	460210	93420
895981	ARK	ENGLISH CARGO VESSEL	1848	RYDE ISLE OF WIGHT	460210	93420
895839	VOLANTE	CUTTER, POSSIBLY BRITISH	1869	RYDE ISLE OF WIGHT	460210	93420
899472	BROTHERS	ENGLISH SMACK	1877	RYDE ISLE OF WIGHT	460210	93420
899484	PROVIDENCE	ENGLISH SMACK	1880	RYDE ISLE OF WIGHT	460210	93420
899525	NO 13	BRITISH CARGO VESSEL	1881	RYDE ISLE OF WIGHT	460210	93420
899488	ECLIPSE	BRITISH YAWL	1881	RYDE ISLE OF WIGHT	460210	93420
899526	TRIO	BRITISH YAWL	1881	RYDE ISLE OF WIGHT	460210	93420
899489	GERTRUDE	ENGLISH CUTTER	1881	RYDE ISLE OF WIGHT	460210	93420
899490	LUCKNOW	ENGLISH SCHOONER	1881	RYDE ISLE OF WIGHT	460210	93420
899498	NEVA	BRITISH BARGE	1882	RYDE ISLE OF WIGHT	460210	93420
1240926	ALEYONE	BRITISH BARGE	1882	RYDE ISLE OF WIGHT	460210	93420
899527	LADY JANE	BRITISH YAWL	1882	RYDE ISLE OF WIGHT	460210	93420
899517	FRIENDS	ENGLISH KETCH	1888	RYDE ISLE OF WIGHT	460210	93420
899134	VOLAGE	FRENCH SCHOONER	1894	RYDE ISLE OF WIGHT	460210	93420
899137	MASTIFF	BRITISH CUTTER	1896	RYDE ISLE OF WIGHT	460210	93420
899136	WILLIAM AND MARY	ENGLISH KETCH	1896	RYDE ISLE OF WIGHT	460210	93420
896153	EMMA	ENGLISH BARGE	1897	RYDE ISLE OF WIGHT	460210	93420
899141	MIDGE	ENGLISH KETCH	1899	RYDE ISLE OF WIGHT	460210	93420
899142	PLOVER	BRITISH SMACK	1901	RYDE ISLE OF WIGHT	460210	93420
899151	TRIXIE	BRITISH CUTTER	1903	RYDE ISLE OF WIGHT	460210	93420
899153	WHISPER	BRITISH CUTTER	1903	RYDE ISLE OF WIGHT	460210	93420
899156	CUCKOO	BRITISH CUTTER	1903	RYDE ISLE OF WIGHT	460210	93420

899154	VIOLET	BRITISH YACHT	1903	RYDE ISLE OF WIGHT	460210	93420
899159	EIRA	BRITISH YAWL	1903	RYDE ISLE OF WIGHT	460210	93420
899155	DODO	ENGLISH CUTTER	1903	RYDE ISLE OF WIGHT	460210	93420
899165	INO	ENGLISH KETCH	1905	RYDE ISLE OF WIGHT	460210	93420
899179	BRITANNIA	BRITISH SMACK	1912	RYDE ISLE OF WIGHT	460210	93420
899181	PATIENCE	ENGLISH KETCH	1913	RYDE ISLE OF WIGHT	460210	93420
899190	ADA	ENGLISH TUG	1917	RYDE ISLE OF WIGHT	460210	93420
895883		AIRCRAFT	1940	RYDE ISLE OF WIGHT	460200	94340
1401890	JUNKERS JU88A-5 (3354) V4+IT	GERMAN AIRCRAFT	1941	RYDE ISLE OF WIGHT	460210	93420
899487	SEA FLOWER	BRITISH CUTTER	1880	SEAVIEW ISLE OF WIGHT	463230	91790
899493	TARTAR	BRITISH YAWL	1881	SEAVIEW ISLE OF WIGHT	463230	91790
899499	EMMA	ENGLISH CUTTER	1882	SEAVIEW ISLE OF WIGHT	463230	91790
899158	NESTA	BRITISH CUTTER	1903	SEAVIEW ISLE OF WIGHT	463230	91790
895889		AIRCRAFT	1940	SEAVIEW ISLE OF WIGHT	463230	91790
895880	ME109	GERMAN FIGHTER	1940	SEAVIEW ISLE OF WIGHT	463230	91790
1456208		WOODEN SAILING VESSELS	1238	SPITHEAD HAMPSHIRE	462300	95760
895909		FRENCH WAR GALLEY	1545	SPITHEAD HAMPSHIRE	462300	95760
1033737	ALEXANDER	ENGLISH FIRESHIP	1689	SPITHEAD HAMPSHIRE	462300	95760
1033724	NEWCASTLE	BRITISH FOURTH RATE SHIP OF THE LINE	1703	SPITHEAD HAMPSHIRE	462300	95760
1432273	JOHN WATSON	ENGLISH CARGO VESSEL	1703	SPITHEAD HAMPSHIRE	462300	95760
1368683	GOLDEN STAR	SAILING VESSEL	1705	SPITHEAD HAMPSHIRE	462300	95760
895705	HMS EDGAR	BRITISH WARSHIP	1711	SPITHEAD HAMPSHIRE	462300	95760
895846	MARLBOROUGH	BRITISH WARSHIP	1776	SPITHEAD HAMPSHIRE	462300	95760
898827	BOYNE	BRITISH SECOND RATE SHIP OF THE LINE	1795	SPITHEAD HAMPSHIRE	462300	95760
898834	MARIA CAROLINA	TRANSPORT VESSEL	1795	SPITHEAD HAMPSHIRE	462300	95760
1393475		FRENCH LUGGER	1798	SPITHEAD HAMPSHIRE	462300	95760
895845	HMS PRINCE FREDERICK	BRITISH STORESHIP	1799	SPITHEAD HAMPSHIRE	462300	95760
1152871	HOPE	BRITISH CARGO VESSEL	1800	SPITHEAD HAMPSHIRE	462300	95760
1234213	PURISSIMA CONCEPTION	SPANISH CRAFT	1800	SPITHEAD HAMPSHIRE	462300	95760
1234793	BELL	ENGLISH CARGO VESSEL	1809	SPITHEAD HAMPSHIRE	462300	95760

