13. MARITIME ARCHAEOLOGY


Kinbane Castle

Key messages

- The marine and intertidal environment contains an important but finite archaeological resource.
- In Northern Ireland, there are hundreds of known intertidal and marine sites and monuments spanning activities over the last 9,000 years. Many of these may be at risk from natural processes or human activities.
- In the last 15 years, considerable progress has been made in researching this resource, with some areas like Strangford Lough, Rathlin Island and the north coast being well documented.
- Other areas remain un-surveyed and contain a largely unknown but potentially important archaeological resource.
- More research is needed on this resource, including broad-scale baseline mapping and prioritised research or survey, on potentially important sites.
- Geophysical data has proved to be an invaluable research tool. However, ready access to this data requires greater cooperation amongst government agencies and commercial organisations.
- The protection of the maritime archaeological resource needs to be incorporated into marine spatial planning.

What is maritime archaeology?

Maritime archaeology is the study of past human interaction with the marine environment through the material remains of past activities. A wide range of evidence is studied by maritime archaeologists and includes underwater sites, such as shipwrecks and submerged prehistoric landscapes. These are areas that were formerly dry land but submerged by rising sea-levels at the end of the last Ice Age.

Coastal and intertidal sites such as ports, mills and fish traps are also studied by marine archaeologists. In many cases, these studies can provide a unique perspective on our maritime history and heritage which cannot be obtained from land-based sources.

What pressures are there on the maritime archaeological resource?

Pressures on our maritime heritage include natural and human factors. Natural factors include seabed and coastal erosion driven by waves, tides and storms which can damage or destroy archaeological sites. Although these are natural processes, there is a strong possibility that future climate change, particularly rising

Figure 13.1. Intertidal archaeological sites identified by the Strangford Lough Survey.
a) Tidal mill complex at Nendrum Monastery. (Photo: NIEA). b) V-shaped stone fishtrap of medieval age at Paddy's Point (Photo: CMA). c) Neolithic (c. 5000 years ago) logboat from Greyabbey Bay (Photo: CMA).

sea-levels and intensified storm activity, will increase erosion and put many more sites at risk [1].

Human factors are driven by the increasing commercial use of the seabed and coastal zone. Activities such as cable or pipe laying, oil and gas drilling, trawling, aggregates extraction and offshore renewable energy developments (e.g. wind-farms and tidal energy installations) can potentially remove, disturb or damage archaeological material.

This places a strong emphasis on locating sites or areas of high archaeological potential in advance. Proposed developments can then avoid these sites, or plans can be put in place to mitigate against potentially destructive activities; for instance monitoring of dredging or pre-development survey and excavation. Consequently, much research in Northern Irish maritime archaeology has been dedicated to identify coastal and underwater sites to build up a maritime archaeological record[2].

What resources are available to study and manage Northern Ireland's maritime heritage?

Systematic research on the Northern Ireland's maritime past has been ongoing since 1993, conducted initially by NIEA and from 1999 onwards by the Centre for Maritime Archaeology (CMA) at the University of Ulster.

The CMA is a partnership initiative established between the University and the government heritage service (NIEA: Built Heritage) to conduct research, promote and to address statutory issues relating to Northern Ireland's maritime archaeology[3]. The CMA posts are funded by NIEA but the unit is based within the wider University of Ulster Centre for Marine and Coastal Research. This partnership has enabled the sharing of technology,