1162491	TRIO	CARGO VESSEL	1812	SPITHEAD HAMPSHIRE	462300	95760
898865	QUEEN CHARLOTTE	CARGO VESSEL	1813	SPITHEAD HAMPSHIRE	462300	95760
898873	UNITY	WELSH CRAFT	1817	SPITHEAD HAMPSHIRE	462300	95760
898876	HELMSLEY	ENGLISH CARGO VESSEL	1818	SPITHEAD HAMPSHIRE	462300	95760
1405780	WILLIAM	BRITISH BRIG	1822	SPITHEAD HAMPSHIRE	462300	95760
1240368	ANN	ENGLISH CARGO VESSEL	1825	SPITHEAD HAMPSHIRE	462300	95760
1047739	COLONIST	WEST INDIAMAN	1837	SPITHEAD HAMPSHIRE	462500	95060
1156991	MARY ANN	BRITISH KETCH	1851	SPITHEAD HAMPSHIRE	462300	95760
898892	EASTERN MONARCH	ENGLISH CARGO VESSEL	1859	SPITHEAD HAMPSHIRE	462300	95760
898902	WILLEM III	DUTCH CARGO VESSEL	1871	SPITHEAD HAMPSHIRE	462300	95760
898955	ROTTERDAM	BRITISH BARGE	1883	SPITHEAD HAMPSHIRE	462300	95760
898960	LARK	BRITISH BARGE	1887	SPITHEAD HAMPSHIRE	462300	95760
898958	LAURA	BRITISH WHERRY	1887	SPITHEAD HAMPSHIRE	462300	95760
898972		BRITISH YACHT	1894	SPITHEAD HAMPSHIRE	462300	95760
898978	EMILY KATE	BRITISH BARGE	1895	SPITHEAD HAMPSHIRE	462300	95760
898999	THREE SISTERS	ENGLISH KETCH	1903	SPITHEAD HAMPSHIRE	462300	95760
1243902	BLINK BONNY	ENGLISH LUGGER	1909	SPITHEAD HAMPSHIRE	462300	95760
899019	THISTLE	ENGLISH BARGE	1912	SPITHEAD HAMPSHIRE	462300	95760
899028	E B	ENGLISH KETCH	1915	SPITHEAD HAMPSHIRE	462300	95760
895842	HMS HILARY II	BRITISH DRIFTER	1916	SPITHEAD HAMPSHIRE	462300	95760
1244181	HMS LUCKNOW	BRITISH TRAWLER	1917	SPITHEAD HAMPSHIRE	462300	95760
1354635	WHITLEY MK V Z9129	BRITISH HEAVY BOMBER	1941	SPITHEAD HAMPSHIRE	462300	95760
1401887	MESSERSCHMITT ME110E-3 (2316) 4U+XL	GERMAN AIRCRAFT	1941	SPITHEAD HAMPSHIRE	462300	95760
895843	KITTYHAWKE	CARGO VESSEL	1944	SPITHEAD HAMPSHIRE	462300	95760
1404900	MESSERSCHMITT ME410B-4	GERMAN AIRCRAFT	1944	SPITHEAD HAMPSHIRE	462300	95760
1033729	RUZZEE PRIZE	BRITISH FIRESHIP	1692	ST HELENS ISLE OF WIGHT	464840	89950
1432126	RICHARD AND ROSE	ENGLISH KETCH	1703	ST HELENS ISLE OF WIGHT	464840	89950
1158994		FRENCH BRIG	1786	ST HELENS ISLE OF WIGHT	464840	89950
1240373	THOMAS AND DOROTHY	CARGO VESSEL	1830	ST HELENS ISLE OF WIGHT	464840	89950
899214	TENNANT	ENGLISH SNOW	1866	ST HELENS ISLE OF WIGHT	464840	89950

1240822	TOR	BRITISH YACHT	1881	ST HELENS ISLE OF WIGHT	464840	89950
1161540	SNOWDROP	ENGLISH SCHOONER	1883	ST HELENS ISLE OF WIGHT	464840	89950
899188	CHARLOTTE SOPHIA	ENGLISH KETCH	1916	ST HELENS ISLE OF WIGHT	464840	89950

Appendix 6: Finds reported by BMAPA companies from aggregate areas to the East of The Isle of Wight.

Find No.	Name	Description	Dredging Area
UMD_022_a	Metal Objects	Metal objects including a rowlock, fishing weight and an unidentified ornamental object	Unknown City of Chichester
UMD_0042_a	Fragments of Bone	Horse pelvis and scapula, rib and long bone from horse cattle or deer. Date unknown. May be prehistoric, may originate from a wreck.	Area 122/3
UMD_0044_a	Fragments of bone	Pelvis and long bone from horse, cattle or deer. Date unknown. May be prehistoric, may originate from a wreck.	Area 122/3
Britannia_ 0066_a	Boat hook and cannon ball	Undated cannon ball, possibly relating to the location of a battle or a shipwreck, and metal boat hook discovered along with two Royal Mortar Shells.	Area 451
Britannia_ 0066_b	Royal mortar shells	Probable British shells dating from the 18th to the early 19th century. Possible bombs for a Royal mortar.	Area 451
UMA_0067_a	Metal monogram	Intertwined G and R, possibly from brass, monogram may relate to monarch or name of a vessel.	Isle of Wight City of Chichester
UMA_0068_a	Cannon ball	Cannon ball of unknown date, possibly relating to the location of a battle or a shipwreck.	Area 395/1
UMA_0082_a	Two cannon balls	Two cannon balls of unknown date, possibly relating to the location of a battle or a shipwreck.	Area 340
UMA_0090_a	Ship's timber	Curved, oak timber with visible tool marks, possibly part of a frame from a carvel built vessel. Probably dating to the period 1500 to 1850.	Area 340
UMA_0096_a	Possible WW2 Rubble	Silver spoon and fork, hallmarked, and a brass plate inscribed, 'portable connection for port bow light'. Spoon of a fiddle pattern type introduced in the 1780s and still produced today.	Area 122/2
UMA_0099_a	Possible WW2 Rubble	Metal object with broad arrow indicating naval origin.	Area 122/3
UMA_0110_a	Possible WW2 Rubble	Three brass objects, a compass ring, fuse box cover and light switch surround dating to the late 19th or early 20th century.	Area 122/3
UMA_0114_a	Possible WW2 Rubble	Small bone fragment, two pieces of timber, two pieces of folded metal sheet, lump of slag and a blue brick.	Isle of Wight City of Chichester

UMA_0119_a	Possible WW2 Rubble	Small bone fragment, possible tooth. Date unknown. May be prehistoric, may originate from a wreck, possibly from WW2 building debris.	Area 122/1A
UMA_0120_a	Brass objects	Five fixtures and fittings, a horse shoe shaped object and an inscribed fuse plate from a ship. Not earlier than the early 20th century.	Area 395/1
UMA_0121_a	Possible WW2 Rubble	Partial rib and vertebra fragments from a bovid with signs of butchery. Date unknown. May be prehistoric, may originate from a wreck, possibly from WW2 building debris.	Area 122/3
UMA_0122_a	Possible metal dog's head	Ornamental dog's head, possibly from a walking stick, possibly from a garden figurine.	Area 395/1
UMA_0127_a	Possible War II Rubble World	One fork, three spoons, three brass plaques, a brass fitting and a rowlock. One spoon is inscribed with a broad arrow indicating a naval association. One brass plaque is inscribed 'Royal Navy Mess No. 4'.	Area 122/3
Kendalls_ 0130_a	Admiralty telescope	Made by W. Ottway and Co. Ltd. in 1944. Markes with a broad arrow indicating a war office origin. Possible WW2 officer of the watch telescope.	Area 351
UMA_0138_a	Possible War II Rubble World	Three pieces of wood. Possibly from a timber. The darker pieces may be oak but no tool marks are apparent.	Area 122/3
UMA_0156_a	Metal debris	Five pieces of metal debris, possibly from and aircraft or vessel but may be from terrestrial building rubble.	Area 340
UMA_0157_a	Brick and a paver	Firebrick stamped with the name Bonnybridge manufactured in Lanarkshire between 1882 and 1936. Blue clay diamond faced paver. Isolated finds of building debris, possibly from a vessel.	Area 340
UMA_0158_a	Bone fragments	Unidentified fragment, possible limb fragment from a cloven hoofed mammal and possible fragment of bovid, lower jaw bone. Date unknown. May be prehistoric, may originate from a wreck.	Area 340
UMA_0159_a	19th century pottery sherd	Decorated pottery sherd with a coded date stamp indicating manufacture between 1868 and 1883.	Area 340
UMA_0166_a	Brass objects	Part of a ships gimble lap commonly used by the Royal navy during WW1 and possible fitting or comparator (adjustable instrument for checking dimensions).	Unknown South Coast Region
Hanson _0174_a	Piece of glass, padlock, nail and thermometer backing	Embossed piece of glass, possibly from a milk bottle. Padlock of a type used from the late 19th century to the present day. Iron nail	Area 122/3