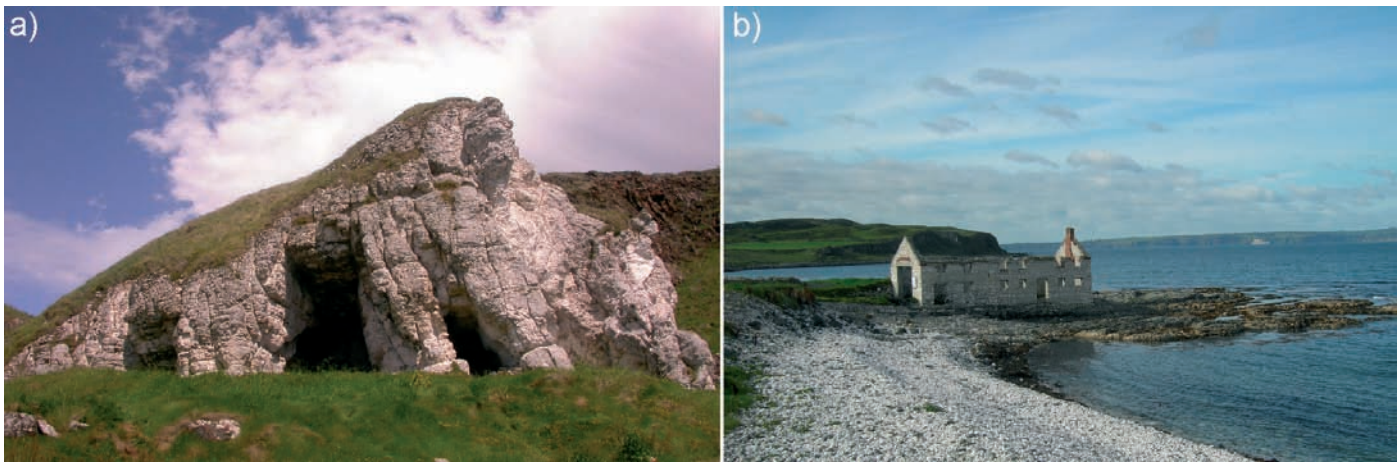

Figure 13.2. Archaeological sites identified by the Rathlin Survey. a) Oweybyrne Caves, in which Bronze Age occupation was discovered. b) Early 19th Century kelp store at Church Bay. (all photos: CMA).

resources, data and expertise between the University of Ulster and NIEA, enhancing identification and recording of maritime heritage sites.

What do we know about Northern Ireland's maritime heritage?

Northern Ireland's coast and offshore has a rich and diverse archaeological record spanning the last 9,000 years. These include materials ranging from prehistoric flint tools and log-boats to historic harbour installations, Second World War shipwrecks and coastal defences. The research done to date can be divided into 3 key areas:

- Foreshore and coastal landscapes
- Shipwrecks
- Marine geoarchaeology

Foreshore and Coastal Landscapes

Foreshore and coastal archaeology encompasses studies of the intertidal zone and the adjacent coastal landscape. These studies improve our understanding of past settlement, exploitation and use of this environment.