		and backing from a thermometer.	
UMA_0177_a	Flag pole finial	Copper alloy flag pole finial.	Area 395/1
UMA_0178_a	Bicycle bell	King of the Road Lucas bicycle bell. Made some time between 1879 and 1980. Possibly from terrestrial building debris.	Area 122/3
UMA_0183_a	Knife and axe head	Fairly modern axe head and commando knife similar to types used in WW2 but with a Bakelite handle suggesting it is a replica manufactured in the early post-war years.	Area 122/3
UMA_0185_a	Employment Badge	Inscribed badge issued in the early 20th century in an attempt to control the employment of child labour.	Area 122/3
UMA_0186_a	Possible deer bone	Metatarsal of a deer, possibly a red deer. Date unknown. May be prehistoric, may originate from a wreck.	Area 395/1
UMA_0114_0119_0121_ 0127_0138_a	Possible WW2 Rubble		City of Chichester Isle of Wight Region west of Nab Tower

Appendix 7: Possible Matches for the Mystery Wreck

Bembridge Ledge, Isle of Wight

NMR UID	Name	Lost	Cargo	Use	Type	Nationality	Built	Tonnage	Manner of Loss
1072757	LIVELY	1842			CRAFT	ENGLISH			FOUNDERED, TOTAL LOSS
1072759	JESPER	1865		Coaster	SCHOONER	ENGLISH	1839	53	STRANDED
1072762	EGBERT	1867	GRAIN	Cargo Vessel	BARQUE	ENGLISH			DROVE ONTO BEMBRIDGE LEDGE DURING A HEAVY GALE AND SNOWSTORM AND BROKE UP.
1072764	STAR	1871	BARLEY	Cargo Vessel	CARGO VESSEL			100	LOST
1072771	PRIDE OF THE SOUTH	1883	GRANITE	Cargo Vessel	BRIGANTINE	CHANNEL ISLANDER	1861	131	STRANDED AND LOST IN ESE FORCE 5 WIND
1072777	BRITONS QUEEN	1886	CHINA CLAY	Cargo Vessel	SCHOONER	ENGLISH	1838	82	STRANDED AND LOST IN W/S FORCE 6 WIND
1072775	ISABEL	1886	STONE	Cargo Vessel	BRIG	CHANNEL ISLANDER	1862	186	STRANDED AND LOST IN ESE FORCE 6 WIND
1072782	MARION ROSS	1891	CHINA CLAY	Cargo Vessel	SCHOONER	SCOTTISH	1863	113 (G)	FOUNDERED AND LOST IN SQUALLY CONDITIONS
1072785	ROSALIE	1899	CEMENT	Cargo Vessel	SCHOONER	FRENCH	1870	142 (G)	GROUNDED ON BEMBRIDGE LEDGE IN NW FORCE 9 WIND
1103409	BIMBO	1903	BALLAST		CUTTER	ENGLISH		2	SANK IN WSW FORCE 10 WHILE CRUISING OFF BEMBRIDGE
1072696	MINT	1909	BALLAST		YAWL	ENGLISH	1890		STRANDED
1072697	ROMOLA	1911	COAL	Cargo	SCHOONER	ENGLISH	1871	88 (G)	STRANDED

				Vessel					
Bracklesham Bay, West Sussex									
NMR UID	**Name**	**Lost**	**Cargo**	**Use**	**Type**	**Nationality**	**Built**	**Tonnage**	**Manner of Loss**
1165491	LIVELY	1886	BALLAST		KETCH	ENGLISH		16 (N)	DRIVEN ASHORE AND LOST IN SW FORCE 6 WIND
Chichester Bar, West Sussex									
NMR UID	**Name**	**Lost**	**Cargo**	**Use**	**Type**	**Nationality**	**Built**	**Tonnage**	**Manner of Loss**
1236842	FANNY	1879	TIMBER, FLOUR, TAR, GUANO	Cargo Vessel	BRIG	ENGLISH	1865	63 (N)	LOST IN NNW FORCE 4 WIND
1240643	RENOWN	1881	BALLAST	Fishing Vessel	CUTTER	ENGLISH		31 (N)	STRANDED AND LOST IN W FORCE 7 WIND
903206	YORKSHIRE LASS	1892	IRON PIPES	Cargo Vessel	KETCH	ENGLISH	1847	58 (N)	STRANDED AND LOST IN W/N FORCE 4 WIND
903387	BEE	1894	COAL	Cargo Vessel	KETCH	ENGLISH	1875	20 (N)	STRANDED AND WRECKED IN ENE FORCE 6 WIND
Chichester, West Sussex									
NMR UID	**Name**	**Lost**	**Cargo**	**Use**	**Type**	**Nationality**	**Built**	**Tonnage**	**Manner of Loss**
895957	SKJOLD	1881			BRIG	NORWEGIAN			FOUNDERED
898953	TARTAR	1883	SAND	Cargo Vessel	BRIG	ENGLISH	1839	26	UNATTENDED VESSEL FOUNDERED IN A FRESHENING GALE WHICH BECAME SW/10
903170	BLUE BELL	1890	SHINGLE	Cargo Vessel	KETCH	ENGLISH	1863	28 (N)	STRANDED AND LOST IN SW FORCE 5 WIND
903425	FOX	1897	TIMBER, PIPES	Cargo Vessel	KETCH	ENGLISH	1826	31 (N)	DROVE ASHORE AND LOST IN WSW FORCE 9
1238250	GENERAL HAVELOCK	1897	COAL	Cargo Vessel	SCHOONER	ENGLISH	1858	121 (G)	STRANDED AND LOST OFF THE ENTRANCE TO THE HARBOUR IN NNW FORCE 5 WIND

903435	EDITH	1898	SHINGLE	Cargo Vessel		ENGLISH	1875	42 (N)	STRANDED
903454	GEORGINA	1900	GRAIN	Cargo Vessel	KETCH	ENGLISH		63 (N)	BLOWN ASHORE AND LOST IN SSW FORCE 7 WIND
903485	HOPE	1906	COAL	Cargo Vessel	BARGE	ENGLISH	1858	23 (N)	STRANDED IN CALM CONDITIONS
899012	BRITANNIA	1910	BALLAST	Leisure Craft	CUTTER	BRITISH	1850	8	STRANDED
903569	RESCUE	1913	COAL	Cargo Vessel	SCHOONER	ENGLISH	1869	143 (G)	STRANDED

Eastney, Hampshire

NMR UID	Name	Lost	Cargo	Use	Type	Nationality	Built	Tonnage	Manner of Loss
1240492	AMITY	1852	COAL	Cargo Vessel	SCHOONER	ENGLISH	1822		RAN ON THE HORSE SAND IN SSW FORCE 8 WIND AND DROVE ON THE SHOAL NEAR FORT CUMBERLAND AND FILLED WITH WATER
1155711	PRINCE REGENT	1853	GRANITE CHIPS	Cargo Vessel	SLOOP	BRITISH		52	STRUCK THE HORSE AND DEAN SAND DURING SSE FORCE 10 WIND. RAN ASHORE AND BECAME A TOTAL WRECK ON LUMPS BEACH. SOME OF THE RIGGING AND SAILS SALVAGED

1155191	MARY FARLEIGH	1902	CEMENT	Cargo Vessel	SCHOONER	ENGLISH	1864	77	ASHORE AND FORT CUMBERLAND AT 10.28AM. ON THE GROYNES AT THE MOUTH OF LANGSTONE HARBOUR BY 12.20PM BADLY HOLED AND FILLING WITH WATER. TOTAL WRECK. CEMENT DISCHARGED ONTO THE BEACH
1155756	LEONIE	1911	POTATOES	Cargo Vessel	DANDY	FRENCH	1892	30	STRANDED

Gilckicker Point, Hampshire

NMR UID	Name	Lost	Cargo	Use	Type	Nationality	Built	Tonnage	Manner of Loss
898970	NIGHTINGALE	1894	SAND	Cargo Vessel	KETCH	ENGLISH		18	FOUNDERED IN WIND CONDITIONS WNW FORCE 6
899010	PETER	1909	BALLAST		BARGE	ENGLISH	1860	26	STRANDED

Hayling Bay, Hampshire

NMR UID	Name	Lost	Cargo	Use	Type	Nationality	Built	Tonnage	Manner of Loss
898883	GEORGE IV	1843			SLOOP	BRITISH			WRECK WASHED ASHORE ON ISLAND
898889	SURPRISE	1853	BALLAST	Cargo Vessel	BARGE				SANK WHILE RIDING AT ANCHOR OFF HAYLING ISLAND
1240538	OCEAN	1865	CHINA CLAY	Cargo Vessel	SCHOONER	BRITISH	1825	84 (N)	STRANDED AND LOST IN WSW FORCE 9 WIND
1383532	PERSEVERANCE	1870	COAL	Cargo Vessel	SCHOONER	ENGLISH			DROVE ASHORE ON THE EAST END OF HAYLING ISLAND IN SW GALE. EXPECTED TO COMPLETELY BREAK UP