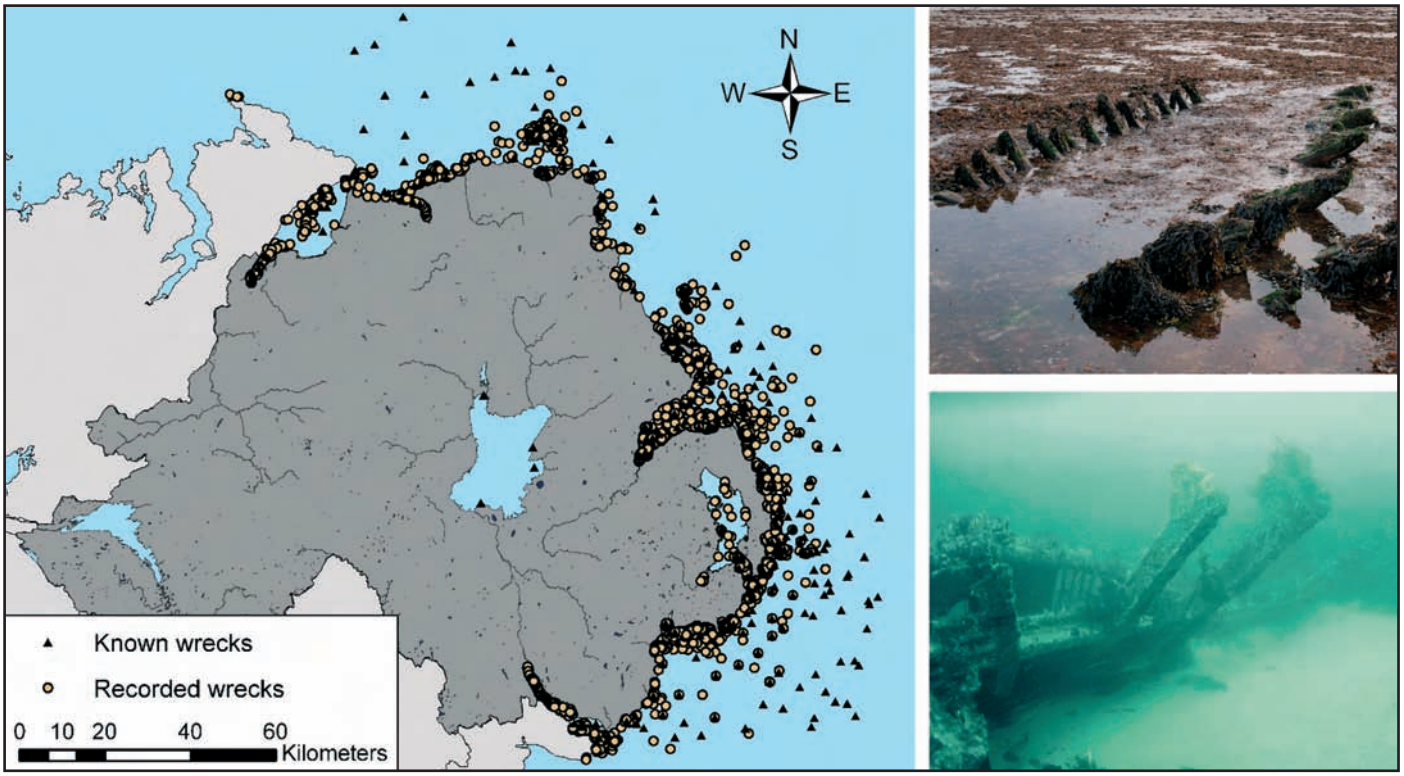

Figure 13.3. Distribution of historically recorded and known shipwrecks around Northern Ireland. Inserts show examples of known shipwrecks.
Top right: unknown wooden wreck located in the intertidal zone at Ballyferris, Co. Down (photo: CMA).
Bottom right: remains of the HMS Drake, a battlecruiser sunk in 1917 in Church Bay, Rathlin Island (photo: Wessex Archaeology).

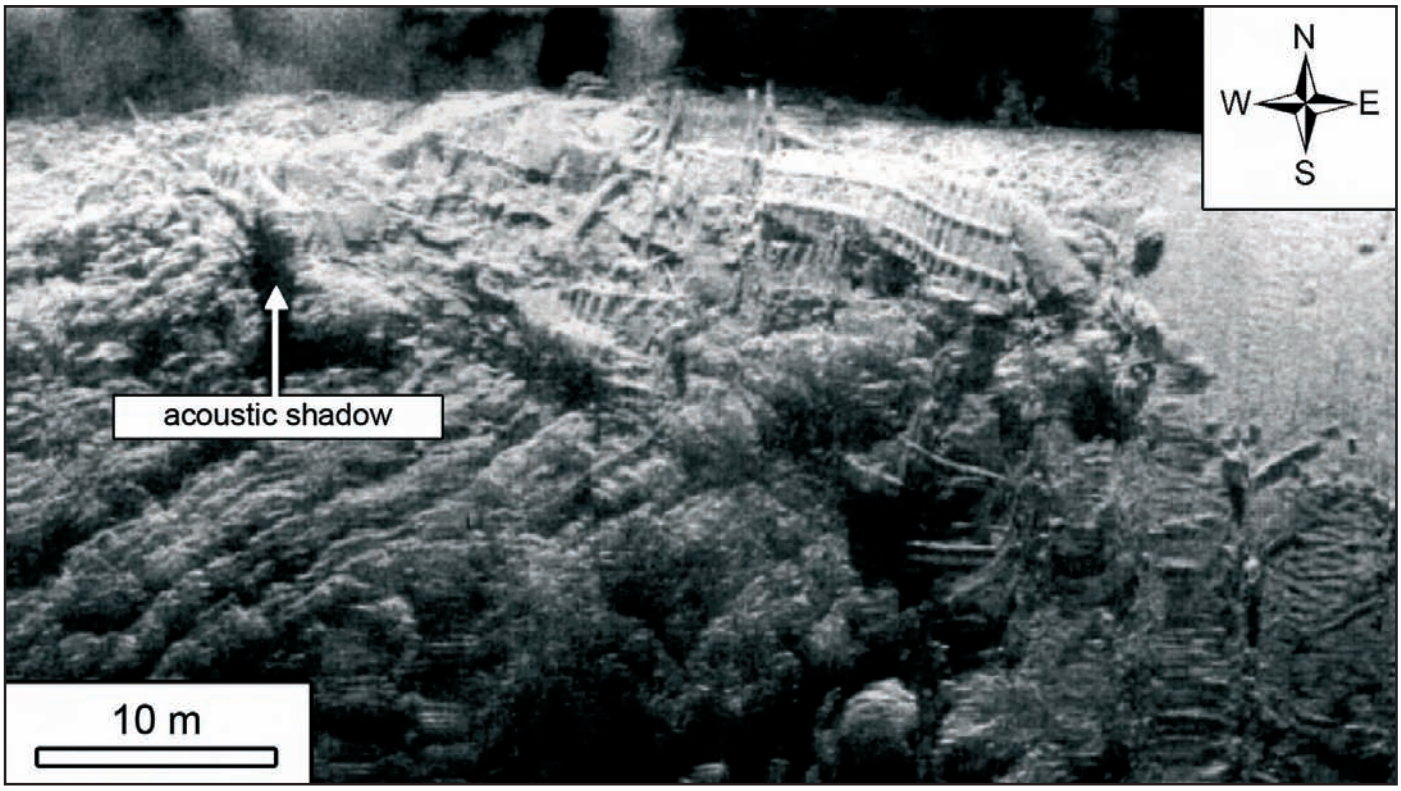

Figure 13.4. Side-scan sonar data from Belfast Lough showing the remains of Oregon (lost 1945). The wreck is heavily broken up and rests on a bedrock substrate (all imagery: CMA).

Over the past 15 years investigations in Northern Ireland have been conducted using conventional archaeological survey and excavation techniques. These investigations have been supported by marine and terrestrial geophysics, scientific diving, aerial photographic and historic map analysis. The surveys have revealed rich cultural landscapes.

Strangford Lough for example, contains some 50 square kilometres of intertidal zone, which when surveyed, was found to contain 680 previously unrecorded sites. These ranged from 8,000 year old submerged forests formed when sea-levels were lower, to medieval fish-traps (Figure 13.1b) and 18th century kelp kilns – an industry crucial to the Irish economy of the time [4].

One of the most important discoveries was a tidal mill at Nendrum monastery, (Figure 13.1a) which when excavated and dated to the early 7th Century AD, proved to be the oldest such structure in the world[5]. A survey of Rathlin Island identified more than 200 new sites including landing places, features related to the kelp industry (Figure 13.2b) and flint tools dating to the late Mesolithic (approximately 8 - 6,000 years ago). Particularly important finds were evidence of Bronze Age habitation within a natural limestone coastal cave and a promontory fort dated to the Iron Age (Figure 13.2a) both of which are rare in Irish archaeology[6].

Shipwrecks

A database of over 2,600 historic wrecks has been built up over the past 15 years using historical sources that record instances of wrecking and which range from parliamentary reports to old newspapers (Figure 13.3). These records show some bias to the improved reporting and recording of shipwrecks after 1800 AD[7]. Currently the oldest wreck recorded in the database is the *Girona*, a Spanish galleass wrecked off the Giant's Causeway following the destruction of the Armada in 1588. There may be, however, even earlier wrecks present which remain yet undiscovered.