898946	COMMERCE	1877	TIMBER	Cargo Vessel	BARGE	ENGLISH		25	STRANDED AND LOST IN CALM CONDITIONS
898963	LONGEST DAY	1890	SAND	Cargo Vessel	KETCH	ENGLISH	1871	36	BLOWN ASHORE IN WIND CONDITIONS SE FORCE 5
898998	FAIRY KING	1903	CHINA CLAY	Cargo Vessel	SCHOONER	ENGLISH	1878	114 (G)	WRECKAGE WASHED ASHORE AT ELEANOR POINT AFTER VESSEL STRANDED AND LOST IN WSW FORCE 5 WIND
899023	BERT	1912	BALLAST	Fishing Vessel	CUTTER	BRITISH		9	FOUNDERED

Horse and Dean Sand, Hampshire

NMR UID	Name	Lost	Cargo	Use	Type	Nationality	Built	Tonnage	Manner of Loss
1364225	HOPEWELL	1838			CRAFT	BRITISH			STRUCK HEAVILY ON THE HORSE SHOE DURING ESE VIOLENT GALE AND FILLED. PART OF HER STORES SAVED
898886	FLOWERS OF UGIE	1852	COAL	Cargo Vessel	BARQUE	ENGLISH	1838	350 (N)	ABANDONED AND SANK IN SW FORCE 10 WINDS
1240494	ARROW	1852	COAL	Cargo Vessel	BRIG	ENGLISH	1839	220 (G)	DROVE ON THE HORSE SAND IN SSW FORCE 11 WIND AND FILLED. STORES BEING LANDED

Langstone Harbour, Hampshire

NMR UID	Name	Lost	Cargo	Use	Type	Nationality	Built	Tonnage	Manner of Loss
1153193	SARAH	1866			CRAFT	ENGLISH	1864	22	FOUNDERED
898899	JOHANNA ELIZABETH	1866	BONE MEAL	Cargo Vessel	BRIG	BRITISH		244	STRANDED AND LOST IN S TOP SW FORCE 12 HURRICANE

898954	ELIZABETH	1883	SHINGLE	Cargo Vessel	KETCH	ENGLISH		20	STRANDED WHILE AT MOORINGS

Pole Sands, West Sussex

NMR UID	Name	Lost	Cargo	Use	Type	Nationality	Built	Tonnage	Manner of Loss
902886	JAMES AND WILLIAM	1860	BALLAST	Cargo Vessel	BARGE	BRITISH		12 (N)	VESSEL LOST IN SSW FORCE 8 WIND. BARGE WENT TO PIECES

Portsmouth, Hampshire

NMR UID	Name	Lost	Cargo	Use	Type	Nationality	Built	Tonnage	Manner of Loss
898882	LARK	1834			CRAFT	BRITISH			FOUNDERED
898885	FAREHAM TRADER	1852	CHALK	Cargo Vessel	BARQUE	ENGLISH			GROUNDED, FOUNDERED
1240513	CRUIZER	1856	COAL	Cargo Vessel	CARGO VESSEL	BRITISH			WENT ASHORE ON THE BEACH IN A HEAVY GALE. CARGO BEING DISCHARGED
1240533	THAMES	1861	BALLAST		BRIGANTINE	BRITISH			WENT ASHORE ON SOUTHSEA BEACH IN A HARD GALE FROM W TO NW
898911	QUEEN CHARLOTTE	1872			CRAFT	ENGLISH	1850	17	STRANDED
1153341	FOUR BROTHERS	1877	FIREWOOD	Cargo Vessel	KETCH	ENGLISH		26	STRANDED AND LOST IN E FORCE 10 W
1155319	EMANUEL	1881	IRON, SODA	Cargo Vessel	SCHOONER	ENGLISH	1851	79	RAN ASHORE ON CLOCK HOUSE POINT IN ENE WIND. STRANDED ON SHORE AND FILLED WITH WATER. CARGO PARTIALLY SALVAGED
898956	RICHARD	1884	MUD	Cargo Vessel	HOPPER BARGE	ENGLISH	1822	27	FOUNDERED IN W FORCE 5 WINDS