Despite its biases, the shipwreck database is an invaluable resource. It improves our understanding of trade patterns between Ireland and the rest of the world. The database also helps to define areas with high archaeological potential, for example around

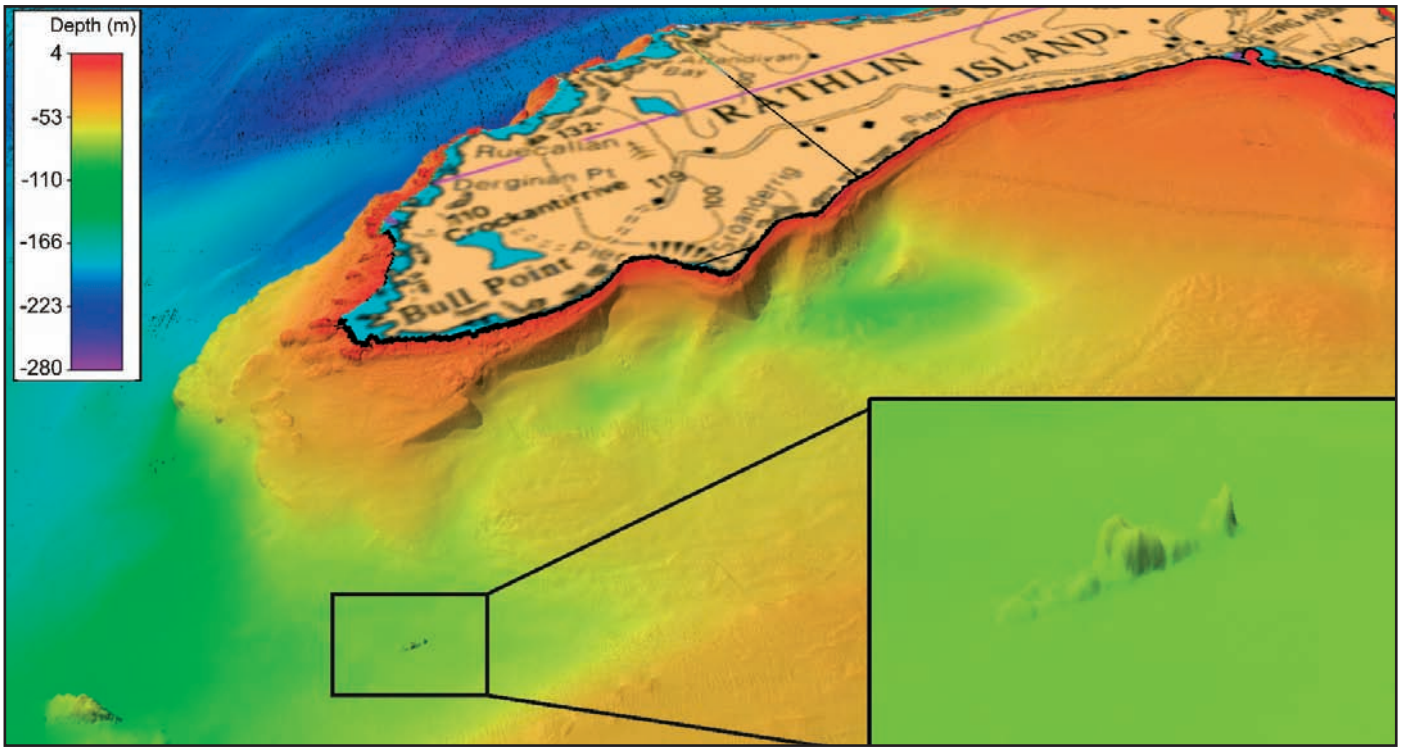

Figure 13.5. Wreck of the SS Lugano, a cargo steamer sunk in 1917 off Rathlin Island. Note how the data can also provide detailed 3D imagery of underwater topography, such as the submerged cliffs surrounding Rathlin Island (underlying data: MCA; processed imagery: CMA).

natural hazards or historic shipping lanes. Out of the thousands of recorded wrecking incidents, fewer than 300 actual wreck remains are currently known to exist on the seabed or intertidal zone. This is a product of 2 issues. Firstly harsh environmental conditions which break up or bury wrecks making diver survey difficult. Secondly, large swathes of seabed have yet to be systematically surveyed, though this is slowly changing with the use of marine geophysical methods (see below).

Marine geoarchaeology

Marine geoarchaeological research involves the application of geological and geophysical techniques for the detection and investigation of submerged archaeological sites. Unlike divers, geophysical systems are not limited by underwater visibility and can survey large areas of seabed in a relatively short time. Consequently, they are invaluable for underwater research and are used extensively for shipwreck detection.

The main systems used are sonars - acoustic instruments which can detect anomalies or features that appear different to the rest of the seabed and could be indicators of wreck material (Figure 13.4). However, targeted ground-truthing by divers or remote cameras is sometimes still needed, particularly when the nature of the anomalies is difficult to confirm from the geophysical data alone [8]. Initial geophysical surveys of the Northern Irish coast began in 1997 and imaged 80 wrecks and 100 targets of archaeological potential[9].

Since 2008, geophysical analysis has centred on a new high resolution bathymetric dataset collected using multibeam sonars - the Joint Irish Bathymetric Survey (JIBS). This survey, funded under the EU INTERREG programme, was a joint effort between the MCA and Marine Institute of Ireland, with NIEA acting as project coordinator. The coverage and resolution of these data are unrivalled by previous surveys and provide high resolution imagery across the entire north coast out to 3 nautical miles. Initial archaeological analysis has detected over 350 anomalies which will be subject to further investigation and ground-truthing in the coming years[10] (Figure 13.5).

The other advantage of geophysical survey methods is that repeat surveys help in understanding the physical processes affecting

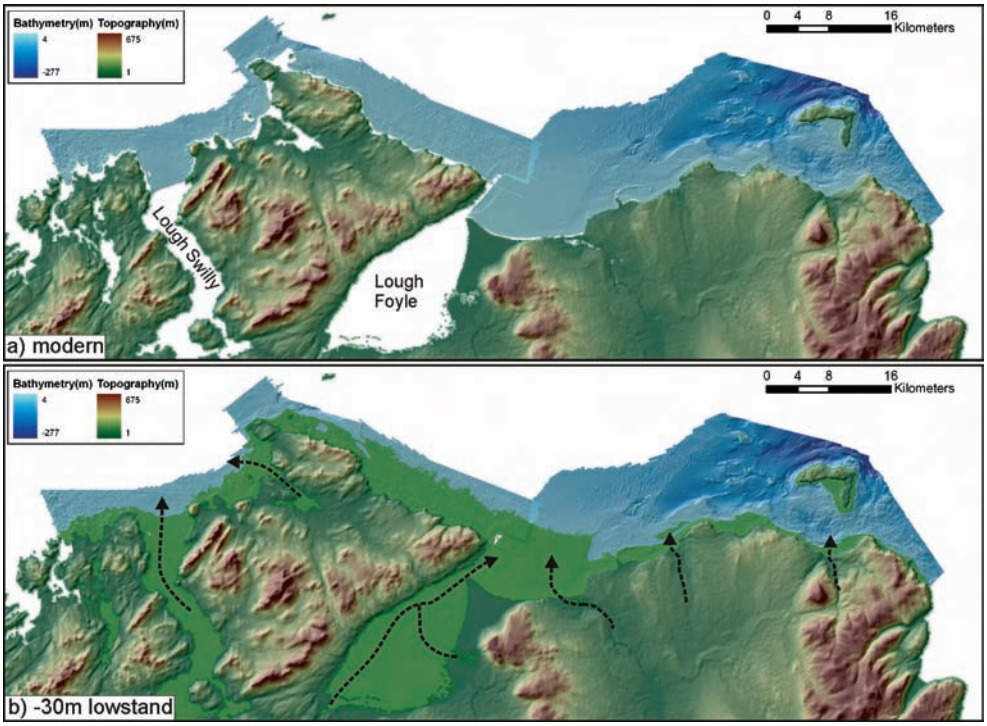

Figure 13.6 a) Modern coastal configuration for the north of Ireland. The seabed north of the modern shoreline has been mapped by the JIBS survey, terrestrial topography is from the NASA SRTM dataset. White areas show where there is no available high resolution bathymetric data. b) Approximation of the past coastline assuming a sea-level fall of 30m such as could have occurred around 12-14,000 years ago (Kelley et al. 2006). Areas shaded light green show the extent of the formerly exposed land. Note the closure of the modern sea loughs to form river valleys and the extension of coastal lowlands by up to several kilometres. Black dashed arrows indicate possible paths of rivers across the former landscape (all imagery: CMA).

archaeological sites and how they will change over time[11]. For example, wave or tidal currents could either deposit sediment on a wreck, burying it and providing a measure of protection. Alternatively the sediment could be eroded resulting in greater exposure of wreck material and accelerating its destruction. The JIBS dataset therefore has the potential to add greatly to the effective management of archaeological sites off Northern Ireland.