1153383	ANNIE CLARKE	1891	SAND	Cargo Vessel	DUMB BARGE	ENGLISH	1867	28	STRANDED LEAVING LANGSTONE HARBOUR IN W FORCE 7 WIND
898981	SWIFT	1897	BALLAST		CUTTER	BRITISH		8	WENT SHORE IN WIND CONDITIONS WSW FORCE 5
1153654	SWALLOW	1898	BALLAST		CUTTER	BRITISH	1868	4	WRECKED ON THE SHORE IN SW FORCE 6 WIND
1153661	PEARL	1898	BALLAST		YAWL	BRITISH		13	WENT ASHORE IN WSW FORCE 6 WIND
898990	MARTIN	1900	BALLAST		CUTTER	ENGLISH	1858	12	STRANDED AND LOST IN S FORCE 5 WIND
898997	PEARL	1903	BALLAST	Leisure Craft	YACHT, CUTTER	BRITISH	1894	9	DROVE ASHORE IN A HEAVY GALE AND WENT TO PIECES
899003	LANCER	1905	BALLAST	Cargo Vessel	CUTTER	BRITISH	1895	6	DRIVEN ASHORE IN WSW FORCE 8 WIND
1155089	ZULU	1910	SHINGLE	Cargo Vessel	KETCH	ENGLISH	1889	30	FOUNDERED FOLLOWING COLLISION IN THE HARBOUR
1155894	PEARL	1922			BARGE	ENGLISH	1889	96 (G)	FOUNDERED IN HEAVY WEATHER. PART OF HER KEEL AND FRAMES SURVIVE PART BURIED IN A SAND/GRAVEL BOTTOM IN 3M OF WATER

Ryde, Isle of Wight

NMR UID	Name	Lost	Cargo	Use	Type	Nationality	Built	Tonnage	Manner of Loss
899428	LIBERTY	1836			BARGE	ENGLISH			FOUNDERED
895981	ARK	1848		Cargo		ENGLISH	1833		FOUNDERED

895839	VOLANTE	1869	PEOPLE	Vessel Leisure Craft	CUTTER	BRITISH		60	SANK AT MOORINGS OFF RYDE PIER IN SW-WSW GALE
899472	BROTHERS	1877	IRON PIPES	Cargo Vessel	SMACK	ENGLISH	1847	27	STRANDED IN W FORCE 8 WIND. SOME CARGO SAVED
899484	PROVIDENCE	1880	PIPE CLAY	Cargo Vessel	SLATE	ENGLISH	1826	37	SUNK FOLLOWING COLLISION IN S FORCE 4 WIND
899490	LUCKNOW	1881	COAL	Cargo Vessel	SCHOONER	ENGLISH	1858	120	SUNK ALONGSIDE THE RAILWAY PIER AND BECAME A TOTAL WRECK IN SE FORCE 10 WIND
899526	TRIO	1881	GENERAL	Cargo Vessel	YAWL	BRITISH	1861	12	STRANDED AND LOST IN E FORCE 8 WIND
899525	NO 13	1881	GRAVEL	Cargo Vessel	CARGO VESSEL	BRITISH	1868	40	BLOWN ASHORE SURING NW FORCE 9 WIND
899489	GERTRUDE	1881	BALLAST	Leisure Craft	YACHT	BRITISH		8	BLOWN ASHORE IN ESE FORCE 10 WIND
899488	ECLIPSE	1881	BALLAST	Cargo Vessel	YAWL	BRITISH		7	CAUGHT IN SEVERE WIND CONDITIONS SE FORCE 10 AND DASHED TO PIECES
899527	LADY JANE	1882	BALLAST	Cargo Vessel	YAWL	BRITISH	1831	7	FOUNDERED IN NW FORCE 10 WIND
1240926	ALEYONE	1882	BALLAST		SPRITSAIL BARGE	BRITISH	1878		SANK AT HER MOORINGS DURING NW FORCE 8 WIND
899498	NEVA	1882	BALLAST	Cargo Vessel	SPRITSAIL BARGE	BRITISH	1879	1	STRANDED AND BECAME A TOTAL LOSS IN WIND

899517	FRIENDS	1888	TIMBER	Cargo Vessel	KETCH	ENGLISH	1862	25	STRANDED AND LOST IN NE FORCE 6 WIND
899134	VOLAGE	1894	BALLAST		SCHOONER	FRENCH	1861	48	BLOWN ASHORE IN WSW FORCE 4 WIND
899136	WILLIAM AND MARY	1896	BALLAST	Cargo Vessel	KETCH	ENGLISH	1857	25	STRANDED AND LOST N FORCE 10 WIND
899137	MASTIFF	1896	BALLAST		CUTTER	BRITISH	1886	6	BLOWN AGAINST RYDE PIER AND WRECKED IN N FORCE 10 WIND
896153	EMMA	1897	PETROLEUM	Cargo Vessel	BARGE	ENGLISH	1857	19	GROUNDED, FLOATED OFF, FOUNDERED. CARGO WASHED OUT
899141	MIDGE	1899	GENERAL	Cargo Vessel	KETCH	ENGLISH	1876	20	DRIVEN UNDER RYDE PIER IN SE FORCE 7 WIND WHERE SHE SANK AND WENT TO PIECES
899142	PLOVER	1901	ROOFING SLATE	Cargo Vessel	SMACK	BRITISH	1861	12	BLOWN ASHORE IN SSE FORCE 5 WIND
899156	CUCKOO	1903			CUTTER	BRITISH	1883	3	BLOWN ASHORE IN WNW FORCE 8 WIND
899151	TRIXIE	1903	BALLAST		CUTTER	BRITISH	1891	3	FOUNDERED IN NNW FORCE 8 WIND
899155	DODO	1903	BALLAST		CUTTER	ENGLISH	1896	7	STRANDED
899159	EIRA	1903	BALLAST		YAWL	BRITISH	1897	5	FOUNDERED AND LOST IN SW FORCE 5 WIND
899153	WHISPER	1903	BALLAST		CUTTER	BRITISH	1900	2	BLOWN ASHORE AND LOST IN WNW FORCE 8 WIND
899165	INO	1905	SHINGLE	Cargo Vessel	KETCH	ENGLISH	1877	30	STRANDED
899179	BRITANNIA	1912	BALLAST		SMACK	BRITISH		6	STRANDED

899181	PATIENCE	1913	COAL	Cargo Vessel	KETCH	ENGLISH	1842	23	FOUNDERED

Seaview, Isle of Wight

NMR UID	Name	Lost	Cargo	Use	Type	Nationality	Built	Tonnage	Manner of Loss
899487	SEA FLOWER	1880	BALLAST	Cargo Vessel	CUTTER	BRITISH		15	STRANDED AND LOST IN SE FORCE 10 WIND
899493	TARTAR	1881	BALLAST	Cargo Vessel	YAWL	BRITISH	1866	14	STRANDED AND LOST IN E FORCE 10 WIND
899499	EMMA	1882	BALLAST	PILOT VESSEL	CUTTER	ENGLISH	1865	26	STRANDED WHILST AT MOORINGS IN SE FORCE 6 WIND
899158	NESTA	1903	BALLAST		CUTTER	BRITISH	1878	4	STRANDED AND LOST IN SSE FORCE 7 WINDS

Spithead, Hampshire

NMR UID	Name	Lost	Cargo	Use	Type	Nationality	Built	Tonnage	Manner of Loss
1047739	COLONIST	1837	GENERAL	Cargo Vessel	WEST INDIAMAN			450	BURNT
1156991	MARY ANN	1851	STONE	Cargo Vessel	KETCH	BRITISH		45	STRANDED AND LOST IN SE FORCE 9 WIND
898892	EASTERN MONARCH	1859	LINSEED OIL, PEOPLE, SALTPETRE, IVORY, BONES	Cargo Vessel, Passenger Vessel	FULL RIGGED SHIP	ENGLISH	1853/1856	1631	EXPLOSION, FIRE
898955	ROTTERDAM	1883	MUD	Cargo Vessel	BARGE	BRITISH		45	FOUNDERED IN NW FORCE 4 WINDS
898960	LARK	1887	MUD	Cargo Vessel	HOPPER BARGE	BRITISH	1872	18	COLLISION IN WIND CONDITIONS E FORCE 4
898958	LAURA	1887	BALLAST	Cargo Vessel	WHERRY	BRITISH	1872	2	COLLISION IN WIND CONDITIONS E FORCE 4

898972		1894	BALLAST	Leisure Craft	YACHT	BRITISH		1	COLLISION IN WIND CONDITIONS SE FORCE 3
898978	EMILY KATE	1895	BALLAST	Fishing Vessel	BARGE	BRITISH		1	FOUNDERED IN SW/S FORCE 5 WIND
898999	THREE SISTERS	1903	CLAY	Cargo Vessel	KETCH	ENGLISH	1879	38	FOUNDERED IN HEAVY SEAS AND STORMY CONDITIONS WNW FORCE 9
1243902	BLINK BONNY	1909	BALLAST		LUGGER	ENGLISH	1894		FOUNDERED AND LOST FOLLOWING COLLISION
899019	THISTLE	1912	BARLEY	Cargo Vessel	BARGE	ENGLISH		60	STRANDED
899028	E B	1915	SHINGLE	Cargo Vessel	KETCH	ENGLISH	1879	39 (G)	SANK AFTER BEING RUN DOWN
895843	KITTYHAWKE	1944		Cargo Vessel	CARGO VESSEL				COLLISION OFF PORTSMOUTH

St Helens, Isle of Wight

NMR UID	Name	Lost	Cargo	Use	Type	Nationality	Built	Tonnage	Manner of Loss
899214	TENNANT	1866	COAL	Cargo Vessel	SNOW	ENGLISH	1837	216	FOUNDERED FOLLOWING COLLISION
1161540	SNOWDROP	1883			SCHOONER	ENGLISH	1833	80	STRUCK GRANITE ROCKS AND KNOCKED HER BOTTOM TO PIECES. WRECK WAS BLOWN UP BUT HER KEEL REMAINS IN THE SAND.
899188	CHARLOTTE SOPHIA	1916	STONE	Cargo Vessel	KETCH	ENGLISH	1876	66	FOUNDERED

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