Geoarchaeological investigations have also been extended to submerged landscapes. These extended coastal zones and lowland plains offered a range of resources and were attractive areas for prehistoric settlement. During the earliest known colonisation of Northern Ireland by Mesolithic hunter-gatherers at least 9,000 years ago, sea-levels were approximately 15 metres lower than today. The lowest sea leves, 30 metres below todays depth, were attained around 12 - 14,000 years ago[12].

Sea level subsequently rose to near-present levels by 5-7,000 years ago. The potential existence of the resulting submerged landscapes has been recognized since the 19th Century[13]. There are tantalising hints of preservation in the form of submerged forests or peat beds in Strangford Lough, Portrush, the Bann estuary, Carnlough, Belfast Lough and Roddans port [4,14]. However, research on this topic in Ireland is still in its infancy, with systematic work ongoing only since 2008. The work on submerged landscapes combines seabed geophysical data with information on past sea-level change to produce reconstructions of the former landscape (Figure 13.6). Future work will use these reconstructions to identify areas where the past landscape may be preserved rather than eroded. The work will focus on areas where features preferred for past settlement (e.g. river valleys and lakes), are situated. These areas can then be subject to detailed survey and inspection[15].

What more can be done for Northern Ireland's maritime heritage resource in the future?

Although significant inroads have been made in mapping and understanding our maritime heritage, there are areas of the coastline and seabed that have yet to be fully explored and researched. The archaeology of Strangford Lough and Rathlin Island has been well documented and similar work has commenced on the north coast and Lough Foyle. However, the rest of the coast needs to be investigated with the same level of scrutiny and it is hoped that this will be undertaken in future.

For the offshore zone, the most systematic work has taken place along the north coast where a large amount of geophysical data is available. The rest of the offshore region has only been subject to smaller localised surveys. Consequently, we aspire to continue the existing programme of research, survey and mapping in order to obtain the best-available baseline data. This information helps to inform effective decision-making and management of the cultural resource and to reveal unique information about our maritime past.

This work would be greatly facilitated by access to marine geophysical datasets like those collected by the JIBS survey. This data is frequently collected by other scientific agencies or developers in advance of work. However, there is often uncertainty as to the location of data sources, their coverage, quality and accessibility. Possible future actions which could increase accessibility to such datasets include greater coordination across scientific agencies in planning surveys and also archiving data or its associated metadata in a central repository.

Further co-ordination across agencies would also benefit the management of our maritime archaeological heritage. Maritime archaeology is an integral, unique and irreplaceable component of the marine environment and as such needs to be included in the marine planning and coastal zone management processes. It is also important that those responsible for delivering these services are able to deal with maritime archaeology-related issues or have access to advice from an external organisation.

What legislation is relevant to maritime archaeology?

Maritime archaeology is not covered by the Marine Strategy Framework Directive. However, there is a recognition that marine cultural heritage is an important and finite resource and should be protected and preserved. The table below outlines the existing legislative drivers for NIEA to protect the maritime archaeological resource.

Legislation	
EC Directives (full references and corresponding regulations – Appendix II)	
Environmental Impact Assessment Directive	Requiring that all the potential impacts of a project are taken into consideration and mitigation measures are put in place where appropriate
International Agreements	
Valletta Convention on the Protection of Archaeological Heritage	Sets standards for archaeological protection, conservation and recording including both underwater and terrestrial sites
UNESCO Convention on the Protection of the Underwater Cultural	Not ratified by the UK although it has accepted its Annex on the treatment of underwater archaeological sites as best practice
Local legislation	
UK Protection of Wrecks Act, 1973	Protects shipwrecks through designation on case-by-case basis. Only one wreck in Northern Irish waters (Girona) is currently protected by this
UK Food and Environment Protection Act, 1985	Controlling deposits in the sea. The licensing process can ensure that maritime heritage is protected
Historic Monuments and Archaeological Objects (NI) Order 1995	Makes possible the protection of archaeological sites and monuments through scheduling on case-by-case basis

